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PZAF

POSTGRADUATE ZOOARCHAEOLOGY FORUM ZAGREB, CROATIA '23

BOOK OF ABSTRACTS

24th-26th MAY 2023
UNIVERSITY OF ZAGREB
FACULTY OF HUMANITIES
AND SOCIAL SCIENCES

HRVATSKO ARHEOLOŠKO DRUŠTVO

Sveučilište u Zadru Odjel za arheologiju

INSTITUT ZA ARHEOLOGIJU

KRANEAMUS MUZEJ KRAPINSKIH NEANDERTALACA

Filozofski fakultet Sveučilišta u Zagrebu

arheološki muzej u zagrebu archaeological museum in zagreb

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10th Postgraduate Zooarchaeology Forum

24th-26th May 2023

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Program

24th of May

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Palaeolithic Hunting Party

Keynote lecture:

Archaeozoology in Croatia: A personal perspective

Siniša Radović

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ABSTRACT: Modern archaeozoology in Croatia began a quarter of a century ago. Although analyses of animal remains from archaeological sites were carried out earlier, they were part of palaeontological studies or rare individual analyses without detailed interpretation. Exceptions are a few international collaborative projects that included specialist in archaeozoology from abroad. However, interest of the latter usually ended with the completion of the project. With the independence of Croatia and the end of the Homeland War, archaeology flourished again. Trying to catch up with world trends, among other things, there was a growing interest in archaeofaunal data. Over time, the first doctoral theses on the topic of archaeozoology were defended, which helped to establish it as a formal discipline in Croatia. Today, the results of those pioneering efforts can be seen. Archaeozoology is taught at undergraduate, graduate and post-graduate courses of archaeology, veterinary medicine and palaeontology at three Croatian universities. More than a decade after the initial doctoral theses in archaeozoology, a new wave of young doctoral students emerged taking archaeozoology in Croatia to the next level.

Keywords: archaeozoology, Croatia, study programme, state of research

Early exploitation of bears in Schöningen and other Palaeolithic open-air sites

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ABSTRACT: Cut-marked cave bear remains from the Lower Palaeolithic site complex of Schöningen provide early evidence for the exploitation of bears. The fine cutmarks on a metatarsal and a phalanx indicate that the bears were skinned by hominins approximately 300,000 years ago at the Schöningen lake site. Archaeological open-air sites with evidence of bear exploitation from the Lower and Middle Paleolithic are rare, but do show consistent evidence for the exploitation of bear skins. In this study I compare the finds from Schöningen with several of these early bear exploitation sites on the basis of age. These finds are interpreted as evidence for bear hunting and primary access since bear skins are best extracted shortly after the animal's death. In the earliest examples of bear exploitation, the location of cutmarks seems to support the exploitation of skins rather than meat; only for the Middle Paleolithic sites, such as Biache-Saint-Vaast (France; ca. 175 ka) and Taubach (Germany; ca. 120 ka), evidence for the exploitation of both skin and meat from bear carcasses is present. Bear skins have high insulating properties and might have played a role in the adaptations of Middle Pleistocene hominins to the cold and harsh winter conditions of Northwestern Europe.

Keywords: bear exploitation; skinning, cutmarks, Lower Palaeolithic

Counting Fragments: A New Holistic Approach to Quantifying ZooMS-Identified Bone Fragments for Analysis

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ABSTRACT: The application of ZooMS (Zooarchaeology by Mass Spectrometry) to Pleistocene-aged osseous assemblages has allowed for novel insights into human evolution, subsistence strategies, and zooarchaeological research. ZooMS is a biomolecular technique which can efficiently provide taxonomic identifications for large assemblages of bone that would otherwise be unidentifiable. Recent ZooMS research suggests that there may be significant data "hidden" within the fragmentary portions of faunal assemblages which traditional zooarchaeological methods are unable to access. One of the most significant concerns with the integration of ZooMS identifications, however, is that the quantification of these fragments is currently restricted to NISP counts, which bring up obvious issues with double-counting that standard zooarchaeological quantification methods (e.g., MNI, MNE, DZ, NDE, etc.) have worked to excise.

This project has therefore sought to develop a new weight-based and normalized statistical method for quantifying ZooMS-identified fragments, abstracted from Kubasiewicz's Wiegemethode, which the authors have termed Relative Abundance (RA). Since RA incorporates fragmentation rates, body part representation, and total expected skeletal weight per species and utilizes data that is commonly recorded during data collection for faunal assemblages, it can be variably applied for comparisons between species, sites, time periods, and even between the morphologically-identifiable and -unidentifiable portions of an assemblage. To test the approach and provide examples for application, RA has been applied here to both the ZooMS- and morphologically-identified horse (*Equus* sp.) specimens from Geißenklösterle in the Ach Valley of the Swabian Jura, Germany. Initial results indicate correlations between traditional quantification methods and RA ratios within the morphological assemblage. With additional work, RA will ideally be expanded to allow for more thorough, holistic analyses of entire faunal assemblages and will help ZooMS to reveal clues "hidden in plain sight".

Keywords: ZooMS, quantification, Paleolithic, zooarchaeology, Swabian Jura, fragmentation, unidentifiable bone

New data from combining ZooMS and archaeozoology to reconstruct subsistence strategies and paleoenvironmental contexts during the Uluzzian in Italy

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ABSTRACT: Uluzzian culture is present in several Italian sites and is related to the first modern human occupation of this territory, as the paleoanthropological remains and radiocarbon dates attest. Our aim is to analyse the faunal remains from different archaeological assemblages to assess whether the economic behaviour of these early humans was homogeneous. We present the recent results of the archaeozoological, taphonomic and ZooMS analysis of the macromammal assemblage from the Uluzzian levels of three Italian sites: Uluzzo C Rock Shelter, Roccia San Sebastiano cave, and Riparo del Broion. In this regard, ZooMS always provides taxonomic information in agreement with the faunal spectra outlined by traditional zooarchaeology, solves doubts in morphological discrimination and increases the number of identified bones. Our data outlined common elements and differences in the composition of the faunal records, environmental contexts, and hunting strategies. The most abundant taxon varies among the three sites (foxes, deer and ursids respectively). However, red deer is the main hunted prey in these three cases, even though settlements are located in different biotopes. Anthropogenic modifications (cut marks, percussion marks and thermal alterations) are observed mostly on limb bones attesting skinning, disarticulation and meat-marrow extraction. This new dataset, generated from this multidisciplinary study, together with a published data comparison from other sites, allows us to improve our understanding of the Uluzzian hunting and subsistence strategies providing a more exhaustive picture of the faunal assemblages and paleoenvironmental condition in the Mediterranean area where the first human groups settled.

Keywords: Uluzzian, ZooMS, Archaeozoology, Palaeoproteomics, Taphonomy, Italy

Prey mobility at the Upper Palaeolithic Yana site complex, Russia

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ABSTRACT: Reindeer and caribou are reputed to be migration champions, sometimes travelling over 500km in a season in search of greener pastures. There are, however, several subspecies that remain in the same region year-round, and both migratory and sedentary subspecies have been observed to change their behaviour between years. Because of this variability in migratory behaviour and migration routes, Native people in North America have developed subsistence strategies to anticipate inter-annual changes in prey availability. Few studies have been carried out investigating the migratory behaviour of prey species at archaeological sites in the Arctic and how this could have affected subsistence strategies in the past.

The Yana site complex (~32 ka BP) in Russia is the northernmost Upper Palaeolithic site in the world. Besides reindeer, bison, horse, and mammoth have also been found in large quantities. Teeth of several individuals were sampled from each species for the analysis of intra-tooth δ18O, δ13C, and 87Sr/86Sr isotope data, which, respectively, can inform on seasonality, diet, and spatial mobility. From these data, we reconstructed the migratory behaviour and seasonality per individual and found inter- and intra-specific variation in landscape use. The implications of the results for our understanding of the animals' ecologies and past human subsistence strategies will be discussed in this presentation.

Keywords: strontium isotopes; Upper Palaeolithic; Arctic archaeology

The domestication of dogs revisited: Palaeogenetical and morphological data from Goyet Cave

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ABSTRACT: The domestication of dogs is considered a landmark of the human evolution. During the Late Pleistocene, H. Sapiens reached such an impressive cognitive and behavioral level, which subsequently led to the acquisition from the dogs of certain morphological, physiological and behavioral characteristics as a result of a prolonged interaction with humans. The exact time, when this process completed, is still debated. In this conference, I would like to present palaeogenetical and morphological data, indicating that the first domestication of dogs should be placed during the Aurignacian period. More specifically, canid DNA sequences from Goyet Cave in Belgium indicate an important level of diversity from the typical Pleistocene wolves and are dated at ca. 31700 years BP. However, these domesticated populations seem to have never crossed the bottleneck of 20000 years BP, caused by environmental deterioration and subsequently, got extinct. These results demonstrate that canids got involved in different stages of domestication throughout the Late Pleistocene, indicating a gradual and complex process, which already started before the end of Late Glacial Maximum. Through the domestication of dogs, humans accomplished further abilities in different aspects of their everyday life, while dogs exhibited their high adaptive and behavioral level. In this context, I anticipate my oral presentation to provide pieces of information about the beginning of progress, whose result is considered a vital aspect of human nature until today.

Keywords: bottleneck, domestication, dogs, Goyet Cave

Pleistocene Zooarchaeology and Taphonomy at Abrigo da Buraca da Moira (Central Portugal)

Alexandre Paya[1]*, Telmo Pereira[2,3,4,5], Cleia Detry[2], Jordi Rosell[6], Patrícia Monteiro[7,8], Eduardo Paixão[8,9,10], David Nora[8,10], Sandra Assis[11,12], Carlos Simões[8], Marina Évora[8,13], Vânia Carvalho[14], Trenton Holliday[15,16]

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ABSTRACT: The Last Glacial Maximum brought long-term harsh climatic and environmental conditions. Because of that, human groups had to adapt to such changes, which was done through the development of new technologies, ecodynamics and settlement patterns. Buraca da Moira is a cave in Central Portugal with LGM human occupations in which faunal remains with different preservation conditions were recovered. The geomorphological setting of the site, in a valley sheltered from strong winds, with access to both lithic raw materials and fresh water, proves advantageous for Pleistocene human groups to settle in such places. This presentation focuses on the zooarchaeological assemblage recovered from the layers associated with the LGM, including the taphonomical patterns. Our results showed the diversity of fauna consumed between the Solutrean and the Gravettian, and the anthropic activity on some specimens, such as cut marks, impact notches and burning, while carnivore activity was sparse. Together, this allowed us to access the nature of the accumulation and its relationship with the remaining archaeological materials.

Keywords: Last Glacial Maximum, taphonomy, Central Portugal

SESSION 2:

Ironing the Antiquity

Keynote lecture:

A horse with a name. A journey through the human-horse relationship in the Early Iron Age southeastern Alpine region

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ABSTRACT: In the southeastern Alpine region (present-day Slovenia), the oldest records of the domestic horse date from the middle of the third millennium BC and come from pile dwellings in the central part of the country. However, it is not until the Late Bronze Age that the number of sites with horse finds increases. This increase is probably related to the emergence of warrior elites, who were symbolically represented by the animal under discussion. Although horse riding was probably known from the earliest days of horse breeding, this animal was apparently not used for warfare until the Late Bronze Age. The association with privileged social groups, i.e., the equestrian elites, is reflected in the spread of horse symbolism, which was projected onto both the world of the living and the world of the dead.

In the latter context, the practice of horse sacrifice and the burial of their remains in association with human graves are of great interest. This phenomenon, which can be observed throughout the Early Iron Age, seems to have undergone several transformations, often showing marked cross-cultural differences. In the area studied here, for example, horses could be represented by the whole carcass, by specific body parts, or by a single tooth/bone in the grave. The remains could be cremated or unburned and were either part of the human burials or deposited in separate pits within the cemeteries. They are most commonly associated with prominent males (chieftains, elite warriors - horsemen), but examples are also known in which this honor was bestowed upon high-ranking females. In addition, horse sacrifices may not be directly related to a specific burial ritual, but were performed as a kind of public ritual, possibly as an act of purification/protection of a particular part of the burial site.

The presentation will give an overview of the practice of horse sacrifice in connection with human burials in the southeastern Alpine region, where more than 60 Early Iron Age graves with horse remains have been attested. Parallels to similar phenomena in neighboring areas from the land of the Veneti in the west to the Pannonian Basin in the east will also be pointed out. Finally, horse finds from settlement contexts will be briefly discussed, showing that despite the fact that animals of economic importance could be owned by the entire community at this time, the horse was very likely an individual possession that underscored the social importance of its owner.

Keywords: archaeozoology, horse, ritual, Early Iron Age

Ritual patterns? Exploring the taphonomy of the Late Hellenistic site of Vodica, Northeastern Bulgaria

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ABSTRACT: The archaeological site near Vodica is a Late Hellenistic rural settlement, located in Northeastern Bulgaria with a chronology dating to the 3rd-2nd century BCE. The faunal assemblage from the site was researched during a commercial archaeological dig. The remains were very well preserved and yielded several contexts consisting of food scraps, articulated animal skeletons and animal remains associated with human burials. A careful evaluation on taphonomy showed a very peculiar situation with a clustering of carbonized animal bones, found in a pit in close proximity to three human infant burials. The burning of animal remains from specific body parts has close parallels to Classical Greek religion. During the so-called "thysia" ritual the smoke from the burned animal remains would make its way to the Gods. While assemblages linked to this ritual have been recovered in Greek temple sites, little is known regarding its practice outside of the Greek polis. The population inhabiting the lands of Northeastern Bulgaria are believed to belong to a tribe known as "the getae" and were culturally different from the Greek population, as their society was governed by a monarchic order. While they had established trade with the Greek colonies of the Black Sea coast, our data show the first ever zooarchaeological assemblage resembling a thysia like ritual in these lands. The proximity between this deposit and the human infant skeletons shows that it might have been practiced as a burial rite. This shows us that zooarchaeological data can help us explore how religion was spread among different cultural groups of the Hellenistic society.

Keywords: zooarchaeology, ritual, taphonomy, Hellenistic

Feast, Famine or Fancy: Iron Age relationships to marine molluscs

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ABSTRACT: The association of marine molluscs remains in archaeological assemblages with famine foods and poverty is a common one, but is it always the case?

Strong arguments have been made over the years for Iron Age people avoiding the consumption of marine resources. This is frequently based on a small selection of archaeological studies and ethnographic works. When relying purely on nutritional values of shellfish, scholars have often concluded that the effort and energy spent harvesting them is not equal to what is gained from their consumption.

However, this is a purely functionalist viewpoint and, when looking closer at site shell assemblages, it becomes evident that the story isn't as clear cut as it is often stated to be.

This is not to say that there is no evidence for potential seafood taboos, but more that the situation is far more complex and often, varies from site to site and population to population.

Using a variety of archaeological evidence from across Scotland we can begin to examine Iron Age relationships to marine molluscs to show that, while they may have had a function as famine food to keep a starving population alive in some situations, they also played a variety of other roles within communities.

The shell assemblage is often an undervalued archaeological resource, but they can tell us a great deal about societies and the environment in which they lived.

Keywords: archaeology, marine molluscs, diet, famine, human animal interactions, allometry

Canid Caves: The Fauna of Fishmonger's Swallet

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ABSTRACT: The animals of Fishmonger's Swallet are recontextualised by integrating both past and new zooarchaeological analysis, as well as new radiocarbon dating of three dogs. This paper highlights this unusual assemblage, which consists mostly of canid (namely dog) remains which have been deposited with human remains and other faunal species. The radiocarbon dating places the dog remains, as well as a single bovine bone, to the late Iron Age. The main domesticate assemblage is a small waste deposit, with cattle, horse, sheep and pig present. The dog assemblage has a minimum of nine individuals which is uncommon within a prehistoric context, particularly in this deposition environment and with the association of human remains. The remains recovered were disarticulated, and there is little evidence of butchery or trauma on the dog remains. The dogs recovered from the site are a range of sizes and shapes, from small and gracile to large and robust. This variation indicates that the dogs had various functions that may have included pest control, hunting, herding, and guarding. Their deposition within the swallet is possibly ritual in nature and could be representative of an association of dogs with death and healing, social roles, or of the strong bond between people and dogs. Part of an ongoing project, this paper presents the preliminary findings.

Keywords: dogs, cave zooarchaeology, Iron Age Britain, morphology

Morphological diversity of dogs from Przeworsk culture in the territory of Poland

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ABSTRACT: Dog skeletal deposits are often found in modern-day Poland's inventories of Przeworsk culture (III century BC – V century AD). The territory of the Kuyavia region, in the north-central part of Poland, is especially rich with this kind of findings. The discovered dog remains, from the probable ritual burials, were discussed in the archaeological literature many times, but lacked broader zooarchaeological analysis. My research project aimed to present a more complex view on this topic by presenting a broader zooarchaeological analysis of dog skeletal deposits. I have analyzed a group of skeletal remains found on the excavations in the Sławsko Wielkie 12 site. I conducted a full biological analysis, including anatomical identification, age and sex determination, bone measurements and observations of pathological alterations. Moreover, the radiocarbon datings were done, allowing for confirmation of chronology based on the archaeological material from the site. It is preliminary research, which covered my bachelor's thesis and is being continued at present.

With this presentation, I want to present the results of zooarchaeological research in the context of the morphological diversity of dogs in ancient Kuyavia. This includes estimations of withers height, body build and skull build. Additionally, further perspectives on the topic of dog burials will be discussed.

Keywords: dog, zooarchaeology, Iron Age, Central Europe, animal burials, La Tene period

The Roman Equids from Lisbon: the remains of Praça da Figueira and Sommer

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ABSTRACT: As a part of this doctoral research, mammalian, avian and molluscan remains recovered from various sites in the Lisbon region are studied to integrate them into the broader Lusitanian context.

Here, the focus is only on several equid remains recovered in Praça da Figueira and the Antigos Armazéns Sommer. The distinction between a horse (Equus caballus) and a donkey (Equus asinus) is complex and made by observing the different morphological criteria and osteometric measurements. Most Roman archaeological sites already studied and published have a small number of equid remains. This may be because the contexts correspond to domestic garbage dumps, and these animals are generally not part of the diet of the populations except in exceptional conditions (e.g. periods of war). Instead, they are used for transport, hunting, warfare, traction, and sometimes rituals.

By studying the assemblages of Praça da Figueira and Antigos Armazéns Sommer, the resultant data will be compared to the maintained patterns in the studied sites or if there are alterations as making, whenever possible, the distinction between species. We carry out ZooMS (Zooarchaeology by Mass Spectrometry), based on a novel collagen marker, to distinguish between horses and donkeys to better interpret their roles in the Roman world of Lisbon.

Keywords: animal remains, Roman, equids, Lisbon, zooarchaeology

The Late Antique dietary habits in Western Serbia: a case study of the Čačak – Dvorište Gimnazije site

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ABSTRACT: The analysed faunal material was collected during the rescue archaeological campaigns conducted between 2014 and 2018 by the National Museum Čačak at the Dvorište Gimnazije site in Čačak (Western Serbia). The Late Antique building remains, constructed in the 3rd–4th century, preserved at the foundation level were discovered at the site. After its destruction, the building was reused during the late 4th and the 5th century but in a more primitive manner. Remains of a few pits, hearths, and probably primitive dwellings belong to this horizon. The 3rd horizon at this site dates to the Late Medieval period (the 15th and the first half of the 16th century), and it is represented by a Christian necropolis dug into the Roman building. Faunal material is more abundant in the Late Antique period than in the Late Medieval context. The remains of mammals form the majority of the faunal sample. Domestic species are more frequent within the assemblage and include cattle, pigs, sheep and goats, horses, dogs, and cats. Furthermore, wild species are represented by wild boar, red deer, roe deer, fox, and hare. The most common are the remains of cattle, followed by pigs and caprines. Among wild mammals, the most numerous remains belong to wild boar and red deer. The greater importance of domestic mammals is expected for the Late Antique and Medieval archaeological sites in Serbia. In addition, the bird remains were confirmed as well. Among them, the remains of chicken were the most numerous. Since this is a newly discovered site, additional archaeological excavations in the vicinity are needed to create a broader picture of this site and its role within the currently unnamed ancient settlement that lasted throughout the centuries by the Western Morava River. Moreover, new zooarchaeological research will enable a better understanding of human–animal relationships of the inhabitants of this settlement in the past.

Keywords: faunal material, Čačak – Dvorište Gimnazije, Late Antique, Late Medieval periods

Keynote lecture:

Vets as archaeozoologists

Tajana Trbojević Vukičević

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ABSTRACT: Many relationships between humans and animals would not be known if there were no archaeological findings that speak of these relationships. Over time and thanks to similar interests, veterinarians have also showed a great interest in archaeological excavations, and their findings have aroused the interest in the archaeozoological scientific field. Fauna research from archaeological sites in Croatia, which are directly or indirectly related to the veterinary profession, has been going on for more than six decades.

In the Department of Anatomy, Histology and Embryology of the Faculty of Veterinary Medicine, University of Zagreb, systematic archaeozoological research from localities in Croatia began in 1996, with almost exclusive focus on the remains of the archaeological fauna from the site of Vučedol. But the attendance to many international and domestic scientific conferences, as well as the reference to the importance of archaeozoological analyses in the overall report from the site, led to the beginnings of systematic research on animal remains at other archaeological sites throughout Croatia.

For two decades, the Faculty of Veterinary Medicine has cooperated with around 30 different Croatian archaeological institutions, including scientific institutes, faculties and museums. International cooperation was achieved during 2015-2017 through the National Geographic Society Fund project called "Nadin - Gradina Archaeological Project (NGAP)".

In the past thirty years, the Archaeozoological Laboratory has analyzed about sixty archaeological sites from all continental and coastal parts of Croatia, and the animal material originated from prehistory to the modern era. Covering various aspects of archaeozoology, the employees of the Department of Anatomy, Histology and Embryology have so far published 18 book chapters, 13 original scientific articles, 67 congress announcements at international and domestic scientific meetings, 12 diploma theses, 5 student theses awarded the Rector's Prize, 2 scientific master's thesis and two dissertations. The proof of excellence is the collaboration of Croatian scientists in an international team, which resulted in publications in the highly ranked scientific journals Cell (2019) and Science (2023).

Keywords: archaeozoology, veterinary science, Faculty of Veterinary Medicine

SESSION 3:

Historical Beasts (and Where to Find Them)

Keynote lecture:

What do geneticists do in zooarchaeology?

Vlatka Čubrić Čurik[1]*, Vladimir Brajković[1], Ivana Držaić[1], Ino Čurik[1]

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ABSTRACT: Geneticists play an important role in the field of zooarchaeology. In particular, geneticists use DNA analysis to study the genetic characteristics of animals from the past, which can provide information about their evolutionary history, their relationships with other species, and their origins. It has been 40 years since the first successful extraction of ancient DNA from quagga. Since then, genetics and all scientific disciplines that rely on DNA sequence information have undergone fundamental changes, driven by the advent and development of next-generation sequencing (NGS), which allows us to address the fundamentals of life in almost all areas of human activity. Overall, the study of ancient DNA can provide important insights into the genetic history of species, informing geneticists and helping us better understand the complex interactions between species and their environment over time. To accomplish this, geneticists work with archaeologists to extract DNA from animal bones and other remains. They then analyse the genetic data to identify the animal's species and determine genetic differences or similarities with other animals. Using the genetic data, researchers can reconstruct the past environment, including the types of animals found in a particular region and their interactions with humans and other species. They can also use these data to track changes in animal populations over time, such as migration patterns or the evolution of new subspecies. Overall, geneticists play a critical role in zooarchaeology because they offer a unique perspective and set of tools for studying animal remains from the past.

Keywords: genetics, DNA sequencing, evolutionary history

From the wetlands to the farmyard: The presence and role of domestic geese and ducks in Zuid Holland, 150-1700 AD

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ABSTRACT: The history of domestic ducks (*Anas platyrhynchos domesticus*) and geese (*Anser anser domesticus*) remains poorly understood. This is mainly caused by the difficulty of identifying archaeological bones as domestic, due to the existing overlap between anatid species and domestic and wild forms. A recently published osteometrical methodology is applied that allows to identify domestic forms and distinguish between anatid species with more confidence. As a case study, four archaeological assemblages from the Zuid Holland province in the Netherlands are analysed, ranging from the Roman period to the 17th century AD.

The new osteometrical methodology was highly successful in determining the variety of anatid species present in the four study cases. 53% of the analyzed elements were identified to the species level and 75% to at least the genus level, although the success varied according to the particular bone type and anatid group. It is determined that domestic geese were present in the Netherlands from at least 160-230 AD, and domestic ducks from at least 585-725 AD. The latter might also be present in the Roman assemblage, but the evidence is inconclusive.

Domestic species constitute only a small percentage of the total consumed anatids and do not surpass 15-20% in any case. This is mainly caused by the weight of wildfowling in the Netherlands. Taphonomical analysis did not show substantial differences between wild and domestic anatids. Chicken (*Gallus gallus domesticus*) were therefore much more prevalent than domestic anatids in all assemblages, showing their role was better established. The sample size considered in this project is likely too small and biased to accurately detect any kind of evolution through time.

Keywords: domestic goose, domestic duck, the Netherlands, Zuid Holland, Roman, Medieval, zooarchaeology

Bones of the Northumbrian Landscape – A New Zooarchaeology of Jarrow Anglo Saxon Monastery

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ABSTRACT: Rosemary Cramps excavation at Jarrow (Tyne and Wear, UK) was pivotal in developing our understanding of Anglo-Saxon monasticism. It concluded that the site was abandoned due to Viking activity during the late Saxon period (Cramp 2005/2006). Animal bones from the site were misplaced before the monograph was published and have never undergone scientific analysis. Current understanding of monastic foodways suggest either provisioning though a monastic farm (Huntley and Rackman 2007), or through food rents bestowed on different houses by the king (Blair 2005). Interpretation of this was not possible at Jarrow without the presence of the bones. Similarly, it is believed that Anglo-Saxon monks were following written rules for their diet (Hagen 1992), even though we know that they were flexible in other areas (Foot 2006). Again, the information from Jarrow was unavailable.

Following the recovery of the bones, a project is underway to investigate animal husbandry strategies at Jarrow, and the extent of monastic landholdings using isotope analysis. An analysis of these remains gives insight into not only the diet of the monastery and the extent of its control in the landscape, but also provides data to help interpret whether a significant change can be detected which would support the idea of monastic abandonment due to Viking raiding. This includes changes in butchery techniques, shifts in species proportions or different grazing locations.

Social changes in times of conflict is an important topic in current archaeological research. Changes during the late Anglo-Saxon period are often attributed to the Vikings and their violence (Ferguson 2010). This research helps examine the impact of the Vikings from a different perspective, and extrapolate the extent to which our understanding of this time has been biased.

Keywords: Anglo-Saxon, monastic, Viking, cultural change, diet

Underrated for too long? Guinea pigs in pre-colonial Peru

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ABSTRACT: Located on the central coast of Peru, Pachacamac is a pre-Hispanic ritual site of paramount importance. Occupied from the 5th century AD until the arrival of the Spanish in the 16th century AD, this monumental site has seen several pre-Hispanic occupations, the Incas being the most recent. This paper reports the results of a zooarchaeological study focusing on faunal remains discovered during 10 Yschma Project excavation campaigns (Université libre de Bruxelles) between 1999 and 2019. Here, a total of more than 30,000 never studied remains were analysed, being the first study of this scale for the Pachacamac site. The main objective of this research was to identify and quantify the different animal species present throughout the occupations of the site. The preservation conditions of the site and the overall great conserved state of the skeletal remains made it possible to identify most of the material.

Among those, domestic guinea pigs (*Cavia porcellus*) were identified, which will be the focus of this paper. These remains were discovered in both domestic and ritual archaeological contexts. The central role of guinea pigs in many life aspects of these populations during these periods is attested by archaeology, ethnohistorical sources, and ethnographic studies. Paradoxically, few zooarchaeological studies of Peruvian sites have focused solely on guinea pigs, contrasting with the vast work produced on camelids. This is partly due to their under-representation, sometimes ascribable to collection methods or taphonomic damages. On the contrary, in the case of our study, guinea pig represents almost half of the remains recovered (NISP). Through our research, we can therefore provide new information about this animal. Furthermore, we discuss age profiles and metric data that have rarely been done before for *Cavia porcellus*.

Keywords: guinea pig, pre-Hispanic, Peru, metric data

Identifying cultural and dietary changes through archaeozoology: a case study from the early modern stratum in the area of the El Kal Viejo (Old) Synagogue in Belgrade

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ABSTRACT: This paper will present the first results of the archaeozoological analysis from the area of the El Kal Viejo (Old) Synagogue in Visokog Stevana street. After the Ottoman conquest of Belgrade in 1521, there followed a continuous period of novelties that concerned not only changes in culture but also when it comes to the dietary habits of the population which inhabited this area during the early modern period. The faunal assemblage was collected during the protective archaeological research carried out in the spring of 2018. It gave rise to completely new and unique data regarding the dietary habits of the population that inhabited this place in the ethnically divided Dorćol riparian zone. The research of this paper aims to try to establish the dietary patterns of the newly arrived population that inhabited the area during the early modern period, as well as potential differences or uniqueness. In contrast to the Christian population, newly arrived communities nurtured different dietary principles based on religious beliefs. According to the obtained results, the predominance of domesticated herbivores in the diet as opposed to the almost complete absence of pork. In addition to the consumption of meat, these animals were also bred for the exploitation of secondary products such as wool or hair, milk, and physical strength. In addition to domestic mammals, a significant source of protein in the diet has been provided by the consumption of domestic poultry, primarily domestic chickens and geese, whose meat and eggs are still considered a delicacy and a valuable source of nutrients. The absence of game bones and the very low amount of fish bones can be expected since they are not in accordance with the principles of the Halal and Kosher diet, which is considered another indicator of the historical and cultural changes that occurred during the early modern period.

Keywords: Belgrade, Dorćol, Early Modern period, El Kal Viejo, dietary habits, dietary changes

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SESSION 4:

Neolithic Workshop

Keynote lecture:

Animal disease and archaeology

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ABSTRACT: Animal diseases before the written veterinary record can only be traced by analyzing pathological evidence on excavated animal remains. Interaction between animals and humans has intensified since the onset of domestication. Physical proximity and regular contacts with animals resulted in higher incidences of animal diseases of all sorts. The probability of trauma, infections and genetic anomalies due to breeding increased. Human care has counter-balanced pressures of natural selection, helping to survive not only the fittest.

Curious phenomena observed on the bones of wild and domestic species, however, would be of limited interest without trying to understand their respective cultural contexts. Poorly healed bones are indicative of neglect in ordinary livestock, while a great degree of compassion and care is shown by the longevity of seriously ill companion animals. Animal paleopathology helps revealing the diversity of past human attitudes toward animals, a characteristic aspect of any culture.

Keywords: pathology, trauma, disease, human-animal relationships

Aurochs to Cattle: investigating the Mesolithic – Neolithic Transition in the Basque Country using Sequential Strontium, Oxygen and Carbon Isotopes

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ABSTRACT: The human-induced aseasonal reproduction cycle of cattle, which in natural conditions would usually produce calves only in the spring months, was a crucial achievement for the success of production economy, since it ultimately enabled humans to produce meat and dairy products year-round. It is theorised that the implementation of this practice played a key role in the increasingly restricted territoriality of the Mesolithic-Neolithic transition communities (ca. 5700-5300 BC) in the Basque Country. This is some centuries before sedentism became widespread with the consolidation of agriculture. As such, observing changes within the natural rhythm and/or certain patterns in the mobility of both supposedly domesticated and wild bovids of this transitional period (i.e., cattle and aurochs, respectively), could suggest human influence, and potentially the introduction of husbandry practices.
This study presents a high-resolution incremental enamel isotope analysis of 10 deciduous bovid premolars to explore the introduction of such practices in the Mesolithic-Neolithic transition of the Basque Country. The teeth, recovered at the famous transitional site of Mendandia (7500–5350 cal. BC), were analysed individually to reveal time-resolute fluctuations in carbon (δ13C), oxygen (δ18O) and strontium (87Sr/86Sr) isotope ratios. Our results revealed an extension of the expected natural birthing seasons, providing evidence of early husbandry controls onto the bovids within the Mesolithic-Neolithic transitional period. Further, strontium profiles indicate a substantial level of animal mobility, potentially linked with short movements (e.g., transterminance) between the seasonally occupied settlements (mostly rock shelters) evidencing the restricted territorial networks characteristic of the period in the Basque Country. This demonstrates that complex and choreographed patterns of animal management were employed relatively early during the Mesolithic-Neolithic transition in this region, and shows the validity of the methodological approach used here to enhance the understanding of this particularly important process in the history of humankind.

Keywords: cattle, aurochs, seasonality of birth, strontium, oxygen, carbon, Mesolithic-Neolithic transition, tooth enamel, Basque Country

Domestic animals in the early Neolithic of the Pannonian Plain: animal husbandry and patterns of settlement seasonality at the Gospođinci-Nove zemlje site

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ABSTRACT: Studies of the neolithization phenomenon in the Balkans and the Pannonian Plain began in the middle of the last century and continue today. The development of the archaeozoological discipline enabled the implementation of the latest research of faunal assemblages from the Early Neolithic sites in Balkans and Pannonian Plain. Archaeozoological research is a major contribution to the understanding of human-animal relations in the past. This research provided significant information about economy and animal husbandry practices of the earliest farming communities, as well as the seasonal character of their settlements. Thus, these research showed that, in the area of the Pannonian Plain, in the early Neolithic faunal assemblages, the remains of domestic cattle, sheep and goats dominate. Therefore, it is established that the early Neolithic economy was based on animal husbandry. The development of newer methods, such as oxygen isotope analysis provided insight into the diversity of animal husbandry practices since the usage of this type of analysis showed that dairy products were exploited in the Bačka region during the early Neolithic. Lastly, the study of faunal remains enabled the implementation of seasonality studies that provided insight into the degree of mobility of early Neolithic communities in the mentioned area. In this research, the faunal remains from the early Neolithic contexts from the archaeological site Gospođinci-Nove zemlje is analysed. This site is located in Serbia, in the area of the Pannonian plain, in the Bačka region. The aim of this research was the reconstruction of animal husbandry practices, as well as patterns of mobility of inhabitants of the site Gospođinci-Nove zemlje. As this fauna hasn't been analyzed so far, this research has pioneering character. The obtained results from the Gospođinci-Nove zemlje site were compared by using correspondence analysis with the published archaeozoological data of other researchers, which also provided an understanding of early Neolithic animal husbandry in the wider area of the Pannonian Plain.

Keywords: Early Neolithic, Pannonian Plain, first farmers, animal husbandry, seasonality studies

Re-writing archaeology. The Chiomonte-La Maddalena Neolithic alpine site (Piedmont, Italy): review and integration of zooarchaeological assessment from 1988 to 2022

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ABSTRACT: In 1988 one of the most important Neolithic sites of alpine western Italy was excavated during the construction of the high-way crossing the Susa valley (province of Turin, Piedmont). The excavators found rock shelters, a Chassean necropolis, Chassean-Rhodanien material culture, together with numerous faunal remains. The material culture testifies to the connections existing across the Alps, between present-day France, Swiss and Italy and to human mobility since Prehistory. The excavation in Chiomonte represented a pioneer approach of 'emergency archaeology', but the scattered documentation produced and the time elapsed since the excavation make the re-interpretation of the data extremely difficult.

Some archaeological questions remained open since the main publication about the Chiomonte-la Maddalena site in 2002. It remained unclear, for example, the distinction between *ovis* and *capra*, useful to infer some hypothesis about the precise flock composition of these Neolithic mountain people and the secondary products revolution or some distinctions about bovids and cervids as it seemed that a local population of 'bigger deer' and 'smaller cattle' was present.

To reassemble the complex biography of this site and to refine the zooarchaeological interpretation, we apply ZooMS to an unstudied group of faunal remains and aDNA on 7 main faunal finds. My research moves from the museology study about the finds (archive search and repository surveys) to an implementation of ZooMS method to distinguish taxa among bovid and cervid families.

Thanks to the recovery of information from a private archive, more accurate reconstruction of the original localization of finds into the site is achieved. We approach an old excavation context, digging into the museum's repository, into local archives and using biomolecules. It is a valuable effort both for re-interpreting historical data and for improving the museum practices towards conservation and dissemination.

Keywords: ZooMs, complex biographies, Neolithic, Chiomonte-La Maddalena

Fashion Objects or Religious Trend? About the animal perforated teeth in the funerary caves from the Carvalhal de Aljubarrota valley (Alcobaça,Portugal) during the 4th and 3rd millennium BCE

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ABSTRACT: Teeth of wild and domestic animals are frequently found perforated in Neolithic and Chalcolithic burial contexts. Teeth of animals such as red fox, Iberian wolf, Iberian lynx, beaver, wild boar and European brown bear are possibly part of the magical-religious world attributed to these animals, not only for their beauty but also for the difficulty inherent to their hunting, since they are wild animals unaccustomed to human presence and contact.

The use of these pierced teeth by humans in a community may be an assertion of power by the ones holding them. However, alongside the use of elements from wild animals, we also find the use of teeth from domestic dogs.

If on one hand the use of these elements may correspond to an assertion of power by certain elements of the community, certainly the use of dog's teeth will correspond to a more emotional aspect of some elements of the community. Thus, the question arises, are they a fashion, whose use corresponds to vanity or does their use correspond to a more symbolic and emotional meaning?

Keywords: Perforated teeth; Neolithic and Chalcolithic; Funerary contexts; Iberian Peninsula

The author has an FCT grant PhD Project: The limestone, the river and Death. The funeral occupation of Carvalhal de Aljubarrota Valley (Carvalhal, Alcobaça) during the 4th and 3rd millennium BCE (2020.05503.BD)

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SESSION 5:

Archaeozoology – Making the World a Better Place

Isotope provenancing of modern moose in Scandinavia: a computational workflow for (zoo)archaeological applications

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ABSTRACT: Strontium ($^{87}Sr/^{86}Sr$) and oxygen ($\delta^{18}O$) isotopes of bones and teeth are often used for provenancing in archaeological contexts due to their link with specific eco-geological areas. Modern animal behaviour is known from other disciplines and in turn can be compared with geochemical fingerprinting. Geochemical studies on modern animals provide the basis to understand how isotopes are linked with mobility and assess their capability for provenance assignment. Here we used n = 65 modern wild-shot *Alces alces* from Sweden to study the potential of isotope markers in unravelling moose home-range and migratory behaviour. We measured Sr and O isotopes in moose bones and antlers and compared their values with isoscapes of Scandinavia. The Sr isoscape was built using a machine learning algorithm with literature data. The $\delta^{18}O$ isoscape represents the mean modelled climatological prediction based on annual precipitations. $^{87}Sr/^{86}Sr$ of moose samples are on average 0.7301 [0.7119, 0.7530], reflecting the bedrock geology of Scandinavia, dominated by old (Precambrian) rocks. Oxygen isotopes of the carbonate moiety structurally bound in the bone bioapatite yielded a mean $\delta^{18}O_{VSMOW}$ value of 21.5 [18.5, 27.7] ‰, in agreement with environmental values observed in Scandinavia. Most individuals have isotope compositions compatible with their place of death, suggesting limited mobility during the last years of life. In contrast, some moose display values not compatible with their place of death (i.e. > 100 km distance), thus being non- locally born. By statistically comparing the data with regional-wide isoscapes, we obtained a first glimpse on *Alces alces* large-scale mobility. The workflow presented here can be transferred to the study of other animal species and to other fields. In particular, this method will be useful in archaeological research, allowing to learn about faunal mobility, also in relation with human activities (e.g. trade and transhumance practices).

Keywords: biogeochemistry, provenance, isoscape, strontium, oxygen, moose

The Deer Turn: Reimagining Nature and Culture Duality Through Human - Red Deer Relations in Scotland's Archaeological Past

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ABSTRACT: My doctoral research takes an innovative archaeozoological approach to exploring culture and nature duality and considers how this can be applied to archaeology to develop a more interconnected, multispecies, and sustainable response to the current ecological and climate emergency.

My research will focus on red deer; an emblem of Scottish identity and wildness in the present; and will investigate the archaeological record to challenge our understanding of this powerful symbol in relation to nature and culture within a selection of prehistoric societies. Taking a deep time perspective which encompasses material culture and ecology alongside zooarchaeology, alternatives to our current attitudes towards nature will be outlined to answer the following questions:

1. What was the nature of human- red deer entanglement within Scottish Prehistory?

2. How were red deer perceived, how were they lived with, socialised, utilised and exploited? How did this vary in time and place?

3. How can these findings be used to better inform a sustainable approach to human-red deer entanglement in the present?

Our contemporary relationship with the environment requires urgent transformation yet attempts to deliver this are hampered by our own, oft-problematised division of "culture" and "nature". This duality underpins our understanding of non-human agency, stewardship and what constitutes the "natural" world. By examining the archaeological record, this project will seek to challenge these constraints and re-imagine human-animal relationships by using long durée approaches to human-animal interactions through small-scale contextualised case studies to explore diversity within human-red deer relationships. This research will therefore contribute to future ways of being with and living with animals and the environment.

Keywords: red deer, social zooarchaeology, human animal relations, prehistory, Anthropocene, nature/culture, identity, sustainability, symbolism, economy

Osteological Re-analysis of Falconry in Britian: A Case Study of Raptors from Faccombe Netherton

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ABSTRACT: Raptors are icons of the British landscape; for over a millennium they have been used in the practice of falconry, however our zooarchaeological understanding of these birds remain limited. Despite a plethora of historical research surrounding raptors in Britain, most archaeological literature addressing falconry synthesises data from published site reports. While this methodology has illuminated the scope of falconry within Britain, it only provides a cursory insight into the nature of human-raptor relationships, not allowing for in-depth assessment such as sex distribution, pathological assessment or exploring morphological adaptations. In addition, the synthesis of data from published site reports does not account for possible misidentification of the birds in question, raising concerns with the validity of any conclusions drawn from the current literature in the field.

This paper will present one case study from the archaeological manorial complex site of Faccombe Netherton where three falconry birds have been systematically re-assessed from osteological remains. Utilising an osteobiographical and full suite analysis approach, it is possible to compare these specimens with other contemporary falconry birds, presenting the value of re-visiting individual specimens to uncover individual life-histories. This integrated approach has generated novel insights into human-raptor relationships in the past and has established new methodologies to create an osteo-biographical baseline for British raptors.

Keywords: falconry, osteology, birds, morphometrics, osteobiographies

A Future for Fallow Deer: Management and Repercussion

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ABSTRACT: Fallow deer (*Dama dama*) were introduced to Britain around 1000 AD and over the last millennium have held a variety of statuses in human cultures: from seigneurial hunting and display to commercial farming, feral/wild populations, ornamentation, public attractions and rewilding projects. Today their populations are arguably higher than at any other point in their history in the British Isles. This has led to challenges and difficulties for modern deer managers.

Recent research (Baker et al. in prep) has argued that management strategies should take into account the deeper biocultural histories of the species being considered. In order to provide a deeper time baseline of human-fallow deer interaction, this paper will use a variety of metric and zooarchaeological analysis techniques to explore how fallow deer management changed across the medieval, post-medieval and early modern periods. This will be augmented by documentary evidence and first-hand accounts from modern deer managers. The variations and changes identified in this study will be used to inform modern managers in the unintentional impacts their management methods may be having on their herds.

Keywords: fallow deer, human-animal interactions, animal management, biocultural histories, Medieval zooarchaeology

ARCHAEOWILD: Modern problems require ancient perspectives

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ABSTRACT: The usual answer to the age–old question of "why do we need archaeology today" often sounds like "because in order to tackle the modern problems, we need to understand the way past societies dealt with them". The project ARCHAEOWILD, funded by the Science Fund of Republic of Serbia, tries to understand the Holocene history of the Human – Wildlife conflict and coexistence. This will provide modern conservation and wildlife management experts with an elaborate overview of the spatial and temporal distribution of wild animals and plants in the Central Balkans from the Mesolithic to the Middle Ages. Our goal is to use a large amount of biomolecular data, including aDNA and C/N stable isotopes, to provide a new understanding of the paleoecology of wild animals that were frequently hunted during the Holocene period, such as red deer and brown bear. We will also investigate the reasons behind the regional disappearance of globally extinct mammals such as the aurochs and European wild ass, while also examining the origins of exotic wildlife, such as fallow deer and leopards.

On the other hand, another important question has been popping up regularly in the last couple of years. "*Why do we need archaeologists*", which especially targets the younger generations on the verge of their academic careers. Universities have started shutting down archaeology departments, leaving fewer options for the newly graduates, who end up searching for a career change. Again, projects such as ARCHAEOWILD can be a good example of dealing with this type of issue, since six out of eight people employed were post–graduate students at the start of the project, while for the three of them this was their first job in the field.

Keywords: human-wildlife conflict; aDNA; stable isotopes; postgraduate perspectives

POSTER SESSION

Animal resources in Medieval Torres Novas (Central Portugal): A zooarchaeological perspective from the Christian context of Prédio Alvarenga

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ABSTRACT: Archaeological excavations undertaken prior to construction works on a building, known as Prédio Alvarenga, located in the historical centre of Torres Novas (Central Portugal) revealed not only evidence suggesting a continuous occupation of this area between the 12th and 20th centuries but, in particular, a relevant zooarchaeological assemblage sealed in three negative structures dated to the medieval Christian period (12th to 14th centuries).

This collection is composed mainly of mammalian fauna, predominantly goats (sheep and goats), pigs (pigs and wild boar), deer and cattle. *Equidae* and *Leporidae* are scarce. Carnivorous species, such as the domestic cat and dog, were also identified. There is also the presence of ornitofauna, namely chicken (*Gallus gallus domesticus*) and rock pigeon (*Columba livia*), and unidentified fish remains. The common cockle (*Cerastoderma edule*) has also been observed in this assemblage.

This study aims to characterise the zooarchaeological assemblage unearthed at Prédio Alvarenga and, namely, to ascertain the abundance of each species present, as well as the relation between the consumption of domesticated species and hunting activities in the subsistence of these communities; thus determining the use that was given to each species and clarify the process of managing of the animal resources and to understand the strategies for exploiting carcasses and other resources. The results obtained provide significant insights for a better understanding on the management of foodways and animal resources of a small town in the medieval Kingdom of Portugal.

Keywords: zooarchaeology, Medieval period, Torres Novas, Portugal.

Pigging Out: Food at a Manor House in Medieval Wales

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ABSTRACT: Cosmeston is a late medieval manorial settlement in south Wales with a manor house and associated households. Excavations at the site (by Cardiff University, Glamorgan-Gwent Archaeological Trust, and Wessex Archaeology) have produced a substantial animal bone assemblage (over 150 kgs). This is unusual for Wales due to the highly acidic soils found throughout the country. A sample of bones from known and dated contexts in the manor house were chosen for identification, quantification, and further analysis. Basic specimen counts reveal the importance of pigs here, pointing to the wealth and elite status of the site's inhabitants. Other quantification methods, including MNI, show that sheep/goats, cows, and chickens were also important food sources. Taphonomy (including butchery, burning, gnawing, and surface wear), and pathology was recorded. This information was used in the data analysis to explore general trends of animal use and deposition at the site during the medieval period. The results from this study were then compared to a previous analysis performed on a sample of the faunal remains from Cosmeston's associated village households in order to examine larger site distribution trends. This comparison revealed an intricate relationship between these two components of the site, and the ways social status affected access to food resources in medieval Wales.

Keywords: Wales, Medieval manor house, animal bones, quantification, taphonomy

Preliminary results of faunal analysis from Mtsvane Gora, Georgia

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ABSTRACT: I propose to present preliminary zooarchaeological analysis of faunal remains from the Late Bronze Age site of Mtsvane Gora, in the Kvemo Kartli region of Georgia. The site is a hilltop enclosed site situated on the edge of the Debeda River plain. The faunal remains come from a trench opened in 2017 intended to elucidate the picture inside this encircling wall, and to expand on excavation in 2015 that uncovered metal production debris. The remains total ~1800 bones from a single context overlying a 14th-13th c. BC floor layer. This context represents approx. 1/10th of the total assemblage. The context includes more hearth fragments than adjacent contexts, indicating it was likely an indoor space. It was also noted during excavation for its higher than usual quantity of animal bones. Faunal analysis in the Caucasus generally is limited in scope, particularly for the Late Bronze Age, and is yet further limited for Georgia.

Keywords: Late Bronze Age, Caucasus archaeology, enclosure/hillfort archaeology

Unravelling Pre-Roman Iron Age Livelihoods: An analysis of animal remains from Horodca Mică and Ulmu sites in Moldova

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ABSTRACT: The interval between the 1st and 3rd centuries BC is of great importance for the Eastern Carpathian area's history. The pre-Roman Iron Age settlements of the region hold valuable insights into the material culture, subsistence strategies, and social organization of ancient communities. The study focuses on the Horodca Mică fortification and the Ulmu settlement located in what is present-day Moldova, and examines their animal remains. The purposes of the research are to determine the types of animals consumed, their relative importance in the diet, husbandry strategies and any changes in subsistence patterns throughout time. Applied methods include taxonomic identification, bone element analysis, and calculation of minimum number of individuals (MNI), as well as analysis of mortality profile, butchering processes and fragmentation patterns. Preliminary analyses indicate that animal husbandry was a pivotal aspect of the local economic system, with cattle (55%) and pigs (18%) being the two most common domesticated animals, while wildlife is also present, suggesting a varied array of subsistence strategies. Whilst the broader context of the sites has been examined, there is as yet no real indication of subsistence tactics. This research further emphasizes the necessity of interdisciplinary approaches and the questions of how animals were raised and hunted, as well as processed and prepared.

Keywords: Pre-Roman Iron Age, animal husbandry, Eastern Carpathian region, zooarchaeology, subsistence strategies

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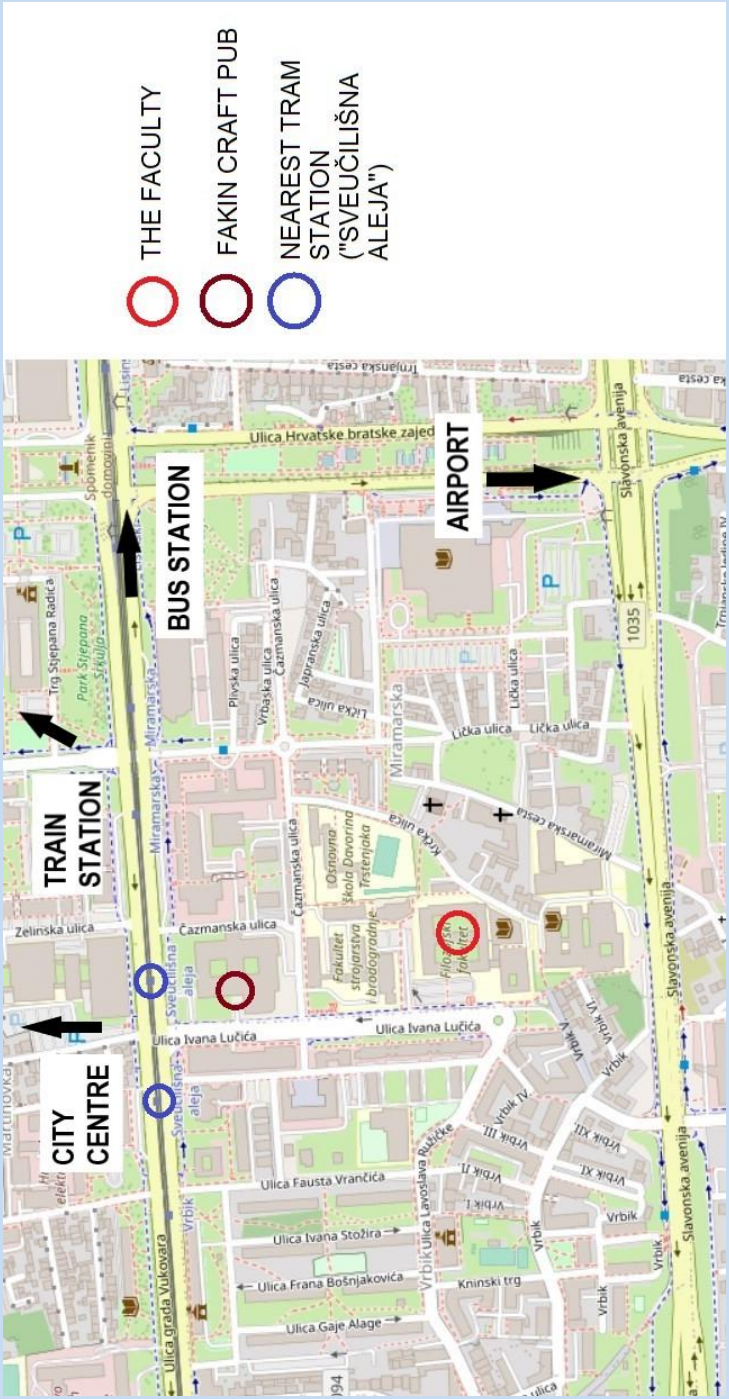

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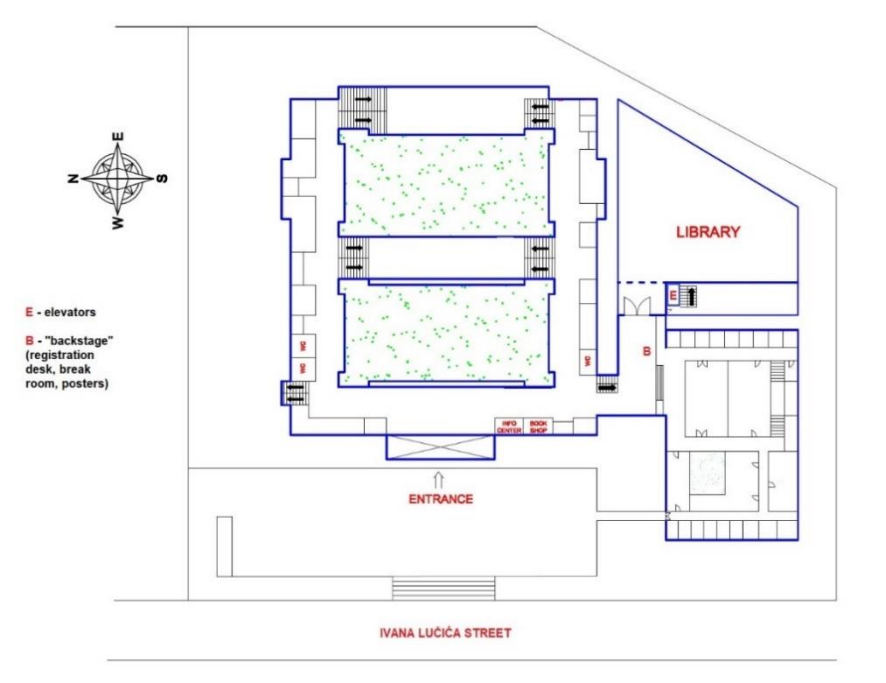

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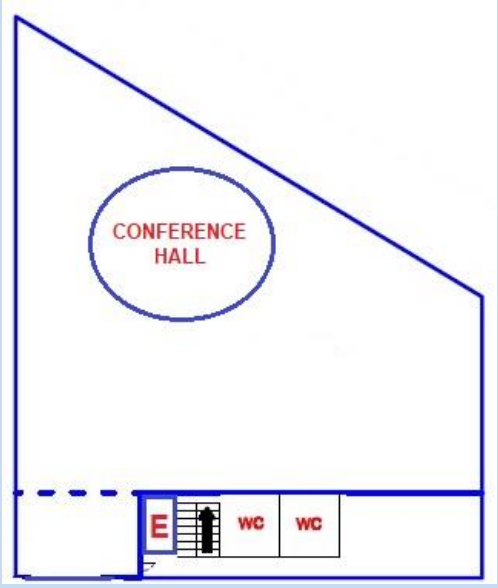

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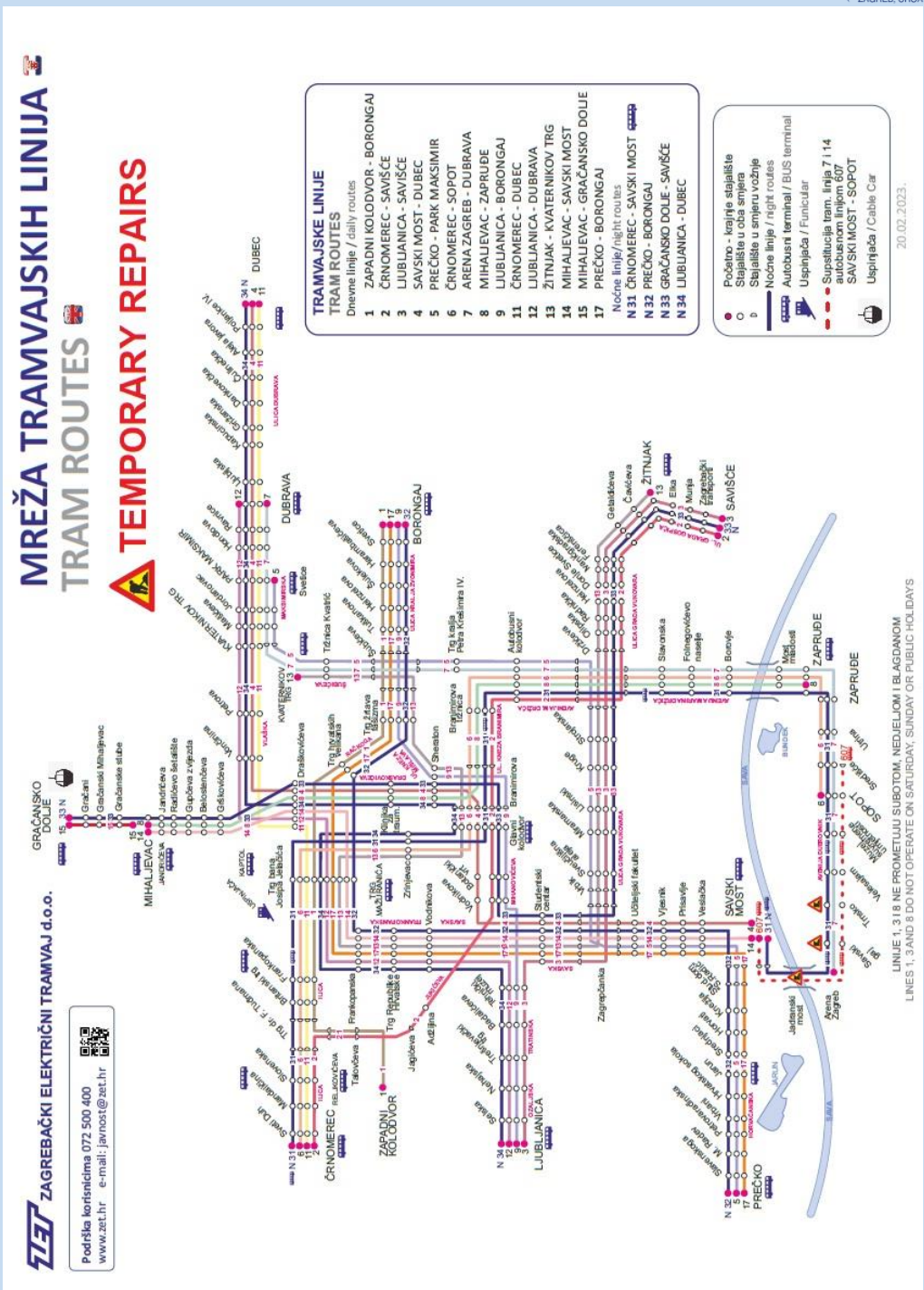
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- Organising commitee contact: **pzaf2023@gmail.com**
- Postgraduate ZooArchaeology Forum Facebook page
- 10th PZAF Facebook event
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- ICAZ official website
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