



# IMQP/IDQP Congress

*First edition*

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## Abstract Book

Co-organized by the consortium

International Master in Quaternary and Prehistory  
International Doctorate in Quaternary and Prehistory



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# Preamble

Since 2004, the International Master in Quaternary and Prehistory (IMQP) has been offering students from around the world a solid, multidisciplinary training in all fields of prehistory (human evolution, prehistoric archaeology, geology, palaeoecology and cultural heritage).

The IMQP is a resolutely international programme, based on exchanges with partner universities worldwide, and in particular between the University of Ferrara (Italy), the Muséum national d'Histoire naturelle in Paris (France), the Universitat Rovira i Virgili in Tarragona (Spain), the Instituto Politécnico de Tomar (Portugal), and the University of the Philippines Diliman (Manila, Philippines), as well as 20 associated partners. Over the years, the Master's programme has trained more than 650 students. The collaborative experience within the consortium also resulted in the creation of the International Doctorate in Quaternary and Prehistory (IDQP), which ran from 2013 to 2021.

After more than 20 years, we are organizing the first IMQP/IDQP Alumni Congress on 25–26 March 2026. The aim of this congress is to reconnect former students of the IMQP and IDQP and to offer a unique space to present current or past research related to the IMQP/IDQP training.

Students participating in the IMQP/IDQP programmes have built a network which, beyond academic exchange, has led to the creation of a true international community. The Alumni Congress aims to celebrate this and to showcase how interactions, sometimes dating back nearly two decades and encouraged by the programme, continue to influence scientific advancements and personal connections today.

Julie Arnaud  
(*IMQP cohort 2007-2009*)

&

Alice Leplongeon  
(*IMQP cohort 2008-2010*)

## **Outlining the Atapuerca karst system through geophysical prospections**

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**Keywords:** Applied geophysics, Prehistory, Karstic environments

### **Abstract**

For this work I will be presenting the main results of my Ph.D. research, for which we collected a total of 60 ERT profiles and 106 GPR profiles, with the aim of identifying the dimensions and continuity of the karstic passages of the Sierra de Atapuerca. The interpretation of 2D and 3D ERT profiles, together with the existing data on the caves, allowed us to determine the underground extension of the conduits and the presence of filled entrances where new archaeological excavations have been set up. The analysis of the radar wave signatures in GPR have allowed identifying the geometry of different karst features, such as air-filled caves, sediment-filled caves, and bedrock structures. Ultimately, these data led to a better understanding of the karst and sites' formation process.

## Isotopic insight into the ecology of the red deer from Riparo Tagliente (Italian pre-Alps) during the Late Epigravettian

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**Keywords:** Red deer ecology, Carbon isotope, Oxygen isotope, Late Glacial, Late Epigravettian.

### Abstract

The transition from the Last Glacial Maximum into the Late Glacial period marked a shift from the cold conditions of Greenland Stadial 2 (GS-2) to the warmer phases of Greenland Interstadial 1 (GI-1), enabling the reoccupation of Alpine regions by Late Epigravettian hunter-gatherers. Riparo Tagliente, a rock-shelter in northeastern Italy, preserves the most extensive Late Glacial stratigraphy in the southeastern Alps and offers key evidence for early human re-settlement. To investigate environmental conditions and resource stability, we analyzed stable carbon and oxygen isotopes ( $\delta^{13}\text{C}$ ,  $\delta^{18}\text{O}$ ) in enamel carbonate from red deer (*Cervus elaphus*) second and third molars across stratigraphic units 13 to 5, spanning GS-2.1a to GI-1.  $\delta^{13}\text{C}$  values reflect a diet based on  $\text{C}_3$  plants within relatively open woodland environments, showing limited change across climatic transitions. Intra-tooth  $\delta^{18}\text{O}$  profiles record seasonal conditions, summer in M2 and winter in M3, and were used to estimate past temperatures. Reconstructed mean monthly winter temperatures reached  $-6.5\text{ }^\circ\text{C}$  in layer 13 and dropped to  $-8.9\text{ }^\circ\text{C}$  in layer 10, followed by warming to  $\sim 15\text{ }^\circ\text{C}$  in summer during GI-1. These results highlight environmental continuity in red deer ecology despite climate fluctuations, suggesting that stable, open habitats supported sustained human use of the site throughout the Late Glacial.

## **Synergies in Archaeoenvironment: Micro-scale Phytolith Analysis and Multimodal Science Communication**

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**Keywords:** SiO<sub>2</sub>-rich Phytoliths, Micro-analysis, Geoarchaeology, Science Communication, Inclusive Outreach

### **Abstract**

This presentation brings together two interconnected and complementary strands of Dr. Andriopoulou's research trajectory, beginning after the completion of the International Master in Quaternary and Prehistory in 2014. Both strands are rooted in her doctoral work on microscopic phytoliths and silicon biogeochemistry and have expanded through initiatives in science communication and accessible heritage education. The first part focuses on the geoarchaeological contribution of phytolith and soil/sediment analyses to Mediterranean contexts. Through laboratory dissolution experiments, multi-analytical sample characterisation, and the study of phytolith preservation patterns, Dr. Andriopoulou's research highlights post-depositional processes in shaping the microarchaeological record. These approaches enhance environmental interpretations, providing insights into vegetation dynamics, human activity areas, and taphonomic pathways.

The second part presents her work on transforming complex archaeoenvironmental information into accessible, multimodal educational resources. Building on geoarchaeology and newly developed methodologies in creative education - and in close collaboration with the GeoSat ReSeArch Lab of IMS-FORTH with advisory support from Dr. Papadopoulos - Dr. Andriopoulou develops narrative-based materials, multisensory tools, and digital applications to engage broader audiences, including children and individuals with visual impairments.

Herein, Dr. Andriopoulou will present this research at the First Edition of the IMQP/IDQP Alumni Congress, highlighting her collaborative work with a focus on phytolith analysis and science communication, with archaeoenvironment at its core. Together, these research axes demonstrate how micro-scale scientific analysis and inclusive outreach can deepen understanding of past landscapes while enhancing the social impact of archaeological research and addressing contemporary challenges.

## **Geometric Morphometric analysis of the facial shape variability in Extant Anthropoids**

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**Keywords:** Facial morphology, geometric morphometrics, anthropoids, hominoids, allometry

### **Abstract**

Facial morphology in primates reflects a long history of ecological, functional, and phylogenetic pressures. Understanding the sources of this variation among extant species provides essential context for interpreting evolutionary processes in the primate order. This study uses 3D geometric morphometrics to analyze facial shape in a comparative sample of platyrrhines, cercopithecoids, and hominoids. A dataset of 55 craniofacial landmarks was subjected to Generalized Procrustes Analysis (GPA), Principal Component Analysis (PCA), and allometric regression to evaluate the major axes of shape variation and the influence of size and sexual dimorphism. Results show that primate families occupy distinct areas of morphospace, with great apes exhibiting the most robust and size-influenced facial morphologies, while platyrrhines display the highest variability. Cercopithecoids separate into cohesive colobine and more variable cercopithecine clusters, reflecting dietary and locomotor differences. Lesser apes retain more gracile, generalized morphologies. Allometry strongly structures variation in hominoids and terrestrial cercopithecines, whereas its effect is minimal in many arboreal taxa. These findings demonstrate that facial shape in extant primates is strongly patterned by phylogeny but modified by ecological adaptation and sexual selection, underscoring the relevance of geometric morphometrics for understanding primate craniofacial evolution.

## **Talking Stones: from a Side Idea to a Method — Lithic Taphonomy and Trace Overlapping at Pirro Nord 13**

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**Keywords:** Lithic taphonomy, Post-depositional processes, Use-wear analysis, Trace superposition (overlapping method), Site formation processes

### **Abstract**

The taphonomic study of lithic assemblages has traditionally been used as a corrective tool aimed at identifying post-depositional alterations in order to limit their impact on functional interpretations. Within the Talking Stones project, developed at the site of Pirro Nord 13 (, Southern Italy), a different methodological perspective was adopted, treating post-depositional surface modifications as informative proxies for reconstructing site formation processes and the history of lithic assemblages. Pirro Nord 13 provides a suitable context for methodological development, as its lithic assemblage derives from a secondary depositional setting affected by gravitational and mass-wasting processes within a karstic fissure system. In this context, lithic artefacts record complex and heterogeneous post-depositional trajectories. To address this issue, a systematic taphonomic protocol was designed and applied to the entire assemblage, without preliminary selection based on typology, size, or technological class, assuming that post-depositional processes act on assemblages as a whole. Within this framework, the overlapping method was developed to analyse superposition relationships between functional use-wear traces and post-depositional alterations. Lithic surfaces are interpreted as micro-stratigraphic records, in which different generations of traces intersect, overlap, or partially obliterate one another. Rather than isolating “unaffected” artefacts, the method focuses on reconstructing the relative chronology of surface modifications through the analysis of their mutual relationships at both macro- and microscopic scales. This approach allows the identification of recurrent taphonomic patterns within the assemblage and supports the assessment of its internal coherence, exposure history, and degree of post-depositional reworking, demonstrating how lithic taphonomy can become an active inferential tool for site formation analysis in complex archaeological contexts.

## **Taking Archaeology Beyond Classrooms**

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**Keywords:** Experimental archaeology, Public archaeology, Heritage outreach, Community engagement, Archaeological education, Living heritage

### **Abstract**

This paper explores the use of experimental archaeology and heritage engagement as effective methodologies for public outreach and archaeological education. Archaeology is often perceived as an academic or site-bound discipline, limiting accessibility for non-specialist audiences. Experimental archaeology provides a practice-based approach that enables participants to engage directly with past technologies and behaviours, fostering understanding through embodied learning.

The study draws on experimental archaeology workshops conducted for school and college students, involving the replication of prehistoric technologies such as stone tool manufacture, functional experimentation, introductory use-wear observation, and engagement with prehistoric artistic practices including rock art. Direct interaction with materials and processes encourages analytical observation, critical thinking, and an appreciation of technological decision-making in the past, transforming abstract archaeological concepts into tangible experiences.

The paper also examines curated thematic walks as a form of applied public archaeology. These include heritage walks focused on historical landscapes and built environments, as well as culinary walks centred on local food and drink traditions, developed in collaboration with local communities. These walks situate heritage within everyday social practices, emphasizing continuity between past and present and recognizing communities as active custodians of cultural heritage.

Together, these approaches function as complementary outreach strategies that promote participatory learning, increase public sensitivity towards archaeology and heritage, and bridge the gap between academic research and public engagement.

## **Bioarchaeological Insights from a Late Jomon Collective Burial in Hokkaido**

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**Keywords:** Jomon, Japan, Neolithic, Collective Burial, Morphometrics

### **Abstract**

This research focuses on morphometrical variation among Late Jomon populations, through the analysis of a collective burial from Usu-Moshiri (Hokkaido). The sample includes 11 individuals (adults and immature), whose skulls, mandibles, and teeth were analyzed and compared to a global reference database of individuals from diverse populations. Using a multidisciplinary approach that includes anatomical drawing, CT scanning, 3D modeling, high-resolution photography, and both metric and geometric morphometric analyses, the study aims to reconstruct biological profiles from cranial and dental remains. The detailed data, currently being analyzed, are intended to clarify patterns of age distribution, sex estimation, and population affinities. This work contributes to our understanding of population dynamics, regional variability, and cultural adaptations in prehistoric Japan by exploring the biological characteristics of early populations, shedding light on how they adapted to their environment and evolved over time.

## **Age estimation on Fragmentary Fossil Hominins: Geometric Morphometric Approach**

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**Keywords:** geometric morphometric; age estimation; principal component analysis; mandible; dental eruption

### **Abstract**

Age estimation is often found to be constricted in fragmentary fossil remains, limiting essential information regarding biological profile, life history, and evolutionary patterns of growth and development of the hominins. This study is an exploration of geometric morphometrics for age estimation on fragmentary remains of *Homo* sp from North Africa from the sites of Jebel Irhoud, Grotte des Contrebandiers, and Dar es Soltane in Morocco. By combining dental eruption and mandibular deformation, the method highlights a novel approach of multi proxy protocol of estimating approximate age within the genus *Homo* based on an age and sex balanced sample of 48 recent humans from the New Mexico Decedent Image Database. Principal component analysis of the Procrustes shape and form coordinates revealed that this combined proxy approach successfully identified morphological changes in the mandible within three-to-six-month intervals, and estimated age is acquired through Procrustes distances. The significance of this research is far-reaching, having the potential to provide a new and flexible age estimation protocol that minimizes reliance on highly variable dental development patterns. Moreover, it can be performed using open-access resources, making it transferable and adaptable to other hominin species as well.

## **Multi-element Isotopic analysis of domestic animals' teeth from World Heritage Harappan Site of Dholavira to reconstruct animal husbandry patterns**

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**Keywords:** Harappan Civilization, Dholavira, C-O-Sr isotopes, Cattle/Buffalo, palaeodiet

### **Abstract**

Dholavira, a UNESCO World Heritage site in Gujarat, India, was one of the major urban centers of the Harappan Civilization (~2600 and 1900 BCE). It was remarkable for its sophisticated water management system, a vast cultural material repertoire and a rich faunal assemblage. Among these, cattle and water buffalo were dominant domesticated animal species, the remains of which offer important insights into Harappan livestock management, dietary practices, and environmental adaptations. This study presents stable carbon and oxygen ( $\delta^{13}\text{C}$ ,  $\delta^{18}\text{O}$ ) and radiogenic Sr ( $^{87}\text{Sr}/^{86}\text{Sr}$ ) isotopic ratios of tooth enamel from 43 cattle and buffalo individuals, providing insights into human-animal interactions. Age-at-death profiles suggest that these animals were kept up to their adulthood, likely for milk and labor. The  $\delta^{13}\text{C}_{\text{VPDB}}$  values ( $-2.09\text{‰}$  to  $3.99\text{‰}$ ; avg.  $1.32\text{‰} \pm 1.04\text{‰}$ ) indicate a predominantly C<sub>4</sub>-based diet, primarily from millets, pointing to intentional year-round foddering. The  $\delta^{18}\text{O}_{\text{VSMOW}}$  values ( $28.80\text{‰}$  to  $38.18\text{‰}$ ; avg.  $33.64\text{‰} \pm 1.53\text{‰}$ ) reflect strong seasonal climatic variation. However, the overall consistency in  $\delta^{18}\text{O}_{\text{VSMOW}}$  values across the site suggests reliance on well-maintained, monsoon-fed reservoirs that ensured a steady water supply throughout the year, supporting both agriculture and livestock. The  $^{87}\text{Sr}/^{86}\text{Sr}$  ratios ( $0.7092$ – $0.7110$ ) match closely with the local geology, indicating that most animals were raised locally, though a few specimens show signatures of short-range movement or varied grazing locations. Comparisons with other regional Harappan sites suggest that Dholavira maintained a self-sufficient but interconnected pastoral economy, welladapted to its semi-arid landscape.

## **Stable isotopes measurements ( $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ ) of giant ground sloths (Mylodontinae, Xenarthra) from Nahuel Huapi region (Patagonia, Argentina)**

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**Keywords:** South America, Megamammal Extinction, Paleoecology

### **Abstract**

The Mylodontinae, commonly known as giant ground sloths, were part of the megamammal community (over one tone) that disappeared from South America around 10,000 cal BP. The causes of this defaunation (humans vs. climate) have been discussed in the paleontological and archaeological fields, since it coincided with climatic fluctuations and the global dispersal of *Homo sapiens*.

Stable isotopes measurements ( $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$ ) are direct proxies for understanding the paleoecology of giant ground sloths and the causes of their extinction. The Nahuel Huapi region (Patagonia, Argentina) has a rich record of Mylodontinae dated between circa 20,000 to 10,000 cal BP, which represents a significant opportunity to contribute new stable isotopic information. Thus, in this work, the results of  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  will be presented from six samples from the caves of Arroyo Corral and El Trébol dated in the Last Glacial Maximum (23,000–19,000 cal BP) (LGM) and in the Late Pleistocene-Holocene Transition (15,000 to 10,000 cal BP) (PHT) respectively.

The Arroyo Corral cave, has  $\delta^{13}\text{C}$  values of around  $-20\text{‰}$ , reflecting a dominant C3 vegetation, and  $\delta^{15}\text{N}$  values of  $6\text{‰}$  show arid conditions. This information indicates that giant ground sloths were adapted to the glacial and dry conditions and open herbaceous landscape of the LGM. In El Trébol cave, Mylodontinae was present between circa 13,000 to 13,500 cal BP. One millennium later (circa 12,500 cal BP) another individual was recorded with evidence of human cut marks. The  $\delta^{13}\text{C}$  is lower, with a mean of  $-22.1\text{‰}$ , but still reflects a C3 vegetation. While the  $\delta^{15}\text{N}$  of  $3.4\text{‰}$  shows moister habitats, with tree and/or shrubs vegetation.

Preliminary information from the Nahuel Huapi region indicates that giant ground sloths coped the arid and cold phase of the LGM and the humid and warm phase of the PHT. The latest record of Mylodontinae shows evidence of human exploitation, which could have disrupted the native adaptation to different climatic pulses.

## **Lithic Landscapes and Neanderthal Adaptations: A Research Journey from the IDQP to Piedmont (north-western Italy)**

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**Keywords:** Middle Paleolithic, lithic technology, Piedmont, raw materials

### **Abstract**

This presentation outlines the evolution of a research trajectory initiated within the International Doctorate in Quaternary and Prehistory (IDQP), centered on the techno-economic analysis of non-flint raw materials during the European Middle Palaeolithic. The doctoral research established a robust methodological framework for understanding how the intrinsic properties of "second-rate" rocks—such as quartz—conditioned Levallois and Discoid knapping methods. By examining key European contexts, including Payre (France) and north-eastern Iberia, it was demonstrated that Neanderthal technical behavior was characterized by significant flexibility and successful adaptation to lithic landscapes lacking high-quality chert.

Building upon these foundations, the subsequent decade of research has focused on the Alpine and sub-Alpine margins of North-Western Italy (Piedmont), an area historically considered marginal in Palaeolithic studies. Through a systematic multi-scale approach—integrating stratigraphic excavations at the Ciota Ciara cave with the study of surface assemblages from the Baragge Biellesi, Colline Novaresi, and the Po Plain (Trino)—this work has redefined the regional settlement model.

The results highlight a sophisticated management of local resources, where "ugly stones" were exploited through specialized reduction sequences to minimize fragmentation while maximizing productivity. Furthermore, recent data from the Trino site provide the first compelling evidence of Palaeolithic occupation in the Po plain of Piedmont, filling a significant gap in the European record. In conclusion, this overview demonstrates how the multidisciplinary training of the IDQP network has been instrumental in developing a long-term research program that restores technological dignity to Neanderthal groups in flint-poor regions and offers new insights into their land-use strategies and mobility.

## **Sea, pots and people**

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\*IMQP cohort 2008-2010

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**Keywords:** Maritime interactions, Southeast Asia, fieldwork, pottery

### **Abstract**

This presentation reflects on a research trajectory in Southeast Asian archaeology shaped by long-term engagement with material culture. Since enrolling in the IMQP Master's program in 2008, I have used pottery as a central lens through which to explore societies, mobility, and social interaction over extended timescales. Over time, this focus has been enriched through work across various regions and archaeological contexts. Rather than presenting detailed analytical results, I aim in this talk to highlight the collective dimensions of archaeological research: team-based fieldwork, long-term collaborations, student training, and friendships built over time. This perspective is especially timely, as the conference occurs during an active field season when I will be working with an international team, giving a glimpse into the collaborative and dynamic nature of our research.

# **A preliminary approach to local and regional cultural dynamics based on archaeological ceramics from Nicaragua (500 BC–1500 AD): a spatial analysis using QGIS.**

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<sup>1</sup>Independent archaeologist

## **Keywords:**

## **Abstract**

Nicaragua, situada en el centro de América Central, ha sido estudiada principalmente a través de la cerámica arqueológica, lo que ha permitido establecer secuencias culturales en regiones como Gran Nicoya, Las Segovias, Chontales y la costa sur del Caribe. Aunque se han llevado a cabo numerosas investigaciones, pocos esfuerzos se han centrado en comprender a profundidad las dinámicas locales y regionales. Los análisis tipológicos de la cerámica han revelado una evolución desde el 500 a. C. hasta la llegada de los europeos en el siglo XVI. Por lo tanto, el propósito de este trabajo es complementar y ampliar los datos existentes en función de entender procesos de integración y aislamientos culturales.

Sobre esta base, se realizó un análisis de densidad de las principales tipologías cerámicas de cada una de estas regiones, teniendo en cuenta los estudios que presentan datos cuantitativos sobre cerámica arqueológica de diferentes zonas utilizando el software QGIS. La información se dividió en cuatro grandes períodos cronológicos: Período I (600/500 a. C.-300/400 d. C.), Período II (300/400–800/900 d. C.), Período III (800/900–1350/1400 d. C.) y Período IV (1350/1400–1550 d. C.). Analysis with QGIS reveals that the history of ceramics in Nicaragua is neither static nor uniform. It evolved from more isolated local centers in the Pacific (period I) to the opening of regional links (period II), culminating in massive integration under the polychrome of Papagayo and the striations of Sacasa (period III), a relationship that continued into the following period (period IV), except in Chontales and the Caribbean, where greater isolation seems to have been established.

# Assessing the Reliability of Endocranial Proxies: A Quantitative Comparison between Brain and Endocast Morphology in a Modern Human MRI Sample

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**Keywords:** Paleoanthropology; Endocast; Paleoneurology; Geometric Morphometric; Virtual Anthropology.

## Abstract

Endocranial casts are a fundamental source of information for reconstructing brain evolution in fossil hominins, yet their capacity to faithfully represent brain morphology is limited by the presence of intervening soft tissues and vascular structures. Despite their widespread use, direct quantitative assessments of the correspondence between brain surfaces and endocasts remain relatively rare.

In this study, we investigate the relationship between brain and endocranial morphology using a modern human reference sample composed of 37 anatomically modern individuals documented through MRI and CT imaging. Brain surfaces were independently extracted from MRI data, while virtual endocasts were generated from reconstructed cranial cavities using automated segmentation procedures. This within individual design allows direct comparison between the two representations under controlled conditions.

Morphological correspondence was evaluated through volumetric analyses and geometric morphometrics based on a shared configuration of anatomical landmarks. The analyses reveal a consistent volumetric offset, with endocranial volumes exceeding brain volumes, alongside marked differences in sensitivity to segmentation thresholds. In contrast, shape analyses indicate a strong overall correspondence between brain and endocast geometry, although localized discrepancies are systematically observed, particularly in regions influenced by major dural venous sinuses.

Rather than addressing adaptive or cognitive interpretations, this contribution focuses on methodological implications. The results demonstrate that endocasts provide a robust approximation of global brain morphology, while also highlighting predictable sources of bias that must be considered when interpreting fossil material. This study contributes empirical constraints for the informed use of endocranial data in paleoanthropological research.

## Early peopling of the Philippines

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**Keywords:** Early peopling, insularism, Early Palaeolithic

### Abstract

Over 60 years ago, stone tools and remains of megafauna were discovered on the Southeast Asian islands of Flores, Sulawesi and Luzon, and a Middle Pleistocene colonization by *Homo erectus* was initially proposed to have occurred on these islands. However, until the discovery of *Homo floresiensis* in 2003, claims of the presence of archaic hominins on Wallacean islands were hypothetical owing to the absence of in situ fossils and/or stone artefacts that were excavated from well-documented stratigraphic contexts, or because secure numerical dating methods of these sites were lacking. As a consequence, these claims were generally treated with scepticism. Here we will present the results of a project reuniting four alumni of the IMQP through excavations at Kalinga in the Cagayan Valley of northern Luzon in the Philippines that have yielded less than a hundred stone tools associated with an almost-complete disarticulated skeleton of *Rhinoceros philippinensis*, which shows clear signs of butchery, together with other fossil fauna remains attributed to *Stegodon*, Philippine brown deer, freshwater turtle and monitor lizard. All finds originate from a clay-rich bone bed that was dated to between 777 and 631 thousand years ago using electron-spin resonance methods that were applied to tooth enamel and fluvial quartz. This evidence pushed back the proven period of colonization of the Philippines by hundreds of thousands of years, and furthermore suggests that early overseas dispersal in Island South East Asia by premodern hominins took place several times during the Early and Middle Pleistocene stages. The Philippines therefore may have had a central role in southward movements into Wallacea, not only of Pleistocene megafauna, but also of archaic hominins.

## **Exploring the evolutionary implications of early hominin stone tool use through a novel neuromechanical experimental approach**

Fotios Alexandros Karakostis\*<sup>1</sup>

\*IMQP cohort 2013-2015

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**Keywords:** neuroarchaeology, EEG, EMG, behavioral evolution, stone tools

### **Abstract**

This presentation introduces a novel experimental method developed by my team that combines electroencephalography (EEG) and surface electromyography (sEMG) to study the cognitive and biomechanical requirements of early stone tool use, addressing the neuromechanical underpinnings of early hominin behavior. While experimental archaeology has traditionally studied brain and muscle separately, our interdisciplinary protocol can efficiently record brain cortical and muscular activity simultaneously during stone tool tasks, tracking brain–hand interactions across the full sequence of the tool-using process. Our team previously applied this protocol to precise leather-cutting with an Oldowan-type flake, dividing the task into Hold, Aim, and Execute phases. We observed distinct frontal beta activity during planning, motor cortex desynchronization during execution, and asymmetrical hand muscle involvement. Comparing flake cutting with hammerstone percussion (nutcracking) showed that, while both engaged frontoparietal regions, flake cutting (a behavior considered exclusive to hominins) produced stronger beta power in frontal and centroparietal areas, particularly during the Aim phase, with increased contralateral frontal activity. Complementary sEMG analyses revealed that prior experience improved flake-cutting efficiency, with experts achieving better results using less muscular effort, a pattern not seen in the forceful nut-cracking tasks. Together, these findings showed that precise flake use requires greater cognitive and biomechanical investment and benefits more from learning and expertise. Our novel neuromechanical approach provides a novel and validated empirical protocol for exploring the implications of hominin behavioral evolution.

## **Active vs. Observational Learning: Effects on Knapping Skill Acquisition**

Shantanu Katiyar\*<sup>1</sup>

\*IMQP cohort 2022-2024

<sup>1</sup>Anthropology Department, Emory University (USA)

**Keywords:** Lithic technology; Skill acquisition; Experimental archaeology

### **Abstract**

Stone tools are central to reconstructing human behavioral and cognitive evolution, yet how knapping skills are acquired remains poorly understood. Experimental studies indicate that learning, rather than expert performance, is the most cognitively demanding phase and that instruction shapes early outcomes. Here we reanalyze the dataset of Pargeter et al. (2022) to test how Active instruction with real-time feedback versus Observation-only learning affects regulation of platform attributes underlying fracture initiation.

Flakes produced by novices were compared with an expert benchmark using categorical success measures and continuous variables linked to fracture mechanics, including External Platform Angle (EPA), Internal Platform Angle (IPA; proxy for angle of blow), and platform thickness, together with sequential change across successive cores.

Active learners produced significantly more intact platforms than Observation learners, while experts outperformed both groups. Mean platform values did not differ across groups, consistent with strong mechanical constraints. Variability and correlation analyses revealed distinct control strategies: novices relied on compensatory adjustments, whereas experts showed more independent regulation. Mixed-effects models identified EPA as the primary dimension of learning-related change, with Observation learners reducing EPA through trial-and-error and Active learners increasing EPA over time. No comparable change was detected for IPA or thickness.

These results show that early knapping learning is selective, emphasizing calibration of affordance selection rather than force delivery, and clarify how teaching structures exploration in technological skill acquisition.

## **Calendar-year dating of the Neolithic in the Balkans via dendrochronology and 14C**

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**Keywords:** Dendrochronology; Radiocarbon; Neolithic; Junipers

### **Abstract**

Dendrochronology has played a central role in the absolute dating of prehistoric periods in some regions of Europe. Absolute dating to an exact year of many prehistoric sites has been possible thanks to the decades-long efforts for collecting, measuring, and cross-dating big amounts of archaeological and subfossil wood. On the other hand, no absolute millennia-long tree-ring chronologies exist for the southwestern Balkans. Systematic sampling of archaeological wood within the scope of the EXPLO project has led to the construction of several “floating” tree-ring chronologies from prehistoric sites in the region. Among them are the Mid/Late Neolithic chronologies from the waterlogged site of Dispilio, Greece. The main tree-ring chronologies of oak and juniper wood span for more than 340 years. Efforts to improve the resolution of the radiocarbon calibration curve led to the discovery several abrupt radiocarbon spikes (SEP- or Miyake events) during the Holocene. A recently discovered Miyake event in absolutely dated tree-ring chronologies from around the world, revealed a sharp spike of radiocarbon in 5259 BC. Annual radiocarbon measurements from Dispilio’s tree-ring chronologies could be matched against the reference data of this new Miyake event, enabling the calendar-year dating of the site without millennia-long tree-ring chronologies. Dispilio represents the first calendar-year dated Neolithic site in the wider Eastern Mediterranean region. Through tree-ring cross dating with wood from other sites we establish an almost 1000-years long single calendar-year sequence for several sites in SE Europe.

## **Late Roman Cemetery in Viytenky: Studying Migration from Palaeopathological and DNA perspectives**

Bohdan Mamchur\*<sup>1</sup>

\*IMQP cohort 2021-2023

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**Keywords:** aDNA, genetics, migration, Ukraine, Eastern Europe

### **Abstract**

Viytenky is a Late Roman settlement and cemetery in Kharkiv oblast, Ukraine. It belongs to Cherniakhiv (also known as Sântana de Mureş) culture. In 2018-2020 I wrote together with my colleagues from Institute of Archaeology of NAS of Ukraine a study about the skeletal remains from this and two other cemeteries of Cherniakhiv culture, assessing primarily their dental remains. On 54 individuals, sampled from Viytenky, we found that the intensity of caries (proportion of carious teeth to the total number of teeth studied in the sample) in women is about twice higher than in men. Moreover, in women contrary to men it has a clear age effect, being about three times higher in women over 40 than in those under 40. In our study we suggested that this effect might be connected to the migration stress, given that the Ost-Gothic, Slavic and some other tribes which supposedly were carriers of Cherniakhiv culture, were highly mobile at that time.

With the evidence of generalized stress we could just hypothesize impact of migration on the studied population. Now, in my current research I am studying migration and admixture of populations of this time in Eastern Europe using direct evidence – aDNA. I compare datasets of SNPs of individuals from the respective time using Principle Component Analysis (PCA) protocol, optimized by our genetic laboratory in the University of Ostrava. In addition to clustering with PCA, we use Identity-by-Descent (IBD) method: we track relatedness of populations by looking at segments of DNA they share. The results of genetic analyses are then correlated with distribution of individuals on the map and the archaeological culture they belong to. My study especially focuses on Viytenky, the cemetery of Cherniakhiv culture with which I already worked before, because it contains over 100 of inhumations which potentially can be suitable for genetic analysis and can help shed light on the population movement in Eastern Europe during the Great Migration Period.

## **Zooarchaeological Investigation of Iron Age Faunal Assemblages at Griesheim-sur-Souffel (Alsace, France)**

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**Keywords:** Zooarchaeology, Iron Age, Faunal remains, Griesheim-sur-Souffel, Animal management

### **Abstract**

This study presents the results of an internship project conducted at Archéologie Alsace (France) in 2024, focused on the identification and analysis of faunal remains from the Iron Age site of Griesheim-sur-Souffel (Bas-Rhin). The site, excavated by Inrap Grand Est in collaboration with Archéologie Alsace, revealed successive occupations from the Neolithic to the Merovingian period. The faunal assemblage studied here derives from features dated to the Hallstatt D2 phase (late 6th century BC).

A total of 362 bone fragments from six archaeological features were examined. The remains are dominated by domestic species, mainly pigs (52%), followed by caprines (sheep and goats), with cattle less represented. Additional finds included dog, horse, a possible wild suid, and amphibians. Analysis of anatomical representation shows a predominance of meaty elements (limbs and girdles), while vertebrae, ribs, and cranial remains were underrepresented. Age-at-death data suggest varied herd management strategies: pigs slaughtered both young (for tender meat) and as adults, caprines predominantly subadults (12–24 months), and cattle over 42 months, likely reflecting their use for traction and reproduction. Cut and burn marks on many bones indicate butchery, food processing, and waste disposal, while the overrepresentation of caprine autopods may point to bone tool production.

Overall, the results suggest that Griesheim-sur-Souffel was a domestic settlement where faunal remains reflect everyday consumption, animal management, and secondary uses of livestock. This case study highlights the value of zooarchaeological analysis for understanding Iron Age lifeways in Alsace.

## **Manufacturing and Study of the Bone Industry Operational Chain: Experimental study and Morpho-Technological and Usewear analysis to deconstruct the Operations, Operational Stages and Manufacturing techniques of the Pleistocene-Holocene bone artefacts**

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**Keywords:** Bone Technology, Chaîne opératoire, Experimental Archaeology, Use-wear, Technique, Microscope Analyses

### **Abstract**

Considering the bone industry as the vector of cohesion between the lithic industry, fauna and the human mind. Understanding the operational chain of each bone artifact and then the set of these in relation to the context in which they appear can allow us to know the relationship between human and fauna, human and lithic, lithic and fauna, and between human and the space/environment that surrounds it. In the manufacture of a simple tool or bone artifact, numerous factors are involved, ranging from the sourcing of the raw materials to be worked, the raw materials of work, the operations involved and the techniques related to them, to the subsequent use and abandonment of the final product. Dropping along the way each technique used, method worn and the individual's own know-how a trace of the work or action that can be determined. Normally the bone industry is presented only by fragments. However, thanks to microscopes, we can take a step forward and try to understand the origin of how the fragments were placed. With this experiment we have tried to collect a catalogue of use-wear/traces of different fragments and tools produced under a wide cloud of different factors (variables), such as the use of different techniques (sawing, grooving, scraping...), the direction and orientation of the movements (oblique, longitudinal, unidirectional, bidirectional...), the state and characteristics of the material (material type, state of the material, size, weight...), anatomical and cognitive features of the individuals (age, knowledge, experience...). All these variables have been collected in a database that has subsequently been compared with the results obtained after having observed the materials using the Hirox microscope in order to create a relationship between the techniques used and the traces they may leave, in order to compare them with those observed in the archaeological sites and to be able to understand what were the operational chains followed by these groups.

# **The Position of Holocene Crania from Braholo Cave, Song Keplek, and Song Terus within Modern Indonesian Cranial Variation: A 3D Geometric Morphometrics Approach**

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**Keywords:** Holocene; Gunung Sewu; geometric morphometrics; cranial vaults

## **Abstract**

The application of geometric morphometrics to Holocene fossils from Gunung Sewu, Java, Indonesia, is constrained by fragmentary preservation. We present a vault-focused protocol that situates fragmentary calvaria within a modern Indonesian morphospace while explicitly testing sensitivity to missing data. The workflow records 36 vault landmarks to construct a modern reference shape space (Java, Kalimantan, Sulawesi), projects fossils as supplementary specimens after Generalized Procrustes Analysis, Principal Component Analysis, and addresses missing landmarks via thin-plate spline imputation. The morphospace is structured, with a principal gradient running from long to low vaults with muted parietal eminence to high, round vaults with pronounced parietal eminence. Applied to Braholo Cave (BHL02, BHL05), Song Keplek (SKP04), and Song Terus (STR01), the protocol differentiates outcomes within an inside/edge/outside interpretive frame. SKP04 shows balanced curvature with moderate parietal swelling, placing it inside the central overlap, and this is consistent with early-mid-Holocene continuity. STR01 exhibits a higher, rounder dome with a smoother fronto-parietal transition, occupying an inner-edge position. The Braholo Cave vaults diverge morphologically: BHL02 presents a longer, lower dome with a sharper parietal-temporal junction and stronger posterior projection, whereas BHL05 displays a more upright frontal wall and a comparatively gracile calvaria, placing both at or beyond the range limits and indicating site-level heterogeneity at Braholo. These placements are stable across alternative ordination views and after imputation, reducing the likelihood that they reflect missing-data. The protocol offers a transparent template for evaluating fragmentary vaults and can be extended to facial and basicranial regions as preservation permits.

## **Rock Arts in Eastern Tigray (Ethiopia): Process, Temporality and Iconography**

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<sup>2</sup>University of Geneva (Switzerland)

**Keywords:** Ethio-Arabian Rock Art, Rock Paintings, Dstetch, Pigment Identification, Rock Art Dating

### **Abstract**

Ethiopia has many rock arts that are currently unstudied and therefore their role in the cultural reconstruction of the populations remains minimal. Negasi Awetehey Nega focuses her work on the eastern Tigray area. Its aim is to answer questions of chronology and know-how (pigments, iconography). To do this, documentation tools (DStretch), pXRF (portable X-ray Fluorescence) analyses and analyses with accelerator mass spectrometer (AMS) are used for the analysis of the pigments used and the dating of the samples.

## **A giant primate from a small Island? Gigantopithecus from Java (Indonesia) and its relationship with mainland fossils**

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**Keywords:** Hominoid evolution, Migration, Insularism

### **Abstract**

In 1935, the German palaeontologist Ralph von Koenigswald described a new species of an ape from a single third lower molar he bought in a Chinese drugstore of Hong Kong which he named *Gigantopithecus blacki*, coining its giant size estimated to average 300 kg, making it the largest primate that ever lived. For the past ninety years, the genus *Gigantopithecus* is known by a single species and is now documented by four mandibles and 2000 isolated teeth, all from Chinese localities except a single canine recovered from Northern Vietnam. Here, two IMQP alumni will report on three new mandibles from a geographic area that is thousands of kilometres from China, in the name of Semedo on Java Island, Indonesia. Building on the seminal research of one of us (HW) in this palaeo-lagoon area, we will present and discuss on the similarities and dissimilarities of these three fossils with their Chinese counterparts, for both their external and internal morphology and morphometry.

## **Lithics in prehistory, from archaeological finds to museum objects: Theories and perspectives in the valorisation of a 'semi-invisible' heritage**

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**Keywords:** lithics, Palaeolithic heritage, anthropology of technology, prehistoric museology, valorisation

### **Abstract**

The material evidence documenting human origins and early prehistory constitutes heritage from the deep past. However, its vast temporal scale and the often unassuming and inconspicuous nature of early prehistoric remains render this heritage semi-invisible: tangible but the significance of which may not be immediately apparent to a non-specialist public. Stone tools are the quintessential expression of this. The prevalence of lithic artefacts in the archaeological record across space and through time has made them a foundational resource for studying changes in technique and tracing the emergence and evolution of technology, cognition, behaviour, and lifeways of prehistoric human groups. No other type of archaeological artefact is able to offer such deep context that can be traced, with continuity and progression, to at least 3.3 million years ago. Consequently, lithics define prehistoric museum collections. With a focus on the Italian context, the present work aims to: 1) examine lithic objects and their foundational role in the co-evolution of prehistoric archaeology as a discipline, lithic studies as a science, and the museum institution; 2) conduct object, museographic, and institutional analyses to investigate museum lithics, their state, interpretation, and surrounding logics; and 3) conceptualise valorisation strategies in which the multiple embedded meanings of lithics—both tangible and intangible—can be more rigorously and effectively communicated to museum publics. The concluding proposal, as is the research itself, is grounded in an interdisciplinary orientation, integrating theories and perspectives from archaeology, anthropology, museology, and heritage studies.

## **Archaeological And Archaeometric Investigations of Roman Mausoleum and Wall Paintings of Le Carceri Vecchie, San Prisco, Italy**

Sujitha Pillai\*<sup>1</sup>

\*IMQP cohort 2017-2019

<sup>1</sup>Independent Researcher

**Keywords:** Roman mausoleum, Campania, Frescoes, Pigments, funerary architecture.

### **Abstract**

In Roman times, the rich decoration of the tombs, which included sculptures, wall paintings, mosaics, and stucco reliefs, was often intended to attest to the social position of the owners. Additionally, these decorations are pivotal in terms of the symbolism of their representation of the afterlife. The current work presents one of the best preserved and least investigated funerary monuments of ancient Capua, the Mausoleum of the so-called. "Carceri Vecchie", with its mural paintings, is an indispensable archaeological testimony to the knowledge of that ancient metropolis that Cicero defined Altera Roma. The importance of the monument has been recognised since the Renaissance, a period in which the building was mentioned and depicted by numerous artists.

The Carceri Vecchie, also known as the Mausoleo delle Carceri Vecchie, is located along the modern route of the ancient via Appia in the commune of San Prisco, in the province of Caserta. With its elaborate architecture in circular typology, the mausoleum consists of three tombs with three panels of wall paintings in situ on each side. The mausoleum is usually dated around the Augustan period and preserves wall paintings executed in fresco style with refined stylistic solutions. The multidisciplinary approach adopted for studying the mausoleum and its paintings involves the collaboration of various specialists in mural paintings, ancient architecture, and archaeometry to study ancient polychromy. This presentation will focus on the results of the scientific investigation, such as broadband imaging, non-destructive analytical techniques, art-historical analysis of the paintings, their decorative programme, the current challenges, their digital reconstruction, tomb plundering, comparative analysis, and conservation measures.

## **Preliminary Research on Prehistoric Settlement in Southern part of Kebumen-Central Java (Indonesia)**

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\*IMQP cohort 2005-2007

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**Keywords:** Prehistory, Paleolithic, Settlement, Kebumen, Central Java

### **Abstract**

Java Island is a well-known Island in Southeast Asia relate to prehistoric human settlement history in the world. The route of human migration "west to east" of the island and discovery of some palaeolithic sites which had been found at the south-eastern part of java (e.g. industry of Pacitan) remains some questions about the possibility on the earlier prehistoric occupation at the western part.

This preliminary research focused on a Karstic formation located at Southern part of Kebumen Region in between western and middle part of Java. Some results indicated a long prehistoric occupation through its palaeolithic type artefacts to the appearances of neolithic ones.

# **Lateralization and brain asymmetries in humans through the study of the endocranium**

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**Keywords:** cerebral asymmetries, endocasts, petalia, lateralization

## **Abstract**

Paleoneurology explores brain anatomy and evolution by examining endocasts- molds formed from the endocranial cavity that reveal the brain's external morphology. The study of endocasts aims to study petalias, the most common cerebral asymmetries, where one hemisphere protrudes into the other hemisphere, leaving marks on the inner surface of the skull.

In this research, we work with a representative sample of 30 endocasts created from computed tomography scans of 30 *Homo sapiens* skulls equally divided between males and females, obtained from the NESPOS repository (Pleistocene People and Places) managed by the Neanderthal Museum.

The research focuses on identifying and quantifying the petalias present in this sample, and exploring possible relationships with sex, endocranial volume, dominant hemisphere, and manual laterality.

The results reveal a typical *Homo sapiens* petalial pattern, with positive petalia observed in 83% of the reconstructed endocasts. Among those in which petalia were identified, 64% present a right frontal and left occipital petalia, while 36% show a left frontal and right occipital petalia. We have also verified that petalias are not related to dominant hemisphere, sex or endocranial volume.

## **Climatic specialisation drives diversification**

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**Keywords:** Climatic niche, Diversification, Time-for-speciation, Mammals, Macroevolution

### **Abstract**

Understanding why some lineages diversify explosively while others remain species-poor is a central question in evolutionary biology. In this study, we investigated whether climatic specialisation — defined as the degree to which species are confined to specific climatic zones — promotes diversification and explains species richness across small mammals, including rodents, bats, insectivores, and lagomorphs. By combining global distributional data, life-history traits, and two large phylogenies, we analysed 4,231 species and showed that climatic specialisation is widespread but unevenly distributed across taxa and regions. Superspecialists (species confined to a single sub-climatic zone) exhibit significantly higher diversification rates, especially in temperate regions. However, this effect is strongly modulated by life-history traits, being most pronounced in short-lived lineages. Our results also show that the strongest predictor of species richness is clade age, supporting a time-for-speciation effect: older families have more species, regardless of niche breadth. Together, these findings suggest a dual mechanism shaping biodiversity: while climatic specialisation fuels diversification by promoting ecological isolation, evolutionary time governs long-term species accumulation. This work bridges macroecological and macroevolutionary theory and contributes to understanding the origins of mammalian megadiversity.

## 20 years of IMQP and 700,000 years of human evolution in the Philippines

Hugo Reyes-Centeno\*<sup>1</sup>, Maximilian Larena<sup>2</sup>

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<sup>2</sup>Uppsala University (Sweden)

**Keywords:** human evolution, Philippines, Southeast Asia, paleoanthropology, palaeogenetics

### Abstract

Over the last twenty years, researchers in prehistory and quaternary science have transformed how we understand human evolution—from pushing previous temporal boundaries of the earliest stone tools to the identification of new hominin taxa in unexpected locations and beyond. The launch of the International Master in Quaternary and Prehistory (IMQP) coincided with the Neanderthal Genome Project in 2006 and, since then, advances in paleogenomics have provided new ways for addressing previously intractable questions. Here, we review how joint archaeological fieldwork and genomic laboratory efforts in the Philippines are beginning to unravel the complexity of human evolution in Southeast Asia. Drawing on recent and ongoing work, paired with the many discoveries by IMQP/IDQP alumni and affiliated colleagues at the consortium institutions, we discuss how human occupation in the Philippine archipelago is characterized by multiple dispersals spanning the last ca. 700,000 years. In addition, we note how several questions remain unanswered and how several spatiotemporal gaps remain to be filled, including identifying the taxon of the first hominins in the archipelago, their connection to Denisovans and *Homo luzonensis*, and dynamics of admixture with the first *Homo sapiens* in the region, among other uncertainties. Finally, we offer some perspectives for additional research avenues in the Quaternary of Southeast Asia.

## **Throug Wear and Fire: An Experimental and Archaeological study of Use Wear Persistence on Burnt Flint from Tinshemet Cave**

Alice Rodriguez\*<sup>1</sup>, Natasha Solodenko<sup>2</sup>, Sapir Ben Haim<sup>2</sup>, Yossi Zaidner<sup>2</sup>

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**Keywords:** use-wear; fire; experimentation

### **Abstract**

Fire plays a critical role in Paleolithic technological and behavioral evolution, yet its impact on the preservation and visibility of use-wear traces remains poorly understood. Our study evaluates whether functional features (polish) can persist on burnt flint using an integrated experimental and archaeological approach. Experimental flakes made from Mishash Formation flint were used on various materials (bone, meat, ochre, wood), then heated under controlled conditions and analyzed using digital microscopy and confocal profilometry. The results show that heating changes the surface relief in consistent ways: it deepens existing valleys and slightly smooths the highest peaks, while the overall spatial organization and texture of the surface remain largely intact. These experimentally defined patterns provide a reference framework for assessing archaeological material from Tinshemet Cave, located in central Israel and dated to MIS 5. The site preserves dense occupation layers rich in combustion residues, with nearly 40% of the lithic assemblage showing macroscopic evidence of heating. Comparisons with archaeological flakes from Tinshemet cave demonstrate that their surfaces fall within the experimental range, with one flake aligning with butchery and another with ochre use. These findings indicate that although fire modifies surface roughness, it does not fully erase the topographic patterns linked to use. The study highlights the potential of confocal metrology for extending functional analysis to thermally modified assemblages and calls for the development of predictive frameworks that integrate temperature, duration, and material properties to refine the interpretation of fire-affected contexts.

## **Symmetry happens: Late Acheulean variability in handaxe production**

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**Keywords:** Late Acheulean, Handaxe variability, Technological analysis, Geometric Morphometrics, Symmetry

### **Abstract**

Acheulean handaxes have been interpreted for a long time as expressions of symmetry and standardization in Lower Paleolithic material culture. However, a growing body of research highlights a marked variability in both shaping strategies and final morphologies, challenging interpretations of symmetry as an intentional production goal. This study investigates Late Acheulean handaxe variability in Western Europe through an integrated technological and geometric morphometric approach. A sample of 88 handaxes from three key sites – Galería (subunits GIIa and GIIb, Spain), Guado San Nicola (stratigraphic unit c, Italy), and La Noira (stratum c, France) – is examined within its chrono-environmental framework to explore technological adaptability during the Middle Pleistocene. By combining qualitative technological analysis, multivariate statistics, and 3D geometric morphometrics, the study addresses handaxe variability from a complementary perspective. Rather than considering symmetry as an isolated attribute, the focus is placed on how different technological pathways can converge toward comparable morphological outcomes. Particular attention is given to the role of sites' specific function, environmental context, and raw material constraints, situating the analyses within the climatic transitions of MIS 12–11 and MIS 8–7. By contextualizing handaxe production within technological and environmental frameworks, this contribution aims to reframe symmetry not as a direct proxy for cognitive or cultural advancement, but as a secondary element emerging from flexible technological systems. In doing so, the research contributes to broader theoretical debates on Acheulean variability, challenging linear evolutionary models and emphasizing the adaptive nature of Late Acheulean lithic production.

## **IMQP, a Path to Study Ancient Metals in Indonesia**

Harry Octavianus Sofian\*<sup>1</sup>

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**Keywords:** IMQP, experience, ancient metals

### **Abstract**

During Master's studies in the International Master in Quaternary and Prehistory (IMQP) program in 2013-2015 at the Muséum national d'Histoire naturelle (MNHN) in Paris. Deepened study in prehistoric and early historical contexts in Indonesia. This multidisciplinary program, emphasizing Quaternary geology, prehistory, and interdisciplinary approaches to human past, provided with advanced training in archaeometric methods and analytical techniques essential for studying ancient materials. For master thesis, studies integrate methods like XRF, metallography, and morphostylistic analysis to reveal technological choices, exchange dynamics, and cultural interactions linked to metalworking traditions from Gua Harimau in South Sumatra.

The IMQP experience served as a pivotal step in academic path toward understanding ancient metallurgical practices, bridging archaeological fieldwork with scientific analysis. This trajectory continues in PhD and study how ancient metals shaped societies, economies, and migrations in the Southeast Asia region.

# **Electron Spin Resonance Geochronology and Heavy Mineral Provenance Analysis of Middle Pleistocene Fluvial Terraces in the Somme River Valley and English Channel Coast, Northern France: Implications for Landscape Evolution and Fennoscandian Sediment Supply**

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**Keywords:** ESR dating, Fluvial terraces, Heavy minerals, Provenance, Middle Pleistocene

## **Abstract**

A chronological assessment of Quaternary sediments is essential for elucidating landscape formation, paleoenvironmental shifts, and prehistoric hominin activity. This study evaluates the stepped fluvial terraces of the Northern France River System (NFRS), specifically within the Somme River Valley and the Pas-de-Calais coastal zone, utilizing a multidisciplinary geochronological and mineralogical approach.

Systematic multi-centre electron spin resonance (ESR) dating was applied to optically bleached quartz grains from key sites, including Amiens (“Rue du Manège”, “Îlot des Bouchers”), Abbeville (“Route de Paris”), Wimereux (“Pointe aux Oies”), and Wissant. By concurrently utilizing Al, Ti-Li, and Ti-H paramagnetic centres, the study established preliminary correlations with marine isotope stages despite uncertainties in long-term water content and burial depth. Results attribute an early Middle Pleistocene age (MIS 12) to Wimereux “Pointe aux Oies,” while the Amiens sites are assigned to the Middle Pleistocene with links to the Weichselian glacial phase. Conversely, age estimates for Abbeville were deemed unreliable due to poor reproducibility between Al and Ti centers. Complementary heavy mineral analysis of the 0.063-0.125 mm fraction revealed distinct compositional suites. Coastal assemblages (Wimereux and Wissant) show high frequencies of garnet, epidote, and hornblende, differing significantly from Somme River Valley signatures. Two primary provenance pathways were identified, associated with high-rank metamorphic and sialic igneous rocks, indicating the transport of fluvio-glacial materials from the Fennoscandian region by Scandinavian Ice Sheets. This integrated framework provides a refined understanding of Quaternary sediment dynamics and the environmental context of early hominin dispersal in Northern France.

## **Human Occupation on the continental margins of Humboldt's Archipelago**

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**Keywords:** Coastal Archaeology; Semiarid North of Chile; Hunter-Gatherer-Fishers; Humboldt's Archipelago

### **Abstract**

Despite its immense biodiversity, the Humboldt Archipelago in Chile (28-29° S) has been sparsely explored in archaeological terms. Over the last four years, the Arqueología del Semiárido Costero team—through the ANID-FONDECYT 122185 project—has worked to develop a comprehensive overview of the area's Holocene occupation, resuming research initiated in the late 1960s while exploring new archaeological sites. Contemporary archaeological research in area, particularly at north of the Elqui River mouth (29° S), has been scarce. A limited number of studies—most of which consist of technical reports conducted within the framework of the Environmental Impact Assessment System and generally lacking radiocarbon dates—have hindered the construction of a broader perspective to address the pre-Hispanic history of the human groups that inhabited these territories.

In this communication, we present a synthesis from the excavations of six previously undocumented archaeological sites, attributable to coastal hunter-gatherer-fisher communities in the aforementioned area, specifically on the continental margin of the Humboldt Archipelago.

These sites—SEO-1, Costanera, Caleta Chañaral Sur, Desvío, Punta de Choros, and Las Locitas—reveal a long-term coastal occupation, which pattern does not fully align with the land-use models proposed for Holocene developments in other areas of the Semiarid North. Consequently, these findings compel us to rethink these communities through their own distinct historical and environmental trajectories.

## **Form, function, and evolution of dental enamel in living and extinct hominoids**

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**Keywords:** Dental enamel, dietary adaptation, hominoid evolution, tooth biomechanics, non-human primates

### **Abstract**

Understanding the functional and evolutionary significance of tooth enamel is fundamental to reconstructing dietary adaptations and life histories in both living and extinct hominoids. This project seeks to elucidate the structural and functional properties of dental enamel and evaluate their implications for human evolution. Central to this research is the investigation of whether variation in enamel thickness and its spatial distribution across the tooth crown is systematically linked to biomechanical performance during food processing. Using a multidisciplinary framework, the project integrates dental functional biology, engineering, and food science to examine how non-human primate teeth interact with foods possessing different mechanical properties. Particular emphasis is placed on assessing how enamel thickness influence development of dental wear during mastication. Advanced three-dimensional computational modelling is employed alongside experimental mechanical testing to quantify tooth crown biomechanics under controlled conditions. Enamel thickness mapping enables high-resolution assessment of spatial variation across the crown, while mechanical testing provides empirical data on material behaviour and resistance to deformation. Dental wear patterns are analysed using Occlusal Fingerprint Analysis, offering insights into how repetitive loading and food mechanical properties shape enamel degradation over time. Together, these approaches provide an integrated understanding of how enamel thickness and distribution contribute to tooth function, wear resistance, and evolutionary adaptation. The findings are expected to refine interpretations of dental variation in the fossil record and enhance reconstructions of hominoid dietary ecology, shedding new light on the evolutionary significance of dental enamel.

## **Living Archives as a Documentation Approach for Cultural Heritage Management**

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**Keywords:** living archives, narrative documentation, heritage management, field-based insights.

### **Abstract**

Heritage management often requires bridging the gap between technical reporting, community experience, and policy needs. This presentation introduces living archives as a dynamic narrative documentation approach that captures the social, ecological, and institutional dimensions of heritage sites. Drawing on field-based experience at major Indonesian sites, including the Sangiran Early Man Site, this approach integrates narrative notes, on-site observations, and thematic documentation to provide a more contextual understanding of site conditions.

Insights from work in Indonesian World Heritage - the List and its Tentative- demonstrates how living archives can enrich assessments, support risk identification, and strengthen the basis for policy recommendations. By foregrounding lived experience alongside formal reporting, this method offers a practical way to connect field realities with decision-making processes, encouraging more responsive and inclusive heritage management models.

## **Variation of the mandibular angle in Middle Pleistocene *Homo*, *Homo neanderthalensis* and *Homo sapiens***

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**Keywords:** Gonion; Mandibular angle; Neanderthals

### **Abstract**

The goniac region is a mandibular feature with a particular morphology in *H. neanderthalensis*, also observed in several Middle Pleistocene fossils, such as a truncated shape and an inverted orientation. *H. sapiens* shows another pattern of intra-specific variability, from the typical regular and straight gonion to the expanded and everted configuration in the Upper Paleolithic Iberomaurusians. This study investigates variation in the morphology of the goniac area with reference to the outline of posterior and inferior mandibular borders, considering possible factors influencing the morphology: bone remodeling, cranial-mandibular integration and biomechanical strains.

For this purpose, 165 specimens were observed, comprising 6 Middle Pleistocene *Homo*, 12 *H. neanderthalensis* and 147 *H. sapiens*, divided into 107 Holocene individuals, 4 Upper Pleistocene and 36 Iberomaurusians. A classification of the observed specimens was done, categorizing them by shape (regular, truncated or expanded) and orientation (straight, inverted or everted) of the goniac area. After, the 70 semi-landmarks outlines were studied by landmark-based Principal Component Analysis and Elliptical Fourier coefficients. The results distinguish *H. sapiens* from *H. neanderthalensis*, with MP *Homo* specimens being close to the latter. An association between the morphology of the goniac area, the ramus border height and incurvation is also indicated, although pattern and causes of variation are yet unclear. *H. neanderthalensis* and MP *Homo* are characterized by shorter, straight posterior ramus border and truncated goniac area, while *H. sapiens* has longer, curved ramus posterior border with regularly curved goniac region. The *H. sapiens* intra-specific variability is indicated by the inclination of the ramus and the eversion of the gonion, seen more emphatically in Iberomaurusians. The conclusions confirm previous observations and advance the debate on the goniac morphology and its phylogenetic significance.

## **Lithic technological variability and the South Asian Palaeolithic: Insights from a typo-technological and reduction sequence analysis of select Palaeolithic techno-complexes from India**

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**Keywords:** South Asia; Lithic technology; Variability; Reduction sequence; Palaeolithic

### **Abstract**

The South Asian Palaeolithic encompasses a wide range of spatial, temporal, geographic and geological contexts. These multi-scalar resolutions of contexts introduce a wide-range of factors for lithic technological variability. However, a historiographical emphasis on 'diagnostic' lithic elements and 'finished forms' has resulted in the under-representation of this variability. This paper presents the results of an inter-assemblage comparison of nine selected lithic techno-complexes from India to address the question of lithic technological variability. Detailed typo-technological and reduction sequence analyses are undertaken on these selected assemblages resulting from field collections by the author as well as the reinvestigation of historical archival collections housed in various repositories in India and Germany. These inter-assemblage comparisons suggest an underlying structural uniformity between the different assemblages, coupled with variability resulting from technological adaptations to tackle regional environmental factors, such as the available raw material, the dimensions and morphology of these raw material clasts and possible site functions. It is believed that these results would help better characterise the range of multi-scalar resolutions of variability represented by the lithic assemblages and their associated technological behaviours, helping better understand and reconstruct past human lifestyles and behaviour - the ultimate goal of archaeology.

## **The Role of THNHM's Marine Mammals Collection for Research and Public Engagement**

Cholawit Thongcharoenchaikit\*<sup>1</sup>, Thitima Phumak<sup>1</sup>, Wanchai<sup>1</sup>, Sukkasem<sup>1</sup>, Yutthapong Rassamee<sup>1</sup>, Phattareeya Soiin<sup>1</sup>, Chatchaiy Chueachat<sup>1</sup>, Sunchai Makchai<sup>1</sup>, Bang-on Changlom<sup>1</sup>

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**Keywords:** Marine Mammals, Museum Collection, Museum Specimens

### **Abstract**

Marine mammals collection of Thailand Natural History Museum (THNHM) contains wealth of data ranging from genetic and phylogenetic, biographical, biogeographic, and ecological information. Collection specimens serve as fundamental of traditional taxonomic and systematic researches for a record of biodiversity and wildlife conservation. They also make innumerable contribution to science and public engagement. Three aspects of marine mammal collection and their uses are discussed here: 1) History of collection, specimens preparation and curation; 2) the use of specimens in taxonomy and associated fields of study 3) the use of specimens in assessment of biological profile (sexual dimorphism, age estimation, dental pathology and bone diseases); and 3) Using collection specimens as an essential teaching and learning resources in public engagement. Furthermore, the need to increase the visibility of the inherent value of marine mammal collections and the care of the specimens for future generations are also discussed.

## **The dynamics of human occupation and environmental change prior to Nakomsé in the Massili sub-basin (tributary of the Nakambé River)/Burkina Faso**

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**Keywords:** Occupation dynamics, Massili, archaeology

### **Abstract**

The Massili sub-basin is located in central Burkina Faso and covers an area of 4,525 km<sup>2</sup>. Burkinabe historiography, based mainly on oral tradition and a few Arab and European explorer sources, identifies two main phases of settlement in this area. The first phase consists of a settlement that is believed to have been composed of Nĩnsi, Yõnyõnse, and Kibsi or Dogon peoples since the 11th century AD. The second phase, which began around 1400 AD, was marked by the arrival of an aristocracy called the Nakomsé, founders of the Mossi kingdoms, notably that of Waogdogo (Ouagadougou). However, our preliminary surveys in the area have enabled us to identify thousands of archaeological sites, including stone tool production sites, ancient iron metallurgy sites, settlements, necropolises, etc., most of which are attributed to the “people of the past,” i.e., those who preceded the populations mentioned above. The first excavations of settlement sites and ancient iron metallurgy sites have uncovered a variety of archaeological artifacts, including numerous human remains, and radiocarbon dating has placed human occupation in the area under consideration between 4000 BC and 1100 AD. The stone tools, made mainly from granite and quartz, display characteristics of the Middle and Late Stone Age, suggesting dynamic occupation of the Massili basin from prehistoric times until the supposed arrival of the Nakomsé. Further investigations aim to determine, on the one hand, the human and environmental dynamics in the Massili sub-basin from prehistory to the 15th century and, on the other hand, to pinpoint the transition between the end of prehistory and the beginning of the Iron Age. Furthermore, this research could provide a better understanding of the role played by this transition zone between the Sahel and the Atlantic Ocean in the waves of migration resulting from the ebb and flow of the Sahara.

## **Application of Quaternary Archaeology into Manga Creation**

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**Keywords:** Comics; Public Archaeology; Practice as Research (PaR); Cognitive ; Totemic Symbolism; Hero's Journey

### **Abstract**

This research addresses the challenge of translating archaeological knowledge into forms accessible to a broader public. Archaeology, as a highly specialized discipline, often presents complex data and interpretations that are difficult for non-specialists to grasp. Comics, as a cross-cultural medium of visual narrative, provide a unique opportunity to reframe academic knowledge through symbols, storytelling, and emotional resonance. The originality of this research lies in its experimental integration of archaeological knowledge with the creative process of comics. Rather than treating art merely as a tool of illustration, the thesis explores comics as a research practice in their own right, capable of testing how archaeological information can be transformed into coherent narrative structures and visual symbolism. By focusing on the case of Göbekli Tepe and related prehistoric contexts, the study draws on the framework of Practice as Research (PaR), cognitive archaeology, and Jungian archetype theory, while also engaging mythological structures such as Joseph Campbell's hero's journey.

The research outcomes propose a cross-disciplinary narrative model that connects archaeological evidence, symbolic interpretation, and visual storytelling. Instead of presenting a fully developed system, the study attempts to establish a preliminary totemic framework based on prehistoric symbolism and explores how such knowledge can inform fictional world-building in comics. This exploratory approach illustrates how rigorous academic content can be preserved while opening new possibilities for creative interpretation.

Ultimately, the thesis contributes to the field of public archaeology by highlighting the potential of cross-media creation to bridge the gap between scientific knowledge and cultural imagination. It argues that when art and science are brought together, they can offer new pathways for both scholarly inquiry and public engagement.



# ***Twenty years of memories***

International Master in Quaternary and Prehistory  
International Doctorate in Quaternary and Prehistory





*In memory of our beloved friends*

*Sheldon Clyde Jago-on  
Victor Paz  
Eusebio Dizon*





I started with no idea on which topic I would like to focus my studies. A bit lost in the archeology field and research world. The only clear thing was to study the first year in Tarragona and move to Ferrara in the second one (good vibes, good food, good weather, you know, Mediterranean culture). Scared to go to the expensive and cold Paris, which I have never visited before. After one year of the course, I got invited to study a bone industry assemblage, but I was blind, with no idea or even experience. So, after having been accepted to do my mobility in Ferrara and everything already planned and filled. Suddenly, all changed, my director decided to send me to Paris and try to find there some help with the bone industry study. I went there, scared and with empty pocket, 0% expectation, 100% fear. Then I met there a couple of teachers in the first class which recommended me to speak with one research specialized on bone industry. That was the moment everything changed. When I met my new supervisor and mentor. She opened my eyes and guided me through the world of technology. Taking this initial stage of euphoria to seeing Paris through different eyes. A vision that made me enjoy the city as never imagined before, turning my stay in Paris into the best decision and time where months gave years to my life. A place where I met good friends and important researchers who inspired me to continue working in this field.

Miguel (IMQP 2023-2025)





IMQP has been the best year of my academic life, not just because of what I learned, but because of the people I shared it with. It brought together friends and collaborators from all over the world, and somehow turned strangers into family.

Tannistha (IMQP 2021-2023)

The two years I spent in IMQP have been deeply meaningful and will stay with me for life. I gained so many lessons and experiences, moments of joy, moments of struggle, and times when I felt I could have done more. Still, I am truly grateful for my first year at UNIFE, where I felt supported by many people and encouraged to keep growing.

Devi (IMQP 2023-2025)





The V Apheleia International Seminar of Mação from 8-15 March, 2019. One of the most memorable experiences from the Prehistoric Europe workshop was engaging directly with ancient techniques — from pounding grains with a quern and muller to drilling tiny holes for shell necklaces. I tried hand-painting using the blow technique, mixed ochre pigments, worked with clay, and made miniature models of food. Each activity offered a tangible link to prehistoric life. Still, what stayed with me most was the sense of human ingenuity and creativity — from the precision of toolmaking to the joy of shaping clay and ornaments and leaving traces of art on rock surfaces. Forever indebted to IMQP for this opportunity.

Sujitha (IMQP 2017-2019)

While I hold countless memories with professors and students close to my heart, the experience shared with Sara Daffara remains one that deeply taught me patience in my life.

Namrata (IMQP 2020-2022)

Pitche - Pitche (means: Picture-Picture by some friends from China ;-))

Andri (IMQP 2005-2007)







Una rondine non fa la primavera.  
Andrej (IMQP 2018-2020)

During the international exchange in January, a group of friends from the program and I spent a weekend in Burgos to visit the Museum of Human Evolution and the Atapuerca sites. That trip finally made us understand why one of our classmates from Burgos used to walk around Tarragona in a T-shirt in the middle of winter, insisting that it was "hot," while the rest of us were bundled up in sweaters.

Alice (IMQP 2016-2018)

I think Dr Martha is the same old like Madame Tosca from IPH/MNHN when I was at 1st EM meeting in Brussel, 2005  
Kasman (IMQP 2004-2006)





What I remember most vividly is the atmosphere: the fog, the silence, and an unsettling loop of Jingle Bells playing over the loudspeakers. Looking back, it still makes me smile, because it genuinely felt like a scene from an 80s horror movie. That memory is inseparable from the people who shaped my IMQP/IDQP experience and made those years so meaningful. I think of colleagues and friends such as Darko, Alma, Ugo, Sara, Picci, Matteo, and also Luiz and Pierluigi, whose presence and guidance were an important part of that shared academic and human journey. The Central was usually the place where we gathered together, and that night, finding myself almost alone made me realise how important those shared moments had been.

Gabriele (IDQP 2015-2017)





Erasmus Mundus Master Thesis defenses on Mação, All the people from the consortium gathering in our tiny town, even so best graduation party! Endless hours of experimenting on carcass processing, and the subsequent churrasco with our mates on Casa Mundus (saudades do meu irmão Pithi).

Boris (IMQP 2018-2010)



To be continued....