CAA 2026

31 march - 4 april

IT'S ALL ABOUT PEOPLE

Vienna

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Posters.....28


ArcheoBase


RIEGL®


arches®


intrasis
intrasite information system


heritage


MAiA
Managing
Artificial Intelligence
in Archaeology

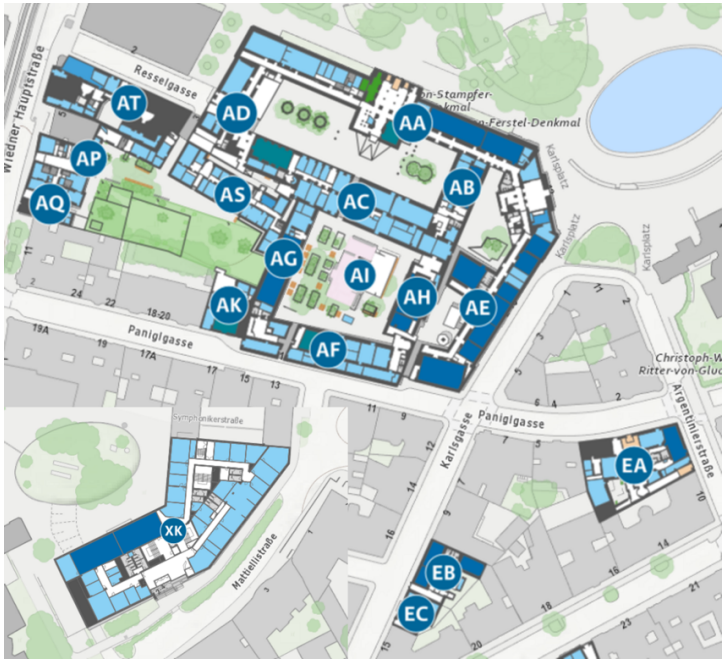

itml
innovation applied

Venues

Workshops at TU Wien

On Tuesday 31 March 2026 CAA2026 will host a full day of workshops for participants.
They will take place at TU Wien (Vienna University of Technology).

TU Wien, Campus Karlsplatz: Karlsplatz 13, 1040 Vienna



Conference Sessions at University of Vienna

All sessions will take place 1 April – 3. April 2026 at the conference venue, University of Vienna, main building.

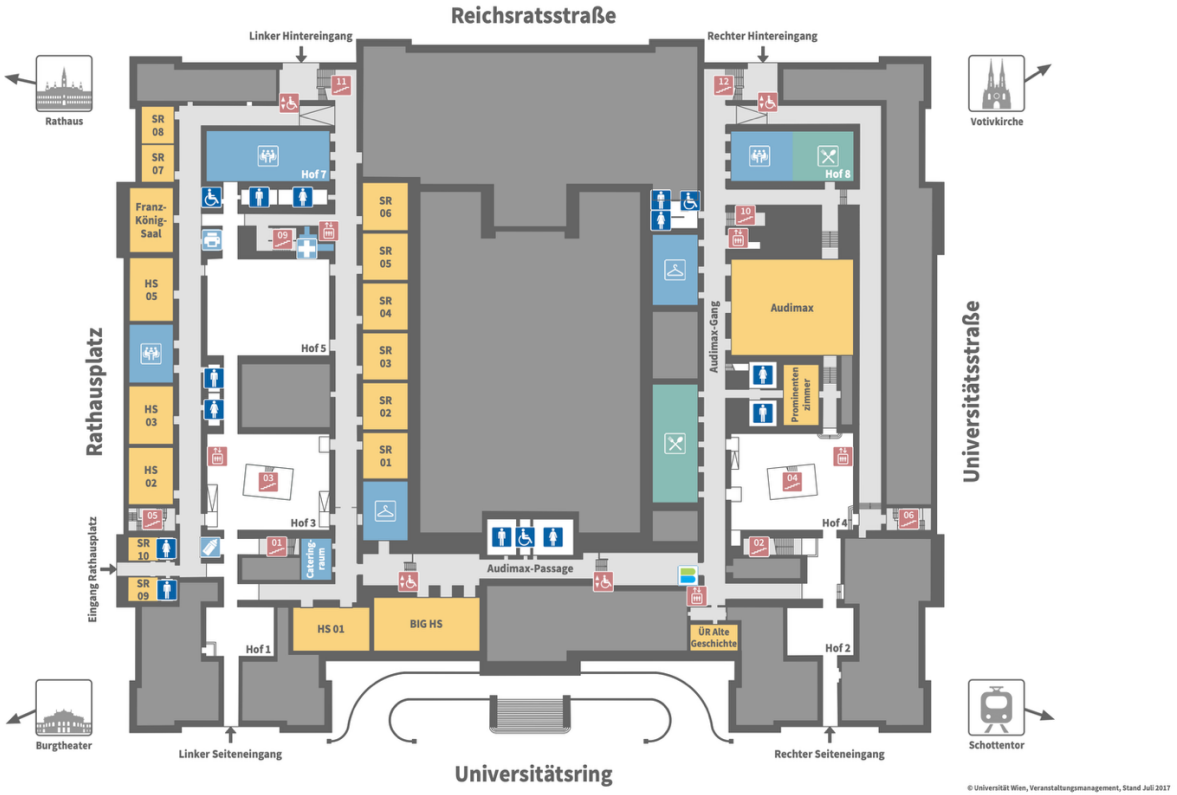
University of Vienna: Universitätsring 1, 1010 Vienna

University of Vienna

Lower Ground Floor (Tiefparterre): Lecture Rooms

universität wien

Hauptgebäude der Universität Wien
Tiefparterre Übersichtsplan



Mezzanine Floor (Hochparterre): Registration and Information Desk

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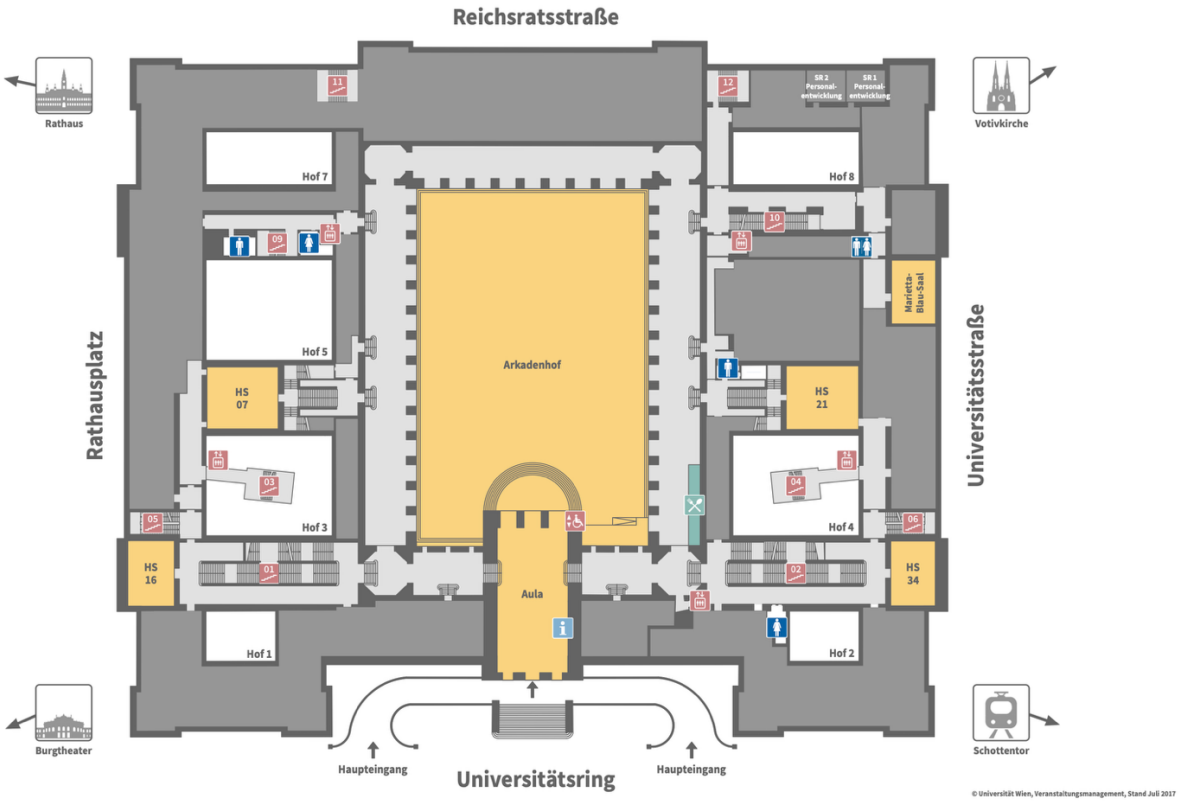
Hauptgebäude der Universität Wien
Hochparterre Übersichtsplan



First Floor (1. Stock): Coffee Breaks, Poster Exhibition, Exhibition

Social Events

Icebreaker Reception

The traditional CAA Icebreaker Reception is included in the conference fee and will take place in the Kuppelsaal at TU Wien on 31 March 2026 from 17:00 – 22:00.

TU Wien, Campus Karlsplatz: Karlsplatz 13, 4th floor, 1040 Vienna
https://maps.tuwien.ac.at/?q=AA0448

Conference Dinner

The CAA Conference Dinner will be held at *Heuriger 10er Marie* on 2 April 2026 from 19:00– 00:00.

Offered are typical Viennese dishes (meat, vegetarian, vegan), desserts and Viennese wine and *Most* (alcohol-free grape juice).

There is a limited number of places available, so make sure to book your ticket at registration!

Heuriger 10er Marie is 15 min away from the venue.
Take tram 44 from Schottentor (direction Maroltingergasse) get off at Johannes Krawarik Gasse.

Heuriger 10er Marie, Ottakringer Str. 222/224, 1160 Vienn

Schedule

Tuesday, March 31										
09:00-12:00	Exploring prehistory with the ROCEEH Out of Africa Database (ROAD)	Documenting Archaeological Fieldwork with iDAI.field: Hands-On Workshop on Usage, Configuration, and Synchronization	3D documentation and multi-sensor data integration	Increasing interoperability and reproducibility of archaeometric data with R	From Zero to Plotting: R for Anyone	InSites: Gen-AI assistant for cultural significance assessment	Chronological modelling with ChronoLog: theory and practice	Itiner-e: contributing to the collaborative digital atlas of Roman roads	Using the ArchaMap application for data synthesis and FAIR data	Open Hardware and Low-cost Electronics and IoT for sensing and monitoring
12:00-13:30	Lunch break									
13:30-16:30	Exploring prehistory with the ROCEEH Out of Africa Database (ROAD)	Documenting Archaeological Fieldwork with iDAI.field: Hands-On Workshop on Usage, Configuration, and Synchronization	3D documentation and multi-sensor data integration	Increasing interoperability and reproducibility of archaeometric data with R	From Zero to Plotting: R for Anyone	Seamless Visualization, Statistical Exploration, and Web Diffusion of Archaeological Spatial Data with the Open-source archeoViz Software Ecosystem	Publishing, Documenting and Enriching 3D Cultural Heritage Objects: A Hands-on Workshop with (Semantic) Kompakkt	Code review and best practices in programming	Efficient Archaeological Data Management with ArcheoBase: From Digital Data Entry to Analysis and Publication	
17:00-22:00	Ice breaker party									

Wednesday, April 1								
	Auditorium Maximum	Hörsaal BIG	Franz König Saal	Hörsaal 01	Hörsaal 02	Hörsaal 03	Hörsaal 05	Oktogon
08:30-10:00	Welcome and Keynote							
10:00-10:30	Coffee break							
10:30-12:30	Session #3 Methodological and Theoretical Research in Digital Achaeology	Session #8 Digital Methods in Rock Art Research II. Connecting People: Reconstructing the Contexts of Past Visual Communication Systems	Session #49 Bridging Micro and Macro Perspectives in the Modelling of Past Human Ecosystems	Session #31 Computational Archaeology Revisited: Building Bridges with Mathematics and Computer Science	Session #18 Connecting the Americas: A Pan-Regional Dialogue among CAA Chapters	Session #47 Artificial Intelligence, a Step into the Post-digital Era of Archaeology?	Session #5 People from the Underground: Towards a Digital Archaeology of Subterranean Environments	Poster session
12:30-13:30	Lunch break							
13:30-15:30	Session #3 Methodological and Theoretical Research in Digital Achaeology	Session #8 Part II	Session #49 Part II	Session #31 Part II Session #36 Composed for Success: Making the Most of Chemical Data in Archaeometry	Session #30 Unstoppable Vision, Immovable Practice: An Adversarial Debate on Linked Open Dreams and the Reality of Archaeological Data Collection	Session #47 Part II Session #20 Digital Archaeological Collections as AI Training Data	Session #5 Part II Session #4 Computer Applications in South Asian Archaeology	
15:30-16:00	Coffee break							Poster exhibition
16:00-19:30	Session #3 Methodological and Theoretical Research in Digital Achaeology	Session #8 Part III	Session #2 Our Little Minions VII: Small Tools with Major Impact	Session #36 Part II	Session #6 Unlocking Hidden Treasures: Digital Methods as the Key to Open Archaeological Collections for Research and Teaching	Session #20 Part II	Session #4 Part II	

8:00-18:00 - Registration and information desk, Aula, University of Vienna, Universitätsring 1, 1010 Vienna

Thursday, April 2

	Auditorium Maximum	Hörsaal BIG	Franz König Saal	Hörsaal 01	Hörsaal 02	Hörsaal 03	Hörsaal 05	Oktogon
8:30-10:30	Session #3 Methodological and Theoretical Research in Digital Achaeology	Sesion #22 Ethics in Digital and Computational Archaeology	Round Table #41 New Advances and Directions of 3D Analysis in Archaeology	Session #1 Hic sunt dracones? Link 'em all! Linked Open Data, Wikidata and CIDOC CRM in Archaeology	Round Table #24 Real-World Perspectives on Building Research Data Infrastructures	Session #29 AI Across the Heritage Pipeline: From Algorithms through Fieldwork to Deliverables	Session #16 "All Models are Wrong": Learning from Failure in Computational Archaeology	Poster exhibition
10:30-11:00	Coffee break							
11:00-13:00	Session #3 Methodological and Theoretical Research in Digital Achaeology	Session #52 Beyond Fun and Games? Rethinking Archaeogaming, Play, and Digital Heritage	Session #21 Computational Approaches to Archaeology in Latin America and the Caribbean: Building Regional Dialogues	Sesssion #1 Part II Session #19 Structuring the World Beyond: Analytical and Computational Approaches towards Protohistoric and Early Medieval Funerary Data	Session #15 MuVAMoLa Part Two: Multivarite Approaches to Mortuary Landscapes	Session #29 Part II	Session #14 Fighting Crime with Computational Archaeology Session #51 From Satellite to Unmanned Platforms	
13:00-14:00	Lunch break							
14:00-16:30	Session #3 Methodological and Theoretical Research in Digital Achaeology	Session #52 Part II	Session #21 Part II	Session #19 Part II	Session #17 Channels of Change Interdisciplinary Approaches to the Archaeology of Fluvial Environments	Session #42 The Reuse of Digital Archaeological Archives and Data: Pathway to New Knowledge or Dead End?	Round Table #35 Chronological Modelling III A Round Table on Time in Computational Archaeology	
16:30-17:00	Coffee break							
17:00-18:30	CAA International AGM							
19:00-23:00	Conference Dinner							

8:00-18:00 - Registration and information desk, Aula, University of Vienna, Universitätsring 1, 1010 Vienna

Friday, April 3

	Auditorium Maximum	Hörsaal BIG	Franz König Saal	Hörsaal 01	Hörsaal 02	Hörsaal 03	Hörsaal 05	Oktogon
8:30-10:30	Session #45 Computational Archaeology at Scale: Large Spatial Datasets for Unveiling Cultural Landscapes	Session #25 How to do ROAD: An Essential Tool for Conducting Multidisciplinary Studies Related to Human Evolution	Session #43 Digital Evolution in Archaeological Practice: From Innovation to Infrastructure and FAIR data	Session # 37 Future Sight on Past Landscapes: Vision Foundation Models for Archeological Remote Sensing and Landscape Archaeology	Session #33 Generative AI, Text Mining, and Semantic Modelling: Using Big Models for Big Problems, FAIRly!	Session #40 Digital Archaeology for Heritage under Threat: Modelling Climate Hazards and Landscape Change	Session #44 Data are People: Data Making as Mirror of Past and Present Practice Session #46 The Human Factor in Archaeological Data Recording	Poster exhibition
10:30-11:00	Coffee break							
11:00-13:00	Session #45 Part II	Session #25 Part II Session #32 Replay: Computational Heritage of Games	Session #43 Part II	Session #50 Heritage under Bombs. Mitigating Destruction in Rapidly Evolving World	Session #33 Part II	Session #40 Part II Session #12 Data Management Plans in Practice	Session #46 Part II Session #7 Reframing the Past: Cognitive, Psychological, and Computational Approaches to Interpreting Artefact Function	
13:00-14:00	Lunch break							
14:00-16:00	Session #9 AI Applications in Cultural Heritage and Archaeological Protection	Session #34 Modelling Seafaring: Methodological Retrospective and Future Roadmap	Session #10 Exploring Past Senses. Digital Tools and Methodologies for Sensory Archaeology	Session #50 Part II	Session #33 Part III Session #27 Digital Communities: Collaborative Archaeologies, Shared Authority, and Community-Led Technologies	Session #39 Palaeo-GIS	Session #13 If I Had a Hammer, I'd 3D-Scan It: Computational Approaches for the Analysis of Tool Artifacts	
16:00-16:30	Coffee break							
16:30-18:30	Session #9 Part II	Session #34 Part II	Session #10 Part II	Session #11 Reframing Cultural Properties Rather than as "Relics of the Past" but as "Objects that Stimulate Modern People's Perception, Sensibility, and Meaning-Making"	Session #27 Part II	Session #39 Part II	Session #13 Part II	

8:00-17:00 - Registration and information desk, Aula, University of Vienna, Universitätsring 1, 1010 Vienna

Tuesday

Full-day workshops

Exploring prehistory with the ROCEEH Out of Africa Database (ROAD)

Christian Sommer, ROCEEH Research Center

Jesper Borre Pedersen, ROCEEH Research Center

Christine Hertler, ROCEEH Research Center

Andrew Kandel, ROCEEH Research Center

ROCEEH Out of Africa Database (ROAD) is a comprehensive, interdisciplinary resource for the study of human evolution (Kandel et al. 2023). Developed over the past 18 years by the ROCEEH research center (The Role of Culture in Early Expansions of Humans), ROAD integrates archaeological, anthropological, and paleoenvironmental data from Africa and Eurasia, spanning a period from 3,000,000 to 20,000 years before present.
ROAD currently contains information on over **28,000 assemblages** and **2,600 localities**, compiled from more than **6,300 publications in over 10 languages**.

It has become a critical tool for researchers conducting quantitative, computer-based analyses of human evolutionary history at multiple spatial and temporal scales (see: https://www.zotero.org/groups/5497463/roceeh/library).

This **full-day workshop** offers an introduction to the structure and core concepts behind ROAD. Participants will engage in **hands-on exercises** using browser-based user interfaces for streamlined data exploration. The workshop will also introduce the newly developed **R package 'roadDB'**, which enables seamless access to ROAD through one of the most widely used platforms for data analysis.
Finally, participants will have the opportunity to develop and run their own queries, with direct support from the ROCEEH team, playing the groundwork for incorporating ROAD into their own research.

References:

https://www.roceeh.uni-tuebingen.de/roadweb\

Kandel, A. W., Sommer, C., Kanaeva, Z., Bolus, M., Bruch, A. A., Groth, C., Haidle, M. N., Hertler, C., Heß, J., Malina, M., Märker, M., Hochschild, V., Mosbrugger, V., Schrenk, F., Conard, N. J. (2023). The ROCEEH Out of Africa Database (ROAD): A large-scale research database serves as an indispensable tool for human evolutionary studies. PLOS ONE, 18 (8), e0289513.

https://doi.org/10.1371/journal.pone.0289513\">https://doi.org/10.1371/journal.pone.0289513

Documenting Archaeological Fieldwork with iDAI.field: Hands-On Workshop on Usage, Configuration, and Synchronization

Fabian Riebschläger, German Archaeological Institute

Lisa Steinmann, German Archaeological Institute

iDAI.field (https://github.com/dainst/idai-fieldn) is free, open-source software for documenting archaeological fieldwork. It was developed and used by the German Archaeological Institute (https://www.dainst.org/\) since 2016, and has since 2023 been further advanced in the context of NFDI4Objects in collaboration with VZG (https://www.gbv.de/informationen/Verbundzentrale\).
The iDAI.field ecosystem comprises FieldDesktop (offline-first data capture), Field Hub (internet synchronization), and Field Web (publication), enabling an end-to-end workflow from trench to dissemination. Its configurable data model, validation features, and open, standardized exchange formats support re-usability, comparability, and downstream archiving in line with FAIR principles.

Core capabilities

- A core data model for archaeological excavations that ensures basic comparability of all projects created with iDAI.field
- Flexibility to extend this data model, so that it can be adapted to the needs of different archaeological domains via a graphical configuration management. Built-in mechanisms for standardization and quality management to support comparability and reuse.
- Integrated image handling and geodata support.
- A customizable type management for e.g. find classification.
- A multilingual user interface (currently translations in 7 languages available) and multilingual data entry in any language .
- Inventory support with QR-code recognition.
- Full offline functionality with robust synchronization, both offline and online.
- Installation on all common desktop operating systems
- Strong emphasis on easy usability for quick on-boarding of field personell, such as students
- Import and export in standardized, open file formats
- Data and configuration access via REST API for integration with other systems or data analysis

What the workshop covers

This hands-on session introduces the essentials for using and tailoring iDAI.field with curated sample data. Short inputs alternate with practical exercises to help participants:

- Set up a project; understand the core data model, entities, relations, value lists, and type management.
- Configure an extended data model via graphical tools for different usage scenarios.
- Manage images and integrate geodata effectively.
- Apply quality-assurance and standardization options that enhance comparability and reuse.
- Import and export data with open formats.
- Collaborate safely using local backups and synchronization across multiple desktops
- Explore the REST API for lightweight interoperability with external systems

The workshop is designed to be directly transferable to active or planned field work without requiring programming skills
Target audience: Researchers at all career stages working in excavation, building archaeology, find processing or on surveys, who want offline, robust, shareable, and maintainable digital field documentation workflows.

3D documentation and multi-sensor data integration

Ing. Bernhard Groiss, RIEGL LMS GmbH

Dr. Matthias Kucera, RIEGL LMS GmbH, University of Vienna

3D recording techniques became manifold during the last two decades, when laserscanning was first being used for archaeological purposes. Early work started to deal with terrestrial Laserscanning (TLS) for recording architecture, archaeological excavations and arcaheological landscapes. Airborne Laserscannig (ALS) is also applied for detecting new archaeological structures under vegetation cover. In addition, photogrammetric methods (Image based Modelling) became a complementary tool, which is used widely. To guarantee comparability of datasets standardized workflows for data acquisition, processing and filtering are crucial.
It is a great honour for Riegl LMS to organize a workshop aiming on the application of Laserscanning in cultural heritage and archaeological research. Long-term expertise in survey planning, processing, filtering, analysis and presentation of the data will be brought in by our trainers and partners. It is also a chance for us to learn more about current specific demands of archaeological research for more accurate implementation of features to our products. In this sense we are pleased to share our knowledge to pin down standardized methods for 3D recording of archaeological entities.

In the **first part** of the proposed workshop, we want to focus on TLS consisting of:

- Survey strategies
- Georeferncing including coordinate systems
- Monitoring
- Processing workflows
- Combination of TLS data and 3rd party results in RiSCAN PRO, Filtering of vegetation (LIS TreeAnalyzer, RiSCAN PRO plug in) and other filtering techniques
- Preparation of data for display and presentation
- Exchange with GIS-tools and software
- Practical training will be carried out with Riegl LMS VZ-600i and the software RiSCAN PRO

In **part two** complementary datasets and their integration will be presented:

- Unmanned Aerial Laser scanning (ULS)
- survey strategies
- data processing and filtering
- Combination of TLS and ULS (ALS) datasets
- Bathymetric Laserscanning (BLS)
- technical introduction
- overview of the integration of photogrammetric datasets (Image based Modelling, Reality Capture)
- Integration of other sensor data (Infrared
- Interface to GIS-software

Attendees will benefit from:

- Presentation of newest TLS, ULS and BLS Laserscanners from Riegl LMS
- Practical training with VZ-600i
- Integration of different datasets (TLS, ULS, BLS
- Basic knowledge of the software RiSCAN PRO
- Design of specific survey strategies
- Presentation of results
- Analysis of the data
- Preparation of data for further spatio-temporal analysis in GIS and other tools

Increasing interoperability and reproducibility of archaeometric data with R

Thomas Rose, Leibniz-Forschungsmuseum für Georessourcen/Deutsches Bergbau-Museum Bochum

Alexandra Rodler-Rörbo, Austrian Archaeological Institute, Austrian Academy of Sciences

Increasing interoperability of datasets is pivotal for the implementation of the Open Science principles throughout the research data life cycle. As a step forward in archaeometry (the material-scientific analysis of usually inorganic archaeological materials) towards this goal, (https://www.lorentzcenter.nl/towards-an-archaeological-science-toolbox-in-r-astr.html) a workshop at the Lorentz Center in Leiden developed a common language for naming of datasets and data conventions in October 2025. The results were formalised in the R package ASTR (https://github.com/archaeo-thommy/ASTR\) and are described in its vignettes.

In addition to this common language, ASTR includes a collection of commonly used tools for data processing, visualisation, and interpretation in archaeometry to ease the transition from Excel and similar software towards scripting languages, increasing reproducibility and transparency. In this regard, ASTR is envisioned to complement existing and future packages for other specialisations in the archaeological sciences, ultimately creating an interoperable software ecosystem for the archaeological sciences and neighbouring fields.
This hackathon aims to continue the work started at the Lorentz Center while opening the project to the entire community. During the hackathon, the participants will be introduced to the common language and will be trained on how to integrate it in their functions. The workshop will focus on the development and refinements of the common language and participants can either work on functions and tools for ASTR or on adding support for the common language in other packages.
In addition, the workshop will offer the opportunity to meet the maintainers of ASTR and to discuss with them. ASTR is envisioned to be developed in a community effort, meaning that the maintainer team welcomes anyone who wants to join them on their quest towards interoperability and repeatability in archaeometry and beyond. Consequently, the next steps of the project will be discussed with all participants during the workshop.

From Zero to Plotting: R for Anyone

Petr Pajdla, Czech Academy of Sciences, Institute of Archaeology, Brno

Peter Tkáč, Czech Academy of Sciences, Institute of Botany

Vít Kozák, Masaryk University, Department of Archaeology and Museology

"We will close your brackets and find all your missing commas!"
Intimidated by R? You're not alone. Whether you've never written a line of code or struggled through previous attempts, this workshop is designed for you. We'll demystify R and show you that data analysis and visualization aren't just possible for archaeologists, they're powerful tools that will transform how you work.
Over this hands-on session, we'll guide you through the complete workflow: installing essential packages, reading, transforming and plotting data and ultimately understanding why R matters for reproducible research. We'll use archaeological data, clean it up, organize it the "tidy" way, transform it to answer your questions, and create publication-ready plots.
We want you to leave the workshop with confidence to keep on coding!

What You'll Learn

- Starting R and R Studio for the first time
- Installing packages

- Working in scripts and projects
- Reading your data with readr package
- Data cleaning and organizing them the *tidy* way with tidyr package
- Transforming and summarizing data with dplyr package
- Creating compelling visualizations in ggplot2 package

Who Should Apply

- Complete beginners with no coding experience
- People who've tried R before and found it frustrating
- Archaeologists wanting to improve data analysis and visualization skills
- Anyone curious about reproducible research workflows
- No prior programming experience necessary
- Just bring your laptop (with R (https://cran.rstudio.com/) and RStudio (https://posit.co/download/rstudio-desktop/)installed) and willingness to learn.

Format: Hands-on coding workshop with guided examples, archaeological datasets, and time to practice. We'll troubleshoot together and emphasize learning over perfection

This workshop is co-organized by **CAA Special Interest Group on Scientific Scripting Languages in Archaeology** (**SSLA**), see https://sslarch.github.io/), (https://sslarch.github.io/)

Half-day workshops

Open Hardware and Low-cost Electronics and IoT for sensing and monitoring heritage assets

Juan Palomeque-Gonzalez, IDEA, Madrid

The rapid development of sensing technologies and analytical methods has made the use of IoT and smart devices increasingly valuable for monitoring environmental conditions that affect heritage assets, such as museum collections, archaeological sites, and historic buildings. Yet, the high cost of many commercial solutions often creates barriers for research teams with limited budgets. Furthermore, even affordable devices are frequently tied to proprietary service providers and closed cloud platforms, restricting flexibility and long-term sustainability.

This workshop introduces participants to open hardware and low-cost electronics for designing and building customised monitoring systems. We will begin by exploring Microcontroller Units (MCUs), the core of IoT sensing devices, including widely used models such as the Raspberry Pi Pico, ESP32, ESP8266, and Arduino. Their differences, capabilities, and coding approaches will be compared to help participants select the most suitable option for their projects.

We will then examine a range of commonly used sensors and interface components, such as temperature and humidity sensors, motion and distance detectors, light sensors, switches, LEDs, and small displays. While it is not possible to cover the full spectrum of devices, the workshop will provide practical examples and general principles that can be applied across many sensor types.

Coding fundamentals will be introduced using open-source tools and two key programming languages: MicroPython, a lightweight Python implementation for microcontrollers, and Arduino C, a C++ variant originally developed for

Arduino boards. Participants will learn how to connect sensors to MCUs, write simple programs, and build functioning prototypes.
In the final section, we will explore the networking capabilities of these devices, demonstrating how to gather, store, and analyse data locally or via open cloud-based solutions.
This will be a hands-on workshop, where attendees will not only gain theoretical knowledge but also actively construct and program simple IoT prototypes, leaving with both practical skills and a foundation for developing their own heritage monitoring projects.

Efficient Archaeological Data Management with ArcheoBase: From Digital Data Entry to Analysis and Publication

Dr Emmanuel Clivaz, ArcheoBase

Jean-Philippe Clivaz, ArcheoBase

The session will be led exclusively by the founders of ArcheoBase, who will present the ArcheoBase platform.

Question Answered by this workshop

- How can we effectively overcome resource limitations (human, financial, and material) in archaeology to improve data collection and analysis?
- What are the best practices for developing and implementing standardized methods in archaeological data processing?
- How can we establish a unified, accessible online database to facilitate data sharing, knowledge transfer, and collaboration across institutions?
- How to enhance the accessibility of archaeological data and publications for both the public and researchers, ensuring cultural heritage preservation and visibility?

Summary

Participants will engage in an end-to-end journey of archaeological data handling, from initial data entry during excavation, through post-excavation analysis, to final publication, addressing critical questions using ArcheoBase.

Workshop Outline

Excavation and Data Entry:
Beginning in the field, participants will learn to record archaeological data efficiently using ArcheoBase, ArcheoEntry module, tailored for dynamic and adaptable data entry. This phase emphasizes the importance of capturing accurate data directly on-site, reducing redundancy, and minimizing errors that often arise from traditional paper-based methods. Through customizable digital forms, participants will capture data in a manner that is compatible with their own workflow and methodology, ensuring accuracy and consistency from the start. Participants will create digital forms based on their own paper templates, learn how to use the module to streamline teamwork on excavation sites, especially on large projects with multiple sectors and team members. They will experience live data entry directly from tablets or mobile devices, allowing everyone to capture information simultaneously and in real-time.

Post-Excavation Analysis:
Moving to the post-excavation phase, the workshop will delve into data management and analytical techniques facilitated by ArcheoBase. Participants will utilize tools for organizing, validating, and analyzing data, including the integration of GIS and photogrammetry. Participants will learn how to link diverse data types, such as photographs, drawings, and forms, to create a comprehensive, integrated dataset. Through hands-on exercises, participants will see how ArcheoBase, capabilities support the automated

generation of Harris matrices enhancing the interpretative depth of the data collected. Participants will also get an exclusive preview of ArcheoBase,latest feature in development, a web-based, geolocalized drawing tool. This tool enables precise, GIS-integrated vector drawings directly in a browser.
The participants will export their data in xlsx format for comprehensive back-ups and further work with other software (R, python, etc.). They will also use Web Feature Services (WFS) that allows a direct synchronization between ArcheoBase and spatial analysis/mapping tools such as QGIS.

Data Publication and Accessibility:
In the final phase, the workshop addresses the publication of archaeological data for both public access and academic use. Using ArcheoBase, ArcheoPublication and ArcheoView modules, participants will learn the process of preparing data for online publication, ensuring accessibility while safeguarding data integrity. ArcheoPublication also enables user to directly publish their work on their own institution, website via an IFrame, offering seamless integration and broader accessibility. This phase will highlight the platform, capacity to facilitate open data initiatives and public engagement, thus contributing to cultural heritage preservation.

Attendees will explore strategies to facilitate the handling of meta-projects, such as the swiss palafitte project, where members come from different institutions and collaborate on a centralized database for data entry and publication.

Code review and best practices in programming

Matteo Tomasini, University of Gothenburg, Sweden

With the introduction of more and more digital tools in archaeology, most journals made it mandatory to publish software on a public repository such as Zenodo or Github, even when said software is not the central topic of a paper. However, during the process of peer review after submitting a paper, only a few journals requires of their reviewers to review a software. Additionally, in many cases the review does not follow a specific protocol to ensure that the code is running and functional. In other words, ensuring the correctness of code review is up to the reviewer's time, capability and willingness.

On the contrary of code review performed in business software development settings – which aims at functionality as well as at uniforming a code base written by several individuals – the process of scientific code review aims at making sure that a code functions correctly, but it also aims at making it more readable by external individuals, and more usable in the future both as its own piece of software, or for further development. The consequence of lack of software review is that a lot of software becomes unavailable a few months after publication – either because it was not written nor assessed to ensure maintainability, or because the original developers left the building and nobody is able to pick up the obscure code.

A simple way to decrease the amount of published unusable software, is to perform code review on each piece of software that see the light of day on a journal. However, code review requires the collaboration of developers who are tasked with writing code better. This is why it is paramount to spread good practices in archaeological programming: these include code documentation (e.g. comments in the code), unit testing, proper software design and good stylistic writing. Learning these principles makes of us better software developers, but also contributes to making review of software easier on reviewers.
In this workshop, we will learn about software design principles and best practices in programming through a look at scientific code review. A short presentation will be followed by some hands-on work.

Using the ArchaMap application for data synthesis and FAIR data

Robert J. Bischoff, Arizona State University

Daniel J. Hruschka, Arizona State University

This workshop introduces ArchaMap, an application and database belonging to the CatMapper project, that facilitates synthetic research in archaeology by mapping and merging datasets through a transparent, reproducible process. ArchaMap is designed to assist users in creating and storing translations of complex categories (e.g., sites, ceramic types, periods) across datasets. Users can integrate diverse categories such as ceramic types, projectile points, time periods, culture areas, sites, or any other type of archaeological category. ArchaMap aligns with FAIR principles (Findable, Accessible, Interoperable, Reusable), ensuring data is easy to manage, share, and reuse across projects.

As an example, the cyberSW database in the Southwest US contains data on millions of ceramic sherds mapped to distinct ceramic types. ArchaMap provides tools to (1) to help users link ceramic types from new projects to the cyberSW ceramic types for new analyses, and (2) publicly share those new linkages for others to re-use.

Specifically, if a user has a spreadsheet of ceramic types from a new project, they can use ArchaMap,Äôs translation tools to automatically find the best matches for existing ceramic types within the ArchaMap database leveraging a comprehensive set of alternate names and contextual information already included in the database. They can also limit their search to only those ceramic types currently used by the cyberSW databaseand those from a specific region or time period. These matches can then be verified for accuracy and modified as necessary. New categories can be created if a ceramic type does not currently exist within the database. After fully translating the new project,Äôs ceramic types, the user can then upload the new project,Äôs metadata and the translations of its ceramic types to ArchaMap categories

After storing the new translation, several ArchaMap tools permit users to find and re-use these translations between their dataset and the cyberSW dataset for future work. This process can be repeated to link multiple datasets. As new datasets are uploaded, each new translation increases the pool of alternate names available for matching, thereby making matching easier in the future. ArchaMap provides tools for easily finding metadata (including Citation and location or urll) on more than 2000 linked datasets, making their data more findable and accessible. By linking categories from one,Äôs dataset to an ArchaMap category with a permanent URL and unique CMID (CatMapperID), it makes one,Äôs data more findable and interoperable. By permanently storing the linkages between datasets, the data becomes more reusable

Another key aspect of ArchaMap is that it encodes multiple competing typologies. Researchers may choose to constrain matches by context or dataset to choose a particular typology that suits their needs or they can upload their own typology. The user is able to determine what constitutes a match and modify the translation to fit their needs. Disagreements in matches will be highlighted by the application and left for the user to moderate This workshop is suitable for researchers at any stage, with any type of data, from any region.

Itiner-e: contributing to the collaborative digital atlas of Roman roads

Adam Pažout, Universitat Autonoma de Barcelona, Spain

Pau de Soto, Universitat Autonoma de Barcelona, Spain

Itiner-e

The digital atlas of ancient roads (https://itiner-e.org) is an open online platform where it is possible to view, query, and download Roman road data. The digital atlas is currently populated by a dataset of some 300,000 km of roads covering all of Roman Empire that is a result of a joint effort of projects Viator-e: The Roads of the Western Roman Empire (PI Pau de Soto) and MINERVA: Understanding the centuries-long functioning of the Roman economy (PI Tom Brughmans, lead data collection Adam Pažout) with contribution from other collaborators from European and non-European institutions. While the current dataset appears impressive, it is far from complete and perfect. Many regions are poorly covered while in others spatial resolution and accuracy of the road data is low. Itiner-e was from the start intended to be an open platform, a scientific repository for researchers to share their research on Roman roads and contribute to the living atlas so that Itiner-e can become a comprehensive database and research tool for scholars and students and a dissemination tool for the public.

The aim of this workshop is to introduce the participants to the key concepts and functions of the platform, its data structure and how new data can be added and edited. In the first part of the workshop, we focus on the interface of the online platform, how to view, query, select, and download the Roman road data. The second part of the workshop is dedicated to the data structure, how the data can be created, prepared, and uploaded to the database. This is illustrated on practical exercises and real-world data. Finally, we would like to discuss with the participants methodological considerations in ancient road digitization, data standards, open data and FAIR principles in sharing research data on Itiner-e platform. With this workshop we hope to consolidate a growing community of scholars and students around Itiner-e so it can become living atlas of Roman roads showing the state-of-the-art of research on Roman road network. However, we would also like to invite researchers not working on Roman roads as we welcome insights from broader field of road archaeology and are ready to share and exchange our experiences from making Itiner-e.

Publishing, Documenting and Enriching 3D Cultural Heritage Objects: A Hands-on Workshop with (Semantic) Kompakkt

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Maria Sotomayor, University of Cologne

Øyvind Eide, University of Cologne

3D models are an essential component of archaeological and cultural heritage research, yet sustainable workflows for publishing, enriching, and documenting such data remain challenging. Researchers must navigate questions of interoperability, semantics, and annotation, and long-term accessibility while ensuring that their 3D data remain usable and citable in scholarly contexts. This half-day workshop introduces participants to open, standards-based methods for publishing and semantically enriching 3D cultural heritage objects, using the open-source platform Kompakkt as a central tool.

Kompakkt, originally developed at the University of Cologne, is an open-source infrastructure designed specifically for scholarly use and flexible presentation of 3D models. It supports viewing, annotating, and sharing 3D objects in a web-based environment. The platform also integrates with established cultural heritage data standards (e.g., the new IIIF 3D standard) and

allows embedding in digital research environments. Its semantic extension, developed within the NFDI4Culture (https://nfdi4culture.de/) consortium at TIB in Hannover, provides an optional layer for linking 3D content with semantic web technologies, enabling persistent identifiers, interoperability, and machine-readable documentation. Together, these components exemplify how 3D data can be made FAIR (Findable, Accessible, Interoperable, Reusable) and sustainably reusable in research workflows.

The workshop will be led by an interdisciplinary team combining expertise from computer science, digital humanities, and digital archaeology. It is coordinated by the project lead and developer of (semantic) Kompakkt, together with a humanities scholar specialised in archaeology and a professor of digital humanities. This cross-disciplinary constellation ensures that both the technical and scholarly aspects of 3D publishing are addressed.

After a brief introduction to 3D publication standards, metadata practices, and IIIF-based interoperability, participants will receive a guided walkthrough of Kompakkt's main features. The majority of the session will focus on hands-on work, allowing participants to use either their own 3D datasets (Kompakkt supports a wide range of formats: .laz, .las, .spz, .splat, .ply, .spx, .glb, .gltf, .obj, .stl) or provided example models to:

- Upload and publish 3D cultural heritage objects on Kompakkt
- Add and edit descriptive and structural metadata
- Annotate and enrich 3D models with research-relevant information
- Optionally, apply the semantic extension to link 3D content with Wikibase

Throughout the session, participants will discuss challenges, best practices, and scholarly use cases. By the end of the workshop, each participant will have created a personal Kompakkt profile and published at least one annotated and enriched 3D object. It's also possible to publish through embedding on another website.

This workshop directly supports the CAA 2026 focus on open, transparent, and interoperable digital archaeology. It empowers researchers to adopt sustainable publication workflows and contributes to the broader discussion on FAIR data, semantic enrichment, and the long-term accessibility of 3D cultural heritage materials.

Expected outcomes

- A network of peers working on sustainable, interoperable 3D research infrastructures
- Practical experience publishing, annotating, and enriching 3D data using open-source tools
- Insight into IIIF-based and semantic approaches for 3D documentation
- A reusable workflow for FAIR-compliant 3D data management

Chronological modelling with ChronoLog: theory and practice

Eythan Levy, University of Zurich

The workshop will present the foundations of ChronoLog, a free tool for building chronological models, testing their consistency, and computing tight, checkable, chronological estimates. These models consist of a network of entities (e.g. archaeological strata, ceramic periods, historical reigns) connected by a set of synchronisms. The tool allows users to modify the data in the model and assess on-the-fly the impact of these updates on the overall chronology. ChronoLog also allows users to add radiocarbon determinations to their models, and to convert the model automatically to an OxCal Bayesian radiocarbon model. This feature allows archaeologists with no knowledge of the OxCal specification language to build complex Bayesian models on their own, with just a few clicks of the mouse. ChronoLog is freely available for download at (https://chrono.ulb.be).

For more details on ChronoLog, a user manual is available on the ChronoLog website. For additional details, see the bibliography below, especially Levy et al. 2021 (Journal of Archaeological Science), and Levy et al., in press (Proceedings of CAA 2021).
The workshop will start with a general introduction to ChronoLog, its basic principles, and its main functionalities. The second part of the session will be devoted to practical modelling exercises, which users will do on their own laptops. In these exercises, users will first learn how to build chronological models by themselves, based on a wide set of archaeological and historical data. They will then explore how ChronoLog can serve as a useful tool for archaeological cross-dating. This part will also present the use ChronoLog as a front-end to OxCal for building Bayesian radiocarbon models. In the final part of the workshop, participants will be invited to present their own data sets, and will be assisted in the modelling of these datasets using ChronoLog

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Seamless Visualization, Statistical Exploration, and Web Diffusion of Archaeological Spatial Data with the Open-source archeoViz Software Ecosystem

archeoViz maintenance team, CNRS, CITERES lab., MASA+ consortium, France

Why coming?
You have spatialised archaeological data –from excavation archives or a total station–, and you want to explore it quickly and efficiently, make figures and perform statistical analyses for a report, publication or even a public presentation. Time is short and your budget is limited or equal to zero: what can you do?

How can the archeoViz ecosystem help you?
archeoViz is a stand-alone application designed for the visualization and statistical exploration of archaeological spatial data across multiple scales, from individual objects to excavation sites, landscapes, and entire regions. Tailored archeoViz instances can be deployed online to provide public access to specific datasets. Complementing this, the archeoViz Portalserves as a web application for discovering and browsing references to existing archeoVizinstances.

It is important to note that the archeoViz Portal is not a platform for data publication. While the publication of datasets is warmly encouraged, this should ideally be carried out using dedicated, specialized services such as Zenodo, Nakala, ADS, or tDAR.

Learn more about the archeoViz Ecosystem here:
https://analytics.huma-num.fr/archeoviz/home
https://archeoviz.hypotheses.org

Expected outputs of the workshop
Join the workshop with your spatialised dataset and, by the end of the day, and depending on your choice you might get:

- figures from your dataset from every angle,
- statistical analysis results,
- or even an online publication of your data and the creation of an interactive website to share with colleagues and local communities.

InSites: Significance Assessment through the Looking Glass of Gen-AI

Dr. Yael Alef, Technion, Israel Institute of Technology, Faculty of Architecture and Town Planning

Yuval Shafriri, YuValue – Edtech & Heritach consultant

Articulating significance, which is crucial in value-based heritage management, is a complex interpretive task requiring the synthesis of diverse and fragmented evidence. While Gen-AI offers powerful processing capabilities, delegating this creative process to a machine raises critical ethical concerns.

In this workshop, inspired by Lewis Carroll's novel *Through the Looking Glass*, we navigate this tension by positioning Gen-AI as a reflective partner. Using our *InSites* Human–AI agentic workflow, we will examine how transformer-based models complement Context-Based Significance Assessment (CBSA), as both fundamentally rely on deep contextual understanding. We move beyond the hype to ask: *Can Gen-AI transparently read and analyze the site documentation so humans can better "read the site" and conserve it*?

We will experiment with transforming site information (from excavation reports, etc.) into a structured assessment process, guiding users through "mini agents" steps in the InSites tool, each with optional training notes for learning purposes. We'll move from detecting missing information and identifying contexts and values to drafting explainable significance statements. Beyond writing, we will experiment with multivocal narratives, knowledge graphs, and interactive views, ranging from standard timelines to novel participant-invented visualizations, that help gain new cultural insights and communicate them in new ways. The *InSites* workflow is grounded in three core Human–AI design principles: *methodological alignment* (embedding professional protocols), *cognitive transparency* and strict *evidence grounding*, which we will explore throughout the workshop sessions.

Workshop Program

1. **Theory & Demo:** An introduction אם the CBSA methodology embedded in the system and how transformer models "mirror" it, followed by a live *InSites* demo.
2. **Hands-On Main Sessions:**
   - **Write with *InSites*:** Co-authoring a significance assessment for a site of the participants' choice alongside the agent workflow, including the generation of visual artifacts and interactive dashboards.
   - **Read with *InSites***: Analyzing the generated assessments to detect hidden patterns.
   - **Ethics in Practice:** Participants will apply the design principles to experiment with sketching a custom agent for their specific needs.

Workshop Takeaways

- A preliminary significance assessment report of the site and other generated artifacts.
- Hands-on experimentation with structured Human-AI collaboration workflows.
- Continued access to the *InSites* tool, website, and GitHub repository.

References

Alef, Y., & Shafriri, Y. (2023). *Cultural Significance Assessment of Archaeological Sites for Heritage Management in the Digital Age: From Text of Spatial Networks of Meanings*. https://doi.org/10.5281/ZENODO.8360843

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GitHub Repository: https://github.com/InSites-Lab/Insites-CAA2026

Posters

Poster session: Wednesday, 1 April 2026, 10:30-14:30
Poster exhibition: Wednesday, 1 April – Friday, 3 April 2026
Location: Oktogon

9. Sihrhis: a geodatabase of Hellenistic and Roman housing in central-western Sicily

Giuseppe Monte, University of Catania

Subject
This project develops an open-access geodatabase documenting Hellenistic and Roman domestic structures in central-western Sicily. It integrates fragmented archaeological records (4th century BCE–3rd century CE) into a unified digital framework using Directus for relational database management and GIS for spatial data vectorization. The geodatabase systematically catalogs architectural features, construction techniques, and material culture, enabling standardized cross-comparison and spatial-statistical analyses.

Background
Despite numerous excavation campaigns, the domestic architecture of

western Sicilian cities remains underrepresented in digital form. Existing publications often lack systematic spatial encoding, relational linkage, or semantic categorization. The traditional approach emphasizes stratigraphic detail, the stylistic analysis of the architectural remains and site-specific interpretation, without enabling cross-site comparison or diachronic study.

Digital heritage initiatives such as the Getty Institute's ARCHEs or SITAR project platforms have demonstrated the potential of open standards and interoperable formats for archaeological documentation. However, these frameworks typically address religious or monumental contexts, leaving domestic data in need of customized solutions.

Discussion

The SIHRHIS database is structured using the open-source platform Directus for content management, while the database schema is designed in PostgreSQL and visualized using DBML syntax. The relational model emphasizes interoperability, data normalization, and bibliographic traceability. Key methodological components include the development of a controlled English vocabulary of the terms used, the database architecture and a GIS integration and vectorialization.

The first step of the project was the creation of controlled and unambiguous vocabularies addressing the various aspects of the study of domestic architecture. Unique vocabularies were developed concerning the class (e.g. "Reception Room") and function of rooms—favouring, where possible, generic terminology (e.g., "kitchen" instead of "culina")—as well as flooring types and catalogued painting styles.

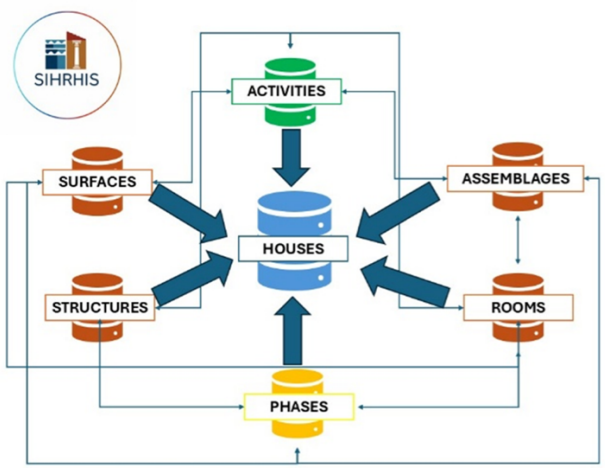
The relational schema consists of several interlinked tables:

- Houses, Phases, Rooms, and Structures define the spatial and temporal framework.
- Activities, Surfaces, Pavements, and Wall Paintings store qualitative information related to function and decoration.
- Assemblages allow material culture to be linked to specific spaces and activities.
- Bibliography and Bibliographic Citations ensure that all data points are explicitly tied to their scholarly sources.

Spatial data is acquired through a custom vectorisation process applied to legacy archaeological plans. For this purpose, SIHRHIS adopts the Simple Vectorisation Protocol (SVP) developed by Julian Bogdani in the context of the PAThs project (Bogdani 2021). SVP is a lightweight, GIS-based method designed to encode architectural and archaeological legacy maps using a minimal yet semantically rich set of attributes.

SIHRHIS is expected to yield several scholarly and methodological contributions:

- Architectural patterns: identification of regional construction trends and spatial organization within domestic units.
- Functional zoning: analysis of how space was used in urban houses based on structural, material, and assemblage data.
- Socio-economic Stratification: quantification of architectural variability to assess status differentiation and household wealth.
- Cultural Hybridity: detection of stylistic and technical features that reflect the interplay of Hellenistic and Roman traditions in housing culture.
- Methodological Advancement: demonstrates how open-source digital tools can support reproducible and transparent workflows in digital archaeology.



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48. Counting in Clay: Linking Cuneiform Mathematics and Cultural Heritage in Wikidata

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Michael Müller, Humboldt University of Berlin

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Background

Ancient cuneiform tablets preserve some of humanity's earliest records of scientific reasoning, from trade and land surveying to geometry and algebra. Among these, mathematical tablets from the Schøyen Collection represent a unique corpus that documents formulas such as the Pythagorean theorem and Heron's formula in Babylonian sexagesimal notation. Although these artefacts are well documented in catalogues such as the Cuneiform Digital Library Initiative (CDLI), their digital representation across infrastructures remains fragmented. The Wikidata Editathon "Cuneiform meets Mathematics", organised within the DiHMaLab framework, brought together researchers from mathematics, archaeology, and digital humanities to bridge this gap. It aimed to create semantic connections between cuneiform artefacts, mathematical concepts, and modern scholarly interpretations through Wikidata and related Linked Open Data (LOD) environments (Schmidt, Thiery, and Trognitz 2022).

Subject

This poster presents the methods and results of the editathon, focusing on

how Wikidata can function as an interdisciplinary knowledge hub between cultural-heritage and scientific domains. Participants manually and semi-automatically annotated cuneiform artefacts from the CDLI and the Schøyen Collection with corresponding Wikidata entities representing both the tablets themselves and the mathematical formulas they contain. The work is based on descriptions provided by Jöran Friberg in A Remarkable Collection of Babylonian Mathematical Texts (Friberg 2007). A central goal is the automated ingestion of metadata from CDLI for Schøyen tablets into Wikidata, building on these scholarly descriptions. To ensure consistency, the team is developing a unified modelling framework within a dedicated Wikidata Wikiproject. This framework aligns CDLI metadata, mathematical concepts, and bibliographic references with CIDOC CRM entities such as E22 Man-Made Object, while enabling automated RDF export and SPARQL-based validation.

The workflow applies FAIR and LOUD principles:

- extraction and structuring of catalogue data
- semantic alignment of artefacts and formulas
- integration with external ontologies and mathematical vocabularies
- documentation and visualisation using tools such as the SPARQLing Unicorn Toolkit

The resulting dataset allows federated SPARQL queries connecting archaeological, textual, and mathematical information in a machine-actionable form.

Discussion

The editathon demonstrates that Wikidata can act as a collaborative bridge between the mathematical and cultural-heritage communities. By semantically linking cuneiform artefacts with mathematical knowledge, it becomes possible to study ancient intellectual practices through a reproducible, data-driven lens.

Beyond the immediate case study, this approach contributes to the creation of interoperable, FAIR-compliant knowledge graphs. It supports larger research infrastructures such as the European Collaborative Cloud for Cultural Heritage (ECCCH) and the emerging NFDI Knowledge Graph ecosystem (Thiery et al. 2025).

The project illustrates how community-driven modelling, open scripting, and interdisciplinary collaboration can transform specialised datasets, in this case, Babylonian mathematical tablets, into connected, reusable digital research resources. It highlights the potential of Wikidata as a shared environment for integrating scientific and cultural perspectives on the world's earliest mathematics, turning clay tablets into nodes within a living web of knowledge.

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75. Synchronizing Multilingual Video Data and Visualizing Archaeological Evidence: A Multi-Method Workflow for Track Analysis in a Cave

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Andreas Pastoors, FAU Erlangen-Nürrnberg

Marcus Walther, FAU CDI

Laura Albers, FAU CDI

This project deals with one of Europe's most extensive sets of Mesolithic human footprints, offering a rare glimpse into human movement around 9,000–8,500 cal BP. During recent documentation sessions, footprint interpretations were provided directly in the cave by indigenous Ju'hoan tracking specialists, whose expertise is rooted in long-standing cultural practices of track reading. Their observations were captured as GoPro video segments, an independent high-quality audio recording in Ju'hoan, and time-aligned transcripts with English translations produced as Word documents and ELAN (.eaf) files. For technical reasons related to field recording conditions and data acquisition, these materials were originally fragmented and unsynchronized, making it difficult to directly connect spoken interpretations to the corresponding visual and spatial evidence.

To overcome this issue, a reproducible digital workflow was developed that synchronizes and integrates these diverse sources into a single, temporally aligned and spatially annotated dataset. The underlying folder structure consists of video and transcript collections divided by cave sector, each containing several recording segments. ELAN annotations were converted to machine-readable XML, enabling the extraction of start and end timestamps, speaker labels, and utterances. These data were then used to automatically generate multilingual subtitles in three formats: original Ju'hoan language, English translation, and bilingual subtitles.

The conversion and subtitle-generation steps were implemented through scripted processing routines that parse ELAN XML files and standardize timestamps across recording segments. These scripts automatically generate subtitle files while preserving speaker attribution and language alignment, enabling consistent processing across multiple cave sectors.

Audio–video synchronization relied on the automated detection of hand-clap events recorded during fieldwork. These events were identified by combining amplitude peak detection with frequency-based analysis to isolate the characteristic acoustic signature of the clap signal. The detected clap peaks were then used as discrete temporal reference points to align the corresponding GoPro video segments with the external audio recordings.

To link verbal interpretations to spatial features within the cave, a laser-based visualization pipeline was introduced. Red and green laser dots, used during recording sessions to indicate individual footprints or movement patterns, were detected using HSV colour filtering and contour detection combined with size-based thresholding. The detected regions were visualized as translucent overlays, providing a direct spatial link between verbal commentary and the referenced footprints.

Each sector-specific video was encoded using FFmpeg to include three subtitle streams, dual audio tracks (original GoPro audio and synchronized external audio), chapter markers for navigation, and structured metadata. This encoding strategy merges text, sound, and image into a consistent and reusable format suitable for analysis, interpretation, presentation, and long-term archiving.

The overall workflow follows a modular, script-based architecture in which audio synchronization, subtitle generation, visual annotation, and final encoding are handled as independent processing steps. This structure allows

individual components to be inspected or adapted without altering the rest of the pipeline, supporting reproducibility and methodological transparency.

The workflow enhances transparency by explicitly linking multilingual verbal interpretations to their original audiovisual context, allowing analytical decisions to remain traceable and verifiable. Spatial clarity is improved by tying narrative explanations to precise visual features, while standardized metadata and formatting support reuse across disciplines such as archaeology, linguistics, and computer science. Beyond its technical contribution, the approach documents how expert interpretations are constructed in the field and provides a practical model for integrating qualitative expertise into reproducible, data-rich archaeological workflows. The methods presented can be adapted to other ethnographic or heritage documentation contexts involving audio, video, and expert narration, supporting interdisciplinary research and open data practices.

103. Museum Storytelling based on Knowledge Graphs and Large Language Models

RIALI Ishak, University Of Blida

Raphaël GERSEN, Faculty of Archaeology, Leiden University

Elizabeth Rodriguez Estrada, Faculty of Archaeology, Leiden University

Gabriel Spautz Vieira, Faculty of Archaeology, Leiden University

Martin Berger, Faculty of Archaeology, Leiden University

Museums play a vital role in preserving and transmitting cultural heritage. However, access to the semantic and historical richness of collections often remains limited to short or technical texts, which are difficult for the general public or those with reading disabilities. This lack of contextualization reduces the educational and emotional impact of the visit, particularly for young people or those with special needs. Furthermore, curators must manage thousands of objects, often poorly documented, which remain invisible to the public.

The use of advanced technologies such as artificial intelligence gave birth to new perspectives for energizing collections, facilitating the work of curators, and enriching the visitor experience. Among these technologies, large language models (LLMs) stand out for their ability to automatically generate rich and coherent narrative texts, adapted to different contexts. To produce historically reliable narratives, however, these models require a structured and usable information base.

In this context, the authors designed a knowledge graph compliant with the CIDOC-CRM standard, enabling the semantic and interoperable representation of key entities related to museum objects (authors, historical events, locations, periods, collections, etc.), while facilitating the inference and retrieval of complex information. The data used comes primarily from MUDEC's Latin American collections, which contain approximately 7,000 ethnographic and archaeological artifacts spanning different periods and regions.

The proposed system is based on a Graph-RAG (Retrieval-Augmented Generation from a Knowledge Graph) architecture and operates in three stages:

- Extraction of the historical and cultural context of an object from the CIDOC CRM graph.
- Narrative generation guided by a pre-trained LLM, using structured prompts to produce fluent texts while maintaining control over the content.
- Converting text into audio content using a text-to-speech module makes the narration accessible to everyone, including visually impaired visitors.

The evaluation of the narratives by three archaeology specialists revealed differences in performance depending on the language models and criteria analyzed, with factual reliability being a priority to ensure accurate historical and cultural information. The literary style and emotional aspect of the texts were also taken into account.

In conclusion, the use of LLMs allows curators to tell vivid and accessible stories, both for physical and virtual visitors. The integration of text-to-speech improves accessibility and cultural inclusion. However, the quality of the data and generated texts must be verified by experts, as AI hallucinations may occur. Finally, the use of varied prompts could diversify the narrative "voice" of exhibitions, offering stories adapted to different audiences.

115. Spectrify.app: Evaluating a Browser-Based Platform for Spectral Analysis

Rubén Parrilla, ICArEHB

Managing spectral data from archaeological and heritage materials remains difficult. Researchers use different techniques—FTIR, Raman, UV-Vis-NIR—each requiring specialized processing. Most software demands installation, programming skills, or expensive licenses, creating barriers that prevent many archaeologists from using chemometric methods despite their proven value for pigment analysis, provenance studies, and conservation work.

We evaluated Spectrify, a in development browser-based application built to simplify spectral analysis. The platform combines multiple analytical techniques in one interface, runs locally to protect unpublished data, and needs no installation. We tested whether Spectrify could match results from established Python libraries (ChemoTools, Scikit-Learn) by replicating published chemometric procedures.
Two validation tests were conducted: first, we reproduced preprocessing and multivariate analysis workflows from published archaeological spectroscopy papers; second, we directly compared Spectrify's algorithms against equivalent Python implementations. We assessed result accuracy, workflow ease, and usability for researchers without programming experience.
Spectrify replicated published results even when using slightly different preprocessing choices (MSC versus SNV standardization, for example). PLSR models built through the interface performed as well as code-based versions. The menu system allowed quick hyperparameter testing and dataset combination without coding. Workflow files (.spws format) enabled reproducibility, which matters for archaeological research where methods need transparent documentation.

Browser-based platforms change how archaeologists access analytical methods. Removing technical requirements while keeping analytical standards lets researchers concentrate on interpretation instead of software problems. Local processing protects sensitive heritage data that cannot be shared before publication.

Accessible spectral platforms can spread quantitative characterization beyond specialized labs. . As archaeometric data grows, tools that balance accessibility with analytical rigor will shape how the field engages with computational methods.

116. Portable Spectroscopy for Pigment and Binder Characterization: A Reflectance Spectroscopy Evaluation

Rubén Parrilla, ICArEHB

Spectroscopic methods remain uncommon in archaeological research despite their proven utility. Raman spectroscopy has gained some acceptance for analyzing individual objects, and laboratory FTIR is increasingly used, but other techniques lag behind. Colorimetry, hyperspectral imaging, and infrared reflectance are standard in remote sensing but rarely applied to archaeological materials. Portable spectroscopy offers clear benefits: in situ measurement, non-destructive analysis, fast data collection, and compatibility

with chemometric analysis. We evaluated portable spectroscopic methods to assess their practical value for archaeological materials.
We analyzed synthetic and natural mineral pigments mixed with five protein binders: bone glue, fish glue, hide glue, gelatin glue, and rabbitskin glue. Pigments included synthetic red, synthetic yellow, natural red, and natural yellow. This combination created a difficult classification problem because the binders have similar spectral properties. Each sample mixed 500mg pigment with 2.5ml dissolved binder.
Two instruments were tested: an ASD Halo Terraspec spectrometer (350-2500nm, 2150 bands) and a Headwall Photonics SWIR hyperspectral camera (900-2500nm, 160 bands). We measured each sample three times. Hyperspectral data used 70×70 pixel areas, giving 4900 spectra per sample. Processing included SNV transformation, Savitzky-Golay smoothing, and normalization. We calculated first and second derivatives and used PCA for classification (Crase, Hall, and Thennadil 2021).
The spectrometer successfully classified binders. Visual spectrum data showed some overlap between rabbitskin, hide, and bone glue, but SWIR regions separated them clearly. Mineral identification found hematite in red pigments and goethite in yellow ones. Hyperspectral analysis showed intensity and peak differences between binders, especially above 1300nm. PCA worked well for natural red samples. False color images using selected wavelengths revealed compositional differences within samples.
Portable spectroscopy can distinguish pigments with different binders, which matters for archaeological interpretation. Similar workflows apply to ceramics, lithics, and other materials. Hyperspectral cameras add spatial analysis, showing how composition varies across surfaces. The speed and non-invasive nature make these methods practical where sampling is restricted. As equipment becomes cheaper and processing simpler, spectroscopic characterization may shift from specialized labs to routine fieldwork, expanding what archaeologists can analyze without laboratory access.

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117. Spacialist: Collaborative research data management in heterogeneous multi-workgroup research projects

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Large-scale collaborative research projects with an interdisciplinary approach inherently incorporate a high level of heterogeneity in methodological approaches and vocabularies, especially when the teams are geographically dispersed. These preconditions can lead to inconsistent terminologies and structures in research data, making comparability and synthesis difficult, if not impossible. With Spacialist, a virtual research environment, we address these challenges by enabling the definition of a shared data model and controlled vocabulary. This approach minimizes human error and ensures consistency and comparability across projects. In addition, it provides collaborative tools for a modern multi-user experience.

When the first prototype of Spacialist was presented at CAA 2017 (Lang et

al. 2020), its requirements focused primarily on archaeological research. Since then, the software has evolved into a more flexible research tool with a powerful plugin system that enables modular functional extensions. In this poster, we focus on new functionalities implemented to support large collaborative projects involving members distributed across multiple sub-projects. These include (1) a new access control system that allows assigning user accounts to different workgroups with separate access rights; (2) real-time data synchronization via the WebSockets protocol for immediate data updates; (3) a commenting system that allows discussion directly at individual data points; (4) a bibliography system for collaborative literature management; and (5) metadata management for copyrights and licensing.

These collaboration features were implemented as Spacialist serves as the central data management platform within the DFG Priority Programme 2361 "On the Way to the Fluvial Anthroposphere", which studies the human impact on floodplains of several rivers in Germany. The project is highly heterogeneous: comprised of seven sub-projects at different institutions; researchers come from a broad spectrum of fields such as geography, archaeology, and history; and they work on multiple sites across Germany. Therefore, we use the SPP 2361 as a case study to demonstrate how Spacialist can support large, heterogeneous research projects.

References:

Lang, Matthias, Michael Derntl, Benjamin Glissmann, Vinzenz Rosenkranz, Dirk Seidensticker, und David Kirschenheuter. 2020. „Spacialist – A Virtual Research Environment for the Spatial Humanities". In CAA: Digital Archaeologies, Material Worlds (Past and Present), Proceedings of the 45th Conference on Computer Applications and Quantitative Methods in Archaeology, Atlanta, Georgia, 2017. Tübingen University Press. doi:10.15496/publikation-43218

121. Quantifying Knapping Kinematics: Applying DeepLabCut to Analyse Bipolar and Freehand Knapping Methods

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The ability to intentionally create and use sharp stone tools was a watershed moment in hominin evolution, allowing our ancestors to interact with and modify their environment in unprecedented ways. Bipolar knapping represents a crucial yet understudied component of early lithic technologies. It has been hypothesised that hominin stone flaking developed from a culture of percussion similar to behaviours observed in modern primates, such as nut cracking (Davidson and McGrew 2005). Both bipolar knapping and nut-cracking involve using a hammerstone to strike an object placed on top of an anvil. The ability to generate suitable kinetic energy and transmit it to a specific point of impact may also be a common aspect of these behaviours. It has been suggested that bipolar knapping may have represented a simpler form of flake production, emerging from a previous culture of percussive activity using stone tools (Hayden 2015).

To evaluate whether bipolar knapping represents an intermediate stage between non-flaking percussive behaviours and freehand flake production, we conducted a quantitative comparison of knapping motions between freehand and bipolar techniques. We used DeepLabCut, an open-source deep learning toolbox for markerless pose estimation, to extract motion data from video recordings of experimental knapping sessions (Mathis et al. 2018). Key points on the knapper's upper body, including the digits, wrist, hand, elbow, shoulder, and hammer, were tracked to capture time-resolved 2D motion

coordinates. These data were then used to calculate relevant kinematic parameters such as hammer swing trajectory, strike velocity, acceleration, and kinetic energy. Our results reveal clear differences in key aspects of knapping motion between the two techniques, demonstrating the potential of DeepLabCut for reliable pose estimation in knapping experiments and establishing a replicable framework for investigating the biomechanical and evolutionary implications of early stone tool technologies.

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126. Settlement preferences of ancestral Pueblo culture in American South West region

Dorian Kominek, Independent

The topic of this analysis was to indentify and quantify the settlement preferences of the Ancestral Pueblo settlement complex (Pueblo III period, Sand Canyon area in South West USA).

The research question was to find these preferences, as a quantitative data patterns, that can be extracted using various GIS analysis. Furthermore, this would be the initial step to perform the comparison analysis of these patterns for other settlement complexes recognised in archaeological record for mentioned culture in this region.

Poster shows the steps and results of the analysis with the GIS geoprocesing tools and workflows. Data used for analysis was received from the archaeological surveys done in multiply sites in that area. Also, the open access resources were used for the landscape and geographical data.
Using the ArcGIS software and it's geoprocesing tools, the georeferenced 3D model of this area was created as a base for analysis, from the combination of the digital elevation model, settlements location with their attributes and water streams courses.
With the different types of settlements recognised by the archaeological record (the main settlement, dwellings, watchtowers, shrines) the following analysis were performed, targeting each type of settlement in a separate take: Viewshed, Availability analysis, water distance, and the finest travel path.
Result values for each one settlement were put together to count statistics and verify what general rules can be extracted.

Discussion
Metrics and statistics of the parameters received from these analysis, refer only to the one settlement complex. Even that direct values can be found interesting, they are mainly the results of the modeling output only, and can't be easy validated on the ground level accuracy. The most valuable outcome of presented set of analysis would be achieved when they are also applied to other settlement complexes known in archaeological record in this region. The comparison analysis of such results would bring additional knowledge in the research of the settlement systems dynamics.

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Palonka R., 2019. „Towers as an Architectural Element of Pueblo Culture in the Mesa Verde Region, Utah-Colorado, in th 12th-13th Century A.D." in: Tower Studies 3 'Urbs turrita', Shaun Tyas Donington.

Lipe W. D., Varien Mark D., 1999. "Colorado Prehistory - A Context for the Southern Colorado River Basin", chapter 9 - "Pueblo III (A.D. 1150-1300)", 290-518.

140. Evaluating Datasets and Comparing Machine Learning Approaches for Archaeological Pottery Classification

Nikhil Sabnis, Nueva School

The advent of computational techniques [1,2] in recent years has significantly impacted the quality of image classification within the field of archaeology. New models of machine learning, including sophisticated artificial neural networks (ANN), have become increasingly prevalent, providing researchers a wide array of computational tools to consider. While purpose-built ANNs have demonstrated accurate results (e.g., Zhao et al., 2023 reported 92.58% accuracy on Chinese pottery using custom CNNs [3]), these models can require considerable expertise and fine-tuning to achieve superior results. This study evaluates open access pottery datasets and compares the outputs of simple machine learning models with advanced, more resource-intensive models based on ANNs, providing a framework for model selection and a deeper understanding of the benefits and challenges of implementing these varied approaches.

In our study, we evaluate several open archaeological pottery image datasets, documenting their organization, image quality, and suitability for machine learning. Using the Chinese Neolithic Painted Pottery dataset [3] along with other publicly-available datasets, I implement classical machine learning approaches including Random Forest and Support Vector Machines, drawing on extractable image features, including color patterns, textures, and basic shapes. Results across these models are compared to published deep learning studies to show the performance difference between accessible methods and cutting-edge approaches. Implications of the benefits and challenges faced by researchers implementing these varied computational models are discussed. This study further contributes to research on increasing the accessibility of computational models for classifying archaeological artifacts.

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151. Quantifying morphometric variability in bead production. First results of a digital study of Double Perforated Ivory Beads from Aurignacian layer IV of Hohle Fels Cave (Germany)

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Double perforated ivory beads (DPIBs) represent a unique element of the Aurignacian ornament assemblages of the Swabian Jura where hundreds of them have been found at four different sites (Wolf, 2015). But are all these DPIBs the same or can we identify individual craftspeople, chronological or regional trends? In order to enable detailed systematic comparisons between numerous fragile DPIBs, we developed a relatively seamless and conservation friendly method to automatically extract morphometric parameters from 2D flatbed scans of the beads.

Frontal and lateral views of DPIBs were scanned at a resolution of 1200dpi/inch with a high-standard flatbed scanner. Using image processing software, all views were assembled in plates and transformed into black and white silhouettes from which bead contours could be automatically recognized and vectorized. The vectorized contours where then extracted and analysed in R. Morphometric variables included surface area and -perimeter, maximum-, minimum- and mean radius as well as the standard deviation of the radii and ellipse eccentricity. A multivariate analysis has been applied to explore patterns in the data set obtained.

Application of this method to the Aurignacian DPIBs assemblage from Archaeological Horizon IV at Hohle Fels Cave (Swabian Jura, southwestern Germany) reveals important differences in size, shape and degree of symmetry of DPIBs.

Determining the reasons for this variability is challenging. First the data acquisition must be checked for errors as 3 dimensional beads may have been scanned in slightly different oblique positions resulting in biased silhouettes, contours and morphometrics. Second, morphometric variability of manufactured beads, may not only depend on chronological and geographical variations but also on multiple other mutually influencing factors such as the characteristics of raw materials used, the stage of production, the skill, aim, and time investment of the maker, as well as the potential impact of the physical and social environments (cf. e.g. Schiffer & Skibo 1997, Ferguson 2008). A promising way to disentangle these contributing factors is to compare the morphometric variability of archaeological craft products to numerous reference collections for which at least one influencing factor is known. By generating target-specific outline images, extracting them in R, and applying computational methods, we can quantify the morphological and morphometrical features of numerous ornaments from archaeological and experimental reference collections and as such create a tool for a better understanding of morphometric variability, standardization and crafts in the archaeological record. Future research may also include automatic landmark positioning for outline regularity analysis and test if 3D morphometric analyses allows to reach similar or different results.

References:

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[3] Wolf, Sibylle. 2015. Schmuckstücke: Die Elfenbeinbearbeitung im Schwäbischen Aurignacien. Tübingen: Kerns Verlag.

153. Reviving the Vanished: Digital Reconstruction of Targovska Street's Urban Heritage

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Ivaylo Nachev, IBS-BAS

Vladimir Kolev, UACG

Targovska Street was one of the principal commercial and cultural arteries of early twentieth-century Sofia, Bulgaria, symbolising the city's transition toward a modern European urban identity. The area was entirely destroyed during the bombing of Sofia in 1944, resulting in the loss of a major architectural and social landmark. Only fragmentary archival materials—drawings, photographs, and cartographic sources—preserve its memory. The scarcity and uneven quality of these sources pose significant challenges for accurate reconstruction, especially in an era when AI-generated models are increasingly produced by non-specialists, often lacking historical or architectural contextualisation.

The research employs 3D architectural modelling integrated with advanced computational methods to reconstruct and interpret the lost urban heritage of Targovska Street. Machine learning and computer vision algorithms were applied to enhance degraded historical imagery, identify recurring architectural typologies, and support data integration. Based on systematically analysed documentary evidence, the study reconstitutes the street's architectural rhythm, volumetric composition, and stylistic diversity. The resulting 3D models are embedded in an immersive virtual environment, enabling interactive exploration of the reconstructed streetscape and fostering both scholarly analysis and public engagement. The workflow combines geometric precision and photorealistic rendering to achieve analytical robustness and experiential realism.

The project demonstrates how AI-assisted 3D reconstruction can function as both a scientific and interpretive instrument within digital archaeology. By reconstructing a completely lost urban landscape, it illustrates how computational methods can recover and reinterpret cultural memory through historically grounded visualization. At the same time, it underscores the importance of expert knowledge in guiding the reconstruction processes to prevent aestheticised but historically inaccurate outcomes. The case of Targovska Street highlights the potential of artificial intelligence, when critically employed, to integrate heterogeneous data sources into coherent virtual environments, advancing computer applications in archaeology from documentation toward interpretive historiography.

172. Towards a digital continuum of archaeological knowledge: from acquisition to processing to consultation of data

Anna Maria De Luca, Università di Catania

The use of digital tools in archaeology does not merely represent an operational improvement but now establishes a true methodological transition towards the construction of integrated systems for archaeological data management and analysis. In this perspective, archaeological data become part of a production and management flow organized according to shared, traceable, and verifiable protocols. Within this framework lies the archaeological context of Castiglione di Sicilia (Contrada Acquafredda–Imbischi, Province of Catania) (Pappalardo et al. 2023, 3–19), which represents a case study of the integrated application of artificial intelligence and digital technologies, from data acquisition in the field to their processing and publication.

The overarching objective is the construction of a unified platform capable of coherently connecting excavation documentation, data management, material organization, and the dissemination of research results, ensuring full interoperability between work environments and publication systems. The model developed for Castiglione di Sicilia is based on an integrated structure designed to interact with different systems—such as GIS, relational databases, and web platforms—while maintaining a consistent semantic structure throughout the entire research process. Information traceability is ensured through the adoption of open standards and univocal recording procedures, which make it possible to accurately reconstruct the origin and use of data.

The operational process is articulated into four main phases: acquisition, processing, enrichment, and publication. During the acquisition phase, topographical surveys, photographic data, stratigraphic annotations, and excavation diaries are produced in order to maintain full correspondence between direct observation and digital recording, working directly in the field. The processing phase organizes data according to controlled schemas and vocabularies, ensuring both semantic and chronological consistency. Enrichment takes place through the integration of datasets within interoperable environments and the association of descriptive and spatial metadata. Finally, the publication phase delivers the research results through interactive interfaces and online consultation tools (D'Andrea 2023, 32).

Artificial intelligence is applied in two main areas: the visual component, through computer vision systems used for the pre-classification of materials, allowing for an initial automatic organization of images based on morphological and typological criteria of ceramic data; and the textual component, through generative language models that support the automatic drafting of forms and excavation diaries, producing coherent compilations consistent with the adopted descriptive standards (Gattiglia 2025, 225–233). Furthermore, an identity and role management system has been implemented to regulate data access and modification levels within the program, ensuring security, traceability, and authenticity of processes.

The experimentation conducted at Castiglione di Sicilia serves as a testing ground for establishing an information flow between excavation, storage, and digital data collection, offering a methodological reflection on the role of new frontiers in archaeological research and on the integration of artificial intelligence languages. It reaffirms the path toward a new epistemology and a renewed methodological and archaeological approach.

203. Cultural Heritage in FAIRyland? How to LODify GeoData in QGIS

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Nadine Alpino, Schleswig-Holsteinische Landesbibliothek

Background

Teaching Linked Open Data (LOD) concepts in archaeology and cultural heritage (Schmidt, Thiery, and Trognitz 2022) often faces the challenge of bridging abstract semantic models with practical geospatial workflows. To address this, the FAIRyland (Thiery, Danthine, and Alpino 2025) project introduces a fictional but geographically inspired training landscape located "somewhere near Sweden during the Minion Period." Its topography draws inspiration from the rock carvings of Norrfors on the Ume River near Umeå in Västerbotten, Sweden (Älvdal 2025). Within this playful setting, archaeological, mythological, and imaginary features coexist to provide an accessible learning environment for FAIR data management, semantic modelling, and QGIS-based geoprocessing.

Subject

The poster presents FAIRyland as an open, narrative-driven sandbox to demonstrate how the FAIR principles – Findable, Accessible, Interoperable, and Reusable – can be applied to geodata using the SPARQLing Unicorn QGIS

Plugin. Vector layers representing sites such as meteor craters, ancient roads, and mythical "input zones" are semantically enriched with Wikidata identifiers and converted into RDF triples.
The workflow illustrates how QGIS can be used not only as a GIS tool but as a FAIRification environment: (1) Structuring geospatial attributes according to shared vocabularies; (2) Transforming datasets into LOD; (3) Querying distributed endpoints such as Wikidata or the NFDI4Objects Knowledge Graph; and (4) Automatically generating human-readable HTML documentation. All datasets and scripts are openly available on GitHub, inviting collaboration and creative reuse.

Discussion
FAIRyland demonstrates that fictional yet technically valid datasets can effectively teach geoinformatics and semantic interoperability in archaeology. By gamifying complex LOD concepts, the approach lowers entry barriers for students and researchers, promoting reproducible, open, and linked workflows.
The combination of real-world topography (inspired by Norrfors) and creative data modelling exemplifies how pedagogical design, semantic web tools, and cultural heritage narratives can merge into an engaging educational framework.
Ultimately, FAIRyland is both a methodological playground and a community-driven experiment in FAIR and LOUD data literacy, encouraging archaeologists to explore how open geodata, storytelling, and semantic technologies can work together to make digital heritage more connected, comprehensible, and fun.

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210. Siamese Networks for the Recognition of Rare Classes in Archaeological Fine-Grained Ceramics

Federica Mauro, University of Pisa

Franco Cicirelli, ICAR CNR

Ettore Ritacco, University of Udine

Gabriele Gattiglia, University of Pisa

Subject
This study explores how Siamese neural networks can address class imbalance in fine-grained archaeological ceramic classification by focusing on relationships between images rather than fixed labels.
The dataset comprises about 10,000 images of decorated majolicae from Montelupo Fiorentino (Italy), across 86 classes, and shows a pronounced long-tail imbalance, with many rare classes represented by fewer than ten instances (Anichini et al. 2021).
This pattern reflects the archaeological record: common types dominate excavation contexts, while rare or transitional artifacts are underrepresented. Although archaeologists can interpret these categories as signs of changing tastes, production shifts, or declining craftsmanship, standard neural networks tend to overlook the subtle visual traits that define them.

Background

In supervised image classification, optimization is dominated by majority classes, making minority categories difficult to learn.
Siamese networks overcome this limitation through metric learning, training on pairs of images instead of isolated samples (Bromley et al. 1993). Each branch shares weights and produces an embedding vector whose distance encodes similarity between artifacts.
To stabilize feature learning, each image is augmented, teaching the network that different versions of the same artifact remain equivalent.
Through a contrastive-loss function, the model pulls similar samples closer and pushes dissimilar ones apart, creating a feature space where fine-grained stylistic similarities become measurable.

Discussion
A baseline ResNet-101 model trained on the same dataset achieved an accuracy of 0.73, a weighted F1 of 0.73, and a macro F1 of 0.62, confirming good overall performance but weak recall for rare decorations. Several minority classes showed recall below 0.50 and F1 near zero due to few instances and high visual overlap with frequent motifs, causing the drop in macro recall (0.64).
The Siamese framework directly addresses this limitation by reframing classification as similarity learning, improving consistency across rarity levels. Although widely used in computer vision and few-shot learning, Siamese networks remain rare in archaeology (an example in Chaowalit et al. 2025); this study presents their first large-scale, fine-grained application.
The approach is inspired by the fact that learning in dissimilarity spaces mirrors human categorization through recognition by resemblance, an idea closely aligned with archaeological typology.
By modeling similarity and dissimilarity, Siamese embeddings reveal visually stable categories and expose ambiguous ones, such as low-quality productions or transitional phases. Finally, assessing such class robustness model uncertainty into archaeological insight and offering a new way to study variation and the cognitive logic of classification in material culture.

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241. After 75.000 Years Still Here - reconstruction of Paleolithic fishing nets, with help of the internet

Jadranka Ahlgren, Studio JI

Background
What inspired me was the reconstruction of Paleolithic fishing nets with the help of indigenous people from New Guinea, the Amazon, and the Nazca culture in Peru, 200 BCE - 600 AD. The Nazca ceramic I found at https://art.thewalters.org/object/48.2865/ - The Walters Art Museum. The Nazca people were fishing with nets around their backs, swimming! They often wear fishing nets around their heads, too, like turbans. We see similar in the Mantava indigenous people from New Guinea - YouTube: Best Ever Food

Review Show, episode Eating With the World's Most Isolated Tribe (Papua), 2024. https://www.youtube.com/watch?v=FtWJPgyACc

Goal
Analyze the Paleolithic diamond fishing net pattern as a new technology, a result of the functional and practical mind, not symbolic ones! Fishing nets from the Paleolithic had shell weights, and the punctuated shells found at the same sites can be weights, not jewelry - personal ornaments (Stein S, Pacheco S, 2025).

Method
Surfing the internet. Before the internet /time with a lack of information/, it was hard to make a study like this. As a designer, I investigated patterns and ornaments workings mostly with a database of my own memory! Today, we have an enormous accumulation of knowledge, which choice is not ours, and in that field, we can easily miss interpretation! For me, individual investigation is the priority.

Discussion
Man is creative, rational, and practical. The diamond-shaped nets are stronger than others; one could hold them around a body and have hands free for work! In my search, I found parallels like “Nazca fishing caps (turbans)” and the Paleolithic Italian shell-caps found in Gravettian cave graves, 20.000 BC:” Lady of Cavilione” and “Prince of Arene Candide”. "Lady" and "Prince" had shell-beaded caps, described by archaeologists as symbolic features and jewelry! (Chavalier T, 2018; Pettitt P, Richard M., 2015). I disagree with that! I think these caps are personal fishing nets of fishing mastes! Similarly, I found two Vinca culture Neolithic figurines, dated to 4500 BCE, from the site of Vitkovac, Central Serbia, with fishing nets around their hips (Ahlgren J, 2005). I think they are not "Ladyes" but master fisherwomen!

Conclusion
75.000 years, after diamond net, abstract, cross-heckled engravings in Blombos ochra stones (Stein S, Pacheco S, 2025), we have the same nets today! Why? Because they are good! Net-like construction holds pressure with all surfaces simultaneously and is strong. Paleolithic man noticed that.

References:

Stein S. and Pacheco S, 2025: Did Fishing Nets with Shell Weights Precede the Bow and Arrow in Brain Evolution? Using Digitally Edited Photographs to Model Another Use for Prehistoric Shell Beads https://www.academia.edu/128597855/Did_Fishing_Nets_with_Shell_Weights_Precede_the_Bow_and_Arrow_in_Brain_Evolution_Using_Digitally_Edited_Photographs_to_Model_Another_Use_for_Prehistoric_Shell_Beads

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251. The CiVers-Project. Bridging research texts and (fine-grained) research data

Marcel Riedel, German Archaeological Institute

Fabian Riebschläger, German Archaeological Institute

Background
Research data are central components of archaeological knowledge production, yet they are – when published - often cited only indirectly or at the level

of the entire databases rather than as fine-grained, reusable research objects. In everyday archaeological practice, researchers may wish to cite a specific pottery sherd from a collaboratively maintained object catalogue, a particular stratigraphic context from excavation documentation, or a defined version of a record whose interpretation may change over time. Without persistent, version-aware identifiers, such references are difficult to reproduce, verify, and reuse.

Persistent identifiers (PIDs) such as DOIs have become a de facto standard for scholarly publications and research data. Through infrastructures such as DataCite and Crossref, DOIs are embedded in a wider network ("PID Graph") that connects publications, data, researchers, institutions, and citation events (Fig. 1). However, integrating these mechanisms into semantic, collaboratively updated archaeological (web) databases remains a significant challenge.

Subject

The CiVers project addresses the problem of persistent, fine-grained citation in semantic data systems without requiring fundamental changes to existing software architectures or data models. Archaeological databases often rely on semantic models and authority data and are continuously updated by multiple contributors, making it difficult to assign stable identifiers to specific resource states or versions.

CiVers provides a reusable, open-source information infrastructure that enables PID-supported citation by combining web archiving techniques, machine-readable metadata extraction, and integration with open DOI registration and metadata services (e.g. via DataCite). CiVers captures citable snapshots of web resources and links them persistently into the global PID ecosystem. The system is currently under active development (minimum viable product) and is being deployed and evaluated locally as a service for archaeological information systems, including iDAI.objects (object catalogues) and iDAI.field (excavation documentation). These deployments serve as quality test cases for fine-grained citation of individual records and their evolving interpretations.

Discussion

For archaeology, CiVers contributes directly to improved reproducibility, data reuse, and scholarly communication. By enabling persistent references to specific versions of archaeological records, the approach supports transparent citation practices across publications and data published or shared via web-databases. This strengthens FAIR-aligned workflows and facilitates quantitative and comparative analyses that depend on clearly identifiable source data.

More broadly, the project addresses a key infrastructure challenge: the quality of interconnection within global information infrastructures depends on the extent to which relationships between self-hosted and external resources are represented through machine-readable metadata (Fig. 1). CiVers is developed in close dialogue with domain-specific initiatives, consortia, and information and library services, combining technical development with community-oriented
evaluation of citation workflows.

The poster will present CiVers architecture, citation workflows, and concrete archaeological use cases. It aims to engage with other archaeological database providers, gather further requirements from diverse contexts, and foster collaborative adoption of persistent citation practices within the archaeological community.

Reference:

Riedel, M., F. Riebschläger, and G. Russo. 2025. "World." Forum for Digital Archaeology and Infrastructure, June, 1–34. https://doi.org/10.34780/6k764r03

Riedel, Marcel, Fabian Riebschläger, Giulia Russo, Ammar Saeed, Juliane Watson, Torsten Kahlert, Iratxe Puebla, Leonhard Maylein, Stephanie Renger, Joshua Ramon Enslin, Angela Berthold, Frank Dührkohp, Lukas Grüning. 2025. CiVers-Workshop 2025: Programm, Fragestellungen und

Ergebnisse. Dataset. Deutsches Archäologisches Institut. https://doi.org/10.34780/4qjy3nf4

Lukas Grüning et al. 2025. “CiVers: Versionierte Webzitation leicht gemacht!” YouTube video, 9:55. November 11, 2025. https://www.youtube.com/watch?v=Jje8Kb8xJL0

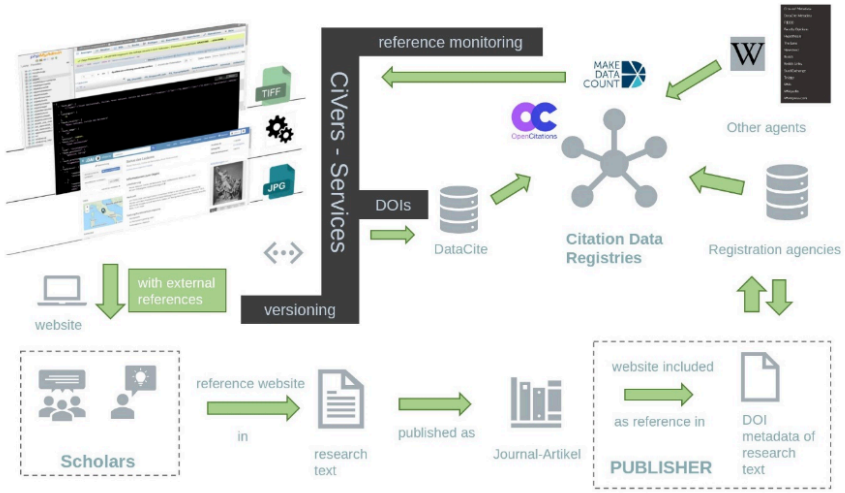

Fig. 1: Schema: CiVers in a nutshell

263. Let the 3D model meet the narrative. A workflow for creating a 3D edition of a tambourine player figurine for archaeology education

Federica Di Biase, University of Cyprus

Digital storytelling solutions centred on 3D volumes are gaining increasing attention in cultural heritage presentation and have been recognised by experts as rewarding practices for disseminating their work in non-traditional formats.

In this poster, I will discuss the theoretical and practical workflow for publishing the 3D edition of a terracotta tambourine player figurine stored at the Natural History Museum of Cyprus in PURE3D, an infrastructure for the publication and preservation of 3D scholarship.

The 3D edition of the tambourine player figurine serves to test and critically assess a publication pipeline grounded on participatory design theory and digital storytelling principles, while also exploring its potential as a pedagogical resource for teaching archaeology to BA and MA students in archaeology and cultural heritage fields. By promoting an object-based learning approach, the 3D edition claims to stimulate curiosity and also encourage deeper engagement between students and the museum context in which the artefact is preserved.

The workflow entailed four main steps: (1) creation of the 3D model and the 3D edition, (2) iterative improvement of the edition, (3) testing, and (4) evaluation.

Semi-structured interviews with museum professionals, including a museum director, curators, archaeologists, and education officers (n=8), informed the first three stages of the process, from object selection to content design, refinement, and testing. This participatory approach ensured that the resulting 3D edition aligns with institutional needs and curatorial perspectives.

The fourth stage of the work entails the use of an online questionnaire, currently still open, to assess students’ perceptions of the narrative structure,

the contribution of multimedia content to understanding archaeological information, and the effectiveness of the 3D edition in supporting the learning of key topics. Preliminary observations suggest that students report high levels of enjoyment and perceived learning, indicating the potential effectiveness of this approach for archaeology education. Moreover, the results of this evaluation will inform the iterative refinement of the digital edition, promoting active student participation in the co-creation of educational content.

References:

Barratt, R. P. (2021) 'Speculating the Past: 3D Reconstruction in Archaeology.' In Champion, E. (ed.) Virtual Heritage. London: Ubiquity Press.

Papadopoulos, C., Gillikin Schoueri, K. and Schreibman, S. (2025) 'And Now What? Three-Dimensional Scholarship and Infrastructures in the Post-Sketchfab Era.' Heritage. Multidisciplinary Digital Publishing Institute, 8(3) p. 99.

Schreibman, S. and Papadopoulos, C. (2019) 'Textuality in 3D: three-dimensional (re)constructions as digital scholarly editions.' International Journal of Digital Humanities, 1(2) pp. 221–233.

278. Hidden in the sands of being FAIR in artificial intelligence in archaeology: the case of the deep learning dataset of qala fortified villages

Nazarij Bulawka, University of Warsaw

Barbara Kaim, Faculty of Archaeology, University of Warsaw

Agnieszka Szaforz, Faculty of Archaeology, University of Warsaw

Aleksander Kwietniak, Faculty of Archaeology, University of Warsaw

This poster evaluates the challenges of publishing and developing a deep learning dataset for computer vision, using the example of the "Hidden in the Sand: The Deep Learning Dataset of Fortified Villages (Qala) Project." A qala is a fortified village typically found in Iran, Afghanistan, and surrounding regions, characterised by a rectangular layout, thick walls, and corner towers (Young and Fazeli 2018). These villages were vital for spatial and social organisation during the Islamic period, with preserved examples traceable to the Safavid (1501-1736 AD) and Qajar (1786-1925 AD) dynasties. While relatively recent, qala villages are essential to the archaeology of Central Asia and Iran during the Islamic era, with possible origins dating back to the Bronze Age (Lamberg-Karlovsky 1994). The Hidden in the Sand project is part of a larger effort to create the RADOGOST repository for archaeological data in Poland (DARIAH-PL Consortium). RADOGOST was designed to fill gaps and address limitations in existing archaeological data repositories, align with ethical and safety standards, and tailor the repository to the needs of Polish archaeology and neighbouring regions. Although geographically distinct, the "Hidden in the Sand" project was integrated into this repository by establishing standards for publishing machine learning datasets.

The project utilised freely available KH-9 HEXAGON imagery, a collection developed during the Cold War (1971-1986) with a spatial resolution of 0.7-1.4 m, accessible through the Earth Explorer platform. KH-9 HEXAGON images

are in the public domain, making them an ideal choice due to their license-free status.

This poster will present methods, challenges of development of the dataset and publishing it in the repository, underscores the need for standardised practices for developing deep learning datasets in archaeology.

References:

Lamberg-Karlovsky, C. C. 1994. 'The Bronze Age Khanates of Central Asia'. Antiquity 68: 398–406.

Young, Ruth, and Hassan Fazeli. 2018. 'Landlord Villages of Iran as Examples of Political Economy and Materiality'. Post-Medieval Archaeology 52 (1): 34–48. https://doi.org/10.1080/00794236.2018.1460150

288. Thinking the world. Defensive architectures as landscape builers

Rodrigo González-Camino, Instituto de Ciencias del Patrimonio (Incipit, CSIC)

Everything that a society produces is done so in certain ways, encoded in tradition, culture or habit. This goes beyond artifactual productions and involves, among other things, the way in wich societies transform the space they inhabit (Hillier y Hanson 1984). In addition to any other functional or symbolic explanation, the configuration of space and the distribution of elements within it also has a social dimensión (Criado-Boado 1993). The Iron Age in the north-west of Iberian Península presents an archaeological reality with great potential to benefit from this kind of observation since, above any other archaeologically recorded materiality, there is the ubiquitous and hegemonic presence of fortified settlements (González-Ruibal 2006). Thus, a monumentalised landscape is presented through constellations of fortified settlements wich, in many cases, offer no information beyond their morphology and location.
This work, which is part of a doctoral thesis currently in progress, presents a comprehensive methodology based on geographic information systems and spatial data processing using digital applications to analyse the formation patterns of these settlements. To this end, special emphasis has been placed on the effects of architecture on the percepction of the landscape. In addition, a new computational tool is developed to quantify the role of monumental entities in fortified settlements as generators of landscape.

References:

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291. A Map to Navigate the Data Archipelago: the "Open-archeOcsean" Catalogue of Open Datasets for Pacific, Southeast and East Asia Archaeology

Sebastien Plutniak, CNRS

Background
Archaeological datasets are sparsely published and distributed, and efforts to collect and assemble them have been an inherent part of this scientific practice for decades. All along the development of the discipline, multiple

calls to openly share structured and reusable data were launched: among others, from Jean-Claude Gardin's 1955 “Problems of Documentation” paper to more recent statements by Charles Perrault in his 2019 “The Quality of the Archaeological Record” book, advocating for the integration of massive datasets to address macro archaeological processes. In this regard, several parts of the globe benefit from large data infrastructures, e.g. “Ariadne” in Europe, “tDAR” in the USA, “ADS” in the United Kingdom, “DANS archaeology” in the Netherlands, etc.

Subject
This is not yet the case for Pacific, Southeast and East Asia archaeology, where no supranational repository is available. This absence results in higher dispersion of datasets and research efforts, in a region also characterised by its vastness and a manifold of islands, and scarce archaeological investigation; the importance of research carried out by non-local archaeologists and, consequently, particular attention paid to autochthonous data sovereignty (Gupta et al. 2020); and a significant linguistic diversity in publishing.

In this context, “Open-archeOcsean” was created, as a curated and interactive online catalogue of open-source datasets for Pacific and Southeast Asia Archaeology (https://analytics.huma-num.fr/open-archeocsean/). This catalogue was coined in reference to the European project “OCSEAN. Oceanic and Southeast Asian Navigators” (https://www.ocsean.eu) --where its development started-- a project that aimed at integrating linguistics, genetics, and archaeological data about the long history of human settlement in East and Southeast Asia and the Pacific.

Discussion
As an initiative intended for archaeological and local communities, “Open-archeOcsean” is an evolving tool, continuously enriched by monitoring (ancient and recent) resources and open to users' contributions. In this perspective, it draws on the FAIR principles (for scientific data management and stewardship) and CARE principles (for indigenous data governance), implementing them at two levels: 1) about listed resources, by reflecting and highlighting the use of these principles by resources' authors; 2) about “Open-archeOcsean” itself: by publishing its data and code under open licence.

This poster will report on “Open-archeOcsean” current contents, its software infrastructure (based on the “spatialCatalogueViewer” R package), the metadata documented for each listed resource, and some limits of its implementation of the FAIR and CARE principles.

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Gupta N., S. Blair, R. Nicholas. 2020. “What We See, What We Don’t See: Data Governance, Archaeological Spatial Databases and the Rights of Indigenous Peoples in an Age of Big Data”, Journal of Field Archaeology, 45, p. 39-50, doi: 10.1080/00934690.2020.1713969.

298. Stories from the Ancient Agora in Athens

Alexandra Katevaini, National and Kapodistrian University of Athens/ American School of Classical Studies at Athens

Excavation notebooks are first-handing recordings of the excavation usually reserved for study purposes; however, they can be used to narrate the history of the excavation through the people that contributed to the project and formed the archaeological sites as we know them now. The excavations of the Ancient Athenian Agora are a systematic excavation project that

started in 1931 by the American School of Classical Studies at Athens. The archaeological site of the Ancient Agora is a central site in the city center of Athens with high numbers of visitors.
The narrative of the Classical Athens is prominent, however there are more stories that exist in the site (Pluciennik 1999). Storytelling is integral to archaeology and its communication with the public (Burlingame and Papmehl-Dufay 2022). This project gives another spin to the source for the stories by using the excavation notebooks and allow the visitors to engage with the site with another lense. As mobile devices are a must have on our everyday life it opens new paths on how to guide the audience engage with the archaeological sites. The tool used to create the stories is the ArcGIS Story Maps application and allow the visitors to engage with the stories via QR codes or statically through a webpage.
The elements of the topic will be technical caveats of using ArcGIS Story Maps and give the participants of the CAA the chance to view the stories. The case study presented is one of the sections of the excavation and works that took place in the area in 1936, 1937, 1950 and 1951.

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Pluciennik, Mark. 1999. “Archaeological Narratives and Other Ways of Telling.” Current Anthropology 40 (5): 5. https://doi.org/10.1086/300085.

299. A Coordination Office for Scientific University Collections in Germany

Louise Tharandt, Humboldt-Universität zu Berlin

The Coordination Office is a unique institution. It supports and brings together the more than 1300 heterogeneous and versatile collections at universities and colleges in Germany. The Coordination Office promotes the exchange of knowledge, offers advice and assistance, conducts its own research projects, and highlights the importance of the collections to the public. Through its work, it contributes to ensuring that university collections are used in research and teaching and are preserved as cultural and natural heritage.
The Coordination Office maintains a detailed overview of the diverse university collection landscape, from A like Archaeology to Z like Zoology. At the same time, it is a service provider and representative of the interests of the collections. It advises, supports, and networks, for example on issues relating to the storage, preservation, digitization and virtual exhibitions of collections, as well as on ethical issues of collecting. It also publishes central handouts and guidelines for working in and with university collections.
As a research institution, the coordination office is a source of ideas for collection-related issues. It is establishing the data competence center “SODa – Collections, Objects, Data Competences” for scientific university collections, which deals with issues of digitization in collections and data-driven research. A particular concern of the coordination office is the promotion of teaching with collections and objects. To this end, it is involved in the Europe-wide project “Teaching with Objects” and operates the online toolbox for object-based teaching developed in the project.
The coordination office has been in existence since 2012. It was established at the suggestion of the „Wissenschaftsrat”, the most important science policy committee in Germany, with the aim of supporting the further development of university collections in Germany. Internationally, it is regarded as a

best practice example of the successful establishment of an overarching institution to support the university collection landscape.
This poster gives an overview of the work the Coordination Office for Scientific University Collections does and the projects it is involved in.

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Wissenschaftsrat (2011): Empfehlungen zu wissenschaftlichen Sammlungen als Forschungsinfrastrukturen; Berlin. https://www.wissenschaftsrat.de/download/archiv/10464-11_engl

309. Looking at hoards through networks: A new approach to research early medieval depositions in the Middle Dnieper Area

Inga Utkina-Wöhrl, Freie Universität Berlin / Leibniz-Institut für Geschichte und Kultur des östlichen Europa (GWZO)

Hoards are a very special category of archaeological find. The reasons for the deliberate burial of objects have long been debated in the archaeology of different periods and regions, mostly focusing on a possibility to distinguish between 'profane' and 'ritual' motivations for these actions. Past research has clearly demonstrated the issues connected to this duality of possible motivations (Fontijn 2002, 13–22), as well as to the challenges by interpretation of hoards in general (Bradley 2017). Recent studies have suggested a variety of theories and methods to gain new insights into this phenomenon, focusing, for example, on the social meaning of space, or the 'biographies' of objects — including their treatment or technological aspects (e.g. Orfanou et al. 2024). Nevertheless, categorizing hoard compositions and depositional contexts is a dominant tool for recognizing different patterns and understanding possible regional or supra-regional dynamics, even though this approach reduces social phenomena. I suggest that a deeper understanding of the complexity of 'hoarding' can only be achieved through a combined quantitative and qualitative investigations. Benefiting from both a quantitative and a qualitative perspectives is possible by using the so-called 'slow' network approach (Deicke 2025). The aim of this poster is to present the theoretical concept that I am working on for my PhD project. This concept enables depositions to be analysed using network analysis, shifting the focus from motivation to modelling the interactions of responsible communities and social groups.

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Orfanou et al. 2024 – Orfanou, V., Bruyère, C., Karydas, A.G. et al. 2024. "A community of practice approach to the management of metal resources, metalworking and hoarding in Bronze Age societies." Sci Rep 14: 16153. https://doi.org/10.1038/s41598-024-65798-4

314. Towards a Comprehensive Virtual Landscape of the Funnel Beaker Culture

Pawel Bernaciak, The University of Edinburgh

The Funnel Beaker Culture (TRB) of North-Central Europe (c. 4000–2800 BCE) is characterized by its megalithic tombs and clustered settlements. Despite decades of research, knowledge of TRB landscapes remains fragmented. Most studies have focused on local groups (e.g. Kuyavia, West Pomerania, or the recently identified Świętokrzyskie cluster in Poland), while the culture's full geographic range extends from Poland through northern Germany to Denmark. This localized focus has limited our understanding of TRB's broader cultural and environmental dynamics.

To address this gap, our project proposes a unified digital framework for reconstructing the TRB cultural landscape at a pan-regional scale. We integrate multi-regional archaeological datasets with GIS-based spatial analysis and paleoenvironmental data to build an interactive digital model of TRB settlements and monument sites. Methodologically, the project combines remote sensing inputs (LiDAR, aerial imagery) and geophysical survey data to map funerary monuments and settlements across diverse terrains. Early findings from case studies in Kuyavia and West Pomerania reveal non-random patterns – for instance, TRB megalithic tombs often occupy elevated areas near water sources, underlining the influence of topography and resources on site selection.

Moving beyond static maps, the envisioned model enables dynamic simulations of Neolithic lifeways. For example, we are analyzing the potential migratory spread of early farming communities, modelling socio-economic interaction networks among TRB populations, and assessing their ecological impacts on the landscape (e.g. patterns of deforestation or soil usage). This simulation capability allows us to explore how TRB communities might have interacted with and transformed their environment, providing insights into socio-environmental feedbacks over time.

This holistic approach aims to bridge the gaps between isolated regional studies by standardizing and integrating data into a single computational framework. The poster will present the project's conceptual design, methodology, and preliminary results, demonstrating how advanced digital tools can unite localized studies into a pan-regional perspective. In doing so, we seek to contextualize TRB's role within the broader Neolithic transformations of Europe, illustrating the value of comprehensive landscape modelling in archaeological research.

Key words: Funnel Beaker Culture; Neolithic; GIS; spatial analysis; cultural landscape; megalithic tombs

References:

Bernaciak, Paweł. "New Perspectives on the Understanding of Megalithic Tombs of the Funnel Beaker Culture in the Territory of Poland: An Assessment of Emerging Discoveries and the Development of Remote Sensing Techniques." New Perspectives on the Understanding of Megalithic Tombs of the Funnel Beaker Culture in the Territory of Poland: An Assessment of Emerging Discoveries and the Development of Remote Sensing Techniques, 2024.

Midgley, Magdalena. 1992. TRB Culture: The First Farmers of the North European Plain. Edinburgh: Edinburgh University Press.

Conolly, James, and Mark Lake. 2006. Geographical Information Systems in Archaeology. Cambridge: Cambridge University Press.

317. Recreating, Creating, or Imagining: Building a Digital Model of a Danish Hypocaust Based on Photogrammetry and Laser Scanning

Morten Birk Jørgensen, The Royal Danish Academy

Mads Lou Bendtsen, Aarhus University

Thomas Hacksen Kampmann, The Royal Danish Academy

This project focuses on the design of a digital model as the basis for the construction of an anastylosis of a medieval hypocaust, excavated in 2025 at Hjortespring, Herlev Municipality, Denmark. The excavation involved the systematic dismantling of the structure's stones and bricks, accompanied by continuous photogrammetric documentation and laser scanning of each course in the brickwork. Using the collected data, this study explores multiple approaches to digitally reconstruct the hypocaust, integrating photogrammetry, laser scans, and comparative research on similar archaeological finds.

While the term "hypocaust" is commonly associated with the radiant heating systems of ancient Greek temples and Roman baths, a distinct medieval variant emerged in Northern Europe and the Baltic region. Unlike their ancient counterparts, which relied on radiant heat from floors and walls, these medieval systems utilized convection heating. Air was channeled through a combustion chamber, heated a bed of natural stones, and circulated directly into the interior once the fire subsided (Tvauri 2009, 71-72).

Hjortespring is a suburb of Copenhagen within Herlev Municipality and the find site is situated adjacent to a local art museum, a retail center, and residential areas. During preparatory work for a new housing development, a local developer uncovered evidence of a medieval hypocaust—a feature typically associated with high-status settlements. Kroppedal Museum, responsible for archaeological oversight in the area, conducted a comprehensive excavation. Combined with historical sources, the excavation revealed a royal hunting estate established by Frederik II around AD 1586, with the hypocaust likely serving as the primary heating system for the building (Bizoev 2024).

Following the excavation by Kroppedal Museum, the site was released for development. However, the developer expressed a desire to preserve the site's historical significance by constructing an anastylosis of the hypocaust. To support this intention, the authors of this paper participated in a subsequent dismantling of the structure and developed a digital model to serve as the foundation for its physical reconstruction.

The preservation of cultural heritage landmarks raises critical questions: Should the hypocaust be preserved in its current state, reconstructed, or restored to a functional condition? How should an isolated structure, devoid of its original building, flooring, and intangible elements—such as heat, light, and scent—be interpreted? This poster addresses these challenges, alongside issues related to digital documentation and reconstruction methods.

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Tvauri, Andres. 2009. "Late medieval hypocausts with heat storage in Estonia." Baltic Journal of Art History Autumn 2009: 49-78.

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343. R–Python workflow for unsupervised classification of artefacts using Conventional Mixture of Experts

Anastasiia Korokhina, Leibniz-Institute for the History and Culture of Eastern Europe

The search for optimal automated procedures for object classification remains one of the key challenges in data preparation and analysis within archaeological research. In many contexts, unsupervised classification from an etic perspective is the only viable way to approach a genuine typology of artefacts.

This work presents a lightweight and original workflow for unsupervised classification of archaeological finds based on two-dimensional images (archaeological drawings). The workflow includes the following stages: semi-automatic image processing, morphometric description using elliptic Fourier coefficients (Kuhl & Giardina 1982), and the classification step implemented via a Mixture of Experts (MoE) model (Jacobs et al. 1991).

The Mixture of Experts approach combines a gating network, which partitions the feature space, with a set of local expert models that capture data structure within each partition. In this workflow, the gating network is represented by a Self-Organizing Map (SOM), while each expert is implemented as a Gaussian Mixture Model (GMM) trained on the data assigned to its SOM node.

Several experimental variants of the procedure were tested:

(1) Explicitly localised experts — data were pre-processed by the SOM, and each expert was trained on a separate node, collectively covering the entire observation space;

(2) Implicitly localised experts, where the SOM-based gating and the experts were trained jointly on the full dataset;

(3) Implicitly localised experts with Bayesian priors derived from the mixture of explicitly localised expert results.

Additionally, the influence of feature-space reduction to meta-features and their subsequent ranking using mutual information was evaluated. Based on visual and statistical assessment, the first variant (mixture of explicitly localised experts) demonstrated the most interpretable and stable classification outcomes.

The procedure was tested on Middle Neolithic material from the North Central European Lowlands (Lorenz 2018). It can be extended to any type of archaeological objects and contributes to the development of unsupervised classification methods.

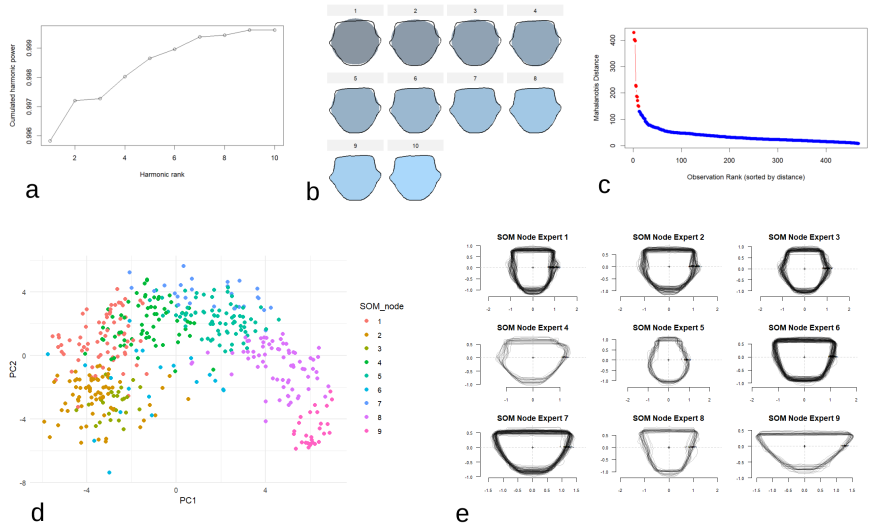

Fig. Main stages of pottery form classification using the Mixture of Experts (MoE): a – Plot of harmonic power used to describe vessel outlines; b – Reconstruction of a randomly selected vessel outline using elliptic Fourier coefficients; c – Detection of multivariate outliers; d – Trained experts visualized in a 2D principal component space; e – Preliminary classification of outlines using the MoE (all plots were generated in R)

References:

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385. In the footsteps of travellers – an analysis of the course of old communication routes in the Low Beskids

Weronika Wnuk-Ciastek, University of Warsaw

Jerzy Ciastek, University of Warsaw

The Low Beskids region has almost always formed the southern border of Poland. In our research, as part of the reconstruction of selected elements of the cultural landscape of this area, we have attempted to recreate as accurately as possible the network of communication routes and defensive structures (including hillforts) in the Middle Ages. The course of communication routes and the location of hillfort were determined on the basis of written sources, the location of defensive positions (data from the Polish National Heritage Institute; Marszałek 1993) and the terrain (assuming no significant changes to date). An attempt was also made to locate strongholds in the Low Beskids, whose location was previously unknown but which were mentioned in historical sources. Using a digital terrain model and vegetation indicators, at least one previously unknown stronghold was located. The DTM was illuminated at an angle of 45 degrees from 8 directions (N, NE, E, SE, S, SW, W, NW) to minimise the risk that shadows or light from a specific direction would obscure smaller landforms or depressions (Banaszek 2015). The spatial resolution of the data is 1 m. The analysis also included colour compositions of images in near-natural colours and CIR, as well as the calculation of vegetation indices such as NDVI (Normalised Difference Vegetation Index). All analyses were performed using QGIS software.

Local changes in vegetation are very helpful in searching for archaeological sites or their traces in ploughed fields, but it is difficult to search for smaller sites in forested areas. However, the Digital Terrain Model is effective both in fields and forests, allowing the discovery of previously unknown sites without the need for long field expeditions. Indicating the specific coordinates of the sites found allows for short field trips to specific locations for verification, instead of tedious searching of the area metre by metre. Research using remote sensing techniques is not new, especially the use of DTM in scientific research in Europe and worldwide (Kucukkaya 2004, 83-88), but this is the first attempt to use DTM and vegetation indices to reconstruct a network of communication routes and defensive sites in the area in question.

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389. Linking Analytical Data through Semantics: Challenges and Perspectives in Archaeometric Research

Lorena Bravi, Sapienza University of Rome

Martina Naso, Sapienza University of Rome

Massimiliano Puntin, Sapienza University of Rome

Subject
The proposed study presents a methodological framework for the semantic mapping of archaeometric data, starting from X-Ray Fluorescence (XRF) analytical processes on archaeological ceramics. The approach is grounded in ontological and graph-based modelling, which allows the explicit representation of relationships between samples, instruments, parameters, and interpretative results. By describing each analytical steps (Johnson et al. 2024): data acquisition, calibration, quantification, and interpretation as an interconnected set of entities and events. The model aims to preserve contextual information while supporting a more structured and interoperable representation of analytical data. The workflow combines controlled vocabularies, persistent identifiers, and open metadata standards (e.g., CIDOC CRM, CRMsci, CRMarchaeo) to enhance data transparency and reproducibility (Bekiari et al. 2024).

Background
In archaeometric research, data heterogeneity remains one of the major challenge to the integration and reuse of scientific information. Analytical results often differ in structure, units, precision, and terminology, depending on the instrument, calibration protocol, and research purpose. This fragmentation hampers the comparison and interoperability of datasets, limiting the potential for large-scale, cross-contextual interpretations. Also, the lack of shared reference vocabularies and standardised recording schemes makes it difficult to trace, validate, and compare results across laboratories and projects.

Discussion
This semantic strategy has broader implications for the adoption of computer applications and quantitative methods in archaeology. By linking archaeometric data through shared ontologies, it becomes possible to bridge the gap between laboratory-based analyses and archaeological interpretation, thus promoting data comparability and reuse across institutions and research domains. Moreover, by incorporating calibration information within the data structure, the model encourages a more transparent and consistent assessment of analytical reliability. While the current implementation focuses on ceramic materials analysed through XRF, the modular nature of the framework ensures scalability to other techniques (e.g., FTIR, Raman, XRD) and material classes (e.g. litics, metals). In the long term, the goal is to contribute to a unified digital ecosystem where archaeometric datasets are no longer isolated outputs but interoperable components of a broader knowledge infrastructure for cultural heritage research.

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396. XRONOS: An open data infrastructure for archaeological chronology

Joe Roe, University of Copenhagen

Martin Hinz, Kiel University

Computational archaeologists have benefited immensely from our field’s embrace of open data and open science approaches. One of the principle domains in which this has been applied in recent years is chronometric data. Comprehensive compilations of radiocarbon dates have become available for many parts of the world in the last decade and, as natural next step, there are now several initiatives to collate this data globally, including the retrieval tool c14bazAAR (Schmid, Seidensticker, and Hinz 2019), the IntChron

exchange format (Bronk Ramsey et al. 2019), and the synthetic database p3kc14 (Bird et al. 2022). But this effort is far from complete. Radiocarbon datasets are still sorely lacking for many parts of the world and, even in those regions with good coverage, the quality of data is highly uneven and largely undocumented. There exists no central repository ensuring the long-term sustainability and completeness of these datasets, and the potential of placing other sources of chronometric information (e.g. dendrochronology, typological dating) in an open data framework has hardly been realised at all.

Here, building on and complementing these initiatives, we present XRONOS (Roe et al. 2025, https://xronos.ch), an open data infrastructure for archaeological chronology. It provides open access to published radiocarbon dates and other chronometric data from any period, anywhere in the world. By collating a large number of existing regional and global compilations of dates, XRONOS offers the most comprehensive radiocarbon database yet published, with over 350,000 radiocarbon and 75,000 site records. It also provides a foundation for expanding the systematic collection of chronometric information beyond radiocarbon, with support for typological and dendrochronological dates and a generalisable data model that can be adapted to other methods of absolute dating. Automated and semi-automated quality control processes ensure that data from diverse sources is continuously integrated and standardised, making it easier to find information of interest and reducing the need for manual data cleaning by end users. The XRONOS framework provides more open, more reliable, and more comprehensive access to chronometric data than previously available, that has already helped futher the application of quantitative and computational methods in archaeological chronology.

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411. archaeo.social and archaeo.dev: decentralised, collective digital infrastructure for archaeologists

Joe Roe, University of Copenhagen

Zachary Batist, McGill University

James A. Fellows Yates, Max Planck Institute for Evolutionary Anthropology

Andrea Titolo, University of Turin

In November 2022, the microblogging service Twitter (now X) was acquired by billionaire Elon Musk, triggering the first of several exoduses of its users. Amongst those who left the site for other platforms, or who simply stopped using it, were archaeologists and other scientists. 'Science Twitter' had been a prominent venue for scholarly communication on social media, providing a platform for researchers to talk directly to each other and to the public (Insall 2023). Its sudden disintegration was a wake-up call for many, highlighting the risks of entrusting public scientific discourse to a single private corporation. Subsequent events have only reinforced academia's need for digital

services that are resilient to corporate capture, 'enshittification', and data colonialism (Brembs et al. 2023). And yet much of the digital infrastructure we rely upon as archaeologists—not just in terms of social media and communication, but software development, code sharing, collaboration, and so on—remains concentrated with a few large corporations.

archaeo.dev (https://archaeo.dev) is a scholarly collective that maintains decentralised digital services for archaeologists. We use free and open source software to promote a 'do it yourself' approach to digital research and scholarly communication tools, with the aim of breaking our field's dependence on centralised, proprietary platforms. The collective began in 2022 with archaeo.social (https://archaeo.social), a federated social media platform created in response to the 'scientific exodus' from Twitter. Since then, we have built on the model with other decentralised services, including instant messaging platform Matrix (https://chat.archaeo.social), software development platform Forgejo (https://forge.archaeo.dev), and collaborative text editor HedgeDoc (https://md.archaeo.dev). These are used by and supported by hundreds of individual users and a number of scholarly societies. Though 'free as in freedom', maintaining these services does require an investment in money, time, labour, and skills in system administration – creating a significant barrier to entry for individual scholars. The aim of archaeo.dev is to overcome this barrier by pooling our resources and operating these tools collectively. With this poster, we invite members of the CAA community both to use them, and help us build them further.

References:

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424. Generative Artificial Intelligence to simulate ancient environmental landscapes

Elisa Paperini, University of Pisa

Reconstructing past landscapes is a key task in archaeology for understanding how human societies interacted with their environments. Traditionally, this work has relied on proxies such as pollen, charcoal, and isotopic data. The recent development of Generative Artificial Intelligence (GenAI) opens new possibilities for visualizing palaeoenvironments, offering realistic outputs that can support both research and public dissemination. Yet, their use raises methodological and epistemological questions: to what extent can GenAI-generated images be considered scientifically valid representations of the past?

Subject
This poster presents an experimental workflow that integrates predictive and generative AI components to reconstruct vegetational landscapes from diachronic pollen data. In the predictive phase, a Random Forest model trained on 41,831 European pollen records (Holocene to present) estimates the dominant biome for each sample. In the generative phase, a multimodal GenAI system (based on Stable Diffusion) translates these biome predictions and site metadata into visual outputs depicting the likely vegetation structure. Archaeological and palaeoecological expertise is used to evaluate the accuracy and plausibility of the generated images.

Discussion
The study discusses both the scientific and communicative potential of GenAI

in environmental archaeology. On one hand, generative models can produce engaging, contextually informed images that help visualize and communicate complex datasets. On the other, they challenge traditional notions of evidence, as their apparent realism may obscure the uncertainty underlying palaeoenvironmental reconstruction. By critically comparing generated landscapes with expert assessments and palaeoecological expectations, this research explores how GenAI can complement, rather than replace, human interpretation. Ultimately, this work argues for a reflective integration of generative AI into archaeological practice, emphasizing transparency, evaluation protocols, and collaboration between computational and domain experts.

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425. Integrating magnetometry and ground penetrating radar at the American Revolutionary War fortification in Butts Hill Fort (Portsmouth, Rhode Island, USA)

Samuel Koontz, University of Kentucky

Alexander Wise, Department of Computer Science, University of Kentucky

Ryan Nolin, Department of Mechanical and Aerospace Engineering, University of Kentucky

James Keppeler, Department of Anthropology, University of Kentucky

Marcus Rodriguez, William S. Webb Museum of Anthropology

Philip Mink, William S. Webb Museum of Anthropology

George Crothers, William S. Webb Museum of Anthropology

Paul Murphy, Battle of Rhode Island Association, Portsmouth

John Robertson, United States Military Academy, West Point

Alexandra Uhl, Department of Sociology and Anthropology, Stonehill College

Sean Bailey, Department of Mechanical and Aerospace Engineering, University of Kentucky

Hugo Reyes-Centeno, Department of Anthropology, University of Kentucky

The Battle of Rhode Island in 1778 stands as a critical yet understudied episode in the American Revolutionary War. The conflict between the newly allied American and French military against the British-Hessian forces culminated at Butts Hill Fort in Portsmouth, Rhode Island, United States. Historic accounts show that the fort once contained barracks, battery, and magazine structures within rising earthwork fortifications, with only the earthworks visible today. A previous remote sensing survey found evidence that buried components of the barracks structure remain underground today (Keppeler, 2025); however, additional multi-modal research was recommended to verify the presence of the barracks and the other buried structures. Integrating multiple remote sensing methods allows for imaging of multi-layer maps and strengthens confidence in feature-identification (Conyers, 2017; Samadzadegan, 2025). Therefore, this research combines additional remote sensing techniques to investigate the presence or absence of subterranean architectural features within the fort. In this study, publicly available satellite and

LiDAR data was used in conjunction with original ground penetrating radar (GPR) and magnetometry data to create digital maps and 3D interpolations of the subterrain. A GPR survey was implemented utilizing a stepped-frequency radar Kontur GROUND 1212 system (30 – 4,000 MHz) in combination with a pulsed radar MALÅ RAMAC GPR CU II (500 MHz) system and a SENSYS multichannel magnetometer, combined with a SPECTRA Precision Global Positioning System (GPS). The surveys were conducted across the area within the earthworks, along with select areas outside the fortification at 0.25 and 0.50 cm transects in select areas, targeting the locations of each architectural feature. Our GPR data results revealed a cluster of rectilinear anomalies at a depth of roughly 18-55 cm where the barracks building once stood. Magnetometry data revealed additional localized anomalies in the same area, with partial overlap with the GPR features, indicating a geophysical correspondence between the two datasets (Figure 1). Several isolated magnetic anomalies are also distributed across the broader survey area, unrelated to the primary architectural pattern. The results of these surveys suggest that components of the barracks building are still present underground and align with the locations of architectural features indicated on historical maps, confirming previous results; however, little evidence for remains of the battery and magazine structures was detected and the provenance of the other anomalies is currently unclear. These findings provide insight into the site's spatial composition, informing discussions about the preservation and management of this historical archaeology site, as well as the limitations of relying on historical maps to infer site formation processes.

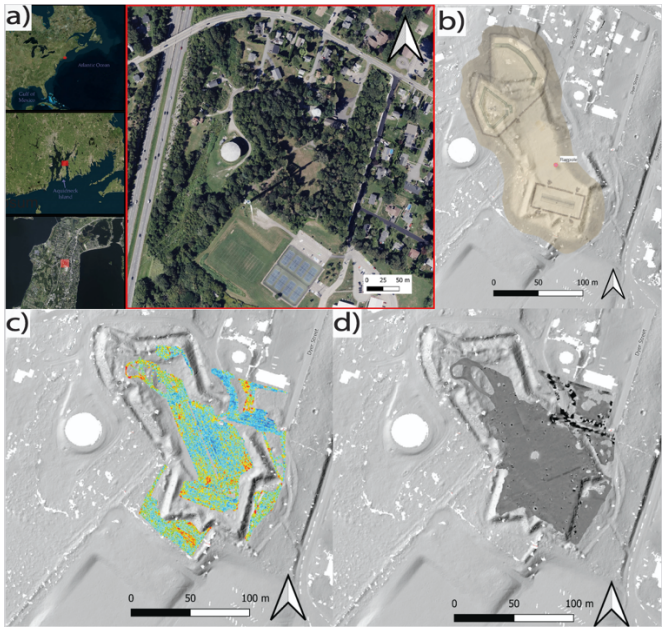

Fig. Maps of Butts Hill Fort with a series of overlays. (a) Sattelite images of Aquidneck Island and Butts Hill Fort. (b) Publically available LiDAR map overlaid with a modified portion of the 1777 Clinton Plan Nr. 19 map, depicting barracks, magazine, and battery structures. (c) LiDAR map overlaid with ground penetrating radar results at a depth of 18.5 cm. Red areas represent higher amplitude signals. (d) LiDAR map overlaid with magnetometry data. Black features represent a positive magnetic (nT) value, white features represent a negative magnetic value.

445. Inked in 3D: Surface modelling and image enhancement of a tattooed human mummified individual from Benguet, Philippines

James Keppeler, University of Kentucky

Dominik Göldner, DFG Center for Advanced Studies "Words, Bones, Genes, Tools,"

Cindy Copas, Office of the Indigenous Peoples Mandatory Representative (IPMR 2017-2021)

Sario Copas, Office of the Indigenous Peoples Mandatory Representative (IPMR 2017-2021)

Rita Peyroteo-Stjerna, University of Uppsala

Max Larena, University of Uppsala

Hugo Reyes-Centeno, University of Kentucky

Decorative tattoos preserved on human mummified remains have been documented globally for at least 5,000 years (Friedman et al. 2018) and can serve as a symbolic archive of socio-cultural narratives, as well as a source for understanding cross-regional ethno-linguistic connections. Southeast Asia has a ~10,000-year tradition of mummification (Hung et al. 2025); however preservation of soft tissue that could retain tattoo symbols is rare due to the predominantly warm, tropical environments of the region. In addition, limited conservation strategies in the face of climate change and increasing international tourism further threaten the preservation of tattooed mummified remains; thus, their documentation is an essential part of heritage management strategies. This work therefore presents a case study applying three-dimensional photogrammetry and decorrelation stretch techniques to document the elaborately tattooed and mummified remains of Apo Anno, an individual revered in the Benguet Province of the Northern Philippine Island of Luzon. First, we collected 1,849 images of Apo Anno using traditional photography and structured light scanning, and used these within a structure-from-motion photogrammetry workflow to generate a three-dimensional (3D) model made up of 105 million polygons. Then, we applied the decorrelation stretch algorithm based on the multivariate Karhunen-Loève transformation using DStretch (Harman 2005), which digitally enhances levels of contrast between similar color values in an image. While most previous applications of DStretch have been made to single images, our approach was to apply the algorithm to the color texture file of Apo Anno in order to enhance the visibility of faded tattoos in 3D. Results featured a high-quality 3D rendering of Apo Anno that contrast his tattoos with the surrounding mummified skin, allowing for a more complete visualization than traditional imaging, particularly in areas where tattoos have begun to fade or deteriorate (Figure 1). We identify examples of tattoo motifs in Apo Anno that can be compared to other conserved mummified examples and material symbols in the Philippines, as well as other parts of Southeast Asia and the Pacific. The results of this study, alongside newly obtained genomic and radiometric chronological data, contextualize Apo Anno within pre-Hispanic mummification and tattooing practices in the Northern Philippines. The joint application of documentation and analytical methodologies in this case study serves as a model for the future documentation of other tattooed mummified individuals.

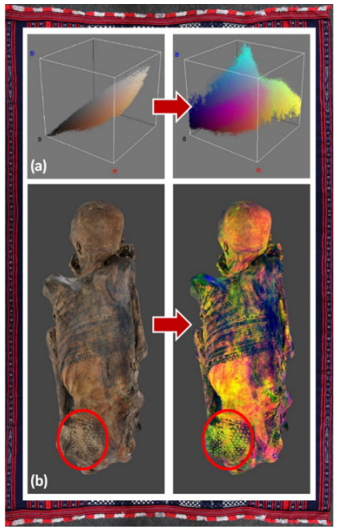

Fig. Apo Anno mummified individual from Benguet, Philippines: (a) Color graph of the Apo Anno texture file in three dimensions before and after the application of decorrelation stretch, followed by (b) the texture file wrapped on the 3D model of Apo Anno (dorsal view) before and after decorrelation stretch. Note enhanced representation in left pelvic region (red circle). Images are overlayed on a traditional death blanket.

References:

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Wednesday

S2: Our Little Minions pt. VII: Small Tools with Major Impact

Brigit Danthine, Austrian Archaeological Institute (Austrian Academy of Science), Vienna, Austria

Ronald Visser, Saxion University of Applied Sciences, Deventer, Netherlands

Florian Thiery, Research Squirrel Engineers Network, Mainz, Germany

Location: Franz König Saal
Session Format: Other

This seventh Little Minion session invites short presentations, lightning talks (max. 7-10 minutes, including very brief discussion), of small coding pieces, software, or hardware solutions at any stage of completion, not only focusing on fieldwork or excavation technology, associated evaluation, or methodical approaches in archaeology. Each talk should explain the innovative character and mode of operation of the digital tool. The only restriction is that the software, source code, and/or building instructions must be open and freely available.

After the previous year's spontaneous success of "Stand-up-Science", you will also have the opportunity to spontaneously participate and demonstrate what you have on your stick or laptop. If you would like to participate without submitting an abstract in the spontaneous section of the session, please don't hesitate. Please come and spontaneously introduce your little minion!

In our daily work, small, self-made scripts (e.g., Python or R), home-grown small applications (e.g., QGIS Plugins), and small hardware devices significantly help us get work done. These little helpers ("little minions") often reduce our workload or optimise our workflows, although they are not often presented to the outside world and the research community [1]. Instead, we generally focus on presenting the results of our research and use our small tools silently during the process, without even pointing to them, especially not to the source code or building instructions. This session will focus on these "little minions", and we invite researchers to share their tools so that the scientific community may benefit. As we have seen in last year's "minion talks" since 2018, there is a wide range of tools to be shared. The Little Minion software tools have evolved from their niche existence into essential components of projects and consortia. They are a significant part of the archaeological Research Software Engineering community (also known as Computational Archaeology) and play a crucial role in the Research Data Management (RDM) process within the Research Data Lifecycle and the digital object biography [2]. This can result in, for example, FAIRification Tools [3-4] and research tools for reproducible quantitative/spatial analysis used in international and interdisciplinary initiatives, such as the German National Research Data Infrastructure (NFDI) [5-7], the European Collaborative Cloud for Cultural Heritage (ECCCH), or ARIADNEplus.

This seventh Little Minion session invites short presentations, lightning talks (max. 7-10 minutes, including very brief discussion), of small coding pieces, software, or hardware solutions at any stage of completion, not only focusing on fieldwork or excavation technology, associated evaluation, or methodical approaches in archaeology. Each talk should explain the innovative character and mode of operation of the digital tool. The only restriction is that the software, source code, and/or building instructions must be open and freely available. Proprietary products cannot be presented, but open and freely available tools are designed for them. To support the subsequent use of the tools, the goal should be to make them open and available to the scientific community (e.g., GitHub, GitLab).

We invite speakers to submit a short abstract, including an introduction to the research tool, a link to the repository (if possible), access to the source code, and an explanation of which group of researchers could benefit from the tool and how. The tools may address the following issues, but are not limited to:

- data processing tools and algorithms
- measuring tools
- digital documentation tools
- GIS plugins
- hands-on digital inventions
- data-driven tools

After the previous year's spontaneous success of "Stand-up-Science", you will also have the opportunity to spontaneously participate and demonstrate what you have on your stick or laptop. If you would like to participate without submitting an abstract in the spontaneous section of the session, please don't hesitate. Please come and spontaneously introduce your little minion!

The Minion session is designed for interested researchers from all domains who want to present their small minions, with a focus on the technical domain, as well as for researchers who wish to explore the types of little minions available to help with their own research questions. We all use minions in our daily work, and often, tools for the same task are built multiple

times. This online session provides a platform for tools that are usually considered too unimportant to be presented in traditional talks, but are crucial and extensive steps in our research.

As a result of the session, we aim to provide support, ensuring that all the presented tools and links to code repositories are available to the research community on our website https://littleminions.link.

A sub-group of the CAA SIG Scientific Scripting Languages in Archaeology (SSLA), the "little minions", organises this session. The core aim of this SIG is to focus on the application of Scripting Languages in archaeological research.

References:

[1] Thiery, F. et al. (2021) Little Minions in Archaeology: An open space for RSE software and small scripts in digital archaeology. *Squirrel Papers*. [Online] 3 (4). doi: 10.5281/zenodo.4575167.

[2] Thiery, F. et al. (2023) 'Object-Related Research Data Workflows Within NFDI4Objects and Beyond', in York Sure-Vetter & Carole Goble (eds.) *Proceedings of the Conference on Research Data Infrastructure*. [Online]. 7 September 2023 Hannover: TIB Open Publishing. CoRDI2023-46. [online]. doi: 10.52825/cordi.v1i.326.

[3] Thiery, F. et al. (2024) Research Software Engineering in NFDI4Objects: Community building, implementation of FAIRification Tools and scripting in Computational Archaeology. *Squirrel Papers*. [Online] 6 (3), #2. doi: 10.5281/zenodo.10774878.

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[6] Thiery, F. & Flemisch, B. (2025) Research Software Engineering in the NFDI (INFRA-WG-RSE). *Squirrel Papers*. [Online] 7 (3), λ5. doi: 10.5281/zenodo.14898391.

[7] Thiery, F. et al. (2025) How to improve the visibility and added value of RSE(s) in NFDI. *Squirrel Papers*. [Online] 7 (3), λ8. doi: 10.5281/zenodo.14976365.

16:00 – 19:30 **Individual breaks**	• 1**.** Detecting Temporal Relations in Archaeology: Model and Algorithms *Eythan Levy (University of Zurich)* • 3**.** From Clay to Code: A Digital Solution for Annotating Cuneiform Texts *Laura Schimmelfennig (Ruprecht-Karls-Universität Heidelberg)* • 46**.** chublets.software – From hidden Little Minions to an Archaeological Research Software Marketplace *Florian Thiery (LEIZA); Lutz K. Schubert (University of Cologne)* • 47. SPARQLing Unicorn Research Toolkit – Little Minions for FAIR Archaeological Data *Florian Thiery (LEIZA); Fiona Schenk (Johannes Gutenberg University Mainz); Daria Stefan (TU Wien)*

- 135. Web scrapping of an archaeological dataset using Python: An ADS bifaces dataset example
  Juan Palomeque-Gonzalez (IDEA- Madrid)

- 223. Wikidata Meets QGIS: Enhancing Archaeological Interpretation with Visual Foundation Models
  Jürgen Landauer (Landauer AI); Florian Thiery (LEIZA)

- 238. Secanto - Recent developments
  Vincent Mom (DPP)

- 273. TagLab - a semantic segmentation tool. Now, also for CH
  Marco Callieri; Gaia Pavoni*; Massimiliano Corsini*; Federico Ponchio*; Alessandro Muntoni*; Paolo Cignoni**

  ** ISTI-CNR*

- 281. QSKOS. Development of a plugin for integrating controlled vocabularies into QGIS
  Lasse Mempel-Länger; Anja Cramer*; Benjamin Streubel*; Kristina Fischer*; Florian Thiery*; Ingrid Stelzner*; Nico Wende*; Allard Mees**

  ** LEIZA*

- 282. The "QSaurus". A QGIS-Plugin to implement (SKOS) Thesauri into QGIS
  Brigit Danthine (Austrian Archaeological Institute); Sinan Zülfikar (Austrian Archaeological Institute)

- 395. MergeLines: a tool to merge adjoining linear structures based on contiguity angles
  Nathanaël Le Voguer (UMR 7324 CITERES-LAT

- 416. STON: a practical imaging tool for archaeological petrography and beyond
  Evgenia Dammer (Rathgen Research Laboratory); Romain Thomas (University of Sheffield)

- 444. Digging for Answers: Unearth the Most Suitable Machine Learning Model
  Daria Stefan (TU Wien); Iris Grze (TU Wien)

- 446. Data driven landscape reconstruction for Blender Software
  Marti Košťál (Masaryk University)

S3: Methodological and Theoretical Research in Digital Archaeology

Anja Wutte, University of Cologne, Germany; TU Wien, Austria

Maria Sotomayor Chicote, University of Cologne, Germany

Location: Auditorium Maximum
Session Format: Standard

Methodological and theoretical research in computational archaeology, perhaps with a few exceptions, is mainly characterised by the adoption of methods and theoretical concepts from other disciplines. What can be regarded

as theoretical archaeology is primarily the import of methods that are adopted and applied by archaeologists, but little discussed and not significantly further developed. These methods, of course, have a theoretical basis, which is then also referred to in the publications or summarised. However, it usually remains an application to archaeological sources, which is neither about a critical 'review' of the underlying theory nor about its further development, but primarily about gaining more, better or even just different insights into the past. To put it somewhat cynically, the impression rises that there is still no theoretical archaeological discourse. (Atzbach 1998; Karl 2015; Rebay-Salisbury 2011).

This session therefore emphasises the need for and importance of methodological and basic research in digital archaeology. The topics of submitted papers may cover, but are not limited to, the following topic groups.

Archaeotecture: Projects and work in the interconnecting field of archaeology and architecture focus on the development of innovative digital methods in relation to architectural cultural heritage and include areas of building recording, data processing, documentation and the development of customised analysis options.

Technical innovations and Solutions: Technical innovations and solutions play an important role in the further development of archaeological research. Archaeologists use technical means to support and expand traditional methods. They have a major impact in the processes of searching, analysing, documenting and presenting finds. Existing solutions are usually adapted for this purpose, but archaeologists themselves can also contribute to improving technical processes and establishing innovative solutions. This sub-area aims to create space to advance modern archaeology on a technical level.

AI in Archaeology: Artificial intelligence has fundamentally changed the possibilities and forms of archaeological research of visual data. Large amounts of data can be analysed and processed in a short time, which optimises long-term research by saving human and financial resources. AI can support archaeologists in their work and establish itself as a strategic tool. For this reason, one section is dedicated to projects that deal with the further development and adaptation of AI-supported methods for archaeology.

Spatial Relation and Modelling: Major goals of archaeology are to document archaeological cultural variability, understand culture-environment relationships, human-landscape interaction and in general describe and understand the behaviors of past populations (Banks, 2017). Considering this, interaction of various kind is the main driver of historical, cultural, social and economic processes. Archaeologists very frequently deal with variants of interaction while there is still room for improving a generalised concept of interaction (Nakoinz 2013).

Digital Data Management: Archaeologists increasingly rely on digital data. A successful data management concept concerns data storage, archiving and preservation as well as data accessibility and usability. Therefore, this topic is dedicated to best practice achievements and organisation of digital archaeological materials.

Teaching and Education: Digital archaeology is transforming not only research, but also how we teach and engage with archaeological knowledge. This section explores how methods such as archaeogaming, gamification and digital simulations support critical pedagogy in classrooms and museums. We welcome works that reflect on digital tools as spaces for theoretical exploration, methodological training and public engagement.

We invite contributions from all backgrounds and research areas that reflect on the role of archaeology within the wider scientific and technological landscape. This session aims to foster critical discussion around the adoption, implementation and development of digital methods. We particularly welcome interdisciplinary approaches and methodological innovations applicable across different archaeological contexts. Theoretical papers reflecting on these aspects are equally encouraged.

References:

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10:30 – 10:50	354. Beyond Borrowed Tools: Towards a Theoretical and Methodological Framework for Digital Archaeology *Anja Wutte (University of Cologne, TU Wien); Maria Sotomayor Chicote (University of Cologne)*
10:50 – 11:10	336. Modular Research Pipeline: Conceptual Work Towards Describing Intentful Research Workflows *Andrea Göhring (Leibniz Laboratory for Radiometric Dating and Isotope Research,*); Steffen Strohm*; Daniyal Kazempour*; Hendrik Raese** ** Kiel University*
11:10 – 11:30	10. Handling the Past: Methodological Reflections on Object Interaction in Physical and XR Archaeological Contexts *Despoina Sampatakou*; Andreea Caragea*; Ross Johnstone*; Iain McLean*; Kieran Waugh*; Julie Williamson** **University of Glasgow*
11:30 – 11:50	134. Design and Evaluation of a Low-Cost IoT Wireless Sensor Network for Environmental and Behavioural Monitoring in Cultural Heritage Structures and Collections *Juan Palomeque-Gonzalez (IDEA- Madrid)*
11:50 – 12:10	25. Potential dwelling structures of the Upper Palaeolithic in Western, Central, and Eastern Europe: A computer-aided quantitative analysis *Dennis Batz (University of Cologne); Andreas Maier (University of Cologne)*
12:10 – 12:30	38. Digital Stones, Real sweat: Estimating Building Effort from 3D Models *Geert Verhoeven (University of Vienna); Seta Štuhec (ÖAW)*
12:30 – 13:30	Lunch break
13:30 – 13:50	331. „Spaces of an Empire“: Revisiting Space Syntax Analysis for Neo-Assyrian Palatial Architecture *Jannis Werner (University of Cologne)*
13:50 – 14:10	335. Towards the Algorithmic Identification of Buildings from Post Hole Locations *Mathys du Plessis (Nelson Mandela University); Raphaëlle Javet (University of Zurich); Aurèle Pignolet (InSitu Archéologie SA)*

14:10 – 14:30	328. 3D Models as Research Infrastructures: workflow and architectural palimpsests at the Theatre of Marcellus *Marika Griffo*; Carlo Inglese*; Simone Lucchetti** ** Sapienza Università di Roma*
14:30 – 14:50	457. Decoding Archaeological Space: A Space Syntax Study of the Hellenistic Baths at Sicily *Mei Yang (UAB)*
14:50 – 15:10	66. Virtual Deconstruction: a Semantic Approach to reality based 3D models in Urban Archaeology *Matteo Lombardi*; Diego Ronchi*; Elisabetta Di Virgilio*; Daniele Ferdani*; Nicodemo Abate** ** Consiglio Nazionale delle Ricerche*
15:10 – 15:30	436. From 3D Models to VR: Multi-Scalar Viewing for Neolithic Art *Dana Alnafouri (Tsukuba University)*
15:30 – 16:00	Coffee break
16:00 – 16:20	390. DIGital: A Substantive Virtual Field School Experience *Devin San Nicolas*; Tate Whittaker*; Ryan Wood*; Jarom Craghead*; Scott LaRocca*; Kayeleigh Sharp* ** Northern Arizona University*
16:20 – 16:40	406. Quantifying material costs in Building Archaeology: an AI application of the Taglab tool to Massenzio's circus. *Domenica Dininno (CNR); Marco Callieri (CNR)*
16:40 – 17:00	294. Fear of the Black Box: Interpretable Machine Learning for Bulgarian Development-Led Archaeological Surveys *Nadezhda Kecheva (Bulgarian Academy of Sciences)*
17:00 – 17:20	351. Archaeological AI in Data-Scarce Underwater Contexts: Exploring Archaeological Understanding and Machine Learning. *Benjamin King*; Øyvind Ødegård*; Aurora Hoel** ** NTNU Trondheim*
17:20 – 17:30	Break
17:30 – 17:50	232. Evaluating Deep Learning for Frost Feature Classification: Integrating CNNs and Expert Knowledge in Archaeological Micromorphology *Sofia Kouki*; Li Li*; Vera Aldeias** ** University of Algarve*
17:50 – 18:10	459. A theory-guided machine learning framework for archaeological science *Vana Orfanou (Ludwig Maximilian University of Munich); Niklas Stausberg (Ludwig Maximilian University of Munich)*
18:10 – 18:30	438. Archaeology Information Modeling - Conceptualization and Pilot Study of BIM-Based 4D Excavation Database Systems *Bjarne Kortmann (BerGSAS))*

18:30 – 19:00	369. Towards a Framework for Modelling Uncertainty in Archaeological Excavation Information *Natalie De Schuytener (University of Antwerp)*
19:00 – 19:20	94. Multimodal Semantic Integration for Next Generation Documentation of Cultural Heritage *Changyu Chen*; Martin Tomko*; Kourosh Khoshelham** ** University Of Melbourne*
19:20 – 19:30	Discussion

S4: Computer Applications in South Asian Archaeology: Digital Innovations in Heritage Research and Preservation

Kamani Perera, Chartered Institute of Personnel Management

E M N Perera, Supreme Court of Sri Lanka

Anushka Earskin, Chartered Institute of Personnel Management

Indika Wijayasriwardana, Union Bank Colombo PLC

Location: Hörsaal 05
Session Format: Standard

The digital preservation of archaeological heritage is gaining unprecedented significance in South Asia, a region marked by historical depth, cultural diversity, and vulnerability to urbanization, climate change, and conflict. This session explores how emerging technologies—3D scanning, GIS-based modeling, virtual reconstructions, and digital repositories—are transforming documentation, conservation, and interpretation practices across India, Sri Lanka, Nepal, Bangladesh, and Pakistan. Beyond technological demonstrations, the session critically examines challenges of accessibility, data sovereignty, and digital ethics, with particular attention to decolonial and community-centered frameworks. Case studies will highlight innovative yet resource-conscious approaches to safeguarding endangered sites and integrating indigenous knowledge systems into digital heritage. By fostering dialogue among archaeologists, technologists, and policy-makers, this session aims to strengthen regional collaboration while contributing to global debates on equitable digital stewardship. It situates South Asia as both a beneficiary and contributor to international discourse, offering transferable insights for sustainable and inclusive digital heritage futures.

Session Rationale and Objectives

South Asia is home to a vast and diverse range of archaeological heritage, covering from the ancient Indus Valley Civilization and Anuradhapura's monumental ruins to medieval Buddhist monasteries in Bangladesh and Islamic urban forms in Pakistan. However, increasing threats such as urbanization, climate change, looting, neglect, and political conflict have rendered many sites vulnerable. Traditional conservation approaches, while important, are often insufficient in ensuring long-term access and safeguarding the information embedded in these cultural assets.

In response, digital preservation—encompassing digitization, 3D scanning, GIS mapping, virtual reality reconstructions, and digital repositories—has emerged as a vital complementary tool for archaeological conservation in the region. Yet, the practice of digital heritage

preservation in South Asia remains fragmented, underfunded, and often disconnected from local communities. Furthermore, issues of digital colonialism, data ethics, intellectual property, and capacity gaps hinder the realization of truly inclusive and sustainable digital preservation practices.

This session is proposed to bring together archaeologists, digital humanists, heritage professionals, technologists, archivists, and policymakers to:

1. Showcase recent initiatives, technologies, and methodologies in digital preservation of archaeological heritage in South Asia.
2. Explore the socio-political, ethical, and infrastructural challenges of digital preservation in the region.
3. Discuss inclusive and community-centered frameworks for digital archiving and access.
4. Strengthen transnational and interdisciplinary collaborations among stakeholders.
5. Envision pathways for regional digital heritage networks that promote resilience, equity, and cultural continuity.

Relevance to CAA Beyond Geographical Vicinity

While the session focuses on South Asia, its relevance extends far beyond regional borders. The methodological, ethical, and collaborative dimensions align closely with CAA's mission:

Methodological Innovation: South Asia offers low-cost, high-impact applications of computational tools (e.g., photogrammetry with drones, open-source GIS) that can inspire globally transferable models for heritage management under resource constraints.

Ethical and Epistemic Contributions: The focus on decolonial, community-based digital practices contributes directly to global debates on knowledge equity, data ownership, and digital colonialism in archaeology.

Scalability and Data Diversity: The region's archaeological range—from prehistoric cities to sacred landscapes—provides a unique testbed for adapting computational methods across varied heritage typologies.

Transnational Collaborations: By aiming to establish a South Asian digital heritage network, the session advances South–South and South–North cooperation, strengthening the global digital archaeology community.

Contribution to CAA's Mission: By bringing underrepresented regions into dialogue, this session promotes inclusivity and global diversity in computational archaeology.

Session Themes and Topics

The session welcomes paper presentations and project demonstrations under (but not limited to) the following themes:

1. **Technological Innovations and Practices**
   - 3D documentation of archaeological sites (e.g., photogrammetry, LiDAR, drone mapping).
   - Virtual and augmented reality applications for public engagement and education.
   - GIS-based mapping and predictive modeling of archaeological landscapes.
   - Development of open-access digital archives and metadata standards tailored to South Asian contexts.

2. **Case Studies from the Region**

- Site-specific digital preservation efforts (e.g., Sigiriya in Sri Lanka, Mohenjo-daro in Pakistan, Lumbini in Nepal, Mahasthangarh in Bangladesh, Hampi in India).
- Integration of local oral traditions and indigenous knowledge systems into digital heritage narratives.
- Digital storytelling and crowdsourced memory initiatives around archaeological heritage.

3. **Ethical and Legal Dimensions**
   - Ownership, repatriation, and control over digitized archaeological materials.
   - Data sovereignty and cross-border access to shared cultural heritage.
   - Intellectual property rights, community consent, and safeguarding sensitive cultural knowledge.

4. **Capacity Building and Collaboration**
   - Building local and regional expertise in digital heritage technologies.
   - South–South collaboration and knowledge-sharing mechanisms.
   - Role of universities, NGOs, and public institutions in fostering sustainable digital heritage ecosystems.

5. **Future Visions**
   - Resilience of digital archives in the face of natural disasters and conflict.
   - Artificial Intelligence and Machine Learning in archaeological research.
   - Blockchain applications for provenance tracking and authenticity.
   - Designing immersive digital heritage experiences for younger generations and diaspora communities.

Format and Structure

The session will be structured as a 90–120-minute panel, allowing for diverse formats:

- 3–5 academic paper presentations (15 minutes each).
- 1 project demo or virtual heritage experience (10–15 minutes).
- Moderated discussion and Q&A (20–30 minutes).

Target Audience

- Scholars and students in archaeology, digital humanities, heritage studies, South Asian studies.
- Archivists, museum professionals, and librarians.
- Technologists and digital preservation experts.
- Policy-makers and government officials in cultural ministries and departments.
- NGOs and community organizations working in heritage conservation.

Relevance to South Asia and Global Context

This session is timely and relevant as South Asian countries increasingly recognize the value of digital strategies in preserving their cultural patrimony. With growing digitization efforts (e.g., the National Digital Repository in India, Sri Lanka's Central Cultural Fund projects, UNESCO-supported archives in Nepal and Pakistan), there is an urgent need to build regional dialogue, share best practices, and confront common challenges.

At the same time, global frameworks such as the UNESCO Recommendation on Open Science (2021) and the Charter on Digital Heritage call for inclusive, rights-based approaches to digital heritage. This session contributes to advancing these goals from a South Asian lens, advocating for contextualized, ethical, and equitable digital preservation practices that empower local custodians while promoting global access and recognition.

Expected Outcomes

- A platform for presenting cutting-edge digital heritage research and practice in South Asia.
- Identification of common gaps, needs, and collaborative opportunities across the region.
- Recommendations for policy frameworks and funding models to support long-term digital preservation.
- Initiation of a regional network or working group focused on digital archaeological heritage in South Asia.
- Possible post-session publication or digital exhibition of featured projects.

15:10 – 15:30	***cancelled*** 4. Digital Revival of Afghanistan Buddhist Heritage site: Virtual Reconstruction and Preservation *Ghulam MortazaDurrani (Sediqi Group I.T Solution Provider)*
15:30 – 16:00	Coffee break
16:00 – 16:20	7. Digitally Preserving the Cultural Legacy of the Kalasha People: A Technological Approach to Saving Endangered Ethnological Artifacts in Chitral, Pakistan *Aurangzeb Aurangzeb (Hazara University Mansehra KP)*
16:20 – 16:40	29. Preservation of Monuments of Ekamrakshetra *Ranjit Kumar Das (Indian Institute of Technology Bombay); Rasmita Mohanty (Tolani College of Commerce Mumbai*
16:40 – 17:00	141. 3D Digital Reconstruction and GIS Mapping of Mahasthangarh: Integrating Archaeological Data for Virtual Preservation *Zillur Rahman (Ahsanullah University of Science and Technology)*
17:00 – 17:20	183. A Mobile Application for Sex Estimation from Femur Measurements: A Practical Tool for Bioarchaeological Applications *Lanka Ranaweera*; Eranda Cabral (University of Colombo); D. M. P. V. Dissanayake*; W. S. V. Lakshan** ** University of Kelaniya*
17:20 – 17:30	Break
17:30 – 17:50	289. Digital Gandhara Project Preserving Buddhist Heritage in South Asia, Khyber Pakhtunkhwa, Pakistan *Numan Anwar (directorate of archaeology and museum of khyber pakhtunkhwa Pakistan)*
17:50 – 18:10	334. Mapping Economic Networks Through Metal: A Spatial Database Approach to Roman Coin Hoards in Early Historic Tamilakam *Rizvan PS (University of Hyderabad)*
18:10 – 18:30	342. Geospatial Approaches to Cultural Heritage Documentation: Remote Sensing and GIS Applications in Burhanpur, India *Manasi Patil (Independent)*

18:30 – 18:50	397. Building an R Shiny-based open archaeological database for the Indus Civilisation in north-western India: integrating spatial, chronological, and cultural data *Ashish Verma (CSIC-IMF Barcelona); Francesc C. Conesa (Social Sciences, Heritage, and Food (SOCIALPAT), IPNA-CSIC); Rajesh SV (University of Kerela); Abhayan GS (University of Kerela); Juan José García-Granero (CSIC-IMF Barcelon)*
18:50 – 19:10	419. Making the Absent Heritage Visible: Using Low-Cost and Portable Digital Tools to Document Heritage at Risk Sites in the Late Mughal Town of Farrukhnagar, India *Simran Kaur (University of Exeter)*
19:10 – 19:30	Discussion

S5: People from the Underground: Towards a Digital Archaeology of Subterranean Environments

Konstantinos Trimmis, Australian Archaeological Institute at Athens

Ivan Drnić, Archaeological Museum in Zagreb

Sonia Machause Lopez, University of Valencia

Georgios Lazaridis, Aristotle University of Thessaloniki

Location: Hörsaal 05
Session Format: Standard

Subterranean environments both natural – such as caves and rockshelters – and anthropogenic – such as catacombs, mines, tombs and so on – represent some of the most intriguing, complex, and methodologically challenging contexts for archaeological investigation. These enclosed and often disorienting spaces resist conventional archaeological approaches due to their spatial configurations, microclimatic variability, and technological constraints. Despite this, underground sites have long been central to human history and memory, hosting an array of human activities functional, economic, and spiritual. Today, digital archaeology offers new and transformative means for their exploration, recording, and interpretation.

Until the beginning of 2011 the dominant way of mapping a cave and its finds that can be found in literature was based on the compass and tape (or Electronic Distance meters (EDM) technique (Stratford, 2011). In this case the measurements are recorded by hand and are transported to a database. The mapping error rate in this case is quite large even if the results of this method whenever it was applied were satisfactory (e.g. see Moyes, 2002; Stratford, 2011). However technological advances in surveying instruments, survey data analysis, LED lighting, digital photography, photogrammetry, cave specific software and recently handheld lidar sensors and Terrestrial Laser Scanners have revolutionised the way that we survey underground spaces and any archaeology within (see Trimmis 2018; and papers in Büster et al 2019 for reviews). Equally specialised software applications (such as Therion) and cave specific workflows for digital recording are also emerging and challenge the difficulties for an underground digital archaeology (see examples among others at Drnić et al 2018; Gazes et al 2024; Redovniković et al 2014)

This session invites contributions that engage with digital methods in the documentation and analysis of subterranean archaeological sites. The aim is to create a platform for sharing innovations, confronting methodological challenges, and envisioning future directions for digital subterranean archaeology. From high-resolution 3D modelling and GIS-based spatial analysis to sensor-based environmental monitoring and virtual reconstructions, the digital toolkit for exploring the underground is rapidly expanding. At the same time, subterranean fieldwork presents persistent hurdles: the absence of natural light complicates optical recording; the lack of GNSS and RTK

reception demands novel solutions for georeferencing; and the volumetric nature of underground sites resists traditional 2D mapping approaches.

We especially welcome papers that address:

- Innovative survey techniques in low- or no – light and signal-deprived environments, such as SLAM-based LiDAR, paperless mapping methods, handheld photogrammetry, structured light scanning, and integrated inertial systems.
- Multi-sensor approaches that combine visual, thermal, acoustic, and environmental data to better understand underground contexts.
- Geospatial data management in complex 3D spaces, including workflows that integrate underground datasets into broader landscape-scale analyses.
- Human-environment interaction studies in caves and artificial underground sites using spatial statistics, movement modelling, and sensorial reconstruction.
- Challenges in visualization and communication, including virtual and augmented reality applications that allow audiences to access and experience subterranean spaces remotely.
- Interdisciplinary collaborations involving speleologists, geologists, engineers, and conservation scientists to solve recording and interpretation problems.
- Preservation and monitoring strategies enabled by digital documentation, particularly in response to climate change, tourism pressure, and development threats.
- Theoretical and epistemological reflections on how digital tools reshape our understanding of underground spaces as landscapes of material practice, memory, and myth.
- The session also encourages contributions from practitioners working in other disciplines that intersect with digital subterranean work, such as architectural documentation of tunnels or bunkers, forensic recording of underground conflict heritage, and digital humanities projects engaging with underground mythologies or urban substructures.

By bringing together an international community of researchers working ” underground” this session seeks to advance a dialogue on how subterranean spaces challenge and inspire digital archaeology, and how our tools and methods must evolve in turn. The discussion will contribute to developing best practices and shared standards for subterranean fieldwork and data integration, while also promoting critical thinking about the conceptual models we apply to space, visibility, orientation, and embodiment underground. Let’s illuminate the underground—digitally.

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10:30 – 10:50	21. Illuminating the Underworld: An Integrated Digital Workflow for the Subterranean Necropolis of Saqqara *Matthias Lang*; Philippe Pathé*; Carmen Rac** ** BCDH, Universität Bonn*
10:50 – 11:10	60. Smartphone LiDAR for Rock Art Caves Mapping: Accuracy Assessment through TLS in La Pileta (Málaga, Spain) *Rubén Parrilla (ICArEHB); Daniel Antón*; Juan Mayoral*; María Simón-Vallejo*; Miguel Cortés-Sánchez** ** Universidad de Sevilla*
11:10 – 11:30	93. Preserving the Past for the Future: Multimodal Digital Documentation of Actun Tunichil Muknal *Holley Moyes (University of California, Merced); Dominique Rissolo (Qualcomm Institute; University of California, San Diego); Scott McAvoy (University of California, San Diego); Justin Simkins (Emescent Incorporated)*
11:30 – 11:50	107. An Innovative Remote Optical Workflow for Detecting Underground Features *Ioannis Lioumbas (Thessaloniki Water Supply and Sewerage Co. S.A.)*
11:50 – 12:10	144. Between Darkness and Data: Digital Approaches to Iberian Ritual Caves *Sonia Machause López*; Manuel Pérez Aixendri*; Agustín Diez Castillo*; Daniel Negueruela Villanueva*; Cristina Portalés Ricart** ** University of Valencia*
12:10 – 12:30	159. Cave's air circulation modelling as a tool for spatial analysis – introductory remarks *Łukasz Czyżewski (Nicolaus Copernicus University)*
12:30 – 13:30	Lunch break
13:30 – 13:50	256. Digitizing a whole Region: Archiving the Historic Mines of Silesia *Piotr Budzisz (Coal Mining Museum in Zabrze)*
13:50 – 14:10	271. An Integrated Multimodal Approach to the Digital Documentation and Spatial Contextual Analysis of Archaeological Cave Sites in Quintana Roo, Mexico *Dominique Rissolo*; Loren Clark*; Scott McAvoy*; Alberto Nava Blank (Global Underwater Explorers); Julien Fortin (CINDAQ); Samuel S. Meacham (CINDAQ); Vid Petrovic*; Helena Barba Meinecke (INAH); Silvina Vigliani (INAH); Falko Kuester** ** University of California, San Diego*

14:10 – 14:30	319. Data to Deployment: Operationalising 3D Datasets for Use in Virtual Reality Experiences: A Case Study on a Late Medieval Georgian Underground House *Brian Armstrong*; Cassandra Kiely*; Jake Hubbert (University of California, Los Angeles); Andrew Mahisa Halim*; Andrew Jameson*; Giorgi Bedianashvili (The Georgian National Museum)* ** University of Melbourne*
14:30 – 14:50	394. New data and research perspectives on the San Salvatore Hypogeum (Cabras, Sardinia) *Nicoletta Camedda*; Paola Derudas (Lund University); Nicolò Dell'Unto (Lund University); Danilo Marco Campanaro (Lund University); Luca Cheri*; Ilaria Orri*; Anthony Muroni** ** Fondazione Mont'e Prama*
14:50 – 15:10	412. Mining the scape – Laserscanning the archaeological mining landscape of Hallstatt *Matthias Kucera (University of Vienna); Daniel Brandner (Natural History Museum Vienna); Bernhard Groiss (Riegl LMS); Bernd Paulowitz (World Heritage Salzkammergut)*

S6: Unlocking Hidden Treasures: Digital Methods as the Key to Open Archaeological Collections for Research and Teaching

Louise Tharandt, Humboldt-Universität zu Berlin

Anna Gnyp, Humboldt-Universität zu Berlin

Sophie Schlosser, Ostbayerische Technische Hochschule Regensburg

Location: Hörsaal 02
Session Format: Standard

University and museum collections represent a rich and diverse array of archaeological objects, assembled over decades through research, excavations, donations and looting. These collections often contain unique and significant objects that have the potential to greatly enhance our understanding of past and recent cultures and societies (Wissenschaftsrat, 2011). However, the full research potential of these collections often remains untapped for various reasons. Besides funding, university and museum collections face a multitude of obstacles that hinder their accessibility and usability. This can make it difficult for researchers to discover and access sufficient and relevant material. The dispersal of objects across different locations can lead to the fragmentation of assemblages and the loss of contextual information. Unknown origins and bias in data limit our understanding of history. Furthermore, the lack of dedicated resources and expertise for collections management can result in inadequate preservation and documentation, further exacerbating these issues. Digital methods and tools can make a significant contribution to addressing these issues. Through the digitisation of objects or data and the use of semantic databases up to machine learning algorithms it is possible to (re)discover hidden or inaccessible data, and reunite dispersed objects across different locations and institutions. Ethical and legal aspects of collection objects can be addressed more effectively. The

potential of collection objects as teaching resources could be utilised and expanded upon.

This session aims to explore new approaches in which researchers, educators, and collection managers are leveraging university and museum collections to advance archaeological knowledge and practice. By bringing together a diverse range of perspectives and experiences, we hope to stimulate a productive dialogue on the role of university and museum collections in archaeology, enhancing their use in a way that is appropriate to their significance. We also seek to showcase creative and effective strategies for working with collections (Andraschke & Wagner, 2020). We invite contributors to share their experiences and insights on how to leverage digital methods, to unlock the hidden treasures within these collections and maximise their potential for research, teaching, and public engagement.

We welcome papers addressing (but not limited to) the following topics:

1. **Revealing Collections:** Efforts to create or enhance digital catalogues, databases, and 3D repositories to increase accessibility and preserve objects virtually. This can include discussions on the use of digital methods such as photogrammetry, laser scanning, or linked opened data and open data infrastructures (Wagner et al., 2019) to create immersive and interactive experiences with collections.
2. **Unearthing Data:** Data science methods to uncover, integrate, analyse, publish and long-term archive previously hidden, inaccessible or new data from collections. This can include open science practices, the use of advanced data mining techniques, machine learning algorithms (Brandsen et al., 2020), 3D digitisation and crowdsourcing initiatives to extract valuable information from unstructured or poorly documented datasets and to permanently archive the data.
3. **Considering Ethical Aspects and Repatriation:** Addressing the ethical dimensions of archaeological collections, including the provenance, display, and description of objects, using digital tools (Shad et al., 2024). This involves provenance research, supporting repatriation efforts (Krupa & Grimm, 2021), and fostering collaboration with descendant, Indigenous, and local communities. We particularly welcome submissions on decolonising collection practices and co-creating knowledge through inclusive, dialogue-based approaches that honour cultural sovereignty and lived heritage.
4. **Reuniting Dispersed Collections:** Strategies to bridge gaps between objects split across different locations, institutions, or databases, recontextualise scattered finds and recombine or reconstruct fragmented objects (Roßberger et al., 2018). This can involve collaborative efforts between universities, museums, and other cultural institutions to share data and resources (Galanakis & Nowak-Kemp, 2013).
5. **Teaching (with objects):** Case studies demonstrating how scientific collections have been employed through digital methods in archaeological research projects or as teaching tools, fostering hands-on learning and research-led teaching. This can include innovative pedagogical approaches that integrate digital or tangible collections into the curriculum (Callieri et al., 2023), as well as student-led research projects that utilise university collections.
6. **Engaging, Collaborating, Transforming:** Initiatives that connect collections with local communities, museums, and other institutions via digital means, encouraging public engagement and interdisciplinary collaboration (Wessman et al., 2019). This can include 3D visualisations, outreach programs, exhibitions, citizen science projects and public lectures that showcase the significance of university or museum collections and their relevance to contemporary issues. Contributions on how collections can be improved or expanded accordingly are equally welcome.

We encourage submissions from researchers, educators, and collection managers at all career stages. By sharing best practices, success stories, and lessons learned, we hope to inspire more effective use of university and museum collections and foster a network of scholars dedicated to their study and preservation.

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16:00 – 16:20	260. We have already digitized them. A Framework for Museum Collections in Research and Teaching *Valentina Salcedo Paparoni (Stiftung Preußischer Kulturbesitz, Staatliche Museen zu Berlin); Adriana Günzel (Institut für Archäologie und Kulturanthropologie, Abteilung für Klassische Archäologie); Matthias Lang (Bonn Center for Digital Humanities, Rheinischen-Friedrich-Wilhelms-Universität Bonn)*
16:20 – 16:40	143. Extending the FAIR Principles to Archaeological Objects through Persistent Identifiers and Standardized Metadata *Rorie Edmunds (Independent Scholar); David Novák (Institute of Archaeology of the Czech Academy of Sciences); Anthony Corns (The Discovery Programme);*

	Yiu-Kang (Gary) Hsu (Deutsches Bergbau-Museum Bochum); Thomas Rose (Deutsches Bergbau-Museum Bochum); Kieron Niven (Archaeology Data Service); Jens Klump (CSIRO & IGSN e.V.); Esther Plomp (University of Aruba); Shawn Ross (Macquarie University); Jan Sessing (Deutsches Bergbau-Museum Bochum); Christin Keller (Deutsches Archäologisches Institut)
16:40 – 17:00	237. Reimagining Archaeological Repositories: Towards Digital Access and Research Visibility in Nigeria *Ishaq Ishaq (Ahmadu Bello University Zaria)*
17:00 – 17:20	137. Engaging, collaborating and transforming digital cultural heritage tools design by use of Design Science Research (DSR) *Martha Mosha (University of Cologne); Øyvind Eide (University of Cologne); Lorenzo Cantoni (Università della Svizzera italiana)*
17:20 – 17:30	Break
17:30 – 17:50	157. On Connection: Ethical and digital approaches to ancient West Asian seals *Sebastian Hageneuer (Berlin-Brandenburg Academy of Sciences and Humanities); Elisa Roßberger (Freie Universität Berlin)*
17:50 – 18:10	152. From Excavation to Experience: Sharing the Dig Hill 80 Digital Archive through a Spatial Context *Sarah Tucker (Virginia Tech); Todd Ogle (Virginia Tech); Simon Verdegem (BAAC Vlaanderen)*
18:10 – 18:30	329. Lessons learned from early adoption: Digital recording of archaeological finds and more at the LVR-Landesmuseum in Bonn, Germany *Irmela Herzog (LVR-State Service for Archaeological Heritage)*
18:30 – 18:50	322. Combining old school methods with new school technology: the Portuguese National Archaeology Museum case study *Miguel Almeida (Morph - Geociências); João Pimenta (Museu Nacional de Arqueologia); Luís Gomes (University of Lisbon), Vinícius Dentzien; António Carvalho (Museu Nacional de Arqueologia)*
18:50 – 19:10	22. Seeing into the Depths - How the 3D Scanning of Artifacts has Helped Provide a Deeper Understanding of the Submerged Lakebed Tsuzuraozaki Site in Shiga Prefecture, Japan *Corey Noxon (Ritsumeikan University); Kenichi Yano (Ritsumeikan University)*
19:10 – 19:30	Discussion

S8: Digital Methods in Rock Art Research II. Connecting People: Reconstructing the Contexts of Past Visual Communication Systems

Ashely Green, University of Gothenburg

Rebecca Döhl, University Münster

Eymard Fäder, University of Cologne

Paolo Medici, Centro Camuno di Studi Preistorici

Oliver Vogels, University of Cologne

Location: Hörsaal BIG
Session Format: Standard

This year we are expanding the session's focus to the digital explorations of the creation, perception, and social circumstances of production and consumption of rock art and related visual communication systems.
The context for the formation and use of visual communication systems, such as rock art (including petroglyphs and paintings), wall art, or graffiti, is mainly analysed through formal methods of interpretation (Taçon and Chippindale, 1998). During the last decade these formal methods shifted more to digital and computational methods, comprising a wide range of approaches, applications, and techniques (Carrero-Pazos et al., 2022; Valdez-Tullett and Figueiredo Persson, 2023). These methods cover well-established GIS-centred analysis of the spatial context of rock art, computational analysis (including AI approaches) of rock art production, and extended reality (XR) applications for cultural heritage and engagement. On both the local- and large-scale, digital and computational methods play an important role in understanding visual communication systems and the people that created them.
To highlight the people behind the visual communication, this session aims to explore all aspects of social engagement with rock art from its creation to its consumption and the feedbacks within these processes. While we refer to rock art as a prime example of visual communication, we embrace all expressions of semantic visuality, such as graffiti, visual marking systems, wall art etc. We welcome contributions on methods, new insights and results from digital methods, and dissemination around the **human-centred lifecycle of rock art**:
Creation – Digital methods can highlight the underlying concepts, formal as ideational, and techniques used to establish certain motifs and topics and their application on the canvas. For example, digital analysis of techniques employed for shaping the figures (Díaz-Guardamino, 2023) and the analysis of panel composition, style, and chronology (Riris and Oliver, 2019).
Position – The spatial and socio-economic context of visual communication production provides another aspect of exploration which allows for digital methods. From studies of the placement of rock art in the landscape (Barnett et al., 2024; Döhl, 2019; Vogels et al., 2021) to the role that natural features played in the creation of rock art (Horn et al., 2023), digital methods play an important role in the multi-scalar analysis of art. Similarly, the interplay between graffiti and their application on built environments and trees are explored with digital methods.
Perception – Understanding perceptions in visual communication systems builds another immanent connection to the people who used the art. Visual perception and analysis using digital methods, such as eye-tracking, can help further understanding of systems and societies who created them (Silva-Gago et al., 2025). Archaeoacoustics (Díaz-Andreu and Mattioli, 2016; Rainio et al., 2025; Santos da Rosa et al., 2023) with sound propagation and soundscape measurement have also showed a great potential for exploring the perception and social role of rock art.
Consumption – The consumption of rock art and other visual systems might be explored both in its original context and in its modern form. The mediation and presentation of rock art and its (original) context to a modern audience, in cultural heritage projects or museums, relies heavily on digital methods (Jalandoni, 2025). Interactive web-based platforms (Green et al., 2024), direct enhanced access like XR applications (Urcia et al., 2022; Westin et al., 2021), or reconstruction of caves (Lascaux, Chauvet) based on digital 3D-

models (Geneste, 2009), for example, offer accessible ways for researchers and the public to consume rock art.

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10:30 – 10:50	97. A multi-tool digital approach to the analysis of rock art and metallurgical symbolism in the Arabian deserts *Jerome Kahl (University of Vienna)*
10:50 – 11:10	181. Written on the Landscape: A Quantitative Analysis of Competing Territorial and Mobile Strategies at Ḥimā *Giacomo Fontana (Texas Tech University); Alessia Prioletta (CNRS, UMR 8167 - Orient & Méditerranée)*
11:10 – 11:30	106. If these walls could talk. Exploring the potential of multivariate statistics to investigate Egyptian Old Kingdom elite tomb iconography. *Christel Birkmann-Little (Leiden University)*
11:30 – 11:50	163. Using rock art and Species Distribution Models to understand climate change in Predynastic Egypt *Sebastián Maydana (University of Liverpool)*
11:50 – 12:10	372. Secular, totemic, shamanistic? – Testing rock art contexts with ABM and GIS *Rebecca Döhl (University Münster)*
12:10 – 12:30	287. Hunting arts: informing the spatial organisation of prehistoric rock art through indigenous knowledge *Oliver Vogels (University of Cologne)*
12:30 – 13:30	Lunch break
13:30 – 13:50	244. Rock, Paper, Mesh: Integrated Approaches to Recording Desert Rock Art *Emma Beckett (UWA)*
13:50 – 14:10	220. Desert to the Sea: Reconnecting Visual Communication Systems across the Western Desert *Jo McDonald (CRAR+M UWA)*
14:10 – 14:30	56. Innovating Heritage: Digital Archaeology as a Tool for Indigenous Rock Art Engagement *Andrea Jalandoni (Griffith University)*

14:30 – 14:50	119. Visualization of bas-reliefs from three-dimensional objects – example of ornaments on the heads of moai kavakava – wooden figurines from Easter Island *Rafal Wieczorek (Uniwersytet Warszawski); Paul Horley (Cimav Campus)*
14:50 – 15:10	123. Stirring the hornet's nest: demonstrating the ritual dimensions of Northwestern Amazonian petroglyphs through geometric morphometrics *Samir Chavarro-Belafonte (Univeristy of Tübingen)*
15:10 – 15:30	44. Rock Solid Replicas: The Application of 3D filament Painting Technique on Pictographs in Southern Alberta, Canada. *Mavis Chan (University of Calgary); Peter Dawson (University of Calgary)*
15:30 – 16:00	Coffee break
16:00 – 16:20	150. Imprints of Time: Reconstructing Prehistoric Expressions Through Digital Lenses *Ankita (Banaras Hindu University)*
16:20 – 16:40	212. A Spatial Life: Rock Art Distribution and Visibility among Mobile-pastoral Societies in the Mongolian Altai *Michael Fisher (Max Planck Institute of Geoanthropology); Dovydas Jurkenas (Max Planck Institute of Geoanthropology)*
16:40 – 17:00	64. Quantifying Image Decorrelation Techniques for Rock Art: Systematic Comparison at La Pileta Cave (Málaga, Spain) *Rubén Parrilla (ICArEHB), María Simón-Vallejo (Universidad de Sevilla); Miguel Cortés-Sánchez (Universidad de Sevilla)*
17:00 – 17:20	Break
17:20 – 17:30	92. Tracing Aegean Prehistory in the rocky landscape. From aerial photogrammetry to detailed recording of petroglyphs at Vathy, Astypalaia *Nikos Sepetzoglou (National Technical University of Athens); Dionysis Niotis (National Technical University of Athens), Spyros Triantos (University of Ioannina), Andreas Vlachopoulos (University of Ioannina)*
17:30 – 17:50	208. Engaging new audiences through digital dissemination of Norwegian rock art *Sjoerd van Riel (Museum of Cultural History, University of Oslo); Alexis Pantos (Museum of Cultural History, University of Oslo); Gunnar Liestøl (Department of Media and Communication, University of Oslo); Magne Samdal (Museum of Cultural History, University of Oslo); Steinar Kristensen (Museum of Cultural History, University of Oslo); Letizia Bonelli (Museum of Cultural History, University of Oslo)*
17:50 – 18:10	290. Putting it in Context: Digital tools and open data to support the analysis of Scandinavian rock art *Ashely Green (Department of Historical Studies, University of Gothenburg); Rich Potter (Department of Historical Studies, University of Gothenburg); Christian Horn (Department of Historical Studies, University of Gothenburg)*

18:10 – 10:90	Discussion

S18: Connecting the Americas: A Pan-Regional Dialogue among CAA Chapters

Giacomo Fontana, Texas Tech University, USA (chair)

Eduardo Herrera Malatesta, Leiden University, Netherlands (chair)

Grégoire van Havre, Universidade Federal do Piauí, Brazil (chair)

Diego Jimenez Badillo, Instituto Nacional de Antropología e Historia, Mexico (chair)

Brian Crane, Maryland-National Capital Park and Planning Commission, USA

Location: Hörsaal 02
Session Format: Other

The session will be structured as a panel discussion among representatives from different CAA chapters in the Americas. Giacomo Fontana will serve as moderator, with Eduardo Herrera Malatesta representing Latin America and the Caribbean, Diego Jiménez Badillo representing Mexico, Grégoire van Havre representing Brazil, and Brian Crane representing North America. The goal is to facilitate an informal conversation focused on exploring opportunities for collaboration, while also addressing the growing funding and political challenges we all face. Following an initial structured discussion among the panelists, the floor will be opened to the audience for questions and to share their perspectives.

This panel brings together representatives from the network of CAA regional chapters across the Americas, including CAA North America, CAA Mexico, CAA Brazil, and CAA Latin America & the Caribbean, for an open dialogue on the shared challenges, research interests, and collaborative opportunities that define computational archaeology in the region.

As the global CAA community continues to grow, chapters in the Americas have emerged within diverse socio-political contexts, facing distinct but often overlapping issues such as uneven access to digital infrastructure and training, linguistic diversity, funding limitations, and the ongoing need to decolonize archaeological knowledge production and digital methods.

While CAA chapters in Europe benefit from longer-established networks and more consistent inter-chapter collaboration, regional coordination in the Americas remains comparatively underdeveloped. This panel seeks to address that gap by fostering dialogue among American chapters and articulating the specific needs and priorities shaped by local conditions, including political instability, institutional fragmentation, and barriers to international cooperation.

The goal of the panel is twofold: first, to explore concrete opportunities for collaboration across American chapters, such as co-organized events, shared resources, and training initiatives, and second, to identify common research priorities that could benefit from sustained cross-regional engagement. These may include digital heritage management, open science practices, spatial and landscape analysis in diverse environments, community-based digital archaeology, and ethical considerations around data sovereignty and representation.

The panel will also reflect on the growing movement of students, researchers, and archaeological projects that cross national borders within the Americas. These transregional academic flows present both challenges and opportunities for building inclusive, context-sensitive approaches to computational archaeology.

By convening this discussion among chapter representatives and the session audience, the panel aims to lay the foundation for sustained inter-chapter collaboration that reflects the diversity, complexity, and potential of archaeological practice in the Americas. It represents both a recognition of ongoing

efforts and a step toward a more connected, responsive, and regionally grounded CAA community.

S20: Digital Archaeological Collections as AI Training Data

Vera Moitinho de Almeida, University of Porto & INESCC

Nevio Dubbini, University of Pisa

Aurore Mathys, Royal Museum for Central Africa & University of Liège

Gabriele Gattiglia, University of Pisa

Location: Hörsaal 03
Session Format: Standard

As the digitisation of archaeological collections accelerates, the field is witnessing a transformative shift in how data are produced, curated, shared, and analysed. Digital databases, archives, and repositories — from site records and objects to high-resolution 3D scans, satellite imagery, and grey literature — are increasingly being enriched and repurposed as training data for artificial intelligence (AI) systems. AI has been applied to a broad range of tasks, such as archaeological sites/objects detection from LiDAR data and aerial photographs, predictive modelling of site locations, automated feature extraction from remote sensing and other data, material provenance analysis, artefact classification, epigraphic transcription, semantic annotation of textual corpora, and data description and integration (Gattiglia 2025). At the core of all these advances lies a foundational component: archaeological training data.

This session explores the multifaceted role of digital archaeological collections as training data for AI, addressing the scientific opportunities, technical and methodological challenges, and social responsibilities that come with applying computational methods to cultural heritage data — issues also tackled by the Managing Artificial Intelligence in Archaeology (MAIA) COST Action CA23141 (2024-2028). Training data will provide novel perspectives for archaeological research on unprecedented scales. Yet, this shift also raises critical questions about data quality, interoperability, ethics, and sustainability.

Archaeological collections, by their very nature, are rich in contextual, typological, and spatial information, making them attractive for AI applications. However, their integration into computational pipelines requires careful consideration of data quality, standardisation, provenance, and cultural sensitivity. Digital archaeological collections are not neutral or static repositories, but highly heterogeneous and dynamic cultural artefacts shaped by different research traditions, historical collection practices, digitisation strategies, institutional priorities, legal frameworks, and budgetary issues, among others. Crucially, this session does not treat digital archaeological data as a mere technical resource, but as a complex cultural and scholarly artefact in its own right. When repurposed for AI, these collections become part of a complex pipeline of knowledge production — one that demands transparency, critical reflexivity, and inclusive governance.

At the core of our research is a commitment to Open Science, as promoted by the European Commission (2019–), as well as to the FAIR (Wilkinson et al. 2016; *Findable, Accessible, Interoperable, and Reusable*), CARE (GIDA 2018, Carroll et al. 2020; *Collective Benefit*, *Authority to Control*, *Responsibility*, *Ethics*) and TADA (Ivimey-Cook et al. 2025; *Transferable*, *Accessibility*, *Documented*, *Annotated*) data principles. These frameworks are essential not only for encouraging open access to research outputs, collaborative infrastructures, and citizen engagement, but also for fostering reproducible and transparent AI research. They help ensure that archaeological knowledge remains a shared public good, while empowering communities to retain control over their data and benefit from its use.

These principles serve as guiding frameworks for preparing archaeological comparative datasets for AI training in a way that maximizes scientific rigor and minimizes unintended harm. It requires deliberate effort: datasets must be curated with clear provenance, comprehensive metadata and paradata, and open licensing; data formats must support machine readability and semantic interoperability; repositories must be designed to facilitate long-term accessibility, cross-disciplinary querying, and reuse. Making data reusable entails not only technical compatibility but also rich documentation of context, uncertainty, and cultural sensitivity — factors that are critical in archaeology but often undervalued in AI workflows. Without these foundations, the reuse of archaeological data for AI risks becoming fragmented, opaque, exploitative, or even useless.

This session explores the dynamic intersection of digital archaeological collections and AI, focusing on both the potential and the challenges of using such datasets to train intelligent systems. What constitutes a high-quality training dataset in archaeology, and how do archaeological standards/practices align (or conflict) with AI data requirements? How can the inherent biases in archaeological data (e.g., resulting from archival practices or digitisation strategies) impact the performance and fairness of AI models? In what ways do AI applications risk reproducing or amplifying existing interpretations, narratives, or silences within the archaeological record? What are the emerging best practices for ensuring transparency, reproducibility, and ethical accountability in AI-augmented archaeological research?

Presentations may address a range of themes, including but not limited to:

- Case studies demonstrating the use of AI in archaeological collections;
- Producing and exploring currently openly available (small to large) archaeological benchmark datasets to test AI models;
- Current good practices and guidelines for preparing data files for AI training;
- Preparing, structuring, and curating archaeological datasets for AI training in compliance with Open Science, FAIR, CARE, and/or TADA data principles;
- Limits and problems linked to the creation and/or use of comparative digital collections for AI applications;
- Technical and ethical challenges of bias, representation, and generalization in AI models trained on archaeological data;
- Collaborative efforts and contributions to open, federated data infrastructures and training resources for AI in archaeology.

By bringing together diverse perspectives on the role of digital archaeological collections in AI data training, this session contributes to a broader discussion about the next generation of AI-driven archaeological research and the future of archaeological knowledge production. It encourages critical engagement with the tools and methods we use, while highlighting the possibilities for AI to support archaeological research. The goal is to chart a path forward for guidelines and best practices with ethically grounded, context-aware, and scientifically rigorous applications of AI in archaeology, supported by high-quality data and research practices.

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15:00 – 15:10	Introduction - *The MAIA project and Digital Comparative Collections and AI Training Data for Archaeology*
15:10 – 15:30	453. Experimental AI Applications for Rapid Archaeological Legacy Data Distribution *John Wallrodt (University of Cincinnati)*
15:30 – 16:00	Coffee break
16:00 – 16:20	168. Natural Schema Evolution vs Machine Learning Readiness: A Case Study from the Stone-Masters Project *Maciej Krawczyk (University of Warsaw)*
16:20 – 16:40	79. From Legacy Data to Training Data: AI-Driven and Open Archaeological Workflows: the example of pottery *Lorenzo Cardarelli (Sapienza University of Rome); Julian Bogdani (Sapienza University of Rome)*
16:40 – 17:00	275. Automated Segmentation and Integration of Avifaunal Bone Image Datasets Using Deep Learning-Based Mask Generation *Nevio Dubbini (University of Pisa); Gabriele Gattiglia (University of Pisa); Beatrice Demarchi*; Lisa Yeomans (University of Copenhagen); Marco Pavia*; Paola Sansone*; Ramazan Parmaksız*; Ayşe Ataş Hooglugt (University of Groningen)* **University of Turin*
17:00 – 17:20	99. From Microscopy to AI-assisted Petrography: Preparing Archaeological Thin Sections for Segmentation in TagLab *Elisabetta di Virgilio*; Giorgio Gosti*; Diego Ronchi*; Marco Callieri** **Consiglio Nazionale delle Ricerche*
17:20 – 17:30	Break
17:30 – 17:50	124. Documenting Fragmentary Wall Paintings through AI-Based Segmentation in Taglab. Toward a Standardised Workflow and FAIR Archaeological Datasets *Caterina Paola Venditti (University of Cassino and Southern Lazio); Diego Ronchi*; Silvia Fortunati (Ministero della Cultura); Giorgio Gosti; Marco Callieri** ** Consiglio Nazionale delle Ricerche*
17:50 – 18:10	197. Harnessing AI to unlock legacy data: the AutArch experience and beyond

	Maxime Brami (Johannes Gutenberg University Mainz); Kevin Klein (Johannes Gutenberg University Mainz); Felix Riede (Aarhus University)
18:10 – 18:30	337. Generative Modeling for Potteries: A GMM-GAN Based Framework for Completion and Clustering of Pottery Fragments *Suhui Liu (University of Science and Technology Beijing)*
18:30 – 18:50	202 – From Pots to Points and Back Again: A 3D Scanning and Generative Machine Learning Workflow for Pottery Studies *Dries Daems (VU Amsterdam); Jitte Waagen*; Mason Scholte*; Mikko Kriek* ** Universiteit van Amsterdam*
18:50 – 19:10	45. Carian pottery geographical differentiation using meta-learning, transfer learning, and signal processing based neural network hybrid architectures *Deniz Kayikci (Universitat Autonoma de Barcelona); Juan Anton Barcelo (Universitat Autonoma de Barcelona)*
19:10 – 19:30	Discussion

S30: Unstoppable Vision, Immovable Practice: An Adversarial Debate on Linked Open Dreams and the Reality of Archaeological Data Collection

Fabian Riebschläger, German Archaeological Institute

Helmut Schwaiger, Austrian Archaeological Institute

Lisa Steinmann, German Archaeological Institute

Brigitte Danthine, Austrian Archaeological *Institute*

Location: Hörsaal 02
Session Format: Other

We wish to include lectures and debate: Our vision would be two have two "adversarial lectures" based on actual project experience followed by a debate slot of ca. 10-15 minutes. This way we can discuss the pros and cons as evident from the experience of researchers at all career stages and from varied institutional and geographical backgrounds and from project results as well as everyday archaeological practice. It is important for the concept of this session to be able to integrate contrary perspectives and thus identify common ground or irreconcilable differences via these debate slots.

'*Adversity is the first path to truth.' (Lord Byron)*

This year marks a quarter century since the publication of Tim Berners-Lee's influential vision of "The Semantic Web"[1]. Humanity's relationship to the internet has changed drastically since 2001, but especially in data-based research, few visions have remained as mesmerising and as promising as that of the Semantic Web. The paradigm of semantic data, together with related concepts such as knowledge graphs, Linked Open Data (LOD), ontologies and

authority files / controlled vocabularies has produced a wealth of research and implementation work over more than two decades.
This vision of the Semantic Web has also swept across archaeology, a discipline which has a keen interest in making sense of complex, often incomplete or even subjective data that is, sometimes obviously sometimes subtly, linked conceptually and contextually, yet produced under highly varied research designs and data-collection practices.
However, the perceivable impact of all these semantic investments remains surprisingly small in everyday archaeological practice, which continues to be dominated by simple tabular and other conventional data structures. Moreover, recent advances in AI have suggested that general-purpose, data-driven methods often outperform carefully engineered knowledge systems—a 'bitter lesson' articulated by Richard Sutton (2019)[2].
This session attempts a critical reappraisal of the 'semantic vision' in archaeology, its current state and potential future. For this purpose, we invite contributions from two 'opposing camps': those who showcase why semantic approaches should shape the future practice and those who argue why traditional data structures continue (and perhaps should continue) to dominate data production and analysis. Contributions may focus on theoretical or practical aspects, on merits or shortcomings of both ‚camps', or any mixture thereof.
In this way, the session will address a number of key questions and issues, including:

- Why are the promises of semantic data so important to archaeologists, and which of them, have been fulfilled so far?
- How accessible and maintainable are semantic approaches in practice?
- When is the cost of semantic data modelling justified by demonstrable gains?
- How does everyday field work and data collection (capture?) need to change to accommodate, incorporate, or be driven by semantic approaches?
- Is the semantic paradigm outdated in the age of AI? Do we need a specific machine-language, if the machines now understand our language?
- What are the reasons for the success and longevity of non-semantic approaches?
- What are the reasons for the success and lasting popularity of semantic approaches?
- What core strengths of non-semantic data might be threatened if semantic approaches become prevalent?
- Are there visions for complementary roles or hybrid workflows between statistical/ML methods and explicit knowledge representation: Do efficient ways exist to reconcile semantic approaches with conventional data structures without adding redundant workload?

As the title suggests, the session has been designed to be adversarial in nature, based on the assumption that 'you cannot have your cake and eat it, too': given the high investment in different skills and infrastructures necessary to make use of both approaches and their radically different nature, a parallel approach with redundant data collecting and provisioning practices in both semantic and traditional data models seems not feasible. Or could we envision a way to reconcile the differences without creating inefficient redundancies and thus, have our cake and eat it, after all?

With this in mind, the session is intended to provide a forum for robust yet fair arguments and a lively debate, grounded in the realities of limited funding, (un)realistic demands made of archaeologists' skill sets, and the need for clear and practical research directives in the (next) coming age of austerity in academia. To ensure a rich and representative debate, we explicitly encourage contributions from early-career scholars, colleagues from geographically and institutionally under-represented regions, and researchers working outside of traditional academic networks. Our goal is to provide the space for constructive discussions among a diverse group of people and perspectives, reflecting the wide spectrum of archaeological research and researchers.

***References*:**

1 Berners-Lee, T., Hendler, J. and Lassila, O. (2001) 'The Semantic Web', Scientific American, May, pp. 29–37.

2 Sutton, R.S. (2019) The Bitter Lesson. Available at: http://www.incompleteideas.net/IncIdeas/BitterLesson.html (Accessed: 28 August 2025).

13:30 – 13:50	86. Iconographic Metadata: From 'Traditional' Databases to Semantic Data *Melissa Bergoffen (BSA Library); Maria Papadopoulou (TALOS); Artemis Karnava (University of Crete); Christophe Roche (TALOS)*
13:50 – 14:10	426. Between Promise and Practicality – Lessons from the NFDI4Objects *Fabian Fricke (German Archaeological Institute); Mattis thor Straten (CAU Kiel)*
14:10 – 14:30	434. Table2RDF: From Everyday Spreadsheets to Reusable RDF. A Generic, Understandable Workflow for Archaeology *Brigit Danthine (Austrian Archaeological Institute); Gerald Hiebel (University of Innsbruck)*
14:30 – 14:50	437. Between semantic vision and excavation practice: Linked Open Data at an archaeological research institute - an honest situation report *Helmut Schwaiger*, Brigit Danthine*; Karl Burkhart*; Micheline Welte** ** Austrian Archaeological Institute*
14:50 – 15:00	Discussion

S31: Computational Archaeology Revisited: Building Bridges with Mathematics and Computer Science

Eythan Levy, University of Zurich

Martin Hinz, Kiel University

Location: Hörsaal 01
Session Format: Other

The official mission statement of CAA states:
"Computer Applications and Quantitative Methods in Archaeology (CAA) is an international organization bringing together archaeologists, mathematicians, and computer scientists. Its mission is to encourage and facilitate dialogue between these disciplines, to provide an overview of the present state of the discipline, and to stimulate discussion to progress the field." (emphasis ours)

Yet, in practice, mathematicians and computer scientists are still under-represented, and most contributions come from archaeologists as end-users rather than as co-developers of new methods. In the early days of computational archaeology, cross-disciplinary collaboration was more common. Especially in the seventies, the pioneering work of the 1970 Anglo-Romanian Conference on Mathematics in the Archaeological and Historical Sciences conference (Hodson, Kendall and Tautu 1971) brought together a whole array of mathematicians proposing concrete mathematical and computational solutions to archaeological problems. This period also saw the publication of the seminal work of Doran and Hodson on Mathematics and Computers in

Archaeology (1975), which embodied the state-of-the art of computational/quantitative archaeology of the time — producing techniques such as seriation algorithms that remain influential today.

Since then, there have been notable breakthroughs, such as Bayesian approaches to radiocarbon dating (Buck et al. 1991; Bronk Ramsey 2009), the application of spatial point process models to settlement patterns, and the adaptation of phylogenetic and network-theoretical methods to study cultural transmission. Yet overall, the field has leaned more towards ready-made tools (GIS, network analysis, semantic modelling, AI applications) than to the joint development of novel mathematical or algorithmic frameworks.

This session aims to reinvigorate that dialogue. Our vision is a CAA that not only showcases applications but also nurtures collaborations where new mathematical models and computational techniques are developed for and with archaeology.

The intended round table would feature the following parts:

- General introduction and problem statement (Levy and Hinz).
- Short interventions by mathematicians, computer scientists, and archaeologists. Mathematicians and computer scientists would present techniques of their choice, which they feel might be of use for archaeology. The intention is, for the archaeological community, to discover techniques they might not be aware of, and which might have significant impact on future quantitative archaeological research. Archaeologists are also invited to present open problem statements: concrete case studies for which they failed to find practical quantitative or algorithmic solutions among the standard toolkits. Each intervention would consist of a short presentation, followed by a longer discussion with the audience.
- Brainstorming part. General discussion, hoping to find convergences between the exposed archaeological needs and available computational techniques presented.

We invite colleagues from all three disciplines to participate actively, especially in presenting open problems or potential solutions. Colleagues wishing to present either a mathematical/computational technique of their choice, or an open problem, are invited to submit an abstract to the session via the conference's standard abstract submission system.

References:

Bronk Ramsey, C. 2009. Bayesian analysis of radiocarbon dates. Radiocarbon 51(1): 337–360.

Buck C.E., Kenworthy J.B., Litton C.D., Smith A.F.M. 1991. Combining archaeological and radiocarbon information: a Bayesian approach to calibration. Antiquity 65(249):808–21.

Doran, J. E., Hodson, F. R. 1975. Mathematics and Computers in Archaeology. Edinburgh University Press.

Hodson, F.R., Kendall, D. G., Tautu, P. (eds). 1971. Mathematics in the Archaeological and Historical Sciences. Proceedings of the Anglo-Romanian Conference, Mamaia, 1970. Aldine-Atherton, Inc., Chicago.

10:30 – 12:30	• Introduction *Eythan Levy, Martin Hinz* • 135. Herculaneum Scrolls Ink Detection Using Textural Features *Oleksandr Korotetskyi (Czech Technical University); Michal Haindl (Institute of Information Theory and Automation, Czech Academy of Sciences)*

	• 127. Probabilistic Geometric Joining for Fragmented Paper: An Algorithmic Pipeline with Markov Assembly under Minimal Supervision *Terrindeep Sandhu (University of California, Los Angeles)*; *Deborah LaCamera* (*Studio TKM Associates*); *Heini Korhonen* (*Studio TKM Associates*); *Kay Horak* (*Studio TKM Associates*); *Lorraine Bigrigg* (*Studio TKM Associates*); *Marie Lassaigne* (*University of Southern California, Los Angeles*) • 265. Multiple testing of local maxima for detection of post holes *Valentina Cammarota (Sapienza University of Rome)* • 383. What Can Ecological Statistical Methods Bring to Archaeological Research? *Fabrice Rossi (Université Paris Dauphine)* • 410. Evolutionary Algorithms: An untapped resource for archaeologists? *Mathys du Plessis (Nelson Mandela University)*
12:30 – 13:30	Lunch break
13:30 – 14:30	Discussion, Round Table

S36: Composed for Success: Making the Most of Chemical Data in Archaeometry

Michaela Schauer, Vienna Institute for Archaeological Science (VIAS) of the University of Venna & Natural History Museum Vienna (NHMV)

Michelle Richards, School of Geography, Earth and Atmospheric Sciences, University of Melbourne

Brandon L. Drake, Department of Anthropology, University of New Mexico

Location: Hörsaal 01
Session Format: Standard

Archaeological data from XRF, LIBS, ICP-MS, FTIR, and Raman spectroscopy is rapidly increasing as these techniques become more accessible, affordable and portable. However, compared to laboratory instruments, portable non-destructive assays, critical assumptions which underlay quantification and interpretation differ. As archaeologists gather massive amounts of compositional and spectral data from materials like pottery, metals, soils, pigments, and glass, this abundance of data for analysis brings both opportunities and challenges. We discuss how to make this data meaningful, reproducible, and interoperable outside of laboratory contexts.
This session, organized by the Global pXRF Network (GopXRF.Net), invites contributions that explore the methodological, computational, and ethical frontiers of analytical data in chemical analysis in archaeometry. We welcome papers addressing workflows from data collection to interpretation, particularly those that integrate *Description*automation, machine learning, AI-based classification, or semantic modeling.
Our goal is to foster an open conversation on the future of chemical data in archaeological context that moves beyond the instrument—toward frameworks that are computationally robust, ethically grounded, and collaboratively reproducible.
Key themes for the session include:

- AI and Machine Learning
  Applications of supervised and unsupervised learning to characterize materials, detect anomalies, or predict provenance.
  Use of spectral fingerprinting and pattern recognition.
- Automated Calibration and Standardisation
  Inter-lab comparability and reproducibility.
  Advances in data and error handling.
  Development of open-source tools and calibration repositories.
- Data Management, Semantics, and FAIR & CARE Principles
  Structuring compositional data for long-term accessibility and reuse in data repositories in perpetuity.
  Ontologies and metadata standards for chemical data.
  First Nations Data sovereignty
  Critical perspectives on algorithmic bias and over-interpretation.
- Case Studies
  How integrated data approaches enhance understanding of technology, exchange, and provenance.
  Studies illustrating the full workflow from field collection to digital publication.

Audience and Impact:
This session is aimed at a diverse audience – archaeologists, archaeometrists, data scientists, and heritage professionals – who engage with chemical analysis, data modeling, or AI in archaeology. We hope to bridge gaps between field practitioners and computational modelers by showcasing both grounded case studies and conceptual frameworks.

Expected Outcomes:
Foster cross-disciplinary dialogue and community building.
Identify bottlenecks in analytical workflows and share open solutions.
Promote reproducible, ethical, and AI-ready data practices in archaeometry.
Inspire collaboration through GopXRF.Net and related networks.

Future perspectives:
We also envision follow-up discussions (virtual or in-person) or the possibility of an open-access proceedings volume or workshop post-conference. The session will be structured to encourage dialogue, including a closing panel discussion.

14:30 – 14:40	Introduction and Welcome
14:40 – 15:00	229. XRF as a Screening Tool for Diagenesis *Marian Hamilton (University of Nothern Colorado); Cyler Conrad (Pacific Northwest National Laboratory); Lee Drake (University of New Mexico)*
15:00 – 15:20	240. Inferring Environmental Processes using XRF *Lee Drake (University of New Mexico); Jenni DeGraffenried (Dugway Proving GRound); Andrea Brunelle (University of Utah); Isaac Hart (University of Utah)*
15:20 – 15:40	Coffee break
15:40 – 16:00	254. All Roads Lead to Accuracy? Navigating Calibrations and Coefficient Corrections in pXRF Studies *Michaela Schauer (VIAS/NHMW)*
16:00 – 16:20	158. Investigation of trade network using elemental analysis of transport amphoras with pXRF *Anno Hein (N.C.S.R. "Demokritos")*
16:20 – 16:40	323. Using p-XRF to distinguish archaeological pottery sherds found on Tami Island, Eastern Papua New Guinea

	Kristine Hardy (ANU); Mathieu Leclerc (ANU)
16:40 – 17:00	324. Getting to the Source: A New Approach to Using Provenancing to Explore People's Strategies of Stone Tool Making in the Deep Past at Pamwak Rockshelter, Papua New Guinea *Caroline Spry (La Trobe University); Christina Pavlides (La Trobe University); Michelle Richards (The University of Melbourne)*
17:00 – 17:20	348. Is big-archaeo-geochemical data increasing our understanding of the past in Oceania? *Michelle Richards (The University of Melbourne); Andrew McAlister (University of Auckland); Josh Emmitt (Auckland War Memorial Museum)*
17:20 – 17:30	Break
17:30 – 17:50	359. Compatibility Challenges Between Quantitative Optical Emission Sprectroscopy, and SEM-EDS in the Compositional Analysis of North Pontic Ancient Glass *Anzhelika Kolesnychenko (The Cyprus Institute); Thilo Rehren (The Cyprus Institute)*
17:50 – 18:10	113. Rock Art Clustering Analysis for Group Identification Using Reflectance Spectroscopy (350-2500 nm) in La Pileta Cave (Málaga, Spain) *Rubén Parrilla (ICArEHB)*; Sara Macías (Universidad de Sevilla); María Simón Vallejo (Universidad de Sevilla); Miguel Cortés Sánchez (Universidad de Sevilla)*
18:10 – 18:30	195. A Bayesian Multi-Endmember Mixing Framework for Lead Isotope Provenancing
	Siran Liu (University of Science and Technology Beijing)
18:30 – 18:50	58. An Explainable Multimodal Modelling Framework with Physics Constraints: A Case Study on Predicting the Degradation of Heritage Leather Materials *Xinyi Lei*; Can Liu (Sichuan University); Peng Zhao (Sichuan University); Xiyang Ma*; Yuchuan Bai*; Wenqiang Yang** ** China National Shadow Puppetry Museum*
18:50 – 19:10	430. Beyond the Instruments: AI-Driven Integration of Multisensor Data in Archaeometry *Martina Naso (University La Sapienza of Roma); Nevio Dubbini*; Arthur Leck (Université Bordeaux Montaigne); Rémy Chapoulie (Université Bordeaux Montaigne); Gabriele Gattiglia*; Claudia Sciuto** ** University of Pisa*
19:10 – 19:30	Discussion

S47: Artificial Intelligence, a Step into the Post-digital Era of Archaeology?

Grégoire van Havre, Universidade Federal do Piauí

Kayeleigh Sharp, Northern Arizona University

Mathias Bellat, Eberhard Karls University of Tübingen

Location: Hörsaal 03
Session Format: Other Format

In the post-digital era in which we now exist, technology has been embraced and normalised such that we are disrupted by its absence rather than its presence (see Huggett 2015). While the post-digital paradigm strongly rejects the narrative of one-way technological progress and recognizes both the advantages and disadvantages of new technologies as engines of innovation, we have not yet fully realised the range of implications integration of AI poses. With hybridised coexistence of analogue and digital, formerly disruptive techniques like GIS or 3D modeling and spatial analysis have become foundational in contemporary archaeological practice. It is within this intellectual environment that emerging AI techniques are being widely adopted. The critical question that emerges is whether such post-digital era technologies are being embraced without adequate consideration of the implications not only for preservation of archaeological sites but intangible cultural heritage as well. This question emerges with the current state of affairs emerging in AI today (Gattaglia 2025).

In May 2025, OpenAI launched a contest called "OpenAI to Z Challenge", aimed at locating archaeological sites in the Amazon region using OpenAI o3/o4 mini and GPT-4.1 (https://openai.com/openai-to-z-challenge/). As it was probably the first time a large public contest was launched on such an archaeological question, it also carried a lot of Indiana Jones-like discourse ("You are the digital explorer", "Discover secrets hidden under the canopy") and a popular colonial mythology of Eldorado (the city of Z). Among the open data indicated were "high-resolution satellite imagery, published lidar tiles, colonial diaries, indigenous oral maps, past documentaries, archaeological survey papers" calling, in effect, to a variety of possible AI applications in archaeology.

At nearly the same time, Bellat and Orellana-Figueroa et al. (2025) reviewed the trajectory of the use of AI in archaeology into six categories (classification of archaeological remains, predictive modelling, automatic structure detection, digital heritage, text analysis and taphonomic classification). In their conclusions, they insist on the necessity of common procedures and workflows, and on the limited availability of open data. As a result, they point out the exploratory dimension of most research. In parallel, Casillo et al. (2025), in their review of AI for cultural heritage practice, highlighted a lack of standardised datasets in their conclusion. Gattaglia (2025) assesses the importance of data availability and transparency, and draws ethical concerns over the invisible materiality of AI.

As computers become more capable of simulating human reasoning through the production of texts, images, and other digital content, it is worth asking about their impact on archaeology and on the production of knowledge about past societies. While the idea of a fully robotic excavation remains in the realm of science fiction, we can already glimpse the possibility of producing and publishing research entirely through large-scale language (LLM) and computer vision (CV) models. Some questions to consider include: Is it possible to identify such models if not clearly stated? What would the bias be? What does this mean for science? How might this influence understanding of the past and the construction of the present? Are there any foreseeable consequences? Is it possible to slow or even stop the damage? Who has access to current tools and who benefits from them? Such are the practical and ethical questions archaeology must address as soon as possible, and which form the basis of this session, as future archaeologists will graduate with an LLM right in their pockets and CV detection will be the norm.

Session aim

This session aims to be a marketplace of ideas and suggestions, of collaborations and knowledge transfer. Specifically, it aims to explore questions about the analytical and ethical use of AI in archaeology, including, but not limited to, those mentioned above. We wish to gather people interested in using Artificial Intelligence on their data, but who don't know how to do so, and people who know how to, but lack data. We call for those who would like to test their models on new and unexpected datasets. While case studies are recommended, we understand they may be incomplete.Some questions for consideration include: How does AI safeguard the respect and collaboration with Native and traditional people? How accurately does AI reproduce and represent the past? As in the case of *OpenAI to Z Challenge*, are certain aspects of colonial mythology already embedded in it? Do the results of the application of AI on archaeological data necessarily relate to past people? What are the possible implications in the present and in the future?

Accessibility & Ethics

We encourage accessible presentation materials, plain-language summaries, and disclosures on data sensitivity, cultural considerations, and potential harms. Work with restricted data should outline mitigation strategies (e.g., redaction, differential access). Please state open vs closed-world assumptions and how constraints affect the inclusion/exclusion of sensitive entities.

Special Interest Group

This session is organised by the CAA SIG on Machine Learning.

References:

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Casillo, M.; Colace, F.; Gaeta, R.; Lorusso, A.; Pellegrino, M. 2025. Artificial Intelligence in Archaeological Site Conservation: Trends, Challenges, and Future Directions. Journal of Computer Applications in Archaeology, 8, 1, 224-241. DOI: https://doi.org/10.5334/jcaa.207.

Gattaglia, G. 2025. Managing Artificial Intelligence in Archeology. An overview. Journal of Cultural Heritage, 71, 225-233. DOI: https://doi.org/10.1016/j.culher.2024.11.020.

Huggett, J. 2015. A Post-Digital Archaeology? Introspective Digital Archaeology. https://introspectivedigitalarchaeology.com/2015/07/05/a-post-digital-archaeology/.

10:30 – 10:50	40. Unveiling Drawing Patterns in Magdalenian Rock Art: Clustering and Unsupervised Machine Learning for the Analysis of animal Depictions *Natalia González Vázquez (Universidad Autónoma de Barcelona); Juan Antonio Barcelo (Universidad Autónoma de Barcelona); Diego Garate Maidagan (Universidad de Cantabria)*
10:50 – 11:10	87. NLP Insights from the OpenAI to Z Archaeology Challenge *Annie Lamar (University of California); Sarah McClure (University of California)*
11:10 – 11:30	189. From Post-Digital to Post-Algorithmic Archaeology: Reflexive Data-Making and the Ethics of Absence *Gabriele Gattiglia (University of Pisa)*
11:30 – 11:50	219. Mapping Hidden Heritage: Self-Supervised Learning on LiDAR-Derived DEMs for Detecting Dry-Stone Walls in the Budj Bim Cultural Landscape

	Zexian Huang; Brian Armstrong*; Billy Bell (Gunditj Mirring Traditional Owners Aboriginal Corporation); Martin Tomko** ** University of Melbourne*
11:50 – 12:10	233. AI, Brazilian archaeology and Global South, or the Colonial Computer *Grégoire van Havre (UFPI); Bruno Carvalho Pereira Campos (UFPI*
12:10 – 12:30	270. What do we actually model when we model with neural networks in archaeology? *Jordy Orellana Figueroa (University of Tübingen)*
12:30 – 13:30	Lunch break
13:30 – 13:50	417. Applying Convolutional Neural Networks to Archaeological Skeletal Analysis: Toward Open-Access Bioarchaeological Methods *Kate Collette (Northern Arizona University); Kayeleigh Sharp (Northern Arizona University); Manuel Antonio Roque Soplapuco (Universidad Nacional Pedro Ruiz Gallo)*
13:50 – 14:10	421. A Survey on Attitudes towards Artificial Intelligence in Archaeology *Elisa Paperini (University of Pisa); Michel Mickael (Institute of genetics and animal biotechnology of the Polish Academy of Sciences)*
14:10 – 14:30	432. Insites - Cultural Significance Assessment as Human–AI Collaboration *Yael Alef (Technion - Israel Institute of Technology); Yuval Shafriri (EdTech Consultant)*
14:30 – 14:50	449. Same or different? Assessing variability in Howiesons Poort backed artifact morphology and composition across southern Africa *Boqiang Huang (University of Cologne)*
14:50 – 15:00	Discussion

S49: Bridging Micro and Macro Perspectives in the Modelling of Past Human Ecosystems

Eleftheria Paliou, University of Cologne

Andreas Angourakis, Ruhr University Bochum; University of Cologne

Location: Franz König Saal
Session Format: Standard

Ongoing and current discourse in socio-ecological research has highlighted the need to explore the types and intensity of human–environment interactions across a variety of temporal and spatial scales (Roberts et al. 2024; Kintigh et al. 2014). Computational archaeology is integral to such investigations, since it enables the study of the dynamic interplay between human behaviour and environmental change, including shifts in climate, vegetation cover, and faunal and floral populations, through a deep-time and multi-scalar perspective. At the macro scale, advances in computational modelling and the growing availability of large datasets on past settlement distributions, radiocarbon dates, and climatic variables have highlighted broader trends and aggregate patterns in the archaeological record, suggesting

reciprocal influences between altering socio-economic and environmental conditions. Nonetheless, a deeper understanding of the local processes that give rise to macro-patterns is notoriously challenging to achieve. This difficulty stems from several factors: the uneven availability and quality of archaeological and environmental data across regions, the problem of equifinality (i.e. distinct pathways can produce similar large-scale outcomes), and the tendency of macro-scale analyses to smooth over local dynamics and short-term fluctuations, thereby obscuring the causal mechanisms that operate at finer scales. On the other hand, microscale studies have offered essential insights into the dynamic relationship between human societies and ecological change at the local level. Especially notable is the contribution of ethnoarchaeological approaches that look into the ecological perspectives of Indigenous and local communities (Sherjon et al. 2015; Whitaker et al. 2023; Pisor and Jones 2021; Welch-Devine et al. 2020), and multidisciplinary research that brings together high-resolution data from material, archaeobotanical, zooarchaeological and paleoenvironmental studies. However, the value of local level understandings for socio-ecological research is increasingly scrutinised due to concerns regarding their direct applicability across diverse contexts and the difficulty of making valid cultural parallels. In this respect, computational approaches, such as Agent-Based Modelling (ABM), that gain insights from ethnoarchaeological and small-scale studies offer significant methodological advantages, as they focus on exploring microscale processes, rather than relying on direct cultural analogies, allow rigorous hypothesis testing, and have the potential to highlight non-linear feedback between local and global processes.

This session aims to bring together micro and macro perspectives on the modelling of past human ecosystems, seeking a more comprehensive understanding of the interdependence between microdynamics and macro patterns. It invites contributions discussing cross-scale approaches to computational modelling and theoretical frameworks that seek to make explicit the links between local-level human action and global environmental impacts. Furthermore, we are particularly interested in approaches to computational modelling that gain insights from Indigenous and traditional ecological knowledge. We also encourage contributions that explore the socio-ecological dynamics of resource use, depletion, and renewal, as well as interdisciplinary eco-archaeological approaches that bring together ethnoarchaeology, archaeological science methods, and computational modelling. More broadly, we invite works on computational modelling (e.g., simulations, GIS-based models, equation-based models, agent-based models, etc.) which look into:

- The response of hunter-gatherer, agropastoralist and urban populations to ecological change
- anthropogenic impacts on the environment in the long- and short-term, at smaller and larger spatial scales
- ecological sustainability and resilience in the past and present
- technological advances in computational modelling of socio-ecological systems

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Kintigh, Keith W., Jeffrey H. Altschul, Mary C. Beaudry, Robert D. Drennan, Ann P. Kinzig, Timothy A. Kohler, W. Fredrick Limp, et al. 2014. 'Grand Challenges for Archaeology'. American Antiquity 79 (01): 5–24. https://doi.org/10.7183/0002-7316.79.1.5.

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10:30 – 10:50	252. Generative Inference and Reflexive Modelling: Bridging Scales in Socio-Ecological Archaeology *Martin Hinz (Institute of Archaeological Sciences, University of Bern); Sophie C. Schmidt (Institute for Pre- and Protohistoric Archaeology, Kiel University)*
10:50 – 11:10	118. Paleoenvironmental reconstructions of the Early and early Middle Pleistocene as a scene for "Out of Africa" dispersals *Kamilla Lomborg*; Nicolas Viovy (Laboratoire des Sciences du Climat et de l'Environnement); Carolina Cucart-Mora*; Jan-Olaf Reschke*; Christine Hertler (Senckenberg Research Institute); Marie-Hélène Moncel** ** CNRS UMR 7194 HNHP Institut de Paleontologie Humaine*
11:10 – 11:30	105. Trading Mediterranean summers for northern winters - studying hominin subsistence behaviour during the first occupation of northwestern Europe *Jan-Olaf Reschke*; Carolina Cucart-Mora*; Kamilla Lomborg*; Matt Grove (University of Liverpool); Christine Hertler (ROCEEH); Marie-Hélène Moncel** **CNRS*
11:30 – 11:50	418. Modelling and simulation of mixed production and community energy balance in the Neolithic: the Cueva de la Dehesilla case study Juan Antonio Fernandez Morales (Universidad de Sevilla); Jesús María Barandica Fernández (Universidad Complutense de Madrid); Daniel García Rivero (Universidad de Sevilla)
11:50 – 12:10	12. From Macro Patterns to Micro Processes: Integrating Regional Spatial Analysis and Intra-Site Investigation to Reveal Temporal Cycling in Iron Age IIA Negev Highlands *Itay Lubel (Hebrew University of Jerusalem)*
12:10 – 12:30	234. Bottom-up or top-down? Modelling natural administrative divisions in Final Iron Age (11th-13th century) Estonia *Kristo Siig (Tallinn University); Kaarel Sikk (Tartu University)*
12:30 – 13:30	Lunch break
13:30 – 13:50	122. Clean Romans, Dirty Air, and Trimmed Forests: The environmental impact of Ancient Baths

	Marta Galindo Diaz; Jeroen Poblome*; Bart Muys*; Dirk Saelens** ** KU Leuven*
13:50 – 14:10	89. Climate, Crisis, and Settlement Dynamics: A Quantitative Model of the Roman-Early Medieval Transition in the Moselle Valley *Ilenia Petrarulo (University of Luxembourg); Giacomo Fontana (Texas Tech University)*
14:10 – 14:30	28. Simulating traditional agriculture in dynamic arid environments: a comparison of resilience strategies *Sara Krubeck (Pompeu Fabra University)*
14:30 – 14:50	Discussion

Thursday

S1: Hic sunt dracones? Link 'em all! Linked Open Data, Wikidata and CIDOC CRM in Archaeology

Florian Thiery, Leibniz-Zentrum für Archäologie (LEIZA), Mainz, Germany & Research Squirrel Engineers Network

Martina Trognitz, Austrian Centre for Digital Humanities (ACDH), Austrian Academy of Sciences, Vienna, Austria

Stephen Stead, Paveprime Ltd, Purley, United Kingdom

Daria Stefan, TU Wien, Vienna, Austria

Location: Hörsaal 01
Session Format: Standard

Today, the World Wide Web (WWW) enables researchers to share their data, allowing the wider community to participate in scientific discourse and generate new knowledge. However, much of this shared data is neither findable nor accessible, resulting in gaps in the web map. Historical maps used the phrase 'Hic sunt dracones' (Latin for 'Here be dragons') to denote areas unknown to the mapmaker. Similarly, our modern 'unknown data dragons' lack connections to other datasets — they are not interoperable and, in some cases, unusable. To overcome these shortcomings, Linked Open Data (LOD) (Berners-Lee, 2006; Hylandet et al., 2013) techniques, as part of the wider Semantic Web, and Linked Open Usable Data (LOUD) (Sanderson 2019), can be used.

LOD and LOUD represent a way to provide data that adheres to the FAIR principles (Wilkinson et al., 2016), which were introduced in 2016. The acronym stands for Findable, Accessible, Interoperable and Reusable research

data and metadata. To allow for greater interoperability and compatibility of digital datasets, CIDOC CRM (2024) and its extensions have established themselves as a de facto standard for digital archaeology data. A last puzzle piece to help in finding and linking all the data dragons are Wikibase instances, such as Wikidata, which entered the world in 2012 (Vrandečić and Krötzsch, 2014).
Semantic Modelling and LOD are a core part of Computational Archaeology and also an essential part of the FAIRification and Research Data Management (RDM) process inside the Research Data Lifecycle (e.g., Thiery et al., 2023; Schmidt et al, 2022; Thiery et al., 2023b; Thiery and Thiery, 2023; Panagiotopoulos and Trognitz, 2025). Interlinked LOD, plays a significant role in Open Science and gains more and more importance as a backbone for international and interdisciplinary RDM initiatives, such as the German National Research Data Infrastructure (NFDI), the European Collaborative Cloud for Cultural Heritage (ECCCH) or ARIADNEplus.

The Semantic Web offers a variety of vocabularies, ontologies and reference models that can be used for archaeology-related LOD modelling: CIDOC CRM, SKOS, PROV-O, FOAF, GeoSPARQL, Wikidata, etc. The Linked Data Cloud (McCrae et al, 2025) already provides FAIR and LOUD research data repositories, data hubs and domain-specific ontologies for specific archaeological and humanities domains such as Nomisma, Kerameikos, Pelagios, OpenContext, Portable Antiquities Scheme, ARIADNE, Linked Open Samian Ware, Linked Open ARS, Linked Open Ogham, and the Ceramic Typologies Ontology.

To enable non-experts to engage with FAIR and LOUD data, research tools – little minions – were created for different purposes, such as modelling relative chronologies in RDF, modelling and reasoning on vague edges in graph data, creating annotated texts and images, and SPARQL, as well as enhancing Geo-Datasets using, e.g., the SPARQLing Unicorn QGIS Plugin. In addition, community-driven knowledge bases like Wikidata not only offer data but also provide several tools for using and interacting with it.

Our session aims to bring together experts and colleagues interested in learning about FAIR and LOUD data-driven publishing and applications, as well as collecting research application scenarios to promote research domain-specific solutions for research data management. We would like to discuss application-oriented and data-driven investigations into improving technologies for FAIR and LOUD data models as a basis for reproducible and CAREful research and exchange on the Semantic Web, as well as solutions related to one or more of the issues listed below:

- application of Semantic Web technologies, such as ontologies (e.g. CIDOC CRM) or RDF/RDF-star, to the archaeological domain
- modelling of archaeological artefacts, the archaeological context, including the specificity of stratigraphy, uncertainty, and vagueness
- development of research tools producing or using FAIR and LOUD data
- interlink other data modelling concepts to semantic techniques, e.g. LPGs, HINs, FAIR Digital Objects
- computer vision or machine learning applications built upon semantic data
- building up Knowledge Graphs by applying semantic and Artificial Intelligence (AI) technologies
- modelling comprehensible/reproducible workflows and data flows using RDF/RDF-star for documentation and reproducible research
- use of LOD tools in archaeological research, their implementation and/or enhancement
- possibilities, challenges, benefits and risks of the Wikimedia Universe (e.g. Wikidata, Wikibase instances, Wikimedia Commons) in archaeological research
- implementation of reference models such as CIDOC CRM in real-world datasets and ways to achieve LOD
- graphs of facts, beliefs, and/or assertions as a digital archaeological method

- reasoning with heterogeneous and real-world archaeological data in graphs
- graph and RDF/RDF-star representation of specific networks of persons, objects and information relating to research questions
- LOUD techniques as a solution for information and data annotation on objects/artefacts in 2D and 3D (e.g. cuneiform tablets, ogham stones, samian ware, books, texts, …)
- implementation of GeoSPARQL as a geospatial standard in archaeological data
- overcoming linguistic barriers and increasing accessibility through LOD and LOUD principles
- implementing the CARE principles through a thoughtful application of LOD and LOUD principles
- development of educational or Open Educational Resources (OERs) to increase the use of LOD

We encourage presenters to describe the problems addressed based on real-world datasets and to formulate proposals for solutions, preferably demonstrating (prototypes of) realised data-driven (web-) applications. Due to the thematic relevance, we target a broad and diverse audience, and the challenges described should also be integrated into an archaeological context (excavation, museum, archive, etc.).

This session is organised by the **CAA SIG on Semantics and LOUD in Archaeology (SIG Data-Dragon)**. The core aim of this SIG is to utilise the SIG format to raise awareness of Linked Data in archaeology by creating a friendly and open platform for discussing and further developing semantics, as well as LOUD and FAIR data in archaeology.

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08:30 – 08:50	247. Conceptualizing Archaeological Data: A LOD-based representation of Göbekli Tepe *Antonia Lourentzaki (TALOS-AI4SSH, UOC); Maria Papadopoulou (TALOS-AI4SSH, UOC); Christophe Roche (TALOS-AI4SSH, UOC)*
08:50 – 09:10	14. A semantic data model based on CIDOC CRM for Mesolithic footprints analysed with a multi-method approach *Laura Albers (FAU CDI); Andreas Pastoors (FAU Erlangen-Nürnberg)*
09:10 – 09:30	199. Dating the Roman conquest of Germania with Samian? Open and FAIR approaches when ordering the chronologically sensitive Arretine terra sigillata Services I-II *Allard Mees (LEIZA); Florian Thiery (LEIZA); Barbara Pferdehirt (LEIZA*
09:30 – 09:50	175. Using ArchaMap to Solve a Key Problem in Re-using Archaeological Data: Linking Sites across Datasets *Daniel Hruschka*; Robert Bischoff*; Matthew Peeples*; Harsha Kasi*; Sharon Hsiao (Santa Clara University)* ** Arizona State University*
09:50 – 10:10	321. FAIRification of Projectile Point Typologies through ArchaMap and Wikidata *Robert Bischoff*; Daniel Hruschka*; Matthew Peeple** ** Arizona State University*
10:10 – 10:30	96. Crosswalking the Dragons: Ontologies and Metadata within the interoperable federated Cultural Heritage Knowledge Graph Ecosystem *Anja Gerber (Klassik Stiftung Weimar); Florian Thiery (Leibniz-Zentrum für Archäologie (LEIZA)); Sarah Wagner (FAU Competence Center Research Data and Information (FAU CDI)); Mattis thor Straten (Kiel University); Steffen Strohm (Kiel University); Fiona Schenk (Johannes Gutenberg University Mainz); Daria Stefan (TU Wien); Andreas Noback (Technical University of Darmstadt); Peter Thiery (Research Squirrel Engineers Network)*
10:30 – 11:00	Coffee break
11:00 – 11:20	49. Federating the Dragons: Connecting Semantic and Digital Objects in the Federated Knowledge Graph Ecosystem *Florian Thiery (LEIZA); Fiona Schenk (Johannes Gutenberg University Mainz); Daria Stefan (TU Wien); Megan Nichole Kasten (University of Glasgow); Andreas Noback (Technical University of Darmstadt); Peter A. Thiery (Research-Squirrel Engineers Network)*

11:20 – 11:40	120. Show and tell – using demonstrators for reproducible results *Ceri Binding (University of South Wales); Douglas Tudhope (University of South Wales)*
11:40 – 12:00	53. Here Be Links: Taming the Data Dragons with OpenAtlas *Bernhard Koschiček-Krombholz (Naturhistorisches Museum Wien/Austrian Centre for Digital Humanities); Nina Richards (Naturhistorisches Museum Wien/Austrian Centre for Digital Humanities)*
12:00 – 12:20	Discussion

S3: Methodological and Theoretical Research in Digital Archaeology, Day II

Anja Wutte, University of Cologne, Germany; TU Wien, Austria

Maria Sotomayor Chicote, University of Cologne, Germany

Location: Auditorium Maximum
Session Format: Standard

08:30 – 08:50	156. From Caves to Codes: A Paradigm Shift in Surveying and Documentation of Rock Art Research in India in a Global Context *Anindya Sanyal (Banaras Hindu University)*
08:50 – 09:10	452. The use of 3D point densities for archaeological interpretation *Joshua Emmitt (Auckland Museum); Rebecca Phillipps (University of Auckland); Stacey Middleton (Auckland Council); Simon Holdaway (University of Auckland)*
09:10 – 09:30	61. Digitizing the Sculptural Heritage of the Accademia di Belle Arti di Firenze: Ethics, Methodologies, and Case Studies *Giulia Vaccari (Accademia di Belle Arti di Firenze, Università di Roma Tor Vergata); Sara Onofrietti (Accademia di Belle Arti di Firenze, Conservatorio "Luigi Cherubini")*
09:30 – 09:50	345. Applying the Image Dimension Measuring System for artifact analysis *Anna Głód (Polish Academy of Sciences); Aldona Kurzawska (Adam Mickiewicz University); Iwona Sobkowiak-Tabaka (Adam Mickiewicz University); Anita Szczepanek (Polish Academy of Sciences); Marjolein Bosch (Austrian Archaeological Institute, Prehistory Austrian Academy of Sciences)*
09:50 – 10:10	136. From fragments to forms: algorithmic modelling and robotic fabrication in ceramic vessel reconstruction *Jakub Franczuk (Warsaw University of Technology); Sara Boś (SWPS University); Piotr Makowski (University of Warsaw)*
10:10 – 10:30	**Discussion**
10:30 – 11:00	Coffee break

11:00 – 11:20	261. From Web to CAVE: The CAVE-Kompakkt Viewer for Immersive Archaeological Visualization *Tom Noack (University of Cologne); Daniel Wickeroth (University of Cologne)*
11:20 – 11:40	226. 4D Data capturing and analysis – Why we need standardized reference models for monitoring cultural heritage *Matthias Kucera (University of Vienna); Parker Van-Valkenburgh (Brown University)*
11:40 – 12:00	112. Integrating social theory with computational methods: The MAPAR QGIS plugin and its multiple applications to study past landscapes *Santiago Tuñas-Corzón (Institute of History, Spanish National Research Council (IH-CSIC))*
12:00 – 12:20	200. Mobile GIS and Digital Innovation in Archaeology: The Italian Experience with QField, pyArchInit, and the National Archaeological Geoportal (GNA) *Roberto Montagnetti (Università degli Studi dell'Aquila)*
12:20 – 12:40	170. Mapping the Potential Location of Roman Wine-making Using Niche Modelling Approaches *Roberto Ragno (University of Cambridge); Maria Elena Castiello (University of Lausanne)*
12:40 – 13:00	366. Testimony of Stones: A New Method in Ancient Traffic Analysis *Murat Dirican (Leiden University); Tuna Kalaycı (Leiden University); Jessica Robkin (University of Central Florida); Martin Steskal (Austrian Academy of Sciences / Austrian Archaeological Institute and Head of Ephesus Archaeological Excavations / Türkiye); Scott Branting (University of Central Florida / Department of Anthropology and Head of Kerkenes Archaeological Excavations / Türkiye)*
13:00 – 14:00	Lunch break
14:00 – 14:20	401. Space time pattern mining: using spatiotemporal analysis for identifying patterns of coin hoarding across the Imperial Roman Empire *Christina Zymari (Independent)*
14:20 – 14:40	250. Trait-Based Multivariate and Network Analysis of Sasanian Ceramic Technologies: From Sherd Patterns to Regional Systems in Southern Iran *Sona Naderi (University of Tehran); Zohreh Zehbari (Philipps-Universität, Marburg)*
14:40 – 15:00	302. Beyond Application: Rethinking Spatial Interaction Modelling in Mycenaean Archaeology *Areti Michalopoulou (University of Cologne)*
15:00 – 15:20	310. Playing With Fire? – Fire Simulation as a Tool for Spatial Analysis of Open-Air Sites *Rebecca Gnau (University of Cologne)*
15:20 – 15:40	315. ArchaeoSky: A Quantitative Platform for the Analysis of Astronomical Alignments in the Roman World *Vasileia Lianou (West university of timisoara)*

15:40 – 16:00	379. Modeling the Deep Roots of Resilience – A Computational Framework for Organizational Adaptation in Hominin Evolution *Ericson Hölzchen (Trier University); Veronika Kurchyna (German Research Center for Artificial Intelligence (DFKI), Trier University); Ana Mateos (Centro Nacional de Investigación sobre la Evolución Humana (CENIEH)); Jesús Rodríguez (Centro Nacional de Investigación sobre la Evolución Humana (CENIEH)); Christine Hertler (ROCEEH Research Center, Senckenberg Research Institute and Heidelberg Academy of Sciences and Humanities); Jan Ole Berndt (German Research Center for Artificial Intelligence (DFKI) and Trier University); Ingo J. Timm (Trier University and German Research Center for Artificial Intelligence (DFKI)*
16:00 – 16:30	Discussion

S14: Fighting Crime with Computational Archaeology

Wouter Verschoof-van der Vaart, Netherlands Forensic Institute

Hayley Mickleburgh, University of Amsterdam, Faculty of Humanities

Mike Groen, Netherlands Forensic Institute

Location: Hörsaal 05
Session Format: Standard

In recent decades, countries across the globe have adopted archaeological theories, methods, and techniques within the context of criminal and judicial investigations, for example in the investigation of clandestine or mass graves, buried evidence, human remains, and heritage crimes (Barone & Groen 2025). This use of archaeological theories, methods, and techniques for the investigation of medico-legal and humanitarian cases defines the field of forensic archaeology (Blau & Ubelaker 2016). It involves the systematic documentation, recovery, and interpretation of material evidence, such as human remains, artefacts, and features from outdoor or complex crime scenes, that fall under criminal or legal inquiry.

Criminal investigations are increasingly data intensive, requiring efficient data processing, secure storage, and advanced analytical tools. Like conventional archaeology, forensic archaeology increasingly employs computational methods and techniques, including geospatial analysis and modelling using GIS, geophysical surveying, remote sensing, 3D-scanning, 3D-modelling, augmented reality, and virtual reconstructions. These methods provide important opportunities to efficiently and accurately collect data that meet the strict criteria for legal investigations. For example, a study comparing UAV-based photogrammetry to laser scanning showed near equal accuracy and precision for both methods of 3D data capture, demonstrating the suitability of UAV-based photogrammetry for rapid, non-invasive documentation in hazardous or logistically challenging environments (Cunha et al. 2022).

While the technical requirements and capabilities of computational methods and techniques in forensic archaeological contexts remain largely similar to those in conventional archaeology, forensic archaeology operates within legal frameworks and must adhere to chain-of-custody procedures. The routine application of digital and computational approaches therefore faces specific challenges in forensic contexts, including adaptation to the requirements of law enforcement agency workflows, the necessity for validation of techniques used in legal and judicial procedures, the integration of these approaches within criminalistics frameworks, and the need for rigorous security measures for sensitive data management.

This session aims to discuss the latest computational developments in the field of forensic archaeology, with particular emphasis on their potential for improving investigative outcomes and to explore how forensic archaeological practice can inform broader archaeology. Due to its fundamental requirements of secure and standardized data handling, careful handling of ethical sensitivities, and strict chain-of-custody procedures, forensic archaeology can offer valuable lessons for developing robust digital practices that benefit broader archaeology.

This session centers on computational innovations applied to or specifically adapted for forensic contexts. We invite contributions surrounding, but not limited to the following major topics:

- Locating, mapping, and visualizing outdoor and/or complex crime scenes such as outdoor scenes, clandestine graves, and mass graves;
- The investigation of heritage crimes (in conflict zones), such as looting;
- Geographical and criminological modeling and the use of geospatial analysis tools such as viewshed analysis and RAG maps within a forensic context.

We ask session presentations to reflect on:

- How forensic contexts affect the requirements of the data itself, procedures for data handling, workflows, etc.;
- Transferable lessons to (and from!) conventional archaeology;
- Gaps in current knowledge and threats to current practice;
- Strategies for standardization and validation of methods and techniques for use in forensic and/or (medico)legal contexts;
- Opportunities to develop open and ethical training resources.

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11:00 – 11:20	242. Searching for clandestine graves in the Netherlands using UAV-based remote sensing *Wouter Verschoof-van der Vaart (Netherlands Forensic Institute); Eliona Langelaan (Amsterdam University of Applied Sciences)*
11:20 – 11:40	311. Predictive Modelling and Modern Clandestine Burials *Mike Groen (NFI)*
11:40 – 12:00	333. Documentation Workflow of the Second World War Mass Grave from Death Valley, Poland *Jakub Stępnik (Department of Archaeology, University of Warsaw); Dawid Kobiałka (University of Łódź); Joanna Rogóż (University of Rzeszów); Michał Czarnik (University of Rzeszów)*

S15: MuVAMoLa Part Two: Multivarite Approaches to Mortuary Landscapes

Timo Geitlinger, University of Zurich
Tucker Deady, University of Toronto

Location: Hörsaal 02
Session Format: Other

We propose a two-part framework.
Part one is in preparation for the conference and includes a submission approximately one month before the meeting of a short summary (this could simply be an adapted abstract) of contributors' overall research and images. The intention is to create an interactive platform to provide conference-goers a prelude to the session. There will be a link in the final program to access this.
Part two is the meeting itself which will be structurally akin to a traditional paper workshop of short presentations, creating an environment centered on questions and discussion. To accommodate for more flow and direct conversation, papers will be approximately 7 minutes long and the aim for each will be to focus on a specific method, question, or theoretical topic out of their larger research. The session will be split into themes depending on the topics submitted and each thematic section will have a discussant.

Mortuary scholarship has perhaps one of the longest histories in archaeological research, but it is a history riddled with bias based on visibility, durability, and public interest. Often most evident in regions where burial practices were accompanied by the erection of monumental architecture, the inclusion of sensational objects, or carry imaginary cultural significance, mortuary contexts have drawn in significant amounts of research. Early scientific endeavors yielded abundant contextual data on burial monuments, ritual behavior, and interred objects. Due to the quality of documentation, however, through locational, temporal and financial predispositions, legacy datasets tend to be heterogenous and noisy and have large gaps in the types of information collected and recorded (see Cooper et al. 2022). Quantitative analyses of mortuary practices are thus commonly met with specific data-related challenges that have proven themselves obstacles in methodological proceedings. How do we therefore reconcile with this biased history of research while still utilizing the documented material and moving forward into more collaborative conversations within both computational and theoretical scholarship?

Mortuary behavior is inherently linked to individual and group identity and should be seen as both agents creating cultural and social connections *and* manifestations of these relations. Simultaneously, burial construction and material inclusions are highly selective and cannot be taken to represent a daily reality of the associated people (Porter 2016). As archaeologists, we must ask how we can use the information we gather from burials, intentionally closed contexts, and speak about the living people and the materialization of their self-perception. Likewise, the placement of tombs within specific environments reveals complexities of cultural expressions that permeate past landscapes. The spatial significance of mortuary evidence in association with material culture, when placed under the scrutiny of quantitative analyses, can further enhance the theoretical and methodological approaches to archaeological landscapes as a whole. While early pioneers of computational archaeology conducted quantitative analyses to study burial contexts within individual sites (Hodson 1968), more recent studies use network analysis (Bourgeois and Kroon 2017; Sosna 2023), and principal components and correspondence analyses (Kjeld Jensen and Høilund Nielson 1997; Kassabaum 2011), amongst other multivariate methods (Nakoinz 2013), to study large scale landscape connections of mortuary contexts.

The session is built to bring together scholars from diverse backgrounds who study burials through multivariate quantitative approaches who are interested in discussing qualitative implications, best (and worst) practices, and potential caveats for future scholarship. In this second iteration of

MuVAMoLA, we propose a two-part framework. Part one is in preparation for the conference and includes a submission approximately one month before the meeting of a short summary (this could simply be an adapted abstract) of your overall research and images. The intention is to create an interactive platform to provide conference-goers a prelude to the session with the further goal of turning it into a publishable format. Part two is the meeting itself which will be structurally akin to a traditional paper workshop of short presentations, creating an environment centered on questions and discussion. To accommodate for more flow and direct conversation, papers will be approximately 7 minutes long and the aim for each will be to focus on a specific method, question, or theoretical topic out of your larger research. The session will be split into themes depending on the topics submitted and each thematic section will have a discussant.

We invite authors who:

- Apply and work on multivariate methods to burials and their landscapes
- Develop methodological or theoretical frameworks for the successful application of multivariate and/or spatial methods to study burial contexts.

Please submit a regular length abstract and indicate a specific area you plan to focus on for the conference. Prior to the meeting, we will be in touch regarding your part one submission. We will also be happy to work with session presenters on narrowing their focus for shortened talks and preparing for this discussion-based gathering.

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11:00 – 13:00

- 185. Looking Back to Move Forward: The History of Multivariate Analysis in Mortuary Archaeology
  Timo Geitlinger (University of Zurich); Tucker Deady (University of Toronto

- 216. Funerary landscape and landscape relationship in the Arabian Peninsula
  Mathias Bellat (University of Tübingen); Tara Beunzen-Waller (University of Perpignan); Thibaut Guiet (University of Perpignan); Sophie Pébay-Peyroula (Cartodia); Olivia Munoz (UMR 8215 Trajectoires, CNRS)

- 166. Where the Dead Were Gathered: Tracing the Development of the Early Bronze I Mortuary Landscape at Bab adh-Dhra', Jordan through Geospatial and Multivariate Statistical Analyses
  Megan Nishida (University of Notre Dame)

- 65. Same pots, different people? Exploring the dual burial custom of Westphalia's Funnelbeaker culture
  Lea Kopner (Universität Münster)

- 378. Quantifying Transformation: Multivariate and Bayesian Approaches to Bronze Age Mortuary Change in Central Europe
  Mirco Brunner (University of Bern)

- 283. Early Anglo-Saxon Burials: A multivariate landscape analysis
  Wyatt Wilcox (University of Oxford)

- 206. Resurrecting the Dead (and the Data): The State of Multivariate Analysis in Archaeological Mortuary Research
  Tucker Deady (University of Toronto); Timo Geitlinger (University of Zurich)

S16: "All Models are Wrong": Learning from Failure in Computational Archaeology

Joe Roe, Department of Cross-Cultural Regional Studies, University of Copenhagen, Denmark

Matteo Tomasini, Gothenburg Research Infrastructure in Digital Humanities & Department of Literature, History of Ideas, and Religion, University of Gothenburg, Sweden

Location: Hörsaal 05
Session Format: Standard

Box's oft-quoted law—"all models are wrong, but some are useful" (Box 1976)—tells us that the value of a model is not in precisely reproducing the real world, but failing to do so in a productive way. This is nowhere truer than in computational archaeology, the search for mathematical approximations of a fundamentally unreproducible past. We are voracious producers and consumers of new digital methods, tools, and perspectives (Scollar 1999; Batist and Roe 2024). It is only to be expected that most of these end up going nowhere. Yet only successful models tend to make it into conferences and publications; the lessons we learn from 'failed' attempts are kept private. In

this session, we call for papers on: models that failed verification, or turned out to be unverifiable; new approaches tried that didn't work; errors in implementation, large and small; methods and tools that have been left on the wayside; and any other form of failure in computational archaeological research.

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08:30 – 08:50	433. Can ecological models predict the occurrence of species in the archaeological record? Can I? *Joe Roe (University of Copenhagen)*
08:50 – 09:10	68. The rise and fall (and rise again?) of cultural phylogenetics in archaeology *Felix Riede (Aarhus University)*
09:10 – 09:30	176. Beyond the Signals: A simulation-based evaluation of the Signal Selection Test (SST) *Alberto Cooper (University of Seville); Enrico Crema (University of Cambridge)*
09:30 – 09:50	224. The Data Strikes Back: Overcoming Challenges in Quantitative Approaches to the Roman Settlement Landscape *Mark Groenhuijzen (NL); Andrew Lawrence (Universität Bern); Philip Verhagen (Vrije Universiteit Amsterdam)*
09:50 – 10:10	Discussion

S17: Channels of Change – Interdisciplinary Approaches to the Archaeology of Fluvial Environments

Martin Offermann, Institute for Geography, University of Leipzig, Leipzig, Germany

Chiara G. M. Girotto, Labor für Prähistorische Anthropologie, Munich, Germany

Iris Nießen, Working Group "Historical Anthropospheres", LeipzigLab, University of Leipzig, Leipzig, Germany & Department of Medieval Archaeology, University of Tübingen, Tübingen, Germany

Lukas Werther, German Archaeological Institute, Romano-Germanic Commission, Frankfurt, Germany

Location: Hörsaal 02
Session Format: Standard

Integrating, collating, and holistic interpretation of inter- and transdisciplinary modes of research, evidence, and ideas has long been a part of investigating the past. In recent decades, this approach to archaeological research has been expanded by the ever-growing availability of high-resolution

datasets, including satellite imagery, lidar, paleoenvironmental proxies, sediment archives, ancient DNA, isotopic analyses, ethnographic and detailed excavation records. These sources span scales from microscopic material analysis to regional climate modelling, and from single events to processes lasting millennia.

Floodplains are especially suited to such integrative approaches. As dynamic socio-environmental zones where hydrological, geomorphological, and ecological processes intersect with centuries or even millennia of human activity, they preserve exceptional cultural and natural archives. However, in Central Europe up to 95 % of floodplains have been altered or destroyed through embankment, drainage, channelisation, damming, and settlement expansion. These transformations reflect long-term interactions between climate variability, catchment-scale processes, and direct anthropogenic forcing.

Werther et al. (2021) define such heavily modified systems as part of a Fluvial Anthroposphere. The onset of these conditions varies regionally, reflecting environmental settings, historical trajectories, and cultural practices. In Central Europe, major transitions occurred in the medieval and preindustrial periods, driven by intensified land reclamation, hydroengineering, and resource exploitation. Adopting the Fluvial Anthroposphere framework in archaeology means bridging qualitative based evidence (typologies, texts, maps, oral traditions) with quantitative evidence (geomorphological mapping, sediment stratigraphy, palaeohydrological models, geochemistry, biodiversity records). The aim is to create interoperable frameworks that preserve disciplinary focussed approaches whilst enabling joint analysis.

Understanding the long-term coevolution of river systems and societies has practical value for floodplain management, biodiversity conservation, climate adaptation, and heritage preservation. Restoration strategies benefit from recognising that many “natural” baselines are products of centuries of human alteration. Integrating archaeological and historical perspectives ensures such strategies are both ecologically sound and culturally informed.

We invite submissions of case studies, methodological papers, and theoretical reflections from any geographical or chronological context, provided they address the central theme of the session. Possible contributions include but are not limited to:

- Integrating archaeological, historical, ethnographical, stratigraphical, palaeoenvironmental, hydrological, and chronological data into unified models of floodplain formation, transformation, and occupation histories and to reconstruct cultural practices, land-use strategies, and socio-political responses to riverine and floodplain dynamics over centuries or millennia
- Applying quantitative tools to heterogeneous cultural and environmental datasets to identify cross-scale patterns and socio-natural feedbacks.
- Developing visualisation tools that represent multi-scalar and multi-temporal relationships in floodplain and riverine archaeology, integrating both qualitative narratives and quantitative measurements.
- Addressing uncertainty, chronological variability, and error propagation when integrating datasets from diverse disciplinary and methodological origins.
- Reflecting on epistemological and methodological challenges in uniting qualitative evidence with quantitative data, ensuring interpretative balance across disciplines and scales.

Contributions from early-career researchers and projects involving interdisciplinary collaboration across fields such as archaeology, paleoenvironmental science, anthropology, history and computer science are particularly encouraged.

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14:00 – 14:20	83**.** Towards a Data-Integrated Understanding of the Fluvial Anthroposphere: Cross-Project Modelling and Classification Frameworks for Central European Floodplains *Martin Offermann (Leipzig University); Severin Opel*; Michael Derntl*; Geraldine Quénéhervé*; Vinzenz Rosenkranz*;Natascha Mehler*; Iris Ophelia Nießen (Leipzig University, Leipzig Lab); Gerrit Jasper Schenk (Technical University Darmstadt); Lukas Werther (German Archaeological Institute); Christoph Zielhofer (Leipzig University)* ** Tübingen University*
14:20 – 14:40	139. The wadi systems of Wadi Abu Dom and Wadi Milik in Sudan – historical hydrology and ancient water management strategies *Tim Karberg (Universität Münster); Jana Eger-Karberg (Universität Münster)*
14:40 – 15:00	205. A GIS approach to digitising the cultural landscape and historical water management of the medieval city Sauran (Kazakhstan) *Katya Turchin (University College London)*
15:00 – 15:20	243. From Experience to Model Parameters: Integrating Experiential Knowledge in Fluvial Archaeological Modelling *Andrew Mahisa Halim*; Martin Tomko*; Adelaide Genay* ** University of Melbourne*
15:20 – 15:40	341. Landscape Transformation and Human Response at the Yantra-Danube Confluence: An Interdisciplinary Study of Environmental Change and Settlement Patterns *Sven Conrad (University of Tuebingen); Nadezhda Kecheva (Archaeological Institute with Museum Sofia)*

15:40 – 16:00	398. Identify, characterize, map, and assess fluvial heritage. GIS, database, and atlas on the Saône, Yonne, and Doubs rivers *Marion Foucher (Inrap-Artehis)*
16:00 – 16:30	414. Study of the landscape: Research in the Mar'e Pontis lagoon, Cabras, Sardinia-Italy *Maria Mureddu*; Viviana Pinna*; Pier Giorgio Spanu (Università degli Studi di Sassari); Rita Auriemma (Università del Salento); Filiberto Chiabrando (Politecnico di Torino); Paolo Orrù (Università degli Studi di Cagliari); Emanuela Solinas (Università degli Studi di Cagliari); Giorgio Murru*; Anthony Muroni** ** Fondazione Mont'e Prama*

S19: Structuring the World Beyond: Analytical and Computational Approaches towards Protohistoric and Early Medieval Funerary Data

Marek Vlach, Institute of Archaeology of the Czech Academy of Sciences, Brno

Balázs Komoróczy, Institute of Archaeology of the Czech Academy of Sciences, Brno

Marek Hladík, Institute of Archaeology of the Czech Academy of Sciences, Brno

Katarína Hladíková, Slovak National Museum, Archaeological Museum, Bratislava

Location: Hörsaal 01

Session Format: Standard

Funerary contexts have long been regarded as a key component of archaeological data for understanding past societies, where burials and funerary areas serve as a bridge between the world of the living and the realm of the deceased (Pearson, 1999). Despite differing perspectives on their potential for shedding light on past societies and their structuring (Tainter, 1978, Binford, 1971, Saxe, 1970, Hodder, 1984, Härke, 2000, Steuer, 1982), they occupy a central role in many theories about social structures, beliefs, and cultural practices. The variability and structure observed in archaeological data on funerary contexts (such as grave furnishings and grave goods) reflect the complex realities of past societies, encompassing the characteristics of the buried individual, their relatives, and the community. Traditionally, archaeologists are primarily examining mortuary remains through qualitative typochronological analysis; however, the available tools and methods, the scale of burial data, and associated natural scientific datasets (e.g., metallography, isotopic analysis, genomics, palaeopathology) enable new and innovative approaches to analyse both qualitative and quantitative aspects of the mortuary record. Today, advances in computing and digital methodologies are transforming the field, from statistical models to machine learning, enabling the extraction of meaningful patterns from burial context data.

Beyond the traditional “visual” identification of grave clusters, statistical spatial analysis methods such as Ripley’s K-function or kernel density estimation are increasingly used to identify structures and clusters within cemeteries based on objective metrics and hypothesis testing (Sayer, 2020). These results can be further integrated into complex relational models using Structural Equation Modelling (SEM), enabling the testing of hypothetical links between spatial organisation, social factors, and chronology. Such combined approaches can reveal whether cemeteries were organised into small nuclear clusters or large, heterogeneous “households” used over long periods, and can analyse relationships with sex, age, status, or the chronology of the buried individuals.

This session concentrates on computational methods for analysing archaeological and natural scientific data on burial records, focusing on the Protohistoric and Early Medieval periods in Europe (though relevant contributions from other regions and periods are also encouraged). These transitional eras exhibit diverse mortuary practices and extensive burial grounds that greatly benefit from data-driven analysis. The session aims to demonstrate how modern computational archaeology can offer new insights into burial evidence, whether shedding light on social hierarchy, ritual variations, demographic trends, population health standards, or cultural connections across regions. Addressing longstanding questions (e.g., new frameworks to measure prehistoric grave wealth) deepens understanding of how the living world has influenced and extended into the perception of the 'beyond' within past societies. In addition to established tools and techniques, the application of artificial intelligence (AI) and machine learning in archaeology can pioneer new frontiers in funerary archaeology, enabling researchers to recognise complex patterns and make predictions that were previously impossible.

Methodologically, the session is open to the full spectrum of computational techniques and tools. We invite researchers to present studies employing any computational methods to analyse burial data. Possible topics and approaches include (but are not limited to):

- Spatial analysis of burial ground layouts, intra-site and/or inter-site spatial analyses, topographic integration, and environmental context
- Chronological modelling of burial sequences through the Bayesian modelling, aoristic analysis, etc.
- Social differentiation through grave goods patterns, including wealth indexing, distributional modelling, and identity metrics across larger datasets
- Multi-proxy integration of archaeometric, bioarchaeological, and environmental data
- Advanced spatial statistics (Ripley's K-function, nearest neighbour analysis, kernel density) combined with Structural Equation Modelling (SEM) to test hypothetical relationships
- Simulation and network modelling of mortuary behaviour, kin groupings, prestige display systems, and ideological transformation
- Machine learning and AI in various aspects of funerary record archaeological data in classification and pattern recognition
- Meta-analyses or comparative studies of burial practices across cultural, temporal and spatial contexts

By highlighting such diverse approaches, the session will emphasise how these tools and methods can help to address various research questions, transforming raw data from graves into meaningful narratives about past societies. The session aims to foster dialogue between specialists in computational methods and archaeologists working on funerary contexts. We welcome contributions from Europe and beyond, as comparative perspectives can deepen understanding of universal and regional patterns in burial practices and enhance knowledge of Protohistoric and Early Medieval necropolises.

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12:20 – 12:40	63**.** Beyond the Tombs: Burial Shaft Arrangement as a Mirror of Family Relationships in the Old Kingdom (Abusir, Giza) *Jana Vacková (Charles University); Veronika Dulíková (Charles University)*
12:40 – 13:00	267. Social network analysis for refining the dating of individuals from Old Kingdom Egypt: A case study of the family tree of High Priests of Ptah *Marek Bukáček (Charles University in Prague); Veronika Dulíková (Charles University in Prague)*
13:00 – 14:00	Lunch break
14:00 – 14:20	222. From Adornment to Symbolism: The Evolution and Cultural Significance of Turquoise at the Jiahu Site, China *Zhang Yiwen (University of Science and Technology of China)*
14:20 – 14:40	422. Modelling burial site distribution: A Machine Learning approach to funerary landscapes in Prehistoric Menorca *Sonia Carbonell Pastor (Barcelona Supercomputing Center); Hèctor A. Orengo (Barcelona Supercomputing Center)*
14:40 – 15:00	255. Connecting demographic agent-based models to skeletal data: the case of the rural Roman cemetery at Tiel-Passewaaij *Laura van der Knaap*; Philip Verhagen*; Mark Groenhuijzen** ** Vrije Universiteit Amsterdam*
15:00 – 15:20	148. A.I. = Archaeological Intelligence: Machine Learning-based Post-Diction in the Avar-period Czokorgasse Cemetery at Vienna/AUT *Dominik Hagmann (University of Continuing Research Krems)*
15:20 – 15:40	435. The Neural Afterlife: Machine Learning Approaches to Reconstructing Roman Period Germanic Societies from Funerary Data Marek Vlach*; Balázs Komorćozy*; Petra Dragonidesová* * Czech Academy of Sciences
15:40 – 16:00	98. Bodies, Beliefs, and Bytes: Digital Pathways through Early Medieval Cemeteries *Nina Richards (Naturhistorisches Museum Wien/Austrian Centre for Digital Humanities); Stefan Eichert*

	(Naturhistorisches Museum Wien); Mária Vargha (University of Vienna)
16:00 – 16:20	330. Reconstructing the re-entering of early medieval inhumation graves: 3D GIS for integration and taphonomic analysis of (bio-)archaeological, environmental and geoarchaeological data from high-resolution excavations *Laura Elmer (Universität Graz); Edeltraud Aspöck (Universität Graz)*
16:20 – 16.30	Discussion

S21: Computational Approaches to Archaeology in Latin America and the Caribbean: Building Regional Dialogues

Sebastian Fajardo Bernal, Leiden University

Cristian Gonzalez Rodriguez, University College London

Yoly Velandria, Archaeological and Historical Conservancy, Inc.

Daniel Sanchez-Gomez, University of Lisbon

Location: Franz König Saal
Session Format: Standard

The newly created CAA Latin America and Caribbean Chapter provides a platform to connect the region's expanding network of researchers and practitioners applying computational approaches in archaeology and heritage. Across the region, there is an active and diverse community working on areas such as 3D reconstruction, digital heritage management, predictive modelling, GIS-based spatial analysis, remote sensing, archaeometry, human–environment modelling, and AI-assisted object reconstruction. These initiatives—developed in countries from the Andes to the Caribbean—often operate independently and face shared challenges related to accessibility, infrastructure, training, and collaboration.

This session seeks to bring these groups together to strengthen research networks that address local contexts, knowledge systems, and specific regional challenges. We invite contributions on computational archaeology in all its forms, including spatial analysis, predictive modelling, network and agent-based modelling, remote sensing, digital documentation, 3D visualisation, and machine learning. Case studies, methodological developments, and theoretical reflections are welcome, whether based on fieldwork, historical datasets, or experimental projects.

The session will highlight the conditions shaping computational research in Latin America and the Caribbean. These include limited digital autonomy, fragmented communication channels, and barriers to research mobility that restrict collaboration across countries and institutions. At the same time, the region offers fertile ground for innovation, drawing on its rich ecological and cultural diversity and supported by a vibrant network of researchers, Indigenous communities, and other local stakeholders eager to amplify their voices in global dialogues. By confronting these challenges while building on the region's strengths, the session aims to foster a more inclusive and diverse computational archaeology. It seeks to lay the groundwork for systematic and rigorous practice in the region, promoting sustained collaborations, shared digital resources, and long-term capacity building.

11:00 – 11:20	27. Evaluating the Limits of Denoising Autoencoders for the Restoration of Mayan Hieroglyphic Imagery *Valeria Duran Rubio (Instituto Tecnológico Autónomo de México); Edgar Roman-Rangel (Instituto Tecnológico Autónomo de México*

11:20 – 11:40	50. Simulating Late Muisca Geopolitical Patterns *Eduardo Herrera Malatesta (Leiden University); Andrew Bevan (University College London); Pedro M. Argüello García (Escuela de Ciencias Sociales, Universidad Pedagógica y Tecnológica de Colombia); Aranka Kriekaart (Leiden University); Alexander Geurds (Leiden University)*
11:40 – 12:00	67. Population and Empire: A New Regional Demographic Model for the Purépecha Imperial Heartland using LiDAR and Settlement Scaling Theory *Benjamin Shirey (Colorado State University)*
12:00 – 12:20	80. From GIS to Archaeology: Archaeological Sensitivity Modeling for Taltal (Antofagasta, Chile) *Margarita Romero (UAB); Juan Antonio Barceló (UAB); Ermengol Gassiot (UAB)*
12.20 – 12:40	268. Challenges and opportunities for developing artificial intelligence projects in Mexican archaeological institutions *Diego Jimenez-Badillo (National Institute of Anthropology and History of Mexico)*
12.40 – 13:00	274. Techno-typological pottery clusters in the Istmo Panama area *Daniel Sánchez Gómez (Universidade de LIsboa (UNIARQ)); Carlos Gómez (Cobre Panamá); Alejandra Quintero-Rúa (Cobre Panamá); Sebastían Fajardo (Leiden University)*
13:00 – 14:00	Lunch break
14:00 – 14:20	313. Investigating the legacy effects of colonial-era Indigenous resistance on recent deforestation in the southern Atlantic Forest *Barney Harris (Bournemouth University); Freg Stokes (Max Planck Institute of Geoanthropology)*
14:20 – 14:40	352. Chullpas in Series: A 3D-Based Morphometric and Spatial Workflow for Andean Funerary Architecture *Cristian Gonzalez Rodriguez (University College London); Marta Crespo Fernandez (Incipit-CSIC)*
14:40 – 15:00	356. Question-Driven Collaboration: Federated Virtual Survey with the Geospatial Platform for Andean History, Culture, and Archaeology (GeoPACHA) *Nathaniel VanValkenburgh (Brown University); Steven Wernke*; James Zimmer-Dauphinee*; Yuankai Huo*; Junlin Guo*; Matthew Ballance (Brown University); Jacob Bongers (University of Sydney); José Capriles Flores (Pennsylvania State University); Cristian González Rodríguez (University College London); Ericka Guerra Santander (Universidad Nacional San Agustín); Frances Hayashida (University of New Mexico); Manuel Mamani Calloapaza**; Giancarlo Marcone (Universidad de Ingeniería y Tecnología); Raquel Mejía Aranguren**; Pablo Mendez-Quiroz Aranda (Universidad de Chile); Gabriela Oré Menéndez (University of Nevada); Jo Osborn (Texas A&M); Alexis Reátegui Diaz**; Kevin Ricci Jara (Independent Scholar); Grecia Roque Ortega**; Jason Toohey (University of Wyoming); Anthony Villar Quintana** * Vanderbilt University ** Independent Scholar*

15:00 – 15:20	377. Tracing empires: settlement dynamics in the Yautepec valley (Mexico) between 1500 BC and 1520 AD *Giacomo Bilotti*; Natália Fedorová*; Iza Romanowska*; Michael Smith (Arizona State University)* ** Aarhus University*
15:20 – 15:40	408. Memory and Control: Digital mortuary landscapes from Wari to Colonial Peru in the Huarmey & Culebras valleys Miłosz Giersz*, Patrycja Prządka-Giersz*, Wiesław Więckowski*; Roberto Pimentel Nita*; Maciej Kałaska*; Jakub Stępnik*; Jędrzej Szymanek*; Izabela Kurjan*; Julia Chyla* * University of Warsaw)
15:40 – 16:00	450. Modeling hunter-gatherer-fisher communities in the South Pacific: A high-resolution spatial approach to studying coastal settlements in the Atacama Desert *Pablo Mendez-Quiros*; Cristian González (University College of London); Estefanía Vidal (Universidasd Alberto Hurtado); Mauricio Uribe (Universidad de Chile); Francisca Santana (Pontificia Universidad Católica de Chile); Vesna Obilinovic (Universidad Arturo Prat); Claudio Wande*; Diego Mayorga (Pontificia Universidad Católica de Chile); Montserrat Javalquinto*; Camila Ramírez** ** Universidad de Chile*
16:00 – 16:20	454. Applying Gaussian Splatting at a Coastal Maya Site El Meco *Ashuni Emmanuel Romero Butróni (Centro INAH Quintana Roo); Nelda Issa Marengo Camach (University of New Mexico*
16:20 – 16.30	Discussion

S22: Ethics in Digital and Computational Archaeology

Eduardo Herrera-Malatesta, University of Bonn

Aleks Michalewicz, The University of Melbourne

Alicia Walsh, Leiden University

Madisen Hvidberg, University of Calgary

Location: Hörsaal BIG
Session Format: Standard

The rapid development of technology in archaeology has introduced both new opportunities and new ethical challenges. The accessibility of advanced tools, from large-scale digitisation and remote sensing to artificial intelligence, has shifted the central question from “Can I?” to “Should I?” While frameworks such as the London Charter, the FAIR and CARE principles, and the CAA Ethics Policy offer valuable guidance, they often remain broad in scope. Their flexibility allows application across diverse scenarios, but it can also make translating them into everyday practice difficult. Ethical review processes frequently prioritise legal compliance, such as GDPR and privacy, reducing ethics to a procedural box-ticking exercise rather than a starting point for deeper reflection. This session reframes ethics as an ongoing,

integral aspect of research design and practice, not an afterthought. We invite presenters to share first-hand accounts of ethical dilemmas encountered in digital and computational archaeology: what worked, what did not, and how solutions were reached. By openly discussing challenges and even "failings," we can collectively identify pathways toward more equitable, sustainable, and context-aware practice.

Topics include (but are not limited to):

- Implementing FAIR and CARE principles in practice,
- Environmental sustainability in digital projects,
- Codes of conduct for field, lab, and online work,
- Navigating ethical research in geopolitical conflict zones,
- Community engagement, co-creation, and restitution,
- Digitisation of human remains and culturally sensitive materials,
- Decolonial approaches to digital heritage,
- Lessons from other disciplines.

While we are interested in grounded, practice-based perspectives, we welcome theoretical discussions on any related topic or questions. For example, how do archaeologists adapt ethical guidelines to fit specific social, political, and environmental contexts? How can grassroots activism, public engagement, and institutional change work in tandem to shape ethical practice? What creative strategies emerge when principles meet the realities of funding bodies, governmental institutions, or community expectations? We also encourage reflections on the intersections between digital and broader archaeological ethics. Restitution, equitable access, intellectual property, accessibility for people with disabilities, and the stewardship of conflicted heritage all gain new dimensions when digital technologies are introduced. By examining these intersections, we can better anticipate the ethical implications of emerging tools such as 3D documentation, virtual and augmented reality, AI-driven analysis, and open data platforms.
With this session, we aim to foster a collaborative space for sharing experiences, learning from one another, and building adaptable roadmaps for the ethical use of digital technologies in archaeology. Through open dialogue, critical reflection, and cross-disciplinary exchange, we hope to strengthen ethics as a living practice, one that guides our decisions, shapes our relationships with communities, and ensures the responsible stewardship of archaeological heritage in a rapidly changing digital world.

1. Common Ground: Examining ethics in digital Dutch archaeology
Alicia Walsh

2. Between Democratization and Scientific Integrity: A Critical Re-evaluation of the London Charter in the Age of AI and Resource Scarcity
Arman Džaferagić

3. When the living are used to restore the dead of the past: a methodological approach to the use of post-mortem CT scans. Ethical issues surrounding the creation of a library of scientific 3D models of immature subjects, from skeletons to bodies.
Geraldine Sachau-Carcel

4. Preserving the Void: Ethics and Temporality of Digitally Reconstructing Post-Conflict Cultural Heritage
Paraskevi Gavra

5. Caribbean Digital Archaeology: Ethical challenges and best practices
Eduardo Herrera Malatesta

6. Data Feminism Frameworks, Indigenous Data Sovereignty, and Data Ethics in Digital Archaeology
Aleks Michalewicz

08:30 – 08:50	52. Caribbean Digital Archaeology: Ethical challenges and best practices

	Eduardo Herrera Malatesta (Leiden University)
08:50 – 09:10	145. Between Democratization and Scientific Integrity: A Critical Re-evaluation of the London Charter in the Age of AI and Resource Scarcity *Arman Džaferagić (Deutsche Schifffahrtsmuseum (DSM) / Leibniz-Institut für Maritime Geschichte)*
09:10 – 09:30	173. Common Ground: Examining ethics in digital Dutch archaeology *Alicia Walsh (Leiden University)*
09:30 – 09:50	388. Preserving the Void: Ethics and Temporality of Digitally Reconstructing Post-Conflict Cultural Heritage *Paraskevi Gavra (University of Cologne)*
09:50 – 10:10	451. Data Feminism Frameworks, Indigenous Data Sovereignty and Data Ethics in Digital Archaeology *Aleks Michalewicz (University of Melbourne)*
10:10 – 10:30	Discussion

RT24: Real-World Perspectives on Building Research Data Infrastructures: Community Practices, Legal Contexts, and Implementation

Fabian Fricke, German Archaeological Institute

Agnes Schneider, Leiden University

Location: Hörsaal 02
Session Format: Round table

Background and Motivation
Archaeology, like all sciences, is entering an era where the volume, complexity, and interconnectivity of data are central to research progress. From excavation records and 3D models to GIS layers and analytical datasets, archaeological research increasingly depends on the ability to store, preserve, share, and analyse data in interoperable, sustainable, and trusted environments.

In other scientific disciplines, research data infrastructures (RDIs) have already become the backbone of collaboration and discovery. If archaeology is to keep pace with these developments, it must ensure that such infrastructures are **not only technically operational, but also widely adopted and embedded in everyday research practice**. Without this combination of functionality and uptake, archaeology risks falling behind in the wider scientific landscape.

This is particularly relevant to the CAA community, which thrives at the intersection of archaeology, computing, and quantitative analysis. The power of advanced methods—statistical modelling, machine learning, network analysis, and simulation—relies on having **large, well-curated, and accessible datasets**. Without robust infrastructures that enable aggregation, interoperability, and reuse, the potential of these methods cannot be fully realised.

Across Europe, RDIs for archaeology exist at different stages of maturity:

- **Established services** with decades of experience in preservation and dissemination.
- **Mid-career infrastructures** that have proven their value and are scaling their operations.

- **New initiatives** still defining their scope, governance, and technical frameworks.

Understanding how these infrastructures develop, gain acceptance, and adapt is not just a matter of institutional interest—it is a prerequisite for archaeology to remain an evidence-driven, data-rich, and methodologically innovative discipline.

Scope and Goals
This round table will bring together representatives from archaeological RDIs in different countries to exchange practical, experience-based perspectives. Our goals are to:

1. **Compare engagement models** — How do top-down institutional approaches differ from grassroots, community-driven models? How are archaeologists incentivised to contribute data? What roles do professional associations and informal networks play?
2. **Examine trust and acceptance** — What makes researchers, heritage professionals, and institutions actually choose and use an infrastructure? How do early-stage projects build credibility, and how do mature infrastructures sustain it?
3. **Share operational challenges and lessons learned** — Insights into technical deployment, training, support, funding continuity, and sustainability planning.
4. **Explore different stages of development** — How do priorities, risks, and opportunities change from the early phases to long-term operation? What can young initiatives learn from established ones, and how do established infrastructures stay agile?
5. **Analyse legal forms and frameworks** — How do organisational structures (federated vs. centralised, public bodies, consortia, non-profits, etc.) and differing national or EU legal environments affect governance, data policies, and the ability to collaborate internationally?

Comparative Dimension
A central feature of this session is its explicitly comparative approach. By bringing together infrastructures that differ in **community size, governance model (federated vs. centralised), juristic form, funding environment, and stage of development**, we will highlight both common challenges and distinctive solutions. The discussion will not only compare archaeological infrastructures across national contexts but also set them in relation to established examples such as the **Archaeology Data Service (UK)**, community-driven organisations like **CAA International**, and interdisciplinary frameworks such as the **Research Data Alliance**. This comparative lens will ensure that the session moves beyond isolated case studies to identify transferable lessons, structural constraints, and opportunities for cross-disciplinary collaboration.

Format and Structure
The round table will be structured for maximum interaction:

- **Opening statements**: Each panelist will have 5–7 minutes to introduce their infrastructure, national context, and position on the themes above.
- **Thematic discussion blocks**: The moderator will guide the conversation through the five key themes, drawing comparisons and encouraging panelists to reflect on successes, failures, and unexpected challenges.
- **Audience engagement**: Participants will be invited to contribute their own experiences, pose questions, and comment on the applicability of different approaches in their contexts.
- **Summary and recommendations**: The session will conclude with collaboratively defined takeaways, which will be documented and shared with the CAA community.

Expected Audience
We expect this session to attract:

- Archaeologists and heritage professionals involved in data management or infrastructure projects.
- Members of the CAA community working with quantitative methods who depend on large, interoperable datasets.
- Policy makers, funders, and administrators concerned with digital research sustainability.
- Students and early-career researchers looking to understand and influence the future of archaeological data sharing.

Relevance to CAA 2026
The CAA community is uniquely positioned to benefit from and contribute to the development of archaeological RDIs. This session addresses core concerns of the conference:

- **Advancing quantitative archaeology** by enabling large-scale, high-quality datasets for analysis.
- **Strengthening international collaboration** through shared infrastructure models and interoperability.
- **Bridging policy and practice** by comparing how national contexts and legal frameworks shape the reality of implementation.
- **Encouraging sustainable, community-driven solutions** for data preservation and access.

If archaeology is to continue evolving as a data-intensive science, it must ensure that RDIs are not just technically sound, but fully embedded in the discipline's workflows. This round table will directly address how to achieve that goal.

Expected Outcomes
By the end of the session, participants will have:
- A comparative map of how archaeological RDIs operate in different legal, organisational, and community contexts.
- Insights into how infrastructure maturity shapes priorities and challenges.
- Practical strategies for fostering trust and adoption in digital services.
- A clearer understanding of the role infrastructures play in enabling large-scale quantitative methods in archaeology.
- A set of shared recommendations for the CAA community and beyond.

The discussion outcomes will be summarised and shared publicly after the conference in paper form, ensuring that insights reach practitioners who could not attend.

S29: AI Across the Heritage Pipeline: From Algorithms through Fieldwork to Deliverables

Katherine Crawford, Chronicle Heritage

Tom Fitton, Chronicle Heritage

Location: Hörsaal 03
Session Format: Standard

Artificial Intelligence and Machine Learning are increasingly becoming core components in various subfields of archaeology, with potential applications in desk-based assessments, remote sensing, field recording, and 3D modelling (e.g. Landauer et al. 2025; Stoean et al. 2024; Küçükdemirci and Sarris 2022). Many of these applications remain disconnected, however, with limited awareness across given stakeholders of how these processes are applied and regulated (Gattiglia 2025; Griffin et al. 2024).
This session seeks to couple innovative use-cases of AI and ML with methodological rigor across the fields of archaeology, heritage studies, and cultural

resource management. We intend to stimulate conversation and engagement on how we might consolidate best practices for AI/ML in archaeology by linking algorithmic/model innovation to measurable outcomes and transparent governance, advancing research applications that are scientifically robust, ethically responsible, and directly applicable to heritage management practices. We seek contributions that present new models, architecture, or evaluation frameworks, as well as papers that demonstrate how these methods can be embedded within end-to-end workflows and communicated to end-user audiences (Klein et al. 2025).
Recognizing that CRM and cultural heritage projects often rely on proprietary or sensitive datasets, we place particular emphasis on governance and reproducibility under contractual and confidentiality constraints. Developing guidelines and legislation such as the EU Artificial Intelligence Act are likely to result in archives and clients requiring transparent documentation, model disclosure, and reproducible evaluation. We especially welcome contributions that translate these requirements into pragmatic workflows.

Topics of interest:

- Scalable site/feature detection from LiDAR and optical imagery, optimizing false positives triage and ground truthing workflows.
- Multimodal fusions (e.g. LiDAR, historic maps, GIS layers) for improved detection and interpretation.
- Application of models for condition monitoring and compliance, from change detection to action thresholds.
- End-to-end AI pipelines including data acquisition, modelling, and client deliverables.
- Challenges or limitations of current AI tools within cultural heritage
- Governance for proprietary/sensitive data

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08:30 – 08:50	230. AI-Based Archaeological Site Prediction Using Community Archaeology Data *Gulyás András (Jász Múzeum); Hegyesi Viktor (Jász museum)*
08:50 – 09:10	308. Shipwreck detection in bathymetry data using semi-automated methods: Combining machine learning and topographic inference approaches

	Cal Pols (University of Southampton)
09:10 – 09:30	386. Linking Ground and Aerial Perspectives: A Vision-Based Workflow for Archaeological Surface Survey *Kyriakos Sgouropoulos (Democritus Univeristy of Thrace); Apostolos Sarris (University of Cyprus); Dushka Urem-Kotsou (Democritus Univeristy of Thrace)*
09:30 – 09:50	327. Unified Cross-Platform Workflow for Digital Twin Generation of Archaeological Monuments Using Universal Coded Markers *Georgi Vasilev*; Milen Borisov (Institute of Mathematics and Informatics - Bulgarian Academy of Sciences); Stanislav Harizanov*; Miglena Raykovska*; Lyubka Pashova (National Institute of Geophysics, Geodesy and Geography - Bulgarian Academy of Sciences, Geodesy); Pavel Georgiev*; Nikolay Petkov*; Georgi Evtimov*; Tsvetan Ostromski*; Svetlana Trifonova; Ivan Lirkov* * Institute of Information and Communication Technologies, Bulgarian Academy of Sciences*
09:50 – 10:10	325. Morphology-Aware Digital Frottage from 3D Scans: A Case Study on Workflow and Time Reduction *Keonwoo Lee (carrotphant. INC.), Hyunju Seo (carrotphant. INC); Dongseok Kang (Dongguk university)*
10:10 – 10:30	167. Revisiting Ancient Ceramic Production Chains: Contributions from Deep Learning *Thaïs Wuillemin (CNRS); Gabriel Ducret (IFPEN); Suzanne Bussod (IFPEN); Serge Cohen (IPANEMA UAR3461 - CNRS); François Giligny (Université Paris 1 Panthéon-Sorbonne); Maxime Moreaud (Manufacture Française des Pneumatiques Michelin, IFPEN); Louise Gomart (Trajectoires. De la sédentarisation à l'Etat UMR8215 – CNRS)*
10:30 – 11:00	Coffee break
11:00 – 11:20	165. Bridging Data Gaps in Heritage Science with AI: Non-Destructive Ink Identification on Silk Painting via Synthetic Image Generation *Sumiko Teng (Government Technology Agency); Sone Kyaw Pye (Government Technology Agency); Zijin Jiao*; Lynn Chua*; Shi Jie Lio*; Siew Wah Lee*; Hui Min Teo (National Gallery of Singapore)* ** Heritage Conservation Centre, National Heritage Board*
11:20 – 11:40	373. Feature Engineering and Machine Learning for the Objective Validation of Rock Art Chronologies: The Tagus Valley Case Study *Sara Garcês*; Sandra Jardim*; Hipólito Collado (Instituto Terra e Memória); Hugo Gomes*; Clerismar Mota*; Dionysios Danelatos*; Noélia Priego (Instituto Terra e Memória); Mahym Amanova (Instituto Terra e Memória); Luiz Oosterbeek* ** Polytechnic Institute of Tomar*
11:40 – 12:00	128. Artificial Reconstruction: Exploring AI-assisted 3D Reconstruction of Archaeological Artefacts *Björk Kosir (University of Vienna)*

12:00 – 12:20	382. A Grid-Based AI System for Chromatic Reconstruction of the Feo Chapel Frescoes *Alessia Remondini (Sapienza University of Rome); Paola Pisano (University of Turin)*
12.20 – 12:40	447. Safeguarding Azulejo Heritage: A Deep Learning Approach to Pathology Detection and Monitoring *Liane Lin*; Mariana Santos*; Sara Pires*; António Antunes*; Gonçalo Jesus*; Dora Roque*; Marluci Menezes*; Lurdes Esteves (National Tile Museum); Anabela Oliveira*; José Machado*; Sílvia Pereira** ** National Laboratory for Civil Engineering*
12.40 – 13:00	332. A Multimodal Continual Learning for Adaptive Heritage Building Degradation Prediction *David Roqui (ETIS/C2RMF)*

RT35: Chronological Modelling III: a Round Table on Time in Computational Archaeology

Thomas Huet, CNRS

Eythan Levy, University of Zurich

Location: Hörsaal 05
Session Format: Round Table

This round table aims at discussing the current challenges and future perspectives on the modelling of time in archaeology. Duration: 2h30.

Some 30 years ago, the introduction of GIS into the archaeological toolbox sparked a 'spatial turn' in the discipline, greatly improving the interoperability of spatial data. However, no such integrated tool exists for managing temporal data. Chronological methods are highly diverse (e.g., seriation, stratigraphy, cross-dating, absolute dating), each typically handled by different software applications and libraries. The lack of interoperability between software outputs, formats and standards hinders the ability to understand cultural developments across different societies. In our view, the time has come to make chronological data more interoperable through the use of standardised formats (e.g., EDTF), relative temporal relationships (e.g., before/after), and specialised software (e.g., OxCal). Such an approach could pave the way for a Temporal Information System (TIS), enabling the calculation of a temporal metric for the rate of human cultural evolution (see our position paper: Huet & Levy, 2025).

We invite all interested colleagues to participate in the open-forum discussion at the round table.

Position paper:
Huet, T., & Levy, E. (2025). Foreword – Archaeometry special issue on chronological modelling. *Archaeometry*, 67(S1), 1-6. https://doi.org/10.1111/arcm.13095

14:00 – 14:10	**Foreword** *Thomas Huet and Eythan Levy*
14:10 – 14:40	**Topic 1: Epistemology of archaeological time** *chair: Joan Anton Barcelo*

	History and Archaeology, sciences of societies in time, are based on the ordering and clustering of events, but differ mainly on the different nature of the proxies they use. History uses mainly authored time-stamped writings (e.g., diplomatic letters, political writings) while Ar-chae-ology uses anonymous time-uncertain material culture (e.g., ceram-ic and stratigraphic sequences). How can such archaeological series be grouped to create periods? To what extent can two periods be consid-ered as con-temporaneous?
14:40 – 15:10	**Topic 2: Archaeological time in practice: cross dating, anchor dates, cultural periods** *chair: Keith May, James Taylor* Archaeologists often deal with multi-aligned chronological data: a piece of material culture can be related to a strati-graphic unit containing other objects, to site-wide stratig-raphy with groupings and phasing, to broader landscape and/or cultural periodisation, to seriation, to artifact types found in other archaeological cultures, and to so-called 'absolute' dates from scientific dating methods (e.g., radi-ocarbon dates). How, in practice, are these data aligned with each other? How is uncertainty propagated over dif-ferent chronological assessments?
15:10 – 15:25	Break
15:25 – 15:55	**Topic 3: Formats, standards and interoperability** *chair: Florian Thierry* Deterministic dates, whether seemingly exact (e.g., 79 AD), approximate with uncertainties (e.g., 80/81 AD), or relative (e.g., after 68 AD), can be encoded unambiguously using standards such as ISO 8601, EDTF, or OWL-Time. Such date expressions can serve as the basis for space–time gazetteers (e.g., PeriodO and ChronOntology) and be reused in ontologies (e.g., CIDOC CRM). However, these formats, gazetteers and ontologies cannot directly ex-press probabilistic temporal distributions, such as those derived from radiometric dating. Furthermore, the differ-ent ad hoc chronological formats and syntaxes used by chronological software (e.g., OxCal, ChronoModel, or ChronoLog) add a further layer of complexity. How can we foster interoperability between all these formats and standards?
15:55 – 16:25	**Topic 4: Mathematics, Algorithms and Software** *chair: Joe Roe* A host of mathematical methods and algorithms exist for both deterministic and probabilistic temporal assess-ments in archaeology. Software packages (libraries), as well as interactive software applications, are being used to solve a wide variety of chronological problems, such as seriation, Bayesian calibration of radiocarbon dates, or chronological network modelling. Mastering the whole array of available chronological methods, algorithms and tools can be challenging. Is a unified, standardised ap-proach feasible and desirable? And if so, what concrete steps can be taken to achieve it?
16:25 – 16:30	**Conclusion: Towards a Temporal Information System?**

RT41: New Advances and Directions of 3D Analysis in Archaeology

Corey Noxon, Ritsumeikan University

Markos Katsianis, University of Patras

Wilhelm Kerle-Malcharek, University of Konstanz

Jannis Werner, University of Cologne

Session Format: Round Table

The field of 3D analysis has made significant advances since the formation of the 3D Spatial Analysis SIG at CAA Tubingen in 2019 (e.g. Hostettler et al. 2024). A founding aim of the SIG was to define the meaning of 3D Spatial Analysis, with early efforts focusing on larger scale GIS-based approaches to better incorporate three-dimensional data into modern archaeological practice. Since that time, the possibilities for digitizing objects—particularly cultural heritage objects—have reached levels of quality, ease of use, and availability that make it possible for anyone with a smartphone to engage in the process, and now forms part of the standard toolkit for many practitioners. Significant improvements in 3D capture technology and accessibility since the founding of the SIG has prompted the need for a re-evaluation of 3D technologies, analytical approaches to the ever-increasing corpus of 3D data, and ways in which we can better incorporate these advances into analytic and synthetic knowledge-building workflows.

Reflecting these changes, the 3D Spatial Analysis SIG is updating its name to the 3D Analysis SIG and is looking to update its aims and goals to better reflect the current technological and analytical landscape. As part of this process of update and renewal, this roundtable session will have participants discuss the state of the field, identify the gains we've made, the areas where we need to improve, and where we aim to go moving forward. Discussion will initially be focused on the following topics: definition of 3D analysis in archaeology, practical applications of 3D analysis in archaeology, project management, "best practices" for data management, 3D outputs directed towards other researchers and the public at large, and new directions for the SIG in general.

Recorded 3D data has become a more mainstream method to display artifacts and other archaeological data, but data reuse for analytical purposes still has a lot of room to grow. Participants will discuss improvements in archaeological applications of 3D data as well as new and upcoming analytical approaches. While GIS applications remain as relevant as ever (e.g. Dell'Unto & Landeschi 2022), the increased accessibility of 3D digitization makes object-based analytical approaches like GMM more accessible as well. In addition to these approaches, recent work related to room illumination and similar visual-based approaches are just a small sampling of the ever-increasing analytical approaches that are opening up to archaeologists and serve as starting points for further discussions.

As photogrammetry and other forms of 3D digitization become more commonplace for recording sites, features, and artifacts both in the field as well as part of subsequent post excavation processing, how can we better integrate this "new" form of data within the broader assemblage of recorded archaeological data? How can the digitization of archaeological findings be positioned as an integral part of the archaeological process and archaeological project management? Are we at a stage in which certain aspects of digitization techniques, such as 3D scanning, can replace prior recording methods, or should multiple methods be continued in tandem? Are there ways in which 3D digitization can be better streamlined to smoothly integrate into existing workflows, whether it be on-site recording or lab-based documentation? What are ways in which we can better integrate 3D scan data into other forms of gathered data to help provide a more holistic and contextualized record of archaeological sites or features?

An equally important part of project management is data management. As data is gathered it must be organized and stored. While less glamorous than other aspects of 3D work in archaeology, the manner in which data is organized and stored becomes increasingly more important as the amount of gathered 3D data increases. Multiple discussions have been had stressing the importance to data management practices like FAIR and CARE, but broadly accepted implementations of these ideals are still far from standardized. Taking a broader view, long-term archival storage of 3D data is another pressing topic of serious importance to the field. Existing database structures are rarely suited for the large file sizes involved in 3D, whether it be large high resolution models, or the hundreds or thousands of images used to create photogrammetry-based scans. If the totality of the gathered and processed data is too large to store long-term, are there any particular types of data that we all agree should be stored as a minimum? What files types and formats should data be stored in? Are some lossy formats "good enough", and if so, how lossy can they be? If archiving 3D models is difficult, how difficult is it to archive the results of 3D analysis? A shared understanding of the realities of these data management challenges could help to provide some realistic guidelines for practitioners moving forward.

Finally, 3D recordings of archaeological sites, features, and artifacts are significantly multi-functional in nature. The same 3D models that are processed for analytical purposes can also be processed for broader public consumption. One of the most approachable methods for this is preparing an individual artifact or component for public access on a 3D model viewer, but uncertainty related to commercial platforms calls into question the long-term sustainability of this approach and stresses the importance of alternative platforms and modes of model presentation. The contexts of objects play a key role in our understanding of objects, and while there has been some work in the field, developing and implementing ways in which individual 3D objects can be better visualized within broader contexts for public consumption and incorporated into a larger site narrative seems another area to be further explored. Incorporating AR and VR technologies is another way in which we can possibly provide new ways to create immersive environments to help provide better spatial understandings of cultural heritage sites. While advances have been made along these lines as well, there still seem to be significant barriers in their implementation. Rather than focusing on individualized approaches to these issues, are there ways in which a shared platform can be developed to further improve accessibility in this form of data presentation?

The problems and opportunities facing 3D analysis in archaeology evolve and change as the field moves forward, and are too numerous for any individual to tackle on their own. This roundtable will hopefully provide a chance to pool the experience, background knowledge, and additional resources of the participants to help identify, discuss, and continue to engage in these areas of movement in the field. With the renewal of the 3D Analysis SIG we hope to be able to continue these discussions and work in a more closely connected and collaborative manner in an attempt to move beyond a patchwork of isolated solutions and help drive the field forward together.

S42: The Reuse of Digital Archaeological Archives and Data: Pathway to New Knowledge or Dead End?

Christophe Tuffery, *Ministère de la Culture et UMR 8068 TEMPS*

Sebastien Plutniak, CNRS

Loup Bernard, Université de Strasbourg / CNRS

Marie Stahl, École Française d'Athènes

Stéphanie Delaguette, IRAA, UAR 3155, CNRS, Aix Marseille University

Location: Hörsaal 03
Session Format: Standard

The amount of archaeological data published or archived in digital formats is increasing. In the context of the open science movement, disciplinary repositories (e.g. ADS, tDAR, OpenContext), journals (e.g. the *J. of Open Archaeological Data*), and specialized archive services contribute to this trend.
The FAIR principles are enthusiastically claimed as a guide in this way, and tireless efforts are made to make digital data findable and accessible – sometimes interoperable – and reusable. But, are FAIR-compliant "reusable" data actually reused? In recent years, data reuse has become a concern, as reflected by conference sessions [1], publications [2, 3], standards [4], and collective projects [5]. Indeed, it raises controversial and sensitive matters:

- The scientific "publish or perish" rationale and archiving rationale "preserve or perish" can prove antagonistic. To what extent have studies based on data reuse actually demonstrated significant benefits in knowledge or methods to ground the idea that digital data conservation is worth it?
- The funding and support of open-science initiatives is made on the promise of their usefulness through reuse. This goes against the fact that professional norms in archaeology today still firmly promote the production of *new* data. What if data openly published is not reused? How to define and track reuse?
- When digital data is reused, how is it done? The reuse of openly published data can conflict with requirements in data sovereignty. How and to which extent are the CARE principles considered when it comes to digital archaeological data?

This session is intended to address these problems and other related issues. We welcome presentations about design studies grounded on data reuse, applied methods, results obtained, difficulties encountered and how they have been overcome, as well as data reuse policies, digital infrastructures, and monitoring.
Presentations should reflect a diversity of projects and actors, particularly those who are not members of academic and research communities (indigenous voices and practitioners) and who come from a variety of regions, especially those that are often underrepresented.
Presentations should also illustrate good practices, some of which could be used to define guidelines for encouraging and ensuring proper reuse of archaeological archives.

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5. Project TETRARCHs Telling Stories with Archaeological Data.
https://www.tetrarchs.org

14:00 – 14:20	34. A political perspective on the power of data reuse *Rita Gautschy (DaSCH, University of Basel)*
14:20 – 14:40	100. AI and the CIDOC-CRM: the first steps of STAIHRE *Muriel Van Ruymbeke (Université du Luxembourg)*

14:40 – 15:00	179. Designing ArchaeoVault: a National Repository for Non-Field Archaeological Data Through Cross-Disciplinary Focus Groups *Filip Hájek (Independent researcher); Michal Lorenz*; Illyria Brejchová*; Jan Adler*; Hana Kubelková*; Peter Tkáč (Czech Academy of Sciences)* ** Masaryk University*
15:00 – 15:20	190. Defeating the digital Dark Ages? Constructing and maintaining a Roman settlement database of the Netherlands *Alexandre Peix*; Philip Verhagen*; Mark R. Groenhuijzen** ** Vrije Universiteit Amsterdam*
15:20 – 15:40	374. Reusing digital archaeological data within AIR: multiple pathways for multiple goals *Paola Derudas (Lund University); Federico Nurra (French National Institute of Art History*
15:40 – 16:00	402. From archives to anchors: reusing 1910 documentation to re-map Pathyris *Aneta Skalec (Institute of Mediterranean and Oriental Cultures PAS); Wojciech Ejsmond (Institute of Mediterranean and Oriental Cultures PAS); Julia Chyla (Faculty of Archaeology, University of Warsaw); Jakub Stępnik (Faculty of Archaeology, University of Warsaw)*
16:00 – 16:30	Discussion

S51: From Satellite to Unmanned Platforms, the Computation of LIDAR Dataset for Archaeological and Heritage Projects

Moisés Hernández Cordero, Austrian Archaeological Institute (ÖAI-ÖAW)

Irene Petschko, Austrian Archaeological Institute (ÖAI-ÖAW)

Location: Hörsaal 05
Session Format: Standard

LIDAR (light detection and ranging) is becoming a survey technique intensively used in archaeological prospections as well as in Building Heritage (Doneus, M. et al., 2020, Fontana, G. 2022, Parcero-Oubiña, C 2022). However, most presentations in archaeological sciences focus on analysing the results obtained by LIDAR rather than explaining why LIDAR was considered more appropriate than other techniques. Usually, papers with a more technical approach are dedicated to illustrating how historical features were detected (Orengo, H.A., Petrie, C.A, 2018, Stott, D. et al., 2015, Kokalj, Ž., Mast, J. 2021) or how the filtering of vegetation (Doneus et al., 2020, Brede et al., 2022) was accomplished. Some others gather instances of the use of LIDAR in archaeology but without analysing quality or reasons for selecting this technique vs others (Stott, D. et al., 2015, Vinci et al., C, 2024). Only few are dedicated to standardizing procedures when processing or presenting results for archaeological projects (Kokalj, Ž. 2025). Recently, with the introduction of machine learning for data analysis, new approaches to query the data are being published with greater focus on the postprocessing phase (Trier et all, 2019, Verschoof-van der Vaart et al., 2020, Berganzo-Besga, I. et al., 2021, Doneus et al., 2022).

This session would like to explore different applications of the LIDAR, shifting the focus from the overall research results to the previous technical phase within a project. The idea is to discuss/debate the use of LIDAR for heritage projects based on:

- what platform do they use (Satellite, plane or UAV) and why (resolution, cost, accessibility flexibility),
- how this might affect the final product (point cloud, raster) and the research questions of the project,
- new processing methodologies (filtering vegetation, noise removal, feature detection, software comparison/alternatives, …), and
- encountered problems in the data acquisition and the post processing phase (filtering vegetation, identifying features…).

We invite researchers interested in computation workflows, comparison of surveying techniques, cost-effect, quality of recorded data and setbacks during processing to present in this session. We welcome talks dealing not only with successes in the application of LIDAR but also with difficulties and failures that occur when delivering data and results, "the process of learning a craft often involves making mistakes along the way" (Gómez Coutouly et al. 2021). Overall, through this session we wish to focus in the exchange of experiences and discussion of senior/experienced scientist and technicians as well as junior researchers regarding the use of LIDAR for their projects. We believe that this topic might open new avenues and approaches to guide projects interested in applying this technique in the future.

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12:00 – 12:20	346**.** Hierarchical Point Patch Transformer for Semantic Segmentation of High Resolution Multimodal Archaeological LiDAR Point Clouds *Nicola Lercari*; Alma Ament*; Qingyan Lu*; Maocheng Xiong*; Evan Eames*; Mina Yacoub*; Yiming Du*; Davide Tanasi (University of South Florida); Rosa Lanteri (Parco Archeologico e Paesagg. di Siracusa, Eloro, Villa del Tellaro e Akrai); Rodolfo Brancato (University of Naples Federico II); Saverio Scerra (Soprintendenza per i Beni Culturali e Ambientali di Ragusa)* ** LMU Munich*
12:20 – 12:40	368. Evaluation of the Usability of the Czech National LiDAR in an Archaeological Research of Cultural Landscapes of the 20th Century *Barbora Weissova (Czech Academy of Sciences); Kryštof Seleši (Czech Academy of Sciences)*
12:40 – 13:00	415. The end of LiDAR? Revealing archaeological sites under the Amazon dense forest canopy without LiDAR *Iban Berganzo Besga (Barcelona Supercomputing Center); Jonas Gregorio de Souza (Pompeu Fabra University); Hector A. Orengo (Barcelona Supercomputing Center)*

S52: Beyond Fun and Games? Rethinking Archaeogaming, Play, and DigitalHeritage

Aris Politopoulos, Leiden University

Sebastian Hageneuer, Berlin-Brandenburg Academy of Sciences and Humanities

Location: Hörsaal BIG
Session Format: Standard

What happens when archaeology meets play? Archaeogaming has grown from a niche into a lively field, exploring how games and playful media intersect with archaeological research, heritage practices, and public engagement. Building on last year's discussions, this session continues to open the field — but shifts the focus more explicitly to questions of accessibility, inclusivity, and the critical limits of play.

We invite contributions that explore how playful tools — from video and board games to VR installations, museum interactives, and game engines — shape archaeological knowledge, communication, and teaching. Play and games clearly provide opportunities for experimentation, collaboration, and joy. Yet we also ask: what happens when play is not universally fun? How do these media exclude or marginalize particular audiences? How do they unintentionally reinforce narratives, power structures, or cultural stereotypes?

Accessibility is central here: games and playful experiences can widen participation in archaeology, but they can also create new barriers. Physical disabilities, technological requirements, and linguistic or cultural differences can all shape who gets to play — and who remains excluded. Similarly, inclusivity demands attention to representation and diversity: whose pasts are being told through games, whose bodies and voices are included or omitted, and how can archaeogaming be a platform for decolonial and feminist perspectives (Gray 2020; Nakamura 2009; Politopoulos/Mol 2023)?

The "limits of play" also invite critical scrutiny. While play has often been seen as inherently liberating, recent scholarship highlights that games can also capture and constrain, reinforcing dominant ideologies or even reproducing systems of surveillance capitalism and extractive economies. In archaeology, too, playful tools can unintentionally "gamify" heritage in ways that flatten complexity, privilege entertainment over reflection, or exclude traditional forms of non-western play.

At the same time, archaeogaming is uniquely placed to experiment with alternative forms of being. Game engines and playful design can be harnessed for critical storytelling, participatory heritage projects, and collaborative learning environments (Graham 2020; Reinhard 2018, 2024). New technologies such as generative AI, immersive XR, and interactive platforms open up further possibilities — but also demand new ethical considerations.

By highlighting both opportunities and risks, this session aims to provide a more balanced perspective on playful archaeology: one that recognizes its capacity for experimentation and joy, while remaining attentive to its exclusions, blind spots, and unintended consequences. We particularly welcome contributions that cross disciplinary boundaries, engage with community-based practices, or present creative and experimental approaches.

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11:00 – 11:20	51. Playful inclusion? Contemporary art and archaeological 'technoheritage *Monika Stobiecka (University of Warsaw)*
11:20 – 11:40	164. Project CLAY: Integrating Ancient Craft and Cutting-Edge Technology to Engage with Archaeology *Kristin Donner (Laguna College of Art + Design); Laura Harrison (University of South Florida))*
11:40 – 12:00	201. From Tomb Raider to Time Machine: Ethics, Ownership and the Limits of Play in Heritage-Based Games *Elisabeth Monamy (Archeomuse)*
12:00 – 12:20	214. DigUp! – Excavating Archaeological Practice Through Play *Lana Elizabeth Allan*; Paraskevi Gavra*; Maria Sotomayor Chicote** **University of Cologne*
12:20 – 12:40	235. The Archaeology Worldbuilding Game *Colleen Morgan (GB); Aris Politopoulos (Leiden University); Kathryn Killackey (Independent); Stuart Eve (Wessex Archaeology)*
12:40 – 13:00	259. A virtual journey to the past: serious games as tool for public engagement with prehistoric heritage *Xavier Roda Gilabert*; Susana Vega Bolívar*; Jorge Martínez-Moreno*; Rafael Mora Torcal**
	* Universitat Autònoma de Barcelona
13:00 – 14:00	Lunch break
14:00 – 14:20	303. Dust, Desire, and Discovery: Women, Archaeology, and their Representation in Games *Dajana Ehlers (University of Cologne)*
14:20 – 14:40	306. How do we want to play with the past? Authoritarian and democratic archaeology in contemporary gaming *Ian Regueiro Salcedo (University of Ferrara)*
14:40 – 15:00	340. Pixels, Perspectives, and the Past – Diversity in historical game settings *Charlotte Tornes (University of Cologne)*
15:00 – 15:20	391. The Poetics of Reconstruction: An Interpretative and Atmospheric Framework in Virtual Heritage and its Contribution to Archaeogaming—The Case of Wukang Mansion LBVR Exhibition in Shanghai *Jiahao Yan (Shanghai Jiao Tong University); Huaqing Huang (Shanghai Jiao Tong University)*
15:20 – 15:40	448. Echoes from Earth: Exploring Archaeology Through Play *Lava Mohamad (University of Cologne)*
15:40 – 16:00	Discussion

Friday

S7: Reframing the Past: Cognitive, Psychological, and Computational Approaches to Interpreting Artefact Function

Silvia Stein, Independent Researcher and active EAA and CAA member

Stefan Zechner, Technische Universität Wien, Technische Physik, Faculty Member

Sergei Makhin, Clinical Psychologist and Docent at V.I. Vernadsky Crimean Federal University, Ukraine

Location: Hörsaal 05
Session Format: Standard

This session seeks new ideas in archaeology for re-describing alternative artefact function though we also welcome new ways in which computational methods, can inform 1. cognitive processes, 2. brain evolution, 3. intellectual evolution, and 4. tool function. An example is the new idea that 100-72 thousand years old (kya) punctured shells not only had ornamental value, they had a functional value as fishing tools. “Interpreting shells found in archaeological contexts is not straightforward. They can be food remains, personal ornaments, or objects used in “black magic” (cf. Léo Neto et al. 2012); fishing nets (cf. Stein and Pacheco 2025); and counting devices (cf. Overmann 2016)” (Mouclier, et al, 2025). This re-description of punctured shells as fishing tools for nets has more explanation power that the evolution of the parietal lobe occurred in relation to early use of string in fishing, shell weights and ornaments 115 70 kya (Stein & Pacheco, 2025), besides the role of the bow and arrow, about 80 kya (Lombard, 2025).

This session invites contributions that explore how archaeology or cognitive science, psychology, neuroscience, and computational methods can enrich our understanding of artefact function in past societies. Traditional interpretations often emphasize symbolic or ritual perspectives, we cannot “resort to this explanation when they do not understand a feature” (Marchand, et al, 2021). An example is the symbolic description of punctured shells as ornamental necklaces and headbands, when a new functional fishing use or redescription has been tested with computer imaging and experimental reconstruction of a fishing net weight system, establishing that brain parietal lobe evolution preceded by 40,000 years the brain evolution associated with the bow and arrow (Stein & Pacheco, 2025, & Lombard, 2025).
This session promotes work in cognitive and experimental archaeology (Bruner, 2020, Stout, et al, 2017, Wadley, 2024, & Wynn, et al, 2024,) integrating the role of artefacts into models of the evolution of human perception, motor coordination, memory, and decision-making.

The session seeks to question established interpretations of artefact function, though we also welcome papers on how computational and quantitative approaches like digital imaging and use-wear provide new insights into cognitive, visual, motorial and spatial processes. We are interested in how these processes underly tool use, production, and perception. For example, neuroarchaeological approaches link brain regions such as the precuneus to complex tool-related activities (Bruner et al., 2018 & Lombard, 2024), while agent-based modeling and machine learning can help evaluate alternative scenarios of artefact function (Eleftheriadou, et al, 2025)- Similarly, computer modeling, digital photo editing, VR/AR environments, and eye-tracking

experiments have been employed to investigate how artefacts afford certain behaviors and how perception shapes functional interpretation (Stout & Hecht, 2017; Bruner, 2017).

We particularly encourage contributions that:

- Use experimental archaeology combined with computational or quantitative analysis to test functional hypotheses.
- Apply neurocognitive or behavioral frameworks to reinterpret artefact functions.
- Demonstrate how visualization tools and synthetic reconstructions (e.g., digital "synthetic memories") can shift interpretative paradigms (Stein & Pacheco, 2025).
- Explore bias detection and reflexivity in archaeological interpretation through digital media or quantitative analyses such as use-wear.

Bringing together diverse approaches, this session seeks to show how artefacts can be understood as products of both material and cognitive processes**.** Our scope is to create a dialogue that situates archaeological evidence within broader models of human evolution, highlighting how computational and quantitative methods can inform questions in psychology and neurosciences regarding cognition, perception, and motorial function, and not merely address the issue of the symbolic value of an artefact when archaeologists "do not understand a feature" (Marchand, et al, 2021).

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11:50 – 12:10	104. Establishing a Functional Use for the MSA Engraved Blombos Ochre Through Image Based Vectorization, Use Wear Constraints, and Experimental Reconstruction *Silvia Stein (EAA); Morris Chukhman (University of Illinois at Chicago)*
12:10 – 12:30	102. Tracing the Mind of the Maker: Cognitive Expressions in the Rock Art of Panchmukhi, India

	Prity Rawat (Banaras Hindu University)
12:30 – 12:50	130. An Early Decision-Making Record from the Cave Zaraut-Kamar at Uzbekistan: A Cognitive Interpretation of a Neolithic Rock Painting *Janusz Krukowski (Independent)*
12:50 – 13:00	Discussion

S9: AI Applications in Cultural Heritage and Archaeological Protection

Dante Abate, ERATOSTHENES Centre of Excellence

Fabio Remondino, Fondazione Bruno Kessler

Donna Yates, Maastricht University

Hector A. Orengo, Barcelona Supercomputing Centre

Location: Auditorium Maximum
Session Format: Standard

Illicit excavations and the trafficking of cultural property remain serious transnational threats, often linked to organized crime and conflict-related instability. Addressing this challenge requires interdisciplinary collaboration and the integration of innovative digital tools. Artificial Intelligence (AI) and Machine Learning (ML) are emerging as game changers in this domain, enabling the processing and analysis of vast and complex datasets at unprecedented speed and accuracy. These technologies can rapidly identify, classify, and monitor archaeological features and artifacts across extensive spatial and temporal scales, enhancing early detection and response capabilities. Such analytical power is particularly valuable in countering the growing challenges of illegal excavations and the illicit trafficking of cultural property, where timely insights can make a decisive difference in safeguarding heritage assets.

This session invites contributions from researchers, heritage professionals, law enforcement agencies, technologists, and policymakers working on AI- and ML-driven approaches to cultural heritage protection.

To ensure thematic clarity, submissions should align with one or more of the following sub-strands:

- remote sensing and site detection,
- artifact recognition and provenance analysis,
- predictive modelling of looting risk,
- integrated monitoring and early warning systems.

Contributors are requested to report validation methods, datasets, metrics, and limitations to ensure methodological transparency and comparability. A diversity and inclusion statement is encouraged, and mechanisms to broaden participation (such as cross-regional partnerships, involvement of early-career researchers, and engagement of underrepresented groups) are strongly supported. Finally, all submissions should include an explicit section on ethics and safeguarding, addressing data sensitivity, potential dual-use risks, and responsible disclosure, thereby ensuring that technological innovation proceeds with full consideration of cultural, legal, and societal responsibilities.

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14:00 – 14:20	142. A Geospatial Machine Learning Approach to Predict Illicit Excavation Risk: A Case Study from Archaeological Sites in Northern Sri Lanka *Milange Hansamali (Sichuan University); Herathmudiyanselage Anuradha (Department of Archaeology); Janaka Prasanna (National Disaster Relief Service Center)*
14:20 – 14:40	194. “Drivers of Archaeological Looting in the Nile Delta: Leveraging Satellite Remote Sensing and Multilevel Modelling for Spatiotemporal Analysis *Michelle Fabiani (University of New Haven)*
14:40 – 15:00	370. Monitoring submerged cultural heritage: AI-driven detection of suspicious vessel activity over underwater archaeological sites using optical satellite images *Maria Cristina Salvi (Eratosthenes Centre of Excellence); Dante Abate (Eratosthenes Centre of Excellence); Iban Berganzo-Besga (Barcelona Supercomputing Center); Hector A. Orengo (Barcelona Supercomputing Center*
15:00 – 15:20	357. Can we detect ancient canals with AI: Leveraging big multitemporal multisource satellite data and deep learning to detect complex and invisible landcape features *Nazarij Bulawka (University of Warsaw); Hector Orengo (Barcelona Supercomputing Center); Felipe Lumbreras Ruiz (Universidad Autónoma de Barcelona); Iban Berganzo-Besga (Barcelona Supercomputing Center); Ekta Gupta (Landscape Archaeology Research Group (GIAP), Catalan Institute of Classical Archaeology)*
15:20 – 15:40	286. Introducing AI Chatbots for Remote Sensing Archaeology *Nicolas Melillos (Cyprus University of Technology*
15:40 – 16:00	5. Uncovering Hidden Patterns in Ancient Gandharan Communication, An AI-Driven Approach *Muhammad Aftab (Zulekha International); Syed Shehzad Ali Shah (Auto Trader PK Group*
16:00 – 16:30	Coffee break
16:30 – 16:50	8. Detecting Media Clones in Cultural Repositories Using a Positive Unlabeled Learning Approach

	Vasileios Sevetlidis; Vasileios Arampatzakis*; Melpomeni Karta*; Ioannis Mourthos*; Despoina Tsiafaki*; George Pavlidis** ** Athena Research Centre*
16:50 – 17:10	211. Transfer learning with ADAF: extending archaeological detection beyond its training ground *Nejc Čož (ZRC SAZU); Luka Škerjanec (ZRC SAZU); Žiga Kokalj (ZRC SAZU*
17:10 – 17:30	296. Popularising archaeological predictive modelling: An application on neolithic settlements in Thrace *Ilias Ladenis (International Hellenic University); Kyriakos Sgouropoulos (Democritus Univeristy of Thrace); Dushka Urem-Kotsou (Democritus Univeristy of Thrace*
17:30 – 18:10	Discussion

S10: Exploring Past Senses. Digital Tools and Methodologies for Sensory Archaeology

Kamil Kopij, Institute of Archaeology, Jagiellonian University

Alexander Braun, University of Cologne

Location: Franz König Saal
Session Format: Standard

How past humans experienced their environment is one of the greatest challenges in archaeology. Audible, visual, and olfactory stimuli shaped human perceptions, experience, memory, responses. These stimuli were, in turn, influenced by human actions across diverse social contexts.
In recent years, computational methodologies have proven that it is possible – within reasonable limits – to model aspects of human sensory experience. With the growing availability of digital tools, archaeologist are increasingly exploring how past humans experienced their environment and how they shaped it in response and in regard to sensory stimuli.
Advances in digital tools provide exciting new prospects for analysing these experiences, their functions, and their interactions with individuals. These advancements foster the development of new synergies and methodologies, allowing for more comprehensive investigations.

This session invites discussion of both established and emerging tools and methodologies to approach the questions of sensory archaeology: what did people experience in the past – and how? What information can we gleam with our approaches on a theoretical and empirical level about past humans and their societies? But also, what are the limitations, and biases introduced by our data and methods?

14:00 – 14:20	15. A Comparative Approach Between In-Field and Computer-Generated Sound Modeling in an Ancient Maya Cave Sit *Graham Goodwin (U.C. Merced); Holly Moyes (U.C. Merced*
14:20 – 14:40	17. “Putting the Body in its Rightful Place”: Assessing Bodily Senses in Late Cypriot Mortuary Rituals at Alassa Pano Mantilaris *Dimitris Gavriil (National and Kapodistrian University of Athens)*

14:40 – 15:00	30. Exploring Changes in Symbolic Expression through Eye-Tracking: A Comparative Case Study of Prehistoric Pottery in Northern Europe and Central Germany *Lizzie Scholtus (Christian Albrecht Universität zu Kiel); Bruno Vindrola-Padrós (Christian Albrecht Universität zu Kiel*
15:00 – 15:20	62. Cocktail Party at the Forum Romanum: Acoustics, Visibility, and the Sensory Politics of Roman Oratory *Kamil Kopij (Jagiellonian University); Adam Pilch (AGH-University of Krakow); Szymon Popławski (Independent); Monika Drab (Wrocław University of Science and Technology); Kaja Głomb (Jagiellonian University)*
15:20 – 15:40	95. Sensing the Sacred: Exploring the Potential of Virtual Reality in Sensory Archaeology *Johanna Roiha (Finnish Geospatial Research Institute FGI); Marja Ahola (University of Helsinki); Juha Oksanen (Finnish Geospatial Research Institute FGI)*
15:40 – 16:00	108. The Archaeology of the Senses in an Ancient Egyptian House: Reconstructing a Cognitive Map through Visibility and Movement Analysis *ŁUKASZ JARMUŻEK (University of Warsaw)*
16:00 – 16:30	Coffee break
16:30 – 16:50	131. Senses and Spaces: Multimodal Investigations into Ancient Lived Experiences *Laura Nissin (University of Helsinki); Ella Peltonen*; Benjamin Kämä*; Mikko Mäkitalo*; Aleksi Vuorinen** **University of Oulu*
16:50 – 17:10	188. Archaeology of the Intangible through Movement and Touch *Willeke Wendrich (Polytechnic University Turin)*
17:10 – 17:30	196. From Visibility to Perceptibility: A Deep Learning Framework for Horizon Profile Analysis at the Jin Dynasty Ritual Site of Baomacheng *Zehao Li (University College London)*
17:30 – 17:50	209. Visual Communication on ancient public squares: 3D vector visibility analysis rid large *Alexander Braun (University of Cologne)*
17:50 – 18:10	458. Exploring Medieval Sacred Soundscapes: Digital Tools and Methods for the Archaeology of Sound, Hearing, and Listening *Zorana Đorđević (University of Barcelona)*
18:10 – 18:30	Discussion

S11: Reframing Cultural Properties Rather than as “Relics of the Past” but as “Objects that Stimulate Modern People’s Perception, Sensibility, and Meaning-Making”

Fujita Haruhiro, Niigata University of International and Information Studies

Kawano Kazutaka, Tokyo National Museum

Location: Hörsaal 01
Session Format: Standard

- Background of this session

This proposing session is a continuous one of the session "Cognitive Mind" organized and held at CAA 2025, of which we enforced the session by adding EEG/ERPs components, for better understanding of body reactions against stimuli and emotional categories.

- VR and MR from instant 3D view to eye fixation experiment with emotion and impression

VR (Virtual Reality) and MR (Mixed Reality) represented a significant advancement by enabling viewers to see and simulate things that are not normally visible. Artefacts converted to 3D can be easily visible by VR/MR equipment, therefore one can obtain instant experience of viewing ancient artifacts.
Microsoft HoloLens2 is capable of capturing the viewer's gaze data using its built-in cameras and sensors. This data includes the 3D coordinates of the fixation point, the direction of the gaze, and the fixation duration (saccades and fixations), serving as indicators of where a person's potential cognition is directed on an object. By projecting the duration of gaze fixation on the surface of the object as color-graded information, it can be visualized as a 3D heatmap.

- Measuring cognition using SD Method

As an experimental method for extracting the mental images people have when viewing objects, the Semantic Differential (SD) method is widely used in psychological testing. This method involves providing pairs of simple sensory impression adjectives, such as "beautiful-ugly," for subjects to rate on a scale. The SD method serves as crucial information to analyze how people perceive objects as stimuli through many simple sensory impression adjectives. A research paper using this method is now published as a proceedings of CAA [1].

- Reconstructing the Cognition Using Deep Generative Models

After a long period of stagnation, machine learning experienced a major turning point with deep learning for image recognition in 2012. Over the past 12 years, advancements in deep learning models have led to cognition analysis capabilities far exceeding human abilities. Recently, these models have been applied to cognition analysis as part of information psychology. By analyzing sensory impressions of subjects viewing artifacts along with data on these objects, deep cognition models offer new insights.

- Prediction of Emotional Response Categories Using Event-Related Potentials (ERPs)

Event-related potentials (ERPs), which capture the temporal responses of the brain to visual stimuli, contain features that reflect differences in stimulus categories and cognitive processing, serving as key indicators for emotion classification and semantic comprehension. For visually presented object groups—such as Jōmon pottery and clay figurines—that differ in shape and semantic interpretation, repeated ERP measurements make it possible to construct models that predict the category of emotional responses to stimuli based on electroencephalographic (EEG) data. In July 2025, emotional label measurements were conducted with a total of 306 participants in Japan and Malaysia. Given the observed fact that many participants recorded gaze trajectories associated with a single emotional label, we became confident that extracting ERPs from EEG measurements synchronized with such single emotional labels would enable the development of models capable of predicting emotional response categories [2] [3].

- The Need for Cultural Property Cognition Studies Session

Cognitive cultural property studies, deeply intertwined with experimental psychology and cognitive information processing, is a crucial field for exploring human psychology and the cognition through archaeological artifacts and

sites. However, aside from the presentation proposed by the authors at CAA2024, no relevant research was identified.
While it is impossible to directly investigate the cognition of ancient people, it is considered feasible to reconstruct their cognition and mental images under the assumption of commonality with modern human cognition, which were proposed by Burner and Matsumoto. Therefore, this group of founders and organizers proposes a Cultural Property Cognition Session, as a continuous from one session held in CAA 2025.

Possible investigations and methodologies:

- 3D views of artifacts by VR/MR equipment and investigations on observers' perception
- VR/MR practices for regional historical education
- VR/MR exhibition as digital museum
- Eye and gaze tracking methodologies for cognitive investigations
- Electroencephalographic (EEG) / Event-Related Potentials (ERPs) studies
- Any cognition related investigations and methodologies
- Deep learning models/deep generative models on cognition

References:

[1] Fujita Haruhiro et al. (2025) Analysis of Sensory Impression Factor Structures of Jomon Potteries through a Semantic Differential Method Viewing 3D Models on MR equipment

[2] Sano T., Shi J., Kawabata H. (2024) The differences in essential facial areas for impressions between humans and deep learning models: An eye-tracking and explainable AI approach

[3] Sano T., Kawabata H. (2024) Neural responses to perceptual and sexual ambiguity in facial images: an ERP and time–frequency analysis

16:30 – 16:50	35.Digitized Yet Hidden: FAIRifying Archaeological Archives through Vision and Language Models *Kateryna Lutsai (UFAL); David Novák*; Dana Křivánková*; Pavel Straňák (UFAL); Petr Pajdla*; Ronald Harasim*; Olga Lečbychová** **ARUB*
16:50 – 17:10	204. Archaeological Heritage as Cultural Memory: Observing Its Imprints from Antiquity to the Medieval Period – The Cases of Aigai and Teos *Ozlem Atalan (Manisa Celal Bayar University); Elif Suyuk Makakli (Isık University)*
17:10 – 17:30	231. Re-Imagining Archaeological Space: Sensory Perception and Digital Mediation *Elif Suyuk Makakli (FMV Isık University); Özlem Atalan (Manisa Celal Bayar University*)
17:30 – 17:50	239. Deep Generative Model of Human Emotion on Cultural Heritage Trained from Analytics of Human Gaze, Emotion Mapping and Verbal Impressions of Holographic Jōmon Artefacts *Haruhiro Fujita (Niigata University of International and Information Studies); Hou Yang Lu (University of Technology Petronas); Kwang Hooi Yew (University of Technology Petronas); Hiroyuki Sasaki (Niigata University of International and Information Studies); Liliana Janik (University of Cambridge); Toru Miyao (Niigata Historical Museum); Simon Kaner (Sainsbury Institute for Japanese Cultures and Arts*

17:50 – 18:30	Discussion

S12: Data Management Plans in Practice – Expectations, Implications and Real-World Experiences

Lizzie Scholtus, Institute of Prehistoric and Protohistoric Archaeology, Kiel University

Steffen Strohm, Department of Computer Science, Kiel University

Location: Hörsaal 03
Session Format: Standard

In recent years, **Data Management Plans (DMPs)** [1] have become an integral part of project proposals in archaeology and beyond. Promoted by funding bodies, institutional policies, and a growing awareness of open science, they aim to ensure transparency, reusability, and long-term accessibility of research data. However, while DMPs are widely recognised as a necessary instrument in digital research workflows, their implementation in the context of active archaeological research often reveals gaps between formal requirements and practical realities.
In former sessions and roundtables we discussed good practices in handling research data. Some raised issues were located outside of research itself: lack of funding to hire RDM staff; lack of prioritization in the proposal phase and after the project. In order to move forward, we would like to address those practical issues, which are realistically in reach and can be improved, through thorough discussion with researchers and RDM practitioners.
This session will critically explore the practical use of DMPs in archaeological research, answering the following main question: How can we improve DMPs in practical research in order to make them more accessible in the beginning, more applicable throughout the project and transparently assessable towards the end.
The session aims to provide a balanced perspective on the benefits, challenges, and evolving expectations around DMPs. On the one hand, they offer potential for better planning, coordination, and reproducibility; on the other, they often introduce additional overhead, especially for smaller teams or projects without dedicated support. The need for structured training, clear responsibilities, and dynamic adaptability in the face of evolving project scopes is increasingly evident. While much of the discourse around DMPs focuses on policy and infrastructure, this session will emphasise practical, case-driven experiences.

Throughout the session, we aim to foster an open and constructive exchange between all participants and audience, discussing relevant actors and roles (see Figure) involved in data management:

1. **Funders** specifying expectations,
2. **Researchers and subproject teams** who must interpret and implement DMPs in specific research contexts, and
3. **Collaborators and institutions**, academic or otherwise, who share responsibility in managing, curating, and reusing data.

The session will be structured unconventionally, combining short talks and longer discussion. It will be divided into two parts. In **Part 1**, contributors will deliver a short talk (see details below), followed by questions and room for discussion focusing on specific issues raised in each case. This structure is designed to move quickly through multiple perspectives while allowing for reflection and clarification. In **Part 2**, we will open the floor for a broader discussion. Audience members will be invited to share their own insights, experiences, and concerns—whether they have worked with DMPs themselves or are preparing to do so.

We encourage participants to provide feedback that reflect on the role and reality of DMPs within their own projects — regardless of whether those experiences were positive, negative, or ambivalent. The short talks (5-10min) should cover major aspects of:

- What kind of project was it, and what role did the DMP play?
- Who was responsible for creating, implementing, and evaluating the DMP?
- Were external specialists involved?
- What challenges arose during the creation or application of the DMP?
- Was the DMP adapted over time, and how?
- Were data and results ultimately made available as initially planned?
- What types of training or institutional support were available—or lacking?
- How were problems with funders, collaborators, or data infrastructure handled?
- What lessons were learned, and how could future DMP practices improve?

We encourage researchers at all levels and from all domains of and around archaeological research to submit **abstracts** (max. 300 words) addressing their experiences with DMPs from a perspective utilising (some of) the points listed above. Abstracts should focus on concrete experiences rather than theoretical frameworks, and we welcome both success stories and critical reflections. The goal is to build a realistic picture of how DMPs function on the ground – and discuss how they might evolve to better serve the needs of active archaeological research.

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[1] European Research Council (Ed.) (2021): Open Research Data and Data Management Plans – Information for ERC grantees. https://erc.europa.eu/sites/default/files/document/file/ERC_info_document-Open_Research_Data_and_Data_Management_Plans.pdf (last retrieved 12.08.2025)

12:00 – 12:20	41. Introduction to Data Management Plans in Archaeology and Digital Humanities *Steffen Strohm (Kiel University); Lizzie Scholtus (Kiel University)*
12:20 – 12:40	316. Building A Practical Framework for Heritage Data Management: Perspectives from the Maeasam Project *Orhun Uğur (University of Cambridge); Stefania Merlo (Mapping Africa's Endangered Archaeological Sites and Monuments (MAEASaM), University of Cambridge); Faye Lander (Mapping Africa's Endangered Archaeological Sites and Monuments (MAEASaM*), University of Pretoria)
12:40 – 13:00	57. Data Management Plans in Priority Programme (SPP) 2143 “Entangled Africa”. Research Data Management Experiences in the Project FAIR.rdm *Lukas Lammers (University of Cologne, Data Center for the Humanities); Eymard Fäder (University of Cologne); Felix Rau (University of Cologne, Data Center for the Humanities)*

S13: If I Had a Hammer, I’d 3D-Scan It: Computational Approaches for the Analysis of Tool Artifacts

Anastasia Eleftheriadou, Institute for Digital Cultural Heritage Studies, Ludwig Maximilian University of Munich, Germany

Guillermo Bustos-Pérez, Department of Human Origins, Max Planck Institute for Evolutionary Anthropology, Leibzig, Germany

João Marreiros, Laboratory for Traceology and Controlled Experiments (TraCEr) at MONREPOS Archaeological Research Centre and Museum for Human Behavioural Evolution, Leibniz-Zentrum für Archäologie (LEIZA), Neuwied, Germany

Location: Hörsaal 05
Session Format: Standard

Technology can be defined as a socially transmitted, multidimensional system that integrates raw materials, operational sequences, behaviors, cognitive processes, and the knowledge and intentions underlying the creation and use of products (Kozatsas, 2020; Schiffer and Skibo, 1987). Tools, as tangible expressions of this system, offer insights into human behavior, as their design, manufacture, and use can reflect adaptive responses to ecological, demographic, and sociocultural conditions (Foley and Lahr, 2003; Hovers, 2012; Kuhn, 2020).
Recent advances in computational methods have transformed the ways archaeologists document, analyze, and interpret tools made from materials such as stone, bone, wood, and metal (e.g., Calandra et al., 2019; Courtenay et al., 2020; Luncz et al., 2022; Marreiros et al., 2020). The adoption of high-resolution 3D modeling has grown steadily since the early 2010s, with applications now well established across a range of artifact types (Courtenay et al., 2019; Proffitt et al., 2023; Wyatt-Spratt, 2022). Since 2018, the use of machine and deep learning techniques has likewise expanded (Bellat et al., 2025; Eleftheriadou et al., 2025; e.g., Courtenay et al., 2024; Luncz et al., 2022; Sferrazza, 2025). Together, these developments are broadening the scope of archaeological studies, enabling comparative analyses across diverse raw materials, chronological periods, and geographical regions.

This session invites papers that apply or critically engage with computational methods in the analysis of lithic, bone, wood and metal tools. We encourage contributions using (but not limited to):

- **3D and surface-based methods:** Photogrammetry, laser scanning, micro-CT, and surface metrology for documenting and analyzing tool morphology and use-wear.
- **Geometric morphometrics:** 2D or 3D landmark-based approaches, including outline and shape analyses.
- **Machine learning and AI:** Supervised and unsupervised methods (e.g., SVMs, tree-based classifiers), deep learning approaches (e.g., convolutional neural networks), for tasks such as segmentation, classification, and pattern recognition.
- **Computer vision and image analysis:** Techniques such as edge detection, segmentation, and texture quantification.
- **Simulation and modeling:** Agent-based modeling, biomechanical simulations, and virtual experiments.
- **Spatial and network analysis:** Geographic information systems (GIS) and network analysis methods.
- **Open science, databases, and interoperability:** Development of FAIR-compliant datasets, ontologies, and reproducible workflows.

We particularly welcome studies that address known challenges in the field, such as equifinality, small or imbalanced datasets, taphonomic overprinting, and the integration of heterogeneous data types. Case studies, methodological advances, experimental validation, and theoretical reflections are all encouraged. By bringing together archaeologists, material scientists, and computational specialists, this session demonstrates how advanced digital methods can reveal new insights into human behavior through the study of tool production and use.

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14:00 – 14:20	20. An Interpretable and Reproducible Deep Learning Approach for 3D Morphological Ceramic Classification: A case study of Sue ware in Japan *Wataru Tatsuda (UCL); Ryo Hori (Nagoya University); Kimiyasu Morikawa (Georgia Institute of Technology); Hayata Inoue (Nagoya University)*

14:20 – 14:40	32. Controlled flake experiments, 3D scanning, landmarking and the extraction of features for a better understanding of flake formation and analysis *Guillermo Bustos-Pérez (Max Planck Institute for Evolutionary Anthropology); Shannon McPherron (Max Planck Institute for Evolutionary Anthropology)*
14:40 – 15:00	78. Simulating and Analyzing Core and Flake Assemblages using a Virtual Knapper *Shannon McPherron (Max Planck Institute for Evolutionary Anthropology)*
15:00 – 15:20	147. If I had a Hammer, I'd model the resulting fracture: Experimental and Morphometric Approaches to Flake Formation *Tamara Dogandžić (Leibniz-Zentrum-für-Archäologie, MONREPOS Archaeological Research Centre and Museum for Human Behavioral Evolution, Neuwied); Li Li (ICArEHB - The Interdisciplinary Center for Archaeology and the Evolution of Human Behaviour Universidade do Algarve, Faro); Guillermo Bustos-Pérez (Max Planck Institute for Evolutionary Anthropology, Leipzig); Shannon McPherron (Max Planck Institute for Evolutionary Anthropology, Leipzig)*
15:20 – 15:40	154. Bronze axes, landmarks, outlines, 3D models, and traces. Are we able to identify objects from the same casting moulds? *Marcin Maciejewski (Maria Curie-Skłodowska Uniwersity); Agata Hałuszko Maria Curie-Skłodowska University; Archeolodzy.org Foundation); Maksym Mackiewicz (Archeolodzy.org Foundation); Kamil Nowak (Austrian Archaeological Institute); Agnieszka Pawlina (Maria Curie-Skłodowska University)*
15:40 – 16:00	184. Fine-tuning Vision Transformers for Lithic Microwear Classification: A Deep Learning and Explainable AI Approach *Paolo Sferrazza (LEIZA)*
16:00 – 16:30	Coffee break
16:30 – 16:50	213. Deep Learning for 3D Point Cloud Classification of Lithic Artifacts by Reduction Strategy *Li Li (Chinese Academy of Sciences); Shannon McPherron (Max Planck Institute for Evolutionary Anthropology); Will Archer (Florisbad Quaternary Research Station, National Museum Bloemfontein)*
16:50 – 17:10	257. From Strikes to Knowledge. Experimental Knapping as Source for modelling Operational Sequences of Lithic Artifact Productions in 3D *Florian Linsel (Free University of Berlin); Hubert Mara (FU Berlin)*
17:10 – 17:30	280. Identifying series in European Late Bronze Age metal mass production through production techniques: the SerialKey project *Léonard Dumont (Université Bourgogne Europe); Fabrice Monna (Université Bourgogne Europe); Josef Wilczek (Sorbonne Université); Nicolas Navarro (EPHE); Ivan Josipovic (Ghent University); Matthieu Boone (Ghent University)*

17:30 – 17:50	284. Deep Learning for Automated Classification of Contact Materials and Tool Motion in Lithic Use-Wear Analysis : Insights from Archaeological and Experimental Data *Anastasia Eleftheriadou (Ludwig Maximilian University of Munich (LMU)); Youssef Djellal (Interdisciplinary Center for Archaeology and the Evolution of Human Behaviour (ICArEHB), Universidade do Algarve); Abdeljalil Bouzouggar (Institut National des Sciences de l'Archéologie et du Patrimoine); Shannon P McPherron (Max Planck Institute for Evolutionary Anthropology); João Marreiros (TraCEr, Laboratory for Traceology and Controlled Experiments at MONREPOS Archaeological Research Centre and Museum for Human Behavioural Evolution, LEIZA)*
17:50 – 18:10	347. Quantitative 3D Analysis of Shipwright Tool Marks: Preliminary Results from the Late Antique Ma'agan Mikhael B Shipwreck *Aleksandra Wiese*; Deborah Cvikel*; Gadi Herzlinger** ** University of Haifa*
18:10 – 18:30	Discussion

S25: How to do ROAD: An Essential Tool for Conducting Multidisciplinary Studies Related to Human Evolution

Christine Hertler, ROCEEH Research Center

Andrew W. Kandel, ROCEEH Research Center

Christian Sommer, ROCEEH Research Center

Location: Hörsaal BIG
Session Format: Standard

Computational analytical approaches have long been established in the study of human history, and they place increasing demands on data volume, structuring, and reliability. As a large-scale research database providing information about human evolution and cultural development, the ROCEEH Out of Africa Database (ROAD) represents an essential tool for researchers. Systematic data collection in ROAD covers Africa and Eurasia between three million and 20,000 years ago. The database contains information about 2,500+ sites and 26,000+ assemblages, with details on human fossils, their paleoenvironmental context in terms of associated fauna and flora, as well as artifacts and their behavioral and cultural interpretations (Kandel et al. 2023). Such a comprehensive warehouse of data prepares the way for integrative studies about the expansions of humans over the course of their journey through prehistoric times.

Most of the data contained in ROAD stems from 6,300+ published sources. Although the majority of data comes from scientific journals published during the last two decades, other sources include historical publications and/or data found in reports and through personal communications. ROAD also integrates data published in languages other than English including other script systems, such as Cyrillic or Chinese. ROAD is curated and maintained by the ROCEEH team.

The Research Center "The Role of Culture in Early Expansions of Humans" (ROCEEH) explores expansions of early humans. The mobility of human groups resulting in large-scale dispersal patterns represents *expansions of range*. Such range expansions reflect changing patterns of resource use, that is, *expansions of the resource space*. In turn, such shifts are driven by changing conditions in the paleoenvironment due to climatic oscillations as well as expansions in sociocultural practices, namely *expansions of cultural performances*.

The ROCEEH team designed a set of tools which enables researchers to explore data in ROAD without direct support and/or in-depth knowledge of writing SQL queries. Examples of available applications in ROAD include: ROAD Site Summary Data Sheets for each locality entered; ROAD Simple Search, an easy-to-use interface to learn more about the contents of the database; WebGIS also known as the MapModule for basic mapping functions; Ask ROAD, an application which allows users to compose queries easily; and upcoming roadDB, a library for data retrieval and analysis using the R language. We will introduce and discuss the use of these tools in a separate ROAD workshop at CAA 2026. In this standard session we invite and feature studies which have been conducted using ROAD data to illustrate the range of methods which can be applied to evaluate large datasets. Examples of the range of studies start with analyses of spatiotemporal patterns (Scerri & Will 2023), network analysis (Sommer et al. 2022) and paleoenvironmental studies (Archer 2021), but also covers diverse modeling approaches including niche modeling (Yaworsky et al. 2024), species distribution models (Timbrell 2024), and simulation-based approaches (Coco & Jovita 2025).

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08:30 – 08:50	193. An Overview of the ROAD Database and Its Application to the Study of Human Evolution *Andrew Kandel*; Angela Bruch*; Nicholas Conard*; Miriam Haidle*; Christine Hertler*; Volker*

	Hochschild; Zara Kanaeva*; Jesper Borre Pedersen*; Friedemann Schrenk*; Christian Sommer** **Heidelberg Academy of Sciences and Humanities*
08:50 – 09:10	155. Tracking change through time: habitat suitability changes for the first hominins of Europe *Carolina Cucart-Mora (Museum National d'Histoire Naturelle,); Ana Belén Galán López (Museum National d'Histoire Naturelle); Jan-Olaf Reschke*; Kamilla Lomborg*; Matt Grove (University of Liverpool); Christine Hertler (ROCEEH Research Center, Senckenberg Research Institute); Marie-Hélène MOncel** ** CNRS UMR 7194 HNHP, National Museum of Natural History*
09:10 – 09:30	84. Modelling Early Hominin Habitat Suitability in Eurasia: Integrating GIS and Machine Learning Approaches *Ana Belén Galán López*; Carolina Cucart-Mora*; Christine Hertler (ROCEEH Research Center, Senckenberg Research Institute); Marie-Hélène Moncel** ** CNRS UMR 7194 HNHP, National Museum of Natural History*
09:30 – 09:50	59. Quantifying Landscape Learning: Integrating Archaeological and Environmental Models of Early Modern Human Dispersal in Western *Eurasia* *Jesper Pedersen (Heidelberg Academy of Sciences and Humanities); Peter Yaworsky (Aarhus University); Felix Riede (Aarhus University)*
09:50 – 10:10	70. Understanding the spatiotemporal variation in Neanderthal hunting decisions across Western Eurasia 200ka to 50ka ago *Peter Yaworsky (University of Copenhagen); Konstantinos Dardavesis (University of Copenhagen); Trine Nielsen (Moesgaard Museum)*
10:10 – 10:30	24. The ROAD to palaeo-synanthropy in Late Pleistocene Europe *Shumon Hussain (University of Cologne); Chris Baumann (University of Tübingen)*
10:30 – 11:00	Coffee break
11:00 – 11:20	228. A review of diverse computational methods applied to the ROCEEH Out of Africa Database (ROAD) *Christian Sommer (Heidelberg Academy of Sciences and Humanities / Uni Tübingen); Angela Bruch*; Nicholas J. Conard*; Miriam Haidle*; Christine Hertler*; Volker Hochschild*; Zara Kanaeva*; Jesper Borre Pedersen*; Friedemann Schrenk*; Andrew W. Kandel** **Heidelberg Academy of Sciences and Humanities*
11:20 – 11:30	Discussion

S27: Digital Communities: Collaborative Archaeologies, Shared Authority, and Community-Led Technologies

Erica Maria Antoinette Van Vugt, University of Calgary

Zoe Cascadden Jassal, University of Calgary

Madisen Hvidberg, University of Calgary

Josephine Hagan, University of Otago

Location: Hörsaal 02
Session Format: Standard

As digital tools and platforms become increasingly embedded in archaeological practice, they are reshaping not only how data is produced and disseminated, but also *who* gets to participate in those processes, and on what terms. At the same time, the decolonization of research paradigms and community-driven methodologies is expanding the field beyond traditional disciplinary boundaries. Community members, whether Indigenous Nations, local stewards, diaspora populations, or grassroots collectives, are claiming greater authority over their own heritage, memory, and material pasts. But while there is significant progress, much work remains to ensure that digital archaeological practices are not extractive, technocratic, or reproducing colonial patterns of control.

This session invites researchers, practitioners, and community partners engaging in **digital community archaeology** to share experiences, critical reflections, and visions for the future. We seek contributions that explore how digital technologies, such as GIS, 3D modelling, digital storytelling, data infrastructures, and online repositories, can support *ethical, collaborative, and community-centred research*. Of special interest are papers focused on work with Indigenous and disenfranchised communities around the world, but we emphasize that "community" is not a singular or static category.

A key starting point for this session is the recognition that imperial frameworks have historically structured archaeological authority. As Silliman (2006) noted, archaeology often assumes that disciplinary expertise confers the sole right to interpret and control the material past, particularly with Indigenous belongings, sites, and narratives. This authority, grounded in Western academic training, often ignores or devalues other ways of knowing, especially those rooted in cultural, ancestral, or lived experience. In response, Indigenous archaeologies emerged to assert that Indigenous peoples have both the right and the knowledge to interpret and care for their own histories, lands, and cultural heritage (see Haakanson 2010; Simons et al. 2021; Supernant 2018; Yellowhown 2006 for example).

Indigenous archaeology is research conducted *with, for, and by* Indigenous people (Atalay 2006:283). It recognizes Indigenous ownership over land, heritage, and representation, and it prioritizes multivocality, relationality, and the incorporation of Indigenous worldviews (Lyons 2016; Sillar 2013). Digital tools can amplify these goals when used in respectful, community-guided ways, but they can also risk flattening or misrepresenting Indigenous perspectives if deployed without care.

Community archaeology overlaps with, but is not synonymous with, Indigenous archaeology. Typically defined as research-driven or led by the community, sometimes referred to as "archaeology from below" or "grassroots archaeology" (Marshall 2002; Londoño 2021). While community archaeology shares approaches similar to those in Indigenous-led work, its epistemological grounding may differ, particularly when the community in question is not Indigenous. Methods such as co-creation, shared authority, and transparent communication must be attuned to the specific histories, politics, and aspirations of each community (Lassiter 2005).

Decolonizing archaeology intersects with both, while maintaining its own focus: the critical interrogation of archaeology's entanglement with colonialism, modernity, and systemic inequity (Londoño 2021). However, it is not a single set of methods or a checklist—it is an ongoing political and relational

commitment (Quinless 2022; Wilson 2008). When digital methods are folded into decolonizing work, questions of infrastructure, access, representation, and data sovereignty become especially urgent.
This session offers space to reflect on these intersecting frameworks through the lens of digital practice. How can digital tools be made to serve community needs, rather than institutional ones? What tensions arise when integrating digital platforms with non-Western knowledge systems? How are authority, authorship, and access negotiated in collaborative digital projects? And what new forms of connection, resistance, or care might emerge when communities use digital technologies to tell their own stories?

We particularly welcome contributions that address:

- Community-led or co-designed digital heritage projects
- Indigenous or grassroots uses of digital technology in heritage or research contexts
- Collaborative mapping, modelling, or digital storytelling
- Ethics of access, data sovereignty, and long-term stewardship
- Digital return, repatriation, and re-connection with heritage
- Pedagogies and training models for community-engaged digital archaeology
- Theoretical reflections on authority, knowledge production, and decolonization

Institutional and structural challenges to doing this work sustainably
This session aims to foster dialogue across regions, research traditions, and community contexts. It is open to scholars, students, community members, and practitioners from any disciplinary background. Our goal is to bring together diverse voices and experiences that speak to the potential and the complexity of building *digital communities* in archaeology.

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14:50 – 15:00	*Introduction*
15:00 – 15:20	2. Virtual Lightbox: Computer Generated Conservation of Stained Glass *Kasi Zoldoske (University of York)*
15:20 – 15:40	11. Digital Preservation of Historical Archives: A Case Study of the Provincial Assembly of Khyber Pakhtunkhwa, Pakistan *Niaz Gul (KP Assembly Secretariate)*
15:40 – 16:00	133. The Jolly Roger showed the way: A decentralised data repository using torrent and p2p technology *Juan Palomeque-Gonzalez (IDEA- Madrid)*
16:00 – 16:30	Coffee break
16:30 – 16:50	182. Training small-data AI through community-driven annotation: towards Indigenous governance in archaeological computer vision *Benedict Dyson (Griffith University); Andrea Jalandoni (Griffith University)*
16:50 – 17:10	262. Connecting Communities through Archaeological Prospection: Ten Years of the LoCATE Partnership *Kate Welham (Bournemouth University); Mike Gill (Bournemouth Univeristy); Hilde van der Heul (New Forest National Park Authority)*
17:10 – 17:30	174. Digital Storytelling as an Approach to Dissonant Heritage Landscapes *Zoe Cascadden-Jassal (University of Calgary); Peter Dawson (University of Calgary)*
17:30 – 17:50	19. Digitally Grounded: Digital Heritage, Colonial Possession, and Relational Practices for Alberta Heritage Landscapes *Erica Van Vugt (University of Calgary); Peter Dawson (University of Calgary); Lindsay Amundsen-Meyer (University of Calgary)*
17:50 – 18:10	320. Documentation and Dialogue: Reflections on Eight Years of Digital Heritage Work with Indian Residential School Sites in Alberta *Madisen Hvidberg (University of Calgary); Peter Dawson (University of Calgary)*
18:10 – 18:30	292. Shared Memories, Shared Maps: Co-creating Digital Archaeologies at Campo 65 (Altamura, Italy) *Daniele Mittica (University of Bari "Aldo Moro")*

S32: Replay: Computational Heritage of Games

Summer Courts, University of Reading (chair)

Walter Crist III, Leiden University (chair)

Tim Penn, University of Reading (chair)

Barbara Care, University of Lausanne (chair)

Branislav Kovar, Slovak Academy of Science

Dorina Moullou, Hellenic Ministry of Culture / Hellenic Open University

Location: Hörsaal BIG
Session Format: Standard

Computational approaches are transforming the way we understand and preserve cultural heritage. One emerging—and presently underexplored—area is the application of Artificial Intelligence (AI) and other computational methods to traditional games. Traditional games—particularly board games—offer a unique window into the past, reflecting social norms, values, and behaviours that are at risk of being lost due to their intangible nature. The rules, playing contexts, and embodied practices often remain undocumented or only partially preserved.
Though existing studies (Crist et al. 2024; Browne 2023; Donkers et al. 2000) have made strong opening moves, the field is still in its early game. Much of the board remains unexplored, with significant potential for computational methods to advance our understanding). This session—organized by the COST Action (CA22145) Computational Techniques for Tabletop Games Heritage ("GameTable")—aims to expand on the themes of our upcoming special issue in JOCCH (*Journal on Computing and Cultural Heritage*). This session will explore the reconstruction and preservation of traditional games, viewing them not merely as leisure activities but as rich cultural artifacts and historical narratives that are vital for a deeper understanding of human societies. By integrating perspectives from archaeology, artificial intelligence, and cultural studies, this session will allow us to **"**replay**"** the past and begin writing the playbook for how computational methods can help illuminate the playability, strategies, and social functions of traditional board games.

Topics for Discussion:
This session invites papers and presentations addressing a broad range of themes related to computational approaches to games heritage, including but not limited to:

Computational reconstruction of traditional games: Using methods such as procedural content generation, human-in-the-loop AI, and human-like AI to infer or rebuild game mechanics and rule sets.

Machine learning for game identification: Applying techniques such as text mining or gameplay metric analysis to identify, classify, or interpret traditional games.

Simulating traditional games: Developing digital implementations and/or tailored, explainable AI agents to simulate how games may have been played.

Analysis of digitised traditional games: Exploring gameplay data and strategy detection to better understand player behaviour and game design.

Mathematical and statistical modelling: Creating formal models of gameplay, game balance, or player strategies based on historical data.

Computer vision applications: Applying image analysis to recognize, reconstruct, or interpret physical components of games from archaeological or archival materials.

3D modelling of game artifacts: Generating accurate digital representations of historical gaming objects for research, preservation, or display.

Educational and heritage engagement: Exploring how reconstructed games can support education, public engagement, or digital storytelling in heritage contexts.

Digital documentation of gaming materials: Using computational tools to support the archaeological recording and interpretation of game-related artifacts.

References:

Browne, Cameron. 2023. "Which rules for mu torere?" In C. Browne et al. (eds.): *CG 2022*, LNCS 13865, pp. 111–120. https://doi.org/10.1007/978-3-031-34017-8_10

Crist, Walter, Éric Piette, Dennis J. N. J. Soemers, Matthew Stephenson, and Cameron Browne. 2024. "Computational Approaches for Recognising and Reconstructing Ancient Games: The Case of Ludus Latrunculorum." In Games in the Ancient World: Places, Spaces, Accessories, edited by A. Pace, T. Penn and U. Schädler, 63-79. Montagnac, France: Éditions Monique Mergoil.

Donkers, Jeroen, Alex de Voogt, and Jos Uiterwijk. 2000. "Human versus Machine Problem Solving: Winning Openings in Dakon." *Board Game Studies3:* 79–88.

11:40 – 12:00	375. LUDITECH: Integrating Tactile Sensing and Computational Modelling in the Archaeology of Ancient Board Games *Barbara Care (University of Fribourg); Theodora (Dorina) Moullou (Hellenic Open University)*
12:00 – 12:20	114. Is Pente Grammai a playable game? Simulation as a third filter for rules reconstruction for historical games *James Goodman (Queen Mary University of London); Summer Courts (University of Reading); Timothy Penn (University of Reading)*
12:20 – 12:40	110. Rolling the Roman Dice: Experiencing Ancient Chance with AI *Summer Courts (University of Reading); James Goodman (Queen Mary University of London); Timothy Penn (University of Reading)*
12:40 – 13:00	109. Ludus ex machina: Studying Ancient and Historical Games through Human-like AI Play Agents *Timothy Penn (University of Reading); James Goodman (Queem Mary University of London); Eric Piette (Université catholique de Louvain); Summer Courts (University of Reading); Walter Crist (Leiden University); Alois Rautureau (ENS Rennes)*

S33: Generative AI, Text Mining, and Semantic Modelling: Using Big Models for Big Problems, FAIRly!

Alphaeus Lien-Talks, Historic Royal Palaces

Florian Thiery, Leibniz-Zentrum für Archäologie (LEIZA), Mainz, Germany & Research Squirrel Engineers Network, mail@fthiery.de

Location: Hörsaal 02
Session Format: Standard (talks + closing discussion)

AI and ML are transforming archaeological research and heritage data work. This session highlights practical approaches for leveraging Generative AI, text

mining [1], and semantic modelling/reasoning (e.g., CIDOC CRM/CRMarchaeo, RDF/LOD, SKOS thesauri, Wikidata) [2] to ensure that extraction, linking, validation, semantic reasoning, and reuse are schema-aware, explainable, and FAIR [3&4]. We want to highlight pipelines where knowledge graphs guide and constrain AI, and where semantic reasoning (rules, constraints, and logical inference) improves accuracy, transparency, and downstream interoperability [3,5].
This session aims for standard talks (research papers) and Lightning Talks (small on-going projects, scripts like little minions, etc.); please indicate what you want to present.

We particularly welcome papers from early researchers or from underrepresented communities.

Rationale and Scope
AI and ML, especially Large Language Models and semantic reasoning, are rapidly reshaping archaeological research and heritage data work. Beyond the hype, we need evidence on when these systems help, when they harm, and how to make their outputs reusable and trustworthy. This session brings together:

- **Generative AI & Text Mining** (LLMs, IR, NER, OCR pipelines, prompt design, non-determinism), including graph-backed retrieval to ground prompts [1,6];
- **Semantic Modelling/Reasoning** (ontologies, knowledge graphs, entity linking, ontology alignment, SHACL validation) [2,3,5]; and
- **FAIR Using AI** (automated metadata extraction, FAIRification workflows, provenance, licensing, stewardship, reproducibility) [1,4].

Contributions should show how semantic models plug into AI methods end-to-end, e.g., graph-backed retrieval for prompts, ontology-aware IE, constraint-based post-processing, and inference over time/space, to deliver robust, reusable results [5&6].

Topics of Interest (include but are not limited to)

- GenAI for text generation, coding assistance, summarisation, translation, and data wrangling in archaeology.
- Information extraction from grey literature, reports, registers, and multimedia; OCR post-processing and layout-aware parsing.
- Semantic modelling & knowledge organisation: ontology design/extension (e.g., CIDOC CRM/CRMarchaeo), cross-walks, SKOS concept schemes and thesauri (e.g., AAT, FISH, PeriodO), knowledge graph construction; entity resolution across HERs, museums, archives, and research datasets; **semantic reasoning approaches and constraint validation** [2,3,5].
- Graph-augmented AI: SPARQL/graph retrieval (RAG) feeding LLM prompts; ontology-aware IE using preferred/altLabels and multilingual synonyms; mapping and reconciliation to CRM properties/classes; linking to Wikidata [6].
- Validation and reasoning in the loop: **SHACL/SHEX for constraint checking and repair; OWL reasoning for consistency and entailment; rule-based reasoning** (SWRL/SHACL-Rules/SHACL-SPARQL) for temporal, spatial, and part-of relations; handling uncertainty and confidence propagation [5].
- FAIR with AI: automated metadata capture; FAIR assessments; PIDs; packaging and documentation; model cards and data cards for archaeological AI [1,4].

What We Ask from Contributors

- Transparent evaluation (report datasets, baselines, confidence/uncertainty, and error analysis):
    - IE/NER/classification: precision/recall/F1.
    - IR: top-k, nDCG.
    - Entity linking: accuracy/F1, ambiguity cases.
    - Ontology alignment: precision/recall/F1 on correspondences, mapping coverage, error types.

    - Reasoning/validation: consistency checks (pre/post), SHACL coverage (% shapes satisfied) and violation rates; competency questions via SPARQL (pass rate); entailment precision/recall on gold inference sets.
    - FAIR: metadata completeness, PID coverage, provenance depth, reproducibility score.
- Reproducibility: share code/models/data where possible. If restricted, provide synthetic examples or detailed protocols; include brief model/data cards and note energy/compute used.
- Pipeline clarity: include a diagram and artefacts (e.g., SHACL shapes, mapping tables, prompt templates, SPARQL queries, and reconciliation rules).

Intended Outcomes

- A shared view on when and how AI truly adds value in archaeology.
- Practical checklists for FAIR-by-design workflows (ingestion → triplification → IE/linking → KG-RAG → reasoning/validation → publication) [4-6].
- A starter kit: example **SHACL** shapes, CRM mapping stubs, KG-aware prompt templates, and SPARQL test suites (competency questions) [3,5&6].
- Connections across research, sector bodies, and data services to advance interoperable, ethical, and maintainable solutions.
- Ideas on how semantic reasoning creates new knowledge from unstructured and/or semantically modelled data.

Accessibility & Ethics

We encourage accessible presentation materials, plain-language summaries, and disclosures on data sensitivity, cultural considerations, and potential harms. Work with restricted data should outline mitigation strategies (e.g., redaction, differential access). Please state open vs closed-world assumptions and how constraints affect the inclusion/exclusion of sensitive entities [4&5].

Special Interest Group

This session is jointly organised by the CAA SIG on Artificial Intelligence and the SIG Data Dragon on Semantics and LO(U)D in Archaeology. The core aim of the SIGs is to utilise the SIG format to raise awareness of AI and Linked Open (Usable) Data in archaeology.

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[1] **Lien-Talks, A**. (2025). Evaluating Natural Language Processing and Named Entity Recognition for Bioarchaeological Data Reuse. Preprints. https://doi.org/10.20944/preprints202509.0822.v1

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[4] **Wilkinson, M.D.,** Dumontier, M., Aalbersberg, I.J., *et al.* (2016). The FAIR Guiding Principles for scientific data management and stewardship. *Scientific Data* 3, 160018. https://doi.org/10.1038/sdata.2016.18

[5] **Knublauch, H. & Kontokostas, D.** (2017). *Shapes Constraint Language (SHACL).* W3C Recommendation.

[6] **Lewis, P.,** Perez, E., Piktus, A., *et al.* (2020). Retrieval-Augmented Generation for Knowledge-Intensive NLP. *arXiv:2005.11501.*

08:30 – 08:35	Welcome and Introduction

08:35 – 08:55	276. Extracting archaeological knowledge from legacy records: a human-in-the-loop approach using AI and NLP *Quirino Saraceni*; Nevio Dubbini*; Gabriele Gattiglia*; Thomas Horrut (ENSEIRB-MATMECA – Bordeaux INP); Francesco D'Antoni (Sapienza University of Rome)* **University of Pisa*
08:55 – 09:15	88. From Paper to FAIR: Orchestrating OCR, NER, and LLMs for Archaeological and Archival Data Accessibility *Alphaeus Lien-Talks (University of York, Historic England, Archaeology Data Service)*
09:15 – 09:35	129. AI in vocabulary-based subject metadata enrichment *Douglas Tudhope*; Ceri Binding** **University of South Wales*
09:35 – 09:55	407. Text Mining archaeological reports for urban farming and fortifications: same approach, different results *Ronald Visser (Saxion University of Applied Sciences); Anja Fischer; Annika Blonk-van den Bercken (NMF Erfgoedadvies); Heleen van Londen*; Arno Verhoeven*); Morgan Schelvis** ** Universiteit van Amsterdam*
09:55 – 10:15	404. Digging through archaeological data: Towards semantic search using neural retrieval models *Stelios Manousopoulos (ASCSA); James Herbst (ASCSA)*
10:15 – 10:30	Discussion
10:30 – 11:00	Coffee break
11:00 – 11:20	441. Talking Tablets: A Graph-Embedding Approach to Semantic Retrieval in Cuneiform Corpora *Daria Stefan (TU Wien); Florian Thiery (Leiza)*
11:20 – 11:40	217. Cuneiform Tablets and LLMs *Lee Drake (University of New Mexico)*
11:40 – 12:00	285. Automated Construction of a Geospatial Archaeological Knowledge Base for the Trans-Karakoram Region Using GraphRAG Agents *Tong Liu*; Linru Xu*; Jie He** **Harbin Institute of Technology, Shenzhen*
12:00 – 12:20	43. Can Generative AI Interpret Code Reliably? A Case Study in ChatGPT-Assisted Implementation of 3D Imaging Tools *Katrina Yezzi-Woodley*; Samantha T. Porter*; Jeff Calder*; Pernu Menheer*; Sofía Pacheco-Fores*; Riley C. W. O'Neill *; Peter J. Olver** ** University of Minnesota*
12:20 – 12:40	221. How Sure Is a 60% Potter? Reasoning about Uncertainty in Archaeological Attribution using the Academic Meta Tool *Florian Thiery (LEIZA); Allard W. Mees (LEIZA)*

12:40 – 13:00	371. From Data to Insight: A Generative AI Workflow for Semantic Mapping and Trend Forecasting in Archaeological Literature *Edisa Lozić*; Benjamin Štular** **Research Centre of the Slovenian Academy of Sciences and Arts*
13:00 – 14:00	Lunch break
14:00 – 14:20	39. Multi-Model Deep Generative Restoration of Harappan Seals Using Advanced Architectures *Meriem Aoudia*; Madeeha Balouch*; Arwa Bayoumy*; Imran Zualkernan** **American University of Sharjah*
14:20 – 14:40	400. Seeing the Generated Past: How Editors and Readers Interpret AI-Created Archaeology Visuals *Aleksandra Cetwińska*; Marcin Zarod (SWPS); Anna Gierojć (Independent); Adam Budziszewski*; Konstanty Kowalewski*; Julia Chyla** ** Faculty of Archaeology, University of Warsaw*
14:40 – 14:50	Discussion

S34: Modelling Seafaring: Methodological Retrospective and Future Roadmap

David Gal, University of Haifa

Karl Smith, University of Oxford

Location: Hörsaal BIG
Session Format: Standard

This session aims to focus on the methodological realm of modelling seafaring. It solicits the showcasing of modelling experiences, including choice considerations, modifications to existing models, tests conducted, and ideas for the future. The session aims to help identify and prioritise the elements of seafaring modelling and its application, contributing towards the goal of an emerging formalisation of such modelling in future research.

Modelling of historic seafaring is not a new undertaking, and it has become increasingly prevalent in the last decade, supporting maritime connectivity studies. The introduction of methods to model seafaring has primarily been an unorchestrated effort of individual researchers or laboratories. (Perttola & Slayton, 2024, p. 2). Two separate paradigms have emerged in recent years. Most studies have employed GIS cost surface analysis, which is drawn from terrestrial movement modelling tools, with adaptations to maritime modelling. (Alberti, 2018; Leidwanger, 2013; McLean & Rubio-Campillo, 2022; Safadi & Sturt, 2019; Trapero Fernández & Aragón, 2022). Others have drawn methods from the nautical sphere, such as weather-routing software packages. (Gal et al., 2021; Warnking, 2016). The GIS cost surface analysis tools have been pushed to new limits, including batching sequential simulations, to overcome the limitation of static averaged wind data. (Perttola, 2021; Perttola & Slayton, 2024). However, they are not without significant drawbacks, such as the inability to incorporate waves, sea currents, and the human factor in modelling.

The validity of using averaged wind data has been questioned; yet many recent studies remain reluctant to abandon this paradigm. The leading presumption for the use of averaged environment is that it reflects the average of all sailings. (Scheidel et al., 2012), while the presumption of the input of a large sample of wind at high temporal resolutions is that it maintains knowledge of the variability of the winds, and that these constitute the windows of favourable winds, which are key for Mediterranean sailing mobility. Multiple simulation runs on a large sample of non-averaged environmental data facilitate a statistical spread of output measures.

Mariners would pick and choose when conditions suited departure on a sailing passage with favourable winds, and they would be prudent in avoiding severe weather conditions. Such reasoning needs to be implemented in seafaring modelling. The human factor may be introduced to the simulation process through agent-based modelling (Davies & Bickler, 2013; Smith, 2020), or it may be reflected in the classification of simulation output using specific criteria. A question that needs to be debated is whether the modelling should focus on practical mobility (i.e., including the human factor) or whether the potential envelope of maritime mobility can be based solely on modelling the technological capabilities of the vessels.

The topic of model verification is an area where solutions are needed, with the hope of finding a standard benchmark that all modellers can use. The practice of benchmarking against historic textual evidence often lacks the knowledge of whether the reported duration was average or if it might have been a faster or slower passage. In many cases, even the season is unknown.

The topic of model output and units of measure deserves a degree of formalisation in support of sharing data and supporting downstream processes. The output of sailing duration as the single cost measure is limited in representing sailing mobility. Time spent waiting for favourable winds was common, and it is an additional cost factor. The need for a temporal dimension (monthly or seasonal) is worthy of debate.

A more detailed discussion on the methodologies of maritime movement models' inputs, processes, and outputs is presented by Slayton et al. (2025), and it is recommended reading in preparation for this session.

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14:00 – 14:20	13. The Prospects of Sharing Seafaring Modelling Data *David Gal (University of Haifa)*
14:20 – 14:40	169. Boats and (Worked) Bones: Traditional Coast Salish Social Networks and Maritime Subsistence Technologies *Adam Rorabaugh (Simon Fraser University)*
14:40 – 15:00	198. From navigation to polar diagrams: a case study *Matteo Tomasini*; Boel Bengtsson*; Björn Bengtsson*; Aurélien Burlot*; Philippe Guillonnet (Koruc); Alvaro Montenegro (Ohio State University); Martyn Prince (University of Southampton); Frédéric Vény (Bugale Kozh Yeodet)* ** University of Gothenburg*
15:00 – 15:20	246. The Export Porcelain Trade Network during the Song and Yuan Dynasties: Network Modeling and Spatial Analysis Based on Multi-Source Shipwreck Data *Xinbei Song (Harbin Institute of Technology, Shenzhen); Jie He (Harbin Institute of Technology, Shenzhen*
15:20 – 15:40	249. Fragmented Coasts, Connected Worlds: Maritime Interaction and Social Reorganization in the Post-Palatial Ionian-Adriatic Region *Ermioni Vereketi (NKUA & University of Cologne); Eleftheria Paliou (University of Cologne); Vassilis Petrakis (NKUA)*
15:40 – 16:00	264. Reconstructing movement: a multidisciplinary study of ancient maritime mobility *Crystal Safadi (University of Southampton)*
16:00 – 16:30	Coffee break

16:30 – 16:50	272. Spatial Modeling Methods for Traditional Nautical Knowledge *Hongpeng Luo (Tianjin University); Jie He (Harbin Institute of Technology, Shenzhen*
16:50 – 17:10	301. Smoothing out the Rough: A Network Analysis Approach to the Roman Colonisation of Cilicia *Adam Dawson (University of Oxford)*
17:10 – 17:30	307. Identifying Coastal Nodes in the Ancient Mediterranean *Karl Smith (University of Oxford)*
17:30 – 17:50	423. HUGASEA: an Agent-based Model to evaluate the interplay between Seascape, Watercraft and Human decisions (and uncertainty) on the rugged coastlines of the Pacific Americas *Alberto Garcia-Piquer (Autonomous University of Barcelona)*
17:50 – 18:10	Discussion

S37: Future Sight on Past Landscapes: Vision Foundation Models for Archeological Remote Sensing and Landscape Archaeology

Sohini Mallick, Independent Researcher

Jürgen Landauer, Landauer AI Research

Agnes Schneider, Leiden University

Location: Hörsaal 01
Session Format: Standard

For the last few decades, advances in artificial intelligence, particularly deep learning and computer vision have enabled new paradigms in the advancement of archaeological remote sensing and landscape archaeology. Recent advances in Vision Foundation Models (VFMs), including ChatGPT, Gemini, SAM, DINOv3, OWL-ViT, Grounding DINO and geospatial-specialized models like Prithvi, AlphaEarth and DeepAndes, are reshaping how we detect and interpret archaeological features from satellite, UAV, and LiDAR. Their ability to generalize across imagery types and perform *zero-shot* or *few-shot detection and segmentation* offers new opportunities for landscape archaeology and archaeological remote sensing, where annotated datasets remain scarce.

Building on recent work in archaeology (Abate et al., 2023; Ciccone, 2024; Landauer & Klassen, 2025) and remote sensing AI (Huo et al., 2025; Guo et al., 2025), this session invites applied and critical contributions that assess the potential of VFMs for archaeological feature detection, practical workflows and adaptations, reproducible pipelines, and shared resources. We also welcome reflections on key technical and ethical challenges, including false positives, interpretability, cultural sensitivity, and the risks of automated misrepresentation or misuse, as we collectively explore the role of

vision AI in advancing scalable, robust, and responsible archaeological research.

Topics of Interest include but are not limited to:

- *Model Application & Evaluation*

We are looking *for* case studies of using VFMs for detecting archaeological features in satellite, UAV, or LiDAR data. Topics include comparative evaluations of general-purpose and geospatial models, prompt engineering, tiling strategies, terrain classification, anomaly detection, and clustering.

- *Deployment & Field Integration*

We are interested in the integration of VFMs into field workflows through drones, edge devices (e.g., Jetson), and mobile platforms. Especially real-time detection, vision-assisted mapping, and energy-efficient or offline deployments in remote areas Visual Perception Engine

- *Benchmarks, Reproducibility & Tools*

We would like to focus especially on the development of modular pipelines, open-source tools, and well-documented workflows. We are hoping for contributions which address FAIR data practices, benchmark design, annotation formats, and archaeology-specific evaluation metrics such as IoU or false positive rates.

- *Critical Perspectives & Position Papers*

Taking a step forward, we specifically encourage conceptual and technical reflections on adapting Vision Foundation Models for archaeology. Amongst others topics such as the feasibility and value of domain-specific pretraining (e.g., an "ArchaeoVFM"), handling model failure modes such as false positives and hallucinations, and challenges in interpretability for heritage-specific outputs are of interest. Theoretical contributions that explore the epistemological implications of relying on foundation models in archaeological remote sensing and landscape archaeology are strongly welcomed.

- *Community & Collaboration*

On a broader scale, initiatives focused on shared infrastructure, participatory annotation, and interdisciplinary research are very welcome, including open benchmarks, collaborative tools, and frameworks that promote reproducibility and community engagement.

- *Ethical Implications of using Vision Foundation Models in Archaeology*

Lastly but of course not least at all, we are looking for papers which focus on the cultural and ethical responsibilities involved in the application of VFMs to archaeological data. We consider this as an umbrella for the risks of enabling looting,unauthorized site exposure, applying models without contextual knowledge, and/or reinforcing geographic and cultural bias. We encourage contributions which address how to communicate model limitations, uncertainty, and confidence in ways that are transparent and respectful of heritage contexts.

To support transparency and reproducibility, we ask contributors to:

- Report evaluation metrics clearly (e.g., precision, recall, IoU, false positive rates)
- Document datasets, preprocessing, and annotation workflows
- Disclose compute infrastructure (e.g., GPU specs, inference/runtime details)
- Communicate uncertainty and model limitations responsibly
- Include pipeline diagrams or summaries when applicable

Presentation Submission Formats

We welcome standard talks of 15 minutes and lightning talks of 5 to 10 minutes, highlighting a specific topic, idea or case study. Please indicate your preferred presentation format when submitting.

We especially encourage submissions from early-career researchers and students.

References:

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08:30 – 08:50	76. “Your Landscape Talks to You”: Making AI Accessible for Landscape Archaeology through a QGIS Plugin *Jürgen Landauer (Landauer Research)*
08:50 – 09:10	90. Towards Benchmarking Vision Foundation Embeddings for Archaeological Remote Sensing : A Modular, Reproducible Pilot Using DINOv3 for Eastern India *Sohini Mallick (Barcelona Supercomputing Centre); Jürgen Landauer (Landauer Research*
09:10 – 09:30	353. Intelligent Detection of Earthen Sites in Xinjiang's Tarim Region: Leveraging Archaeological Knowledge and Multimodal LLMs with High-Resolution Imagery *Linru Xu*; Tong Liu*; Jie He** **Harbin Institute of Technology (Shenzhen)*
09:30 – 09:50	392. From Limited Labels to Scalable Survey: Leveraging Vision Foundation Models for Few-Shot Detection of Archaeological Features in Satellite Imagery *Junlin Guo*; Yuankai Huo*; James Zimmer-dauphinee*; Xiao Wang (Oak Ridge National Laboratory); Parker Vanvalkenburgh (Brown University); Steven Wernke** ** Vanderbilt University*
09:50 – 10:10	420. No more training data: visual language modeling for large-scale archaeological studies in Egypt *Iban Berganzo Besga (Barcelona Supercomputing Center); Islam Kamal (University of Sadat City); Hector A. Orengo (Barcelona Supercomputing Center)*
10:10 – 10:30	440. Mergin Maps: Currently the Most Optimal Solution with Advanced Functions and Easy Set-Up? *Barbora Weissova (Czech Academy of Sciences, Prague); Katrin Dorfner (Charles University, Prague)*

10:30 – 11:00	Coffee break
11:00 – 11:15	Discussion

S39: Palaeo-GIS

Patrick Cuthbertson, The Central Asian Archaeological Landscapes (CAAL) Project, UCL; Centre for the Archaeology of Human Origins (CAHO), University of Southampton

Christian Sommer, Heidelberg Academy of Sciences and Humanities Research center "The Role of Culture in Early Expansions of Humans" (ROCEEH) at the Senckenberg Institute and the University of Tübingen

Peny Tsakanikou, The University of Crete Research Center (UCRS), Department of History and Archaeology, University of Crete, Gallos Campus, 74150 Rethymno

Location: Hörsaal 03
Session Format: Standard

In the first Palaeo-GIS session (CAA Tübingen, 2018) we contended that Palaeolithic and prehistoric applications of GIS are fundamentally different from applications in later periods, and advocated for particular consideration of their unique analytical challenges and 'temptations' (Cuthbertson & Tsakanikou 2023).

The aim of our second Palaeo-GIS session is to further develop this theme in discussion with GIS users facing similar issues in Palaeolithic and later prehistoric research contexts.

The study of human prehistory requires an holistic approach to properly assay the complex interplay of palaeoenvionmental factors, resources (affordances), material culture, and early human behaviour across vast spatio-temporal scales.
Although Geographic Information Systems (GIS) have proven an effective analytical tool for integrating and analysing these different factors and their interrelationships, a unique theoretical basis for their application is still underdeveloped.

Palaeolithic applications of GIS can be used to:

- Address prehistoric research themes at different spatial scales, from analysis of individual artefacts, the more familiar scale of the site, and over increasingly vast regions and landscapes to the continental level.
- Tackle broad, continental-scale prehistoric narratives, and even provide finer-scale empirical and analytical connection for broader scale narratives.
- Integrate time-depth through the capabilities of temporal GIS (or TGIS), to understand environmental and occupation change over time.
- Organise, analyse, and visualise archaeological and paleoenvironmental data from diverse sources; combining and compiling from diverse spatial datasets and generating novel data.
- Analyse the impact of enduring physical features on ancient human occupation, such as geomorphological, tectonic, and geological factors.
- Employ a vast array of tried and tested geospatial computational methods for data analysis, as well as including the tools to develop bespoke methods of analysis.
- The capability to generate and test predictive models, which is probably the most common current usage of GIS in Palaeolithic applications.

- The effective communication and dissemination of results through map making, georeferenced orthophotos, and other cartographic outputs.
- Make use of standardised and reusable filetypes and data schemes developed in other areas (e.g. Building Information Modelling (BIM)) for coordinated collaboration, sustainable data publication, and long-term preservation.

This potential of GIS applications in Palaeolithic and later prehistoric research has only very partially been explored, and there remains a lot of potential for innovative and bespoke solutions. The opportunity remains to develop new approaches that emerge from the needs and logical structure of Palaeolithic research and the prehistoric record, rather than being driven primarily by technological or conceptual developments in other fields.

It is a combination of the analytical challenges and temptations of Palaeolithic applications of GIS that potentially hinder the ability of researchers to capitalise on this opportunity. Our identified challenges and temptations of Palaeolithic applications of GIS are:

Challenges

1. poor data coverage
2. vast spatio-temporal scale
3. the difficulty of inferring behavioural patterns under the conditions of problems 1. and 2.

Temptations

1. to follow the data coverage, rather than to try to generate data for difficult places and periods
2. to adapt questions to the logic of data structure, rather than rework data to suit questions
3. to do analyses that are familiar but irrelevant, rather than pioneer new methodological solutions (Cuthbertson & Tsakanikou 2023: 14).

The Palaeo-GIS session is intended to encourage contributions from authors applying GIS in Palaeolithic or later prehistoric contexts and research topics. We particularly encourage authors to submit papers that reflect on the unique characteristics and challenges of their prehistoric research context, and engage reflectively with those challenges.

Reference:

Cuthbertson, P and Tsakanikou, P. 2023 Challenges in Palaeolithic Spatial Archaeology: Two Eurasian Case Studies. In:. Human History and Digital Future : Proceedings of the 46th Annual Conference on Computer Applications and Quantitative Methods in Archaeology. 31 October 2023. Tübingen University Press. pp. 51–68. DOI: https://doi.org/10.15496/publikation-87765.

14:00 – 14:20	81. A pre-informed end-member modelling approach to infer sediment sources and landscape evolution: an example from the Fayum Basin, Egypt *Annelies Koopman*; Willem Toonen*; Maarten Prins*; Sjoerd Kluiving** **VU Amsterdam*
14:20 – 14:40	162. Lower Palaeolithic hominin activity at the Lesvos wetland: a view from agent-based modelling and affordance analysis *Simon Kübler (Ludwig Maximilian University of Munich); Peny Tsakanikou (University of Crete); Nena Galanidou (University of Crete)*

14:40 – 15:00	178. Rocky Roads: Simulating Neanderthal Mobility and Lithic Resource Use in the Liguro-Provençal Arc during MIS 3 *Amélie Vallerand (University of Montreal); Claudine Gravel Miguel (New Mexico Consortium); Julien Riel-Salvatore (University of Montreal)*
15:00 – 15:20	253. Geospatial predictive modelling of prehistoric rock shelter sites: A case study from from eastern South Africa *Felix Weinschenk (ROCEEH/University of Tuebingen); Gunther Heinz Dietrich Möller (University of Tuebingen); Lawrence Msimanga (ArcheoTask); Volker Hochschild (University of Tuebingen); Manuel Will (University of Tuebingen); Christian Sommer (ROCEEH/University of Tuebingen)*
15:20 – 15:40	258. The SUGAR ecosystem: Integrating archaeological data management and GIS-driven analysis for multi-layered Pleistocene excavations *Xavier Roda Gilabert*; Susana Vega Bolívar*; Xavier Sánchez-Martínez (IPHES-CERCA, Universitat Rovira i Virgili); Sofía Samper Carro (Australian National University); Jorge Martínez-Moreno*; Rafael Mora Torcal** **Universitat Autònoma de Barcelona*
15:40 – 16:00	349. Endless desert, endless possibility - Survey planning, data collection and data storage of the ARIMAS project *Matthias Blessing (University of Vienna); Aurore Val (CNRS); Kaarina Efraim (National Museum of Windhoek); Dominic Stratford (University of Witwatersrand); Christian Sommer (University of Tübingen)*
16:00 – 16:30	Coffee break
16:30 – 16:50	367. Predicting Palaeolithic Site Distribution Using MaxEnt Modelling in the Walannae Formation, South Sulawesi (Indonesia) *Putra MUHAMMAD (National Museum of Natural history in Paris); Akin Duli (Hasanuddin University); Hasanuddin Hasanuddin (National Research and Innovation Agency of Indonesia); Budianto Hakim (Pusat Kolaborasi Riset Arkeologi Sulawesi (Colaboration Research Centre of Archaeology))*
16:50 – 17:10	387. Accounting for uncertainty in sea-level reconstructions using Bayesian hierarchical modelling: A case study from Mesolithic western Sweden *Isak Roalkvam (Aarhus University); Victor Lundström (Rio Göteborg)*
17:10 – 17:30	409. Settlement Development in the Okluky River Basin in the Light of Current Archaeological Evidence *Klára Augustinová (Palacký University Olomouc); Tomáš Krampera (University of Hradec Králové)*
17:30 – 17:50	442. Ecological Gradients as Sandboxes: Complexity, Environment, and Social Hierarchy *Chiara Girotto (LMU)*
17:50 – 18:10	443. Challenges and Lessons in Palaeo-GIS: Modelling Late Neolithic Movement in the Mountain Landscapes of the Eastern Rim of the Tibetan Plateau *Yidan Zhang (University of Oxford)*

S40: Digital Archaeology for Heritage under Threat: Modelling Climate Hazards and Landscape Change

Emeri Farinetti, Landscape Archaeology – Archaeological Theory and Methods, RomaTre University – Dipartimento di Studi Umanistici

Miltiadis Polidorou, Lab of Digital Humanities and GeoInformatics ,Archaeological Research Unit (ARU), University of Cyprus

Fernando Moreno Navarro, RomaTre University – Dipartimento di Studi Umanistici

George P. Pavlidis, ILSP – Institute for Language and Speech Processing, ATHENA – Research and Innovation Centre in Information, Communication and Knowledge Technologies

Location: Hörsaal 03
Session Format: Standard

Archaeological landscapes are shaped by the interplay between human activity and natural forces such as erosion, sedimentation, tectonic shifts, and climate-driven changes. Today, these same forces—accelerated by climate change—pose unprecedented risks to cultural heritage, from flooding and coastal erosion to extreme weather events and desertification. These dynamics not only threaten the material integrity of archaeological sites but also challenge how we document, interpret, and preserve the past for the future.
This session explores how digital tools and spatial geotechnologies can help monitor, model, and mitigate climate-related hazards in archaeological landscapes, while also enhancing our understanding of their long-term evolution. We welcome contributions that showcase innovative workflows, risk-assessment strategies, and predictive models at the intersection of geomorphology, archaeology, and heritage conservation.

Topics may include, but are not limited to:

- High-resolution digital terrain analysis for vulnerability assessment
- Remote sensing and change detection for hazard monitoring (e.g., LiDAR, photogrammetry, UAV surveys, geophysical prospection)
- Geoarchaeological case studies addressing climate-induced landscape transformations
- Simulation and predictive modeling of hazard scenarios and human–environment interactions
- Integration of hazard datasets into archaeological GIS and decision-support tools
- Digital Twins for real-time monitoring and adaptive heritage management
- GIS-based spatial modelling for cultural heritage risk mapping and resilience planning

We particularly encourage interdisciplinary approaches combining earth sciences, climate studies, and digital archaeology to develop proactive solutions for cultural heritage under threat. This session also aims to foreground the role of computational and spatial methods in climate change adaptation strategies, ensuring that archaeological data informs policy and resilience planning.
Join us to advance the discussion on how digital archaeology can be a key player in safeguarding cultural heritage from climate change, bridging the gap between research, technology, and heritage protection.

08:30 – 08:50	82. Orbit-to-Action: A Three-Tier Data Driven Framework for Climate-Resilient Cultural Heritage Response *Pouria Marzban*; Elvira Iacono*; Bernhard Fritsch*; Benjamin Ducke** **DAI*
08:50 – 09:10	149. SAR for Heritage Protection: Detection of Small-Scale Looting Holes

	Cem Boyoglu (Wuhan University); Timo Balz (Wuhan University
09:10 – 09:30	180. Texturing Computed Tomography 3D Models using Multimodal 3D Reconstruction *Stephan Costopoulos (Athens University of Economics and Business); Georgios Papaioannou (Athens University of Economics and Business*
09:30 – 09:50	225. Developing a Coastal Change Vulnerability Index for Archaeological Sites along the Lebanese Coast *Celia Prescott (University of Southampton)*
09:50 – 10:10	269. Modelling soil loss and deposition in Monti Lucretili (Italy): a multi-temporal approach *Giordano De Coste (Università degli Studi Roma Tre)*
10:10 – 10:30	293. Integrating Optical and Radar Remote Sensing to Monitor Urban Sprawl and Assess its Impact on the Ancient Egyptian Cultural Heritage at Bawiti, Bahariya Oasis *Mina Yacoub (LMU Munich); Nicola Lercari (LMU Munich)*
10:30 – 11:00	Coffee break
11:00 – 11:20	304. Annual-scale soil erosion monitoring using high-resolution UAV-collected DEMs at the Medieval Silk Road settlement of Ak-Beshim, Kyrgyzstan *Patrick Cuthbertson (Central Asian Archaeological Landscapes Project (CAAL), UCL; Centre for the Archaeology of Human Origins (CAHO), University of Southampton); Gai Jorayev (University College*
	London (UCL), Macao University of Tourism); Marco Nebbia (University College London (UCL)
11:20 – 11:40	339. Unmanned Aerial Vehicle (UAV) Photogrammetry for Archaeological Documentation: A Case Study of Shahr-i Zohak, Afghanistan *Masood Zaman (Qayoom Ihsan Limited)*
11:40 – 12:00	439. Satellite-based Monitoring of Urban and Environmental Threats to the Lebanese Cultural Heritage: A Decade of Change at the Bronze-Age Site of Tell Fadous-Kfarabida Georgios Leventis (ERATOSTHENES Centre of Excellence); Mahmoud Mardini (ERATOSTHENES Centre of Excellence); Hermann Genz (American University of Beirut)

S43: Digital Evolution in Archaeological Practice: From Innovation to Infrastructure and FAIR data

Chiara G. M. Girotto, Freelance Archaeologist & Osteologist

Daniel Löwenborg, Uppsala University

Albrecht M. F. Knauber, Arch Pro Beratungsgesellsch. mbH

Stephan Winkler, illisystems

Location: Franz König Saal
Session Format: Standard

Following recent explorations of the implementation of standards, FAIR data recording, and emergent standards, as well as their intersection with

commercial archaeology and academic research, this session examines the development lifecycle of digital archaeological data and solutions—from experimental tools to essential infrastructure. We wish to investigate how innovations become integrated into archaeological practice and what this evolution reveals about the discipline's digital future.

Commercial archaeology occupies a unique position where innovation must prove itself immediately practical. This session explores the development pathways of digital solutions, examining how tools evolve from addressing specific project needs to serving broader archaeological communities, and can navigate both formal organisational requirements and the needs of academic research. We invite papers that explore the critical transition points where individual solutions become shared resources, and local innovations gain international relevance.

The session addresses the increasingly blurred boundaries between commercial and academic data generation. As development-led archaeology produces ever-larger datasets structured according to FAIR principles, these resources become invaluable for synthetic research, regional studies, and heritage management. We examine how this convergence shapes development priorities and funding models for archaeological infrastructure. This becomes increasingly relevant as the EU Open Data Directive is implemented, and there will be growing pressure to make data from archaeological investigations openly accessible and FAIR. By building on solutions from the archaeological community, this can be an opportunity to transform archaeological practice.

Central to our discussion is the sustainability of digital innovation. Many successful solutions begin as cost-effective responses to immediate needs—custom scripts, adapted open-source tools, or lightweight databases. We explore how these pragmatic beginnings can evolve into robust, maintainable systems without losing their original flexibility and efficiency.

The human dimension remains paramount: how do development teams strike a balance between user needs and technical possibilities? How do we ensure that digital evolution enhances rather than constrains archaeological practice? What governance models best support community-driven development while ensuring long-term sustainability?

We invite contributions addressing:

- Challenges in scaling local solutions to international contexts
- Development trajectories from prototype to production in archaeological software
- Governance models for community-driven digital infrastructure
- Bridging commercial innovation with academic research needs
- Sustainability strategies for archaeological digital tools and data
- The economics of open-source development in archaeology
- User-centered design in archaeological software development
- Case studies of successful tool evolution and adoption

08:30 – 08:50	42. From Innovation to Implementation: A Case Study in Researcher and End-user Collaboration to Create Usable Imaging Tools *Samantha Porter*; Katrina Yezzi-Woodley*; Riley C. W. O'Neill*; Jeff Calder*; Peter J. Olver ** **University of Minnesota*
08:50 – 09:10	54. From Data Fragmentation to Knowledge Graph: Archipel as a FAIR Digital Infrastructure for Preventive Archaeology in France *Kai Salas Rossenbach (Inrap)*
09:10 – 09:30	71. What professional infrastructure does an excavation company need? *Albrecht Knauber (Arch Pro Beratungsgesellschaft mbH)*

09:30 – 09:50	74. Migration and Integration of CAD-based Excavation Documentation into an Archaeological GIS Framework: A Case Study from Manching, Bavaria *Christoph Danner (Pro Arch)*
09:50 – 10:10	77. Integration of Work- and Billing-Relevant Metadata into GIS-Based Archaeological Documentation *David Biedermann (Pro Arch Prospektion und Archäologie GmbH)*
10:10 – 10:30	101. Standardizing Color Documentation in Archaeology: Using Digital Tools and Reference Palettes for Consistent Field Recording *Carolina de Bruyne (Pro Arch)*
10:30 – 11:00	Coffee break
11:00 – 11:20	207. Managing Complexity: A Digital Management System for Experimental Archaeology *Syed Ghaus Rabbani (Leibniz Zentrum für Archaologie (LEIZA)); Ivan Calandra (Leibniz Zentrum für Archaologie (LEIZA))*
11:20 – 11:40	215. A GIS-Enabled Application for Bayesian Optimal Allocation of Effort in Archaeological Surveys *Edward Banning (University of Toronto); Steven Edwards (Nova Scotia Community College)*
11:40 – 12:00	248. The CUD of an Archaeologists' Guide to Good Practice: Bridging Innovation and Infrastructure in Digital Stratigraphic Analysis *Keith May (Historic England); James Taylor (University of York)*
12:00 – 12:20	350. From Prototype to Standard – Digital Transformation from Innovative Tool to Added Value? *Stephan Winkler (illisystems); Nathalie Rodriguez (LWL-Archäologie für Westfalen)*
12.20 – 12:40	381. From 16 to One - The attempt to create a uniform German data model *Anna Anzenberger (Illisystems); Stephan Winkler (Illisystems)*
12.40 – 13:00	405. RADOGOST archaeological repository: building a FAIR, interoperable archaeology data service *Arkadiusz Sołtysiak (University of Warsaw); Marcin Maciejewski (Maria Curie-Skłodowska University); Julia Chyla (University of Warsaw); Wojciech Fenrich (ICM UW); Kamil Filipek (Maria Curie-Skłodowska University); Łukasz Dumiszewski (ICM UW); Łukasz Bownik (ICM UW)*

S44: Data are People: Data Making as Mirror of Past and Present Practice

Loes Opgenhaffen, University of York / Saxion University of Applied Sciences

Vasiliki Lagari, Belvedere Museum (Vienna) / International Hellenic University

Location: Hörsaal 05
Session Format: Standard

Too often we hear at conferences and courses about the production and aggregation of data, but not about what precedes data: the people creating it (after d'Ignazio and Klein 2023, 7). We hear hardly anything about what this data means or about the subjectivity inherent in using tools to create something: the choices we make in the process of first deciding what is important to document (in 3D) and what is *not*, and secondly, the purpose of the visualisation based on predetermined commercial or scientific objectives (e.g. public outreach, academic publication, project documentation, etc.). These decisions determine both the tools and the resolution of the output, as well as the settings (camera, 3D scanner, etc.), all impacting the final visual result. This means that persons are just as involved in the production of 3D visualizations as the devices they use, and they mutually affect and direct each other and the product. We understand this human-machine engagement as *sociality*.

This implies a social environment of data production: several people are involved, and even more people are involved in the consumption of this data. When we look beyond this anthropocentric perspective and extend sociality to the machine's capacity for action, a synergy arises between the operator and the device. This combination invites a continuous dialogue with our device, which informs our decisions. The limitations that our digital tools sometimes impose actually offer opportunities instead, and stimulate our *creativity* to find new solutions, adapting (i.e. improving) the devices we use, which are often not designed for archaeology.

The documentation of this synergy can be understood as paradata, emphasizing the social and creative dimensions of data-making. Awareness of the social aspects of production promotes creativity, but standardisation in the documentation of heuristic processes can simultaneously constrain it. The documentation of the creative process can be summarised as a pipeline. The pipeline should not be conceived as a rigid, step-by-step manual; rather, its paradata component provides the intellectual context and creative inspiration for engaging with the tools, which we might call the "machine factor." The amalgamation of the unique character of heritage objects, volatile nature of technology and changing epistemelogies means that both experienced practitioners and novices are constantly faced with new challenges, for which paradata can foster adaptive and innovative solutions.

Although such pipelines cannot be replicated exactly, they offer a flexible framework to guide practice. In this way, paradata bridges two dynamic temporalities – the study of the past and contemporary practices – and offers future researchers a reflective lens on our own social, professional and intellectual worlds.

In this session, we invite researchers and practitioners to share their "creative" methodologies for producing 3D data and to explore whether there are opportunities for a standardised way of documenting our data visualisation processes, with an emphasis on the social aspects of the data creation process (Huvila 2025). By comparing technical pipelines and social practices in academic and development-led archaeology and the GLAM sector, this session aims to promote discussion about practitioners' experiences with technologies in order to find common ground at this specific social level of creating 3D visualisations. These sectors should not each reinvent the wheel separately, but share their expertise to improve registration processes while recognising the social nature of the production process of 3D visualisations of heritage. We are certainly not the first to pursue such a goal, but since there is still no form of shared and accepted standardisation (but there is certainly a need for it) for documenting and sharing practices such as workflows or protocols (Opgenhaffen et al 2021), this goal must continue to be pursued.

Papers may focus on either or both themes, but are not limited to the following topics, however, we advise to include/apply a reflexive approach by considering the social context they work in:

- Synergy between people and digital devices
- The social production of 3D visualizations of archaeological and heritage objects
- Methodologies of making 3D objects
- Documentation schemes for recording paradata

Standardization of recording production/creative processes

Suggested reading:

Huvila, Isto, Lisa Andersson, and Olle Sköld, eds. *Perspectives on Paradata: Research and Practice of Documenting Process Knowledge*. Knowledge Management and Organizational Learning, vol. 13. Cham: Springer, 2024. https://doi.org/10.1007/978-3-031-53946-6

Ioannides, Marinos, Drew Baker, Athos Agapiou, and Petros Siegkas, eds. *3D Research Challenges in Cultural Heritage V: Paradata, Metadata and Data in Digitisation*. Lecture Notes in Computer Science, vol. 15190. Cham: Springer, 2025. https://doi.org/10.1007/978-3-031-78590-0

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Opgenhaffen, Loes, Hayley Mickleburgh, Martina Revello Lami (2021). "Art, Creativity and Automation. From Charters to Shared 3D Visualization Practices." Open Archaeology 7(1), 1648-1659. https://doi.org/10.1515/opar-2020-0162

08:30 – 08:50	*365.* Two visualizing archaeologists from different sectors and countries, finding one common ground *Loes Opgenhaffen (University of York); Vasiliki Vasiliki (Belvedere, Vienna/ International Hellenic University)*
08:50 – 09:10	*171.* When your tools are not designed for your case – HBIM approach in archaeology and 3D visualisation of an ancient city with procedural modelling *Anna Kubicka-Sowińska*; Wojciech Ostrowski*; Jakub Modrzewski*; Łukasz* Miszk (Jagiellonian University) ** Warsaw University of Technology*
09:10 – 09:30	297. The many faces behind one excavation record: A methodology to see the people behind the data *Alexandra Katevaini (National and Kapodistrian University of Athens/ American School of Classical Studies at Athens)*
09:30 – 09:45	Discussion

S45: Computational Archaeology at Scale: Large Spatial Datasets for Unveiling Cultural Landscapes

Jonathan Lim, University of Arkansas

Carla Klehm, University of Arkansas

Jack Berner, Washington University in St Louis

Location: Auditorium Maximum
Session Format: Standard

As spatial technologies advance rapidly in sophistication and become more accessible, archaeologists increasingly wield large datasets to answer landscape-scale research questions. Emerging technologies like light detection

and ranging (LiDAR), passive and active satellite sensors, unmanned aerial systems-mounted cameras, structure-from-motion (SFM) elevation data, large-scale geophysical survey, and others are broadly known as high density survey and measurement (HDSM) (Opitz and Limp, 2015; Klehm et al., 2019). The data-rich nature of these datasets multiply the options for analysis, often generating unexpected insights and novel research directions.

For example, airborne LiDAR survey, once exclusively the purview of only the most well-funded projects, are now relatively more accessible by mounting them on UAS units (Risbøl and Gustavsen, 2018), enabling feature visualization and heritage management/monitoring over vast swathes of densely vegetated terrain (Frachetti et al., 2024; Vinci et al., 2025). Open science archival practices further improves access to these elevation datasets, enabling large-scale analysis at minimal cost. Satellites now have near-total coverage of much of the world at very high resolution— beyond direct observation of archaeological sites and the environment, it is possible to produce elevation models of the landscape and even small archaeological features (Lim and Linares Matás, 2023). In order to efficiently study these large HDSM datasets, many archaeologists have turned to machine learning (Bellat et al., 2025). This field has advanced substantially in recent years and has yielded impressive results, although it is often challenging to identify best practices for specific environment types and cultural contexts.

In this session, we invite researchers to showcase how they have used HDSM datasets in innovative ways. By no means a comprehensive list, topics may include or be tangentially related to the following:

- Large UAS or terrestrial LiDAR surveys, and the challenges of storing and processing such data.
- Satellite remote sensing using passive (Visible light or multispectral) or active (e.g., Synthetic aperture radar) sensors, for direct observation or surface reconstruction.
- Historical imagery, especially imagery that inherently involve complex issues (e.g., Keyhole) in their processing and applications
- Low-cost and open methods for visualizing, processing, and archiving HDSM
- Machine learning for automatic classification or computing change in longitudinal datasets
- Landscape-scale geophysical survey, both vehicle-mounted and pedestrian
- Cloud-based processing workflows for HDSM data in a lab or field environment
- Data fusion of different types of spatial data

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Lim, J.S., Linares Matás, G.J., 2023. Dunes, death, and datasets: Modelling funerary monument construction in remote arid landscapes using space-borne stereo imagery. J. Archaeol. Sci. 156, 105815. https://doi.org/10.1016/j.jas.2023.105815

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08:30 – 08:50	23. Unveiling Entangled Landscapes of the Southern Levant: Spatial Archaeometry with Large Spatial Datasets *Marcio Teixeira-Bastos (University of São Paulo (USP)*
08:50 – 09:10	26. Unveiling Cultural Landscapes through Multi-Scalar Non-Invasive Analysis: Community Organization in Late Neolithic Twin-Circle Settlements *Petra Basar (University of Pittsburgh); Bryan Hanks (University of Pittsburgh)*
09:10 – 09:30	33. Mapping Bronze Age Pastoralist Habitations in the Eurasian Steppe Using Deep Learning on High Resolution Satellite Imagery *Jack Berner (Washington University in St Louis); Michael Frachetti (Washington University in St Louis); Denis Sharapov (University of Tyumen)*
09:30 – 09:50	91. Hydraulic Landscape of the Highlands: Modeling Water Systems in Early Medieval Central Asia *Mirae Jo (Washington University in St. Louis); Michael Frachetti (Washington University in St. Louis*
09:50 – 10:10	138. A Machine Learning Framework for Vectorising Land Use and Cover from Historic Cadastral Map *William Ward (University of Exeter)*
10:10 – 10:30	326. From Nestor's "Wine Magazine" To Pgi Labels: A Terrain-Aware Wine Landscape of Messenia *Vayia Panagiotidis (University of the Peloponnese); Vasiliki Valantou (University of the Peloponnese)*
10:30 – 11:00	Cofee break
11:00 – 11:20	338. Integrating Airborne and UAS LiDAR for Long-Term Monitoring of Cultural Landscapes: A case study from Western Tennessee *Jonathan Lim (University of Arkansas*
11:20 – 11:40	363. LiDAR-Based Storytelling using historical landscapes *Carla Klehm (University of Arkansas); V. Camille Westmont (University of Alabama at Birmingham)*
11:40 – 12:00	380. The Enduring Field: Mapping the Long-Term Management and Abandonment of Andean Agriculture with Deep Andes - a Computer-Vision Foundation Model *James Zimmer-Dauphinee*; Junlin Guo*; Yuankai Huo *; Parker VanValkenburgh (Brown University); Steven Wernke (Vanderbilt); Cody Berkey*; Rachel Clark*; Greta Cullipher*; Luisa Raquel Mejia Aranguren**; Alexis Reátegui Díaz (Brown University); Manuel Mamani Calloapaza (Vanderbilt Spatial Analysis Research Lab); Oluwatamilore Obisesan*; Kevin Jarra**; Grecia Roque**; Anthony Villar (Brown University); Ericka Guerra**; Ella Wright* *Vanderbilt University ** Vanderbilt Spatial Analysis Research Lab*

12:00 – 12:20	393. Inundation innovations: comparing datasets for modeling monsoonal floods, natural catastrophes, and long-term settlement reorganization on the Swahili Coast *Wolfgang Alders (University of Cambridge); Ioana Dumitru (University of Sydney); Elinaza Mjema (University of Dar es Salaam); Jonathan Soon Lim (University of Arkansas); Dylan Davis (Columbia University)*
12.20 – 12:40	413. Toward continental-scale perspectives on human settlement in the Andes through AI-assisted satellite imagery survey *Steven Wernke (Vanderbilt); Parker VanValkenburgh (Brown University); James Zimmer-Dauphinee*; Yuankai Huo*; Junlin Guo*; Matthew Ballance (Brown University); Jacob Bongers (University of Sydney); Jose Capriles Flores (Pennsylvania State University); Cristian Gonzalez-Rodriguez (University College London); Ericka Guerra Santander (Universidad Nacional de San Agustin); Frances Hayashida (University of New Mexico); Manuel Mamani Calloapaza**; Luisa Raquel Mejia Aranguren**; Gabriela Ore Menendez (University of Nevada Los Vegas); Jo Osborn (University of Michigan); Giancarlo Marcone (Universidad Tecnica del Peru); Pablo Mendez-Quiros (Universidad de Chile); Alexis Reategui Diaz**; Kevin Ricci Jara**; Grecia Roque Ortega**; Jason Toohey (University of Wyoming); Anthony Villar Quintana**; Xiao Wang (Oak Ridge National Laboratory* ** Vanderbilt University* *** Independent Scholar*
12.40 – 13:00	429. Accessible AI for Archaeology: A User-Friendly Workflow for Predictive Site Detection *Linduo Li (Institut Polytechnique de Paris), Yifan Wu (University College London); Zifeng Wang (Northeastern University); Youngjie Zhuang (Amazon)*

S46: The Human Factor in Archaeological Data Recording

Silvia Götti, Universität Bern

Piotr Wroniecki, Montefortino Prospection & Digitalisation

Location: Hörsaal 05
Session Format: Standard

The human factors in archaeological data recording New technologies and digital tools promise precision yet archaeological data are still shaped by human choices and limitations. This session focuses on how factors such as expertise, stress, improvisation, or recording bias influence the creation and use of digital archaeological records. We encourage case studies and reflections that show not only where things go wrong, but also how we can design better practices. What lessons can we draw from common mistakes? How can systems be built to reduce human error without ignoring the creativity and flexibility that fieldwork demands? By comparing experiences, we aim to outline practical guidelines for improving data quality in archaeological recording and processing.
Possible topics for presentations include, but are not limited to:

- sources of recording bias and missed opportunities
- improvisation in the field and its consequences
- reorganizing and migrating “grown” or legacy data systems

- creative adaptation or misuse of digital tools not designed for archaeology
- breaking (and fixing) our digital tools in practice
- strategies for designing data systems that reduce human input errors

This session is aimed at archaeologists, computer scientists, heritage managers, data engineers, archivists and everybody else who has to work with the recording and processing of digital archaeological data. We welcome scientific papers as well as anecdotal story telling.

References:

Cowley, D.C. (2016). What Do the Patterns Mean? Archaeological Distributions and Bias in Survey Data. In: Forte, M., Campana, S. (eds) Digital Methods and Remote Sensing in Archaeology. Quantitative Methods in the Humanities and Social Sciences. Springer, Cham. https://doi.org/10.1007/978-3-319-40658-9_7

Austin, A., Heilen, M., McEwan, C., Uhl, S. & Wolf, E. (2024). Improving the Usability of Archaeological Data through Written Guidelines. Advances in Archaeological Practice, 12(2), 123–135. https://doi.org/10.1017/aap.2023.30

Anderson, D.G. (2024). Modern Archaeological Research and the Importance of Properly Reported and Curated Data. Proceedings of the National Academy of Sciences, 121 (16) e2403792121, https://doi.org/10.1073/pnas.2403792121.

Morgan, C. & Eve, S. (2012). DIY and Digital Archaeology: What Are You Doing to Participate? World Archaeology, 44(4), 521–537. https://doi.org/10.1080/00438243.2012.741810

09:45 – 09:50	Welcome and Introduction
09:50 – 10:10	146. Past Landscapes of Bias and Those Deceitful Digital Methods *Grzegorz Kiarszys (The University of Szczecin)*
10:10 – 10:30	361. Pretty Maps & Partial Truths. The Human Factor in Geophysical Survey Design and Interpretation *Piotr Wroniecki (Montefortino Prospection & Digitalisation)*
10:30 – 11:00	Coffee break
11:00 – 11:20	266. Chaos and stability, the disruptive element of innovation in an established department *Esther Schoenenberger (Archaeology and heritage management for the canton of Zurich); Kristin Kruse (Archaeology and heritage management for the canton of Zurich*
11:20 – 11:40	399. The African Archaeology Archive Cologne (AAArC) - Digitizing, Archiving and FAIR RDM since 2012 *Eymard Fäder (Universität zu Köln)*
11:40 – 11:50	Discussion

S50: Heritage under Bombs – Mitigating Destruction in Rapidly Evolving World

Nazarij Buławka,Non-Invasive and Digital Archeology Laboratory (PANiC), Faculty of Archaeology, University of Warsaw

Oleksandra Ivanova, National University of Kyiv-Mohyla Academy
Huyam Khalid Mohammed Madani, Cardinal Stefan Wyszyński University in Warsaw

Mariia Lobanova, Odesa Archaeological Museum of the NAS of Ukraine

Location: Hörsaal 01
Session Format: Other

The session will consist of 20-minute presentations, followed by an extended discussion block at the end.

Tangible and intangible cultural heritage shape people's sense of identity and their sense of belonging. Heritage is particularly vulnerable during periods of political instability. It can become a silent victim of war through destruction, use in military activities, looting and cultural appropriation, can be politically abused, or be used as a tool to whitewash war crimes. Heritage destruction can be accidental or a deliberate, systemic tool of 'cultural genocide', which aims to erase the memory of individuals and evidence of past communities' existence and culture. Whereas, looted artefacts appear on the black market and are used to purchase weapons, thereby exacerbating further violence (Hanson, 2011).

The situation of heritage is extremely threatened because of the ongoing conflicts and wars around the globe, and the United States' plan of withdrawal from UNESCO. During 2025, we witnessed a third year of the full-scale Russian invasion of Ukraine, continued destruction of Gaza, the war in Sudan, Tigray (Ethiopia), the Democratic Republic of the Congo, India-Pakistan, and Cambodia–Thailand border conflicts, and many more.

During the ongoing war Ukraine's heritage is being constantly destroyed by Russia and artefacts looted. At the same time, such cases as rebuilding of Tauric Chersonesos in occupied Crimea, condemned by UNESCO committee, is an example of cultural appropriation and political abuse of heritage (Mick 2024; Munawar and Symonds 2024; Shydlovskyi et al 2023). Such a violent process is not unique; the situation in Ukraine has received widespread media coverage. In many areas affected by war and political instability, heritage protection is often inadequate and can undergo a similar process. However, information about such situations rarely reaches outside audiences. For example, scholars working in the Tigray region (Ethiopia) report that many museums were looted, and that heritage professionals face particular challenges due to the presence of explosives at destroyed sites.

Since April 2023, Sudan has been experiencing a widespread armed conflict, resulting in a severe humanitarian crisis and the deterioration of security across various regions. This conflict has had devastating effects on cultural heritage, with significant archaeological sites and several museums being affected. Preliminary reports indicate that the damage to archaeological sites may be linked to large-scale population displacement, which led to the use of some sites for housing and agriculture in the absence of adequate protection. More than nine museums across Sudan have also been affected, notably the Sudan National Museum, which was used as a military base, resulting in direct damage from military operations and the looting of its collections. The National Ethnographic Museum, which was completely destroyed by fires caused during direct confrontations. Heritage workers have not yet been able to access museums in the Darfur region to assess the extent of the damage. This situation poses a threat not only to Sudanese cultural heritage but also to the heritage of humanity and calls for urgent action by local and international authorities to safeguard these historical assets from further destruction.

Digitization is emerging as one of the most effective tools for safeguarding heritage in conflict zones, enabling the creation of detailed, shareable, and enduring records of at-risk sites and artefacts. As shown by Radchenko and Hadick (2024) in the Ukrainian context, preserving cultural heritage through

digital means is an interdisciplinary challenge, requiring not only technology and equipment but also trained specialists, sustainable funding, and sufficient time for data collection, processing, and dissemination. In Ukraine, where ongoing hostilities continue to endanger heritage and reduce the number of professionals able to respond, digitization has become both an urgent priority and a logistical challenge. This experience demonstrates that digital preservation efforts in war zones must be internationally supported, well-resourced, and embedded within broader strategies for heritage protection.

During the last CAA meeting in Athens, we discussed the situation of heritage in Sudan, Ukraine, Ethiopia, Syria, Egypt, Armenia, and Azerbaijan. One of the key conclusions of the session was that the CAA must prioritise sessions focused on heritage protection, as this could help develop and introduce new methods and procedures in war zones. A plan for creating a Heritage Under Bombs special interest group was proposed. This meeting will continue to discuss the importance of developing digital methods to document heritage before it is lost.

The session aims to bring together researchers from areas affected by conflict and war, who are deeply concerned about the future of heritage, as well as specialists in digital methods. The session welcomes papers devoted to monitoring archaeological heritage in conflict zones, focused on:

- Inventories, databases for heritage preservation, and Linked Open Data.
- Monitoring: remote sensing (from satellite imagery to Unmanned Aerial Vehicles (UAV)) and citizen science;
- Digital twins: photogrammetry and laser scanning;
- Reports of heritage destruction;
- Heritage protection initiatives.

References:

Hanson, Katharyn. 2011. 'Ancient Artefacts and Modern Conflict: A Case Study of Looting and Instability in Iraq'. In Cultural Heritage, Ethics, and the Military, edited by Peter G. Stone. Heritage Matters. Boydell & Brewer. https://doi.org/10.1017/9781846159442.008.

Mick, Christoph. 2024. 'The Fight for the Past: Contested Heritage and the Russian Invasion of Ukraine'. In War and the Historic Environment: The Effect of Conflict from Front Line Ukraine to Historic Namibia, 1st ed., edited by Michael Dawson. Routledge.

Munawar, Nour A, and JaMunawar, Nour A, and James Symonds. 2024. 'Empires of Lies? The Political Uses of Cultural Heritage in War'. In War and the Historic Environment: The Effect of Conflict from Front Line Ukraine to Historic Namibia, 1st ed., edited by Michael Dawson. Routledge.

Radchenko, S., & Hadick, K. (2024, May). Preserving Ukrainian legacy: Midway reflections and lessons learnt. The European Archaeologist, (80), 24–31.

Shydlovskyi, Pavlo S., Ian Kuijt, Viacheslav Skorokhod, et al. 2023. 'The Tools of War: Conflict and the Destruction of Ukrainian Cultural Heritage'. Antiquity 97 (396): e36. https://doi.org/10.15184/aqy.2023.159.

11:00 – 11:20	427. From Documentation to Digital Narratives: Transforming the Odesa Archaeological Museum *Mariia Lobanova (Odesa Archaeological Museum of the NAS of Ukraine); Oksana Hrytsiuta (Odesa Archaeological Museum of the NAS of Ukraine)*
11:20 – 11:40	69. Ukrainian Battlespace Management System "Delta": Important Tool for Cultural Heritage Protection during High-Intensity Warfare *Denys Grechko (Armed Forces of Ukraine)*
11:40 – 12:00	318. Digital Preservation as Mitigation: Photogrammetric Documentation

	Kseniia Lishchyna (The Odesa I.I.Mechnykov National University)
12:00 – 12:20	111. Photogrammetry as a tool for preserving cultural heritage: the example of artifacts from the medieval steppes of Ukraine *Yaroslav Chentsov (Odesa National Scientific Library)*
12:20 – 12:40	355. From ramparts to trenches. Digital documentation of belligerent landscapes in wartime Ukraine (case study of Bilhorod-Kyivskyi hillfort) *Oleksandra Ivanova (National university "Kyiv-Mohyla academy"); Ivan Zotsenko (Institute of Archaeology NAS of Ukraine)*
12:40 – 13:00	36. Safeguarding Archaeological Collections at the Musée d'Archéologie Nationale: Foundations and Futures of Data Modelling for Heritage at Risk *Kai Chun Lennox Yeung (University of Bologna)*
13:00 – 14:00	Lunch break
14:00 – 14:20	18. Kamyana Mohyla: The Story of the Rock Art Site, its Digital Study, and Outrageous Looting under Russian occupation *Simon Radchenko (University of Stavanger)*
14:20 – 14:40	305. The fate of the Neolithic Mariupol cemetery: evidence of the crimes of the Russian occupiers*)* *Nataliia Mykhailova (National Academy of Sciences of Ukraine)*
14:40 – 15:00	37. Translating Heritage Under Bombs: The IOSPE Ukrainian Version as a Case of International Collaboration, Terminological Innovation, and Decolonisation *Olena Shevchenko (King's College London)*
15:00 – 16:00	Discussion