

The Initiative for the Science of the Human Past wrapped up 2023 with a wide variety of new projects, findings, and collaborators from across the globe. In focus are our Max Planck-Harvard Research Center, the [Historical Ice Core Project](#), and [SoHP's educational projects](#).

By Lisa Ransom Lubarr and Andy Chen.



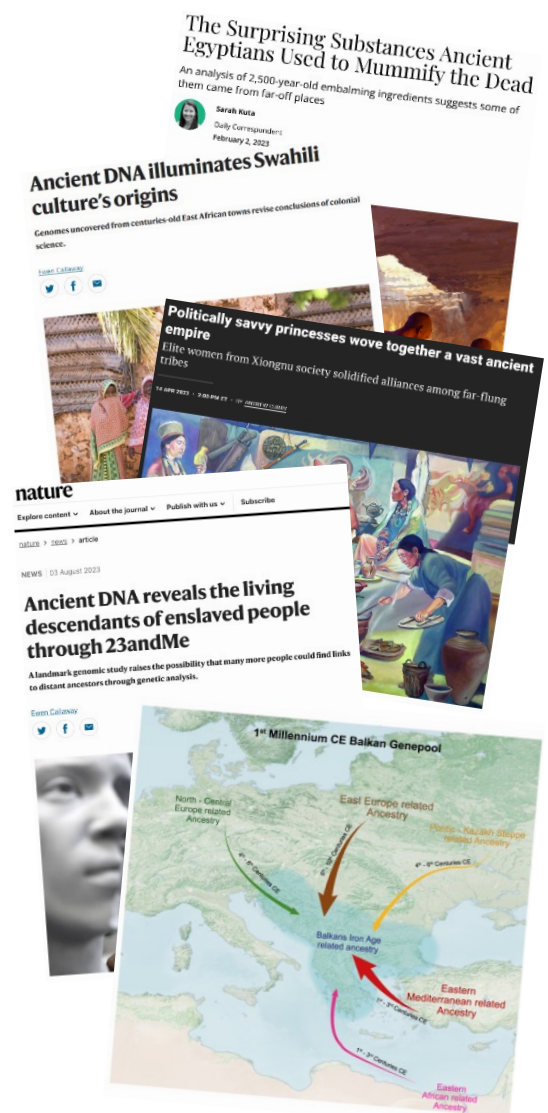
The Max Planck-Harvard Research Center for the Archaeoscience of the Ancient Mediterranean ([MHAAM](#)), Cambridge and Boston, Leipzig and Jena (Germany)

Publications

MHAAM's team members have advanced our discipline with studies in leading journals such as Science, Nature and PNAS, and contributions to multiple books have produced 23 publications for 2023.

Here are the highlights.

- **The year began** with [DNA evidence from the prehistoric Aegean](#) uncovering admixture history and endogamy. Studying southeastern Anatolia and the southern Levant, researchers traced [early Neolithic mobility and migration](#) through isotopic and DNA analyses.
- **Fascinating new evidence** on [ancient Egyptian embalming practices](#) was highlighted by [Science](#), [Nature](#), [ScienceNews](#), and [Smithsonian Magazine](#). Analysis of organic residues enabled the reconstruction of trade networks (even beyond the Mediterranean) critical to this process.
- **In Early Iron Age Southeast Europe**, researchers deepened knowledge of [kinship practices](#) through genetic and isotopic analysis of cemetery burials.
- **DNA data from the Swahili Coast** revealed changing ancestries that will now inform understandings of medieval African culture, as covered by [Science](#), [Nature](#), and [Smithsonian Magazine](#).
- **Genetic analysis of individuals** in [cemeteries of the Xiongnu - the first historical steppe empire \(~200 BCE-~100 BCE\)](#) delivered new insights into its leadership, including women and ordinary people, was featured by [Nature](#) and [Science](#).
- **New Methods** for studying [microbial natural products of early homins](#) underscore implications for modern humans.
- **DNA from the Catoctin Furnace in Maryland** in com-



Images from top to bottom:

Smithsonian, February 2, 2023; Nature, March 31, 2023; Science, April 14, 2023; Nature, August 3, 2023

bination with DNA data from 23andMe led to the first genomic study to connect living people with enslaved African American iron-makers; results have been featured by [Nature](#), [Smithsonian Magazine](#), [Science](#), the [AAAS](#), and [CSPAN](#). This endeavor was led by SoHP Fellowship recipient and population geneticist Éadaoin Harney in her conjoined roles at 23andMe and at Harvard.

- [Roman Empire's Danubian frontier](#): genomic evidence from 136 Balkan individuals from the 1st millennium CE revealed a large-scale migration of Romans of Anatolian ancestry during the Imperial period and the arrival of the Slavs thereafter.

Other studies to check out from the impressive range of MHAAM members' work this year include research into contact between [farmers and pastoralists in prehistoric Europe](#), and an exploration of the ethics involved in [studying DNA links between historical and living people](#).

These are only highlights of MHAAM's many 2023 publications; at Harvard, MHAAM is generously supported by INSTAP. A full guide to the year's research can be found [here](#).

MHAAM Awards

MHAAM was honored to receive grants this year that expand its research frontiers and the new discipline.

The Richard Lounsbery Foundation is supporting a project on archaeogenetics and burial archaeology, continuing the collaborations formed via the Lounsbery-funded research of MHAAM postdoc Solenn Troadec, who is studying medieval plague in France via archaeology (anomalous burials) and genetic pathogen analyses.

Transnational research projects include, in that collaboration, colleagues from the Centre national de la recherche scientifique (Cnrs), Direction régionale des affaires culturelles (DRAC), and Services régionaux de l'archéologie, as well as Europe's largest archaeological institution, the Institut national de recherches archéologiques préventives (Inrap).



Solenn Troadec drilling bone samples on-site in France



Incoming Postdoc Vicki Moses with Solenn Troadec at SoHP HIST 1056 Poster Session

Getty is supporting a new two-year venture to pair an early-career archaeologist with an early-career geneticist, so that each can learn to “speak each other’s language.”

- “The Classical World in Context: The Near East,” will analyze the interaction of cultures via combined reconstructions of the archaeological context, history, and genomics of ancient individuals and material remains.
- This Dual Post-Doc program is a first-of-kind endeavor in the simultaneous training of scholar-scientists towards creating the transdisciplinary teams of the future; MHAAM and SoHP’s more holistic approach to the study of the past is at the root of

this experimental approach.

Prof. Christina Warinner also received an exploratory award from Harvard University's competitive Star-Friedman Challenge for Promising Scientific Research for her MHAAM project investigating a novel proteomics approach to ancient viral pathogens which will be supported by a gift by the Francis Goelet Charitable Lead Trust to SoHP/MHAAM.

Dr. Alison Barton (Harvard Ph.D., 2022, Bioinformatics, Integrative Genomics; Certificate, Standing Committee on Archaeology), joined the Reich lab and is deepening her knowledge in Classical archaeology with Dr. Moses.

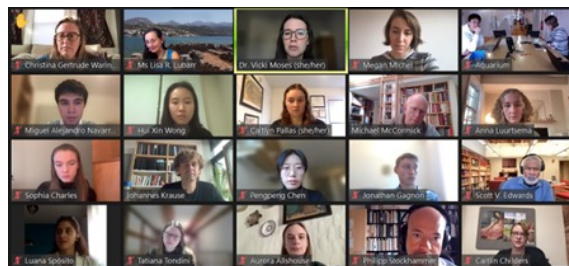
Dr. Victoria Moses joined the History Department at Harvard this fall, and is training in archaeogenetics at the Reich lab with Dr. Barton in preparation for the January kick-off to the new program. Dr. Moses studied Archaeology and Zooarchaeology at the University of Arizona (Ph.D. 2020) and held a two-year fellowship at the American Academy in Rome and specializes in Iron Age Italy.

Programs and Workshops

In March and November, the international research team met to discuss projects ranging from Mongolia to the Near East, Megiddo, Tunisia, Morocco and Egypt, and from France, Germany and the UK in Northern Europe to Iberia, the Italian peninsula, Albania and Greece.

The 5th annual SoHP-MHAAM Young Investigator Symposium in early November Presentations on research as different as paleoclimate, ice cores, population genetics, building science, and artificial intelligence underscored the diverse experience and talent among these early career investigators in the new science of the human past.

- Their novel methodologies led to new findings on the history of populations in Brazil, Mexico, China, Egypt, Mesopotamia, Russia, Greece, Italy, and the Alps. Students around the world were able to network and share their innovative engineering, chemical, archaeological, botanical, and genetic analyses with their peers and faculty in this unique online forum.



5th Annual SoHP-MHAAM Young Investigator Symposium

Graduate Students and Postdocs

MHAAM's current Harvard graduate students and postdocswere busy in the lab and in the field and are nearing completion and publication of results. Additionally, MHAAM's three postdocs are making rapid advances on archaeogenetic research on medieval France and Iron Age Italy.

Megan Michel (Human Evolutionary Biology) continued her research in the Archaeogenetics Department at the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany. She:

- presented the poster "Leveraging high-throughput metagenomic screening for the identification of human parasitic protozoa" at the 10th International Society for Biomolecular Archaeology



Megan Michel (far right) co-organized SPAAM5 Workshop

(ISBA) Meeting in Tartu, Estonia and co-organized the associated meeting sponsored by the SPAAM community (Standards, Precautions, and Advances in Ancient Metagenomics).

- Co-authored two chapters in a free online textbook, [Introduction to Ancient Metagenomics](#) (Edition 2023). She is currently finalizing two studies exploring the evolution of ancient microbes and working on her thesis, which she plans to defend in 2024.

Aurora Allshouse (Anthropology) continues her work to reconstruct dietary patterns of individuals from the Greek Bronze Age using machine learning technology to analyze results of stable isotope analysis.

Reed Morgan (History) wrapped up a year-long stay at the Max Planck in Leipzig, where he has been working on Punic and Late Antique Mediterranean population genetics. He:

- hosted two colleagues from Tunisia for training exchanges in Germany over the summer, ran a training session on sampling techniques in Mahdia (Tunisia), and participated in the Max Planck excavation of a Stone Age Moroccan cave site.
- presented preliminary results to the Leeds International Congress and the Annual Meeting of the European Association of Archaeologists.
- Back at Harvard, he is continuing work on his archaeogenetic projects and was Head Teaching Fellow for the SoHP “Cutting Edge” course alongside Professor McCormick.

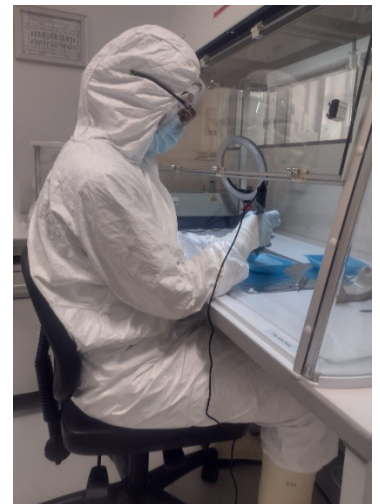


Reed Morgan training colleagues in Mahdia, Tunisia

MHAAM Postdoc Solenn Troadec (PhD, University of Nottingham) completed specialized training at the Max Planck Institute for Evolutionary Anthropology, and travelled across France to collect bone samples from early medieval individuals.

- By targeting atypical burials and more traditional graves, this project promises to shed much light on the people of early medieval France.
- This endeavor is made possible by the exceptional support of the Richard Lounsbery Foundation, French regional services of archaeology, and the invaluable collaboration of Inrap and Cnrs researchers.

MHAAM Postdocs Victoria Moses and Alison Barton (above) are developing their future project to integrate archaeological, historical, and genetic data in preparation for the January 2024 start of the Getty-funded SoHP/MHAAM Dual Postdoctoral Program to explore interactions between the Near East and Classical Civilizations.



Solenn Troadec training at MPI-Jena

We congratulate our teams for their significant global accomplishments this year in the rapidly-growing field of archaeoscience. We also thank our generous supporters who have made all of this possible!

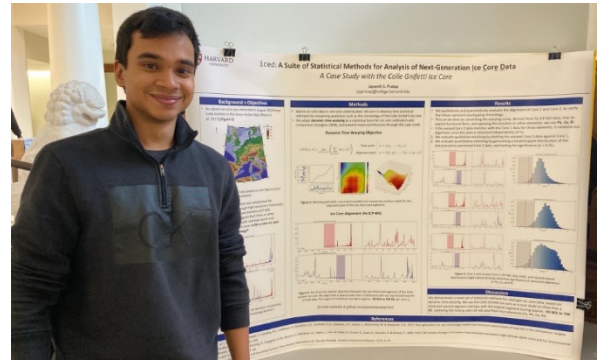
Historical Ice Core Project (HICP)

In December, SoHP learned it would receive a grant from the **Harvard FAS Dean's Competitive Fund for Promising Scholarship** to support a one-year postdoc position for its [Historical Ice Core Project](#). This key appointment will allow analysis and publication of several hundred thousand subannual elemental measurements from the first millennium CE, produced from the ice core that the project retrieved from the Colle Gnifetti glacier in the Swiss-Italian Alps in 2013.

The grant funding will further understanding of the 536 CE volcanic event which triggered the recently identified Late Antique Little Ice Age that helped end the ancient world globally in the Roman Empire, post-Roman Christian and Islamic societies, China, and Mayan civilization. Ideally, funding for a second year of this new postdoc position can be identified, which will ensure further discoveries as captured within the ancient ice.

The hard work of Harvard undergraduates gave SoHP research a major boost this year. Students in the Fall 2023 "The New Science of the Human Past: Case Studies at the Cutting Edge" investigated how to improve methodology for the study of the Colle Gnifetti ice core data.

Among them, **Jay Pratap** (College '25 Statistics and Chemical & Physical Biology) delighted the project team with statistical analyses towards aligning results from overlapping ice cores. **Sophia Charles** (College '24 History and Physics) presented alternative methods towards this alignment, and **Nicholas Frumkin** (College '27) investigated Roman economy datasets, shipwrecks, and lead production to detect inflation peaks during the Roman Empire.

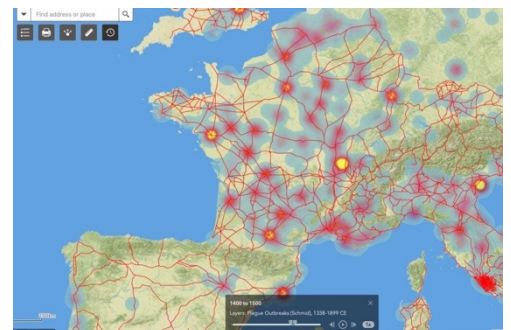


Jay Pratap (College '25) at HIST 1056 Poster Session

The importance of the project cannot be overstated: fear that these unique records could vanish has been confirmed by the [recent report](#) that Switzerland's glaciers melted ~10% this year. Tragically, ours may be the last such core with stratified information for 2000 years of human and environmental history.

Mapping Past Societies (MAPS)

Mapping Past Societies (MAPS), SoHP's free online digital atlas, was released earlier this year to succeed the Digital Atlas of Roman and Medieval Civilizations (DARMC). This resource, created over years by teams of Harvard undergraduates, receives over a million visitors a year and lets students and researchers make new discoveries by connecting archaeology, climate change, medicine, linguistics, and migration, as well as religious, artistic, and economic history. The new version, inspired by data visualizations that tracked the spread of the COVID pandemic, now allows overlays of different data sets and base maps. During the launch event, the MAPS team demonstrated that nexuses of



Mapping Past Societies (MAPS)

historical plague pandemic emergence corresponded to COVID-19, indicating long-term environmental or infrastructural factors that affect how disease was, and is, spread.

SoHP Media and Public Outreach



Michael McCormick at Cosmos Club, February 2023

Prof. Michael McCormick presented highlights of SoHP’s ice core research at NASA’s [Goddard Science Colloquium](#) in February, focusing on the climate shifts at the outset of the Late Antique Little Ice Age illuminated by the joint SoHP and Climate Change Institute (University of Maine) project. McCormick also gave a talk on SoHP’s interdisciplinary work and Harvard’s new approaches to history to a full house at the Washington DC Cosmos Club.

Prof. Christina Warinner was in Ulaanbaatar in September for the opening of a special exhibit at the Natural History of Mongolia museum on “Dairy Cultures – The Science of Mongolian Heritage!” which was very well attended, from herders to government officials who traveled great distances to be present. The exhibit even has an [online virtual version](#). The Warinner Group’s research on Pleistocene natural products was featured on a famous German TV quiz show, broadcast on ARD in November. Tina also illuminated historical dimensions of lactose intolerance and the gut microbiome on [NPR’s Science Friday](#) (April).



Tina Warinner, Natural History of Mongolia Museum

SoHP colleague **Admir Masic** (MIT, Laboratory for Multiscale Characterization and Materials Design) [made global news](#) by revealing [just how concrete was created in ancient Rome](#), where the longevity (2000 years!) of this newly-discovered and durable “hot-mixed” process could significantly increase the ca. 70-year lifespan of buildings, lowering annual carbon dioxide emissions (ca. 8%) to the atmosphere caused by structure replacements. Truly light from the scientific study of the past to guide the present!

SoHP Programs



Andrea Nanetti, NTU Singapore, and SoHP group

SoHP sponsored a meeting of faculty and postdocs with **Prof. Andrea Nanetti, NTU Singapore** in March to discuss his Digitizing Venice project and engineering historical memory.

Topics ranged from the neuroscience of aesthetics to Blockchain and AI in creating new digital humanities resources, e.g., the AI analysis of sentiment in Arabic, Franco-Venetian and English historical records, and the malleability of self-conceptions, including race and ethnicity, across time spans and populations. Conversation touched on Chinese, Ottoman and Egyptian writing, Venetians, and the archaeology of France ... not to mention Stephen Jay Gould’s insights into the nature of evolutionary change.

Teaching with research: SoHP's educational mission

Courses taught in 2023 exposed students to new ways of studying our past across a variety of disciplines.

Spring 2023

Christina Warinner's "Introduction to Archaeological Science," acquainted students with archaeological science, the type of questions it studies ("Who were the Neanderthals?"), and the methods and theories that ground research. In her graduate course, students gained hands-on experience with laboratory methods for their independent biomolecular archaeological science projects.

Christina's co-sponsored **SPAAM Summer School** offered a five-day intensive introduction to Ancient Metagenomics, where Masters and early-stage PhD students learned the main steps of bioinformatic workflows, how to process next-generation-sequencing (NGS) data, and how to perform de novo metagenomic assembly. Nearly 100 applicants competed world-wide for spots in this high-demand virtual course.

Peter Huybers' "Climate, Crops, and Food Security," students investigated the links among climate change, extreme weather events, agricultural production, and food insecurity. Undergraduates considered complex questions such as how climate change variations in temperature, water, and sunlight exacerbate food insecurity, and how regional socioeconomic, political, and health contexts worsen or mitigate of food insecurity today.

Fall 2023

Scott Edwards' "Genome analysis, ecology and evolution" explored with undergraduates the theory and applications of DNA technologies to the study of evolutionary, ecological, and behavioral processes in natural populations.

Jason Ur and Rowan Flad co-taught the general education course "Can We Know Our Past?". They course asked students to explore the ways that historians, archaeologists, and other investigators have built robust narratives of the distant past, and how we might reconcile competing narratives. Students directly interacted with artifacts, experiments, and analytical methods to understand how our knowledge of the past has been produced.

Éadaoin Harney's research course "Investigating the Human Genome" guided students in the use of population genetic tools to build a report on the ancestry, health, and phenotypes of an unknown individual.

Gabriel Pizzorno's "Digital Methods and Primary Sources" graduate history seminar taught students the ins and outs of using digital tools for data collection from visual and textual sources, with a focus on design and implementation processes.

Michael McCormick's undergraduate course, "The New Science of the Human Past: Case Studies at the Cutting Edge" introduced students to archaeoscience through real-time discussion of new discoveries as they unfold, including reconstructing Boston's precipitation from trees they cored themselves at Harvard's Arboretum.

SoHP Undergraduate Team



Sage Barnes, College '24

SoHP SHARP Summer Fellow **Sage Barnes** (College '24, Government and Classics) assisted in documenting the extraction, transport and distribution of wealth from ancient mines and how and whether that wealth was stored (concealed) by identifying and mapping ancient coin finds from the time of the fall of the Roman Empire.

Anika Christensen (College '26, Human Evolutionary Biology and Music) did outstanding research with MHAAM Postdoc Solenn Troadec on the atypical medieval burials project, engaging with archaeological and biological data for French and UK sites to augment and quality-check records for the growing database after greatly assisting in final data-checking for SoHP's climate records database.



Anika Christensen, College '26



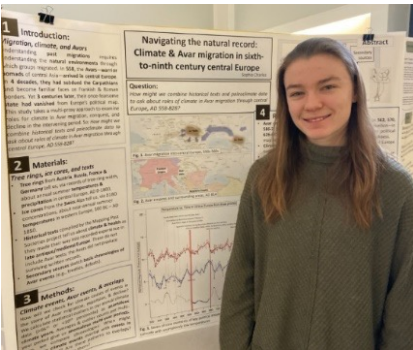
Jimena Luque, College '25

Jimena Luque (College '25, Molecular and Cellular Biology, and History of Art and Architecture) also shone in her work with Dr. Troadec, putting her language skills to work by helping identify and investigate some of the hundreds of early medieval funerary sites known in France and published only in French.

Lindsey Brail (College '26, Applied Math) assisted in research on the "Geodatabase of Reports of Climate and Weather From Written Sources, 23BCE to 1800 CE," which is the multi-year work of many Harvard undergraduate students under the oversight of SoHP former Postdoc and Research Associate, Assoc. Prof. Alexander More (Urban Public Health, UMass Boston).



Lindsey Brail, College '26



Sophia Charles, College '24

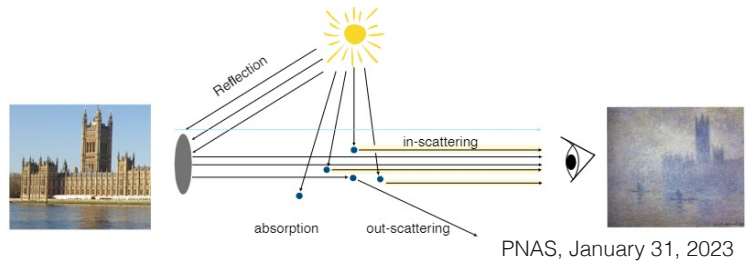
Sophia Charles (College '24, History and Physics) continued her stellar research with SoHP, creating a new database of historical proxy data from Eastern Europe and Central Asia to study climate trends and migration, complementing existing datasets for Western Europe, necessary -- and understudied -- for a greater understanding of global patterns and societal impacts. Sophia also helped Profs. McCormick and Reich in research related to early Slavic movement in Europe and their Cell article.

For the SoHP Historical Ice Core Project, Sophia also tested existing visual methods and new statistical methods for comparing data from early Europe. She focused on modeling data from metals such as lead and iron to identify possible changes in air composition. The SoHP Historical Ice Core Project is benefiting greatly from the insights provided by this talented young interdisciplinary scholar. She is writing an undergraduate History thesis this year and is poised for great success following graduation!

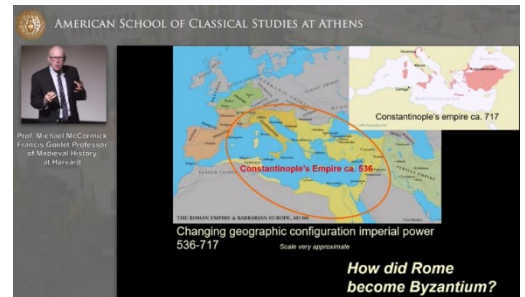
SoHP Steering Committee

The **SoHP Steering Committee** welcomed this year new members **Margaret Andrews**, Assistant Professor of Classics (beginning 2024) and **Scott Edwards**, Professor of Organismic and Evolutionary Biology (and current Department Chair) and Curator of Ornithology and Alexander Agassiz Professor of Zoology in the Museum of Comparative Zoology. Scott published extensively on ornithological research this year, including as first author, on [genetics of Australian treecreepers](#).

Peter Huybers (Earth and Planetary Sciences) published on topics including [Northern Hemisphere continental warming patterns](#), [interglacial coral preservation](#), [soil moisture](#), [solar irradiance](#), [coastal air and sea surface temperature](#), and in a fascinating study determined that the [Industrial Revolution altered the environmental context for 19th-century artists Turner and Monet](#) whose paintings captured changes in the optical environment of increasingly polluted atmospheres.



Michael McCormick (History) co-authored the [MHAAM study from David Reich's lab](#) that reconstructed the changing cosmopolitan population on the Roman Empire's Danube frontier, and presented his research at the Goddard Science Colloquium (above). He offered a keynote address at a conference in the Netherlands on "Turning Lead into Silver: connecting Science, Archaeology and the future of early medieval economic history at Leeuwarden and gave the annual Malcolm H. Wiener Lecture, American School of Classical Studies (Athens), speaking on "How Rome Became Byzantium: New Light from DNA, Ice Cores, and Harvard's Science of the Human Past." Additionally, McCormick continued during his sabbatical to guide MHAAM's rising Max Planck archaeogeneticists in Leipzig, in the history and archaeology necessary to derive the most insight from their ancient DNA investigations.



Michael McCormick, ASCSA, May 4, 2023

Nick Patterson (Human Evolutionary Biology; Broad Institute) co-authored many Reich lab publications this year, notably the [Allen Ancient DNA Resource \(AADR\)](#): A curated compendium of ancient human genomes and, most recently, a [study on accurate detection of identity-by-descent segments in human ancient DNA](#).

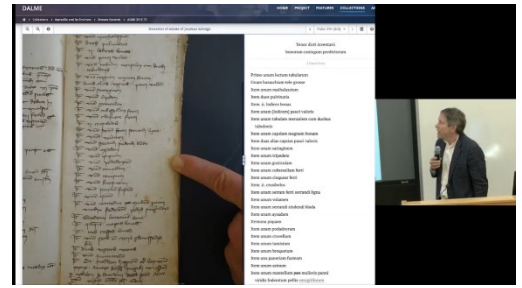
David Reich (Human Evolutionary Biology; HMS) continues to advance methodology for archaeogenetics, introducing a method for accurately inferring effective population size variation during the past ~2000 years in both modern and ancient DNA, called [HapNe](#), and innovating the modeling of [African population history](#), for example. Some of his most important papers this year: genetic continuity, change, and patterns of migration among the [Indigenous peoples of California](#), how certain Indigenous languages spread in North America, as well as the articles on the Roman Danube's populations and on the enslaved African-Americans at Catocin Mt.



Nature News and Views, November 22, 2023

Daniel Lord Smail (History), along with **Gabriel Pizzorno** (History), expanded and improved [The Documentary Archaeology of Late Medieval Europe \(DALME\)](#), a digital resource which makes vast amounts of material culture accessible online as open and machine-actionable datasets readily amenable to linguistic and computational analysis.

In December, DALME received funding from the Belgian Fonds voor Wetenschappelijk Onderzoek to undertake a joint project developing algorithms for tagging Flemish interior scenes ca. 1450-1600, with the end goal of comparing them to Flemish household inventories from the same period. DALME also received a seed grant from the Harvard Dean's Competitive Fund for Promising Scholarship for "Historical Pharmacopeias to 1850," a cross-institutional project developing a collection of historical sources documenting natural products and pharmaceuticals. The goal of the project is to make the collection accessible to medical researchers, biochemists, and medical and pharmacy historians. A workshop is slated for Spring '24 with a provisional board of expert scholars, with aims to launch a platform later that same year.



Daniel Lord Smail presents DALME (SoHP Lecture)

Jason Ur (Anthropology) completed another field season in the Kurdistan region of N. Iraq, investigating via archaeology whether ancient texts describing the Assyrians conquering Israel and bringing captives back are accurate—i.e., do we find evidence of this influx of people into the Kurdistan region or not? Jason is also employing ground penetrating radar (GPR) to study colonial-era burials of enslaved persons in Cambridge, MA.

Christina Warinner (Anthropology) received more accolades this year, winning a [Research Award from the Shanghai Archaeology Forum](#) for her contributions to the study of ancient



Christina Warinner (center), Shanghai Archaeology Forum, Dec. 2023

human microbiomes. She presented her research, at their "Archaeology of Climate Change and Cultural Sustainability" event in December. Additionally, her "Cultures of Fermentation" team won an American Anthropological Association Exemplary Cross-Fields Prize for microbial studies on health and cuisine.

Tina co-authored studies on [early saddle and stirrup technology in Mongolia](#), [endolithic microbial communities](#), [processing ancient meta-genomic data](#), and the [dental plaque microbiomes across populations](#), among many other MHAAM publications. She presented research at Stanford, the National Academy of Sciences, the Carl R. Woese Institute for Genomic Biology, Harvard Medical School, and at the "New Frontiers in Reconstructing Human Evolution History" Symposium in Hannover, Germany. Tina was also [elected President](#) of the International Society for Biomolecular Archaeology (ISBA) in October!

In Conclusion...

Our diverse contributions to the science of the human past this year are entirely thanks to the resources made available by our generous supporters, particularly the Getty, Harvard's Faculty of Arts and Sciences, INSTAP, The Richard Lounsbery Foundation, the Francis Goelet Charitable Trust and you, our individual supporters. We are inspired by the potential of our research both to make deeply personal discoveries on an individual level, as demonstrated by the Catoctin furnace team and Professor Warinner on Mongolian dairy culture, and to uncover new knowledge on a global scale with constantly evolving methodologies.