

**2022**

In 2022, the award of the [Nobel Prize in Medicine](#) to colleague [Svante Pääbo](#) in Leipzig, Germany, threw a global spotlight on the cornerstone of MHAAM's research: how ancient genetics reveal past societies and how they originated, grew, reacted to disease and climate crises, relocated, and thrived or failed. On October 3<sup>rd</sup>, the ancient DNA community was overjoyed at this recognition of Dr. Pääbo's research on sequencing the Neanderthal genome, discovering a previously unknown hominin (now called "Denisovan"), and ultimately understanding the genetic differences between *Homo sapiens*—us—and those species closest to us. Pääbo's pioneering investigations at the Max Planck Institute for Evolutionary Anthropology (MPI-EVA) promoted the work of MHAAM



2022 Nobel Prize Winner Svante Pääbo



Svante Pääbo & Johannes Krause, photo © Sylvio Tuepke, MPI for Evolutionary Anthropology

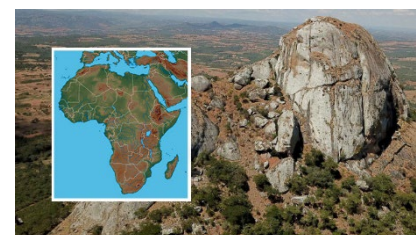
research leaders including Johannes Krause (Department of Archaeogenetics, MPI-EVA in Germany) and Science of the Human Past's David Reich and Nick Patterson (Harvard Medical School; Department of Human Evolutionary Biology), who each contributed in important ways to Dr. Pääbo's breakthrough reconstruction of the Neanderthal genome. The Nobel is welcome acknowledgement as our new discipline of archaeoscience rewrites not only what we used to consider "prehistory," but now most certainly the broad-spectrum *history of humanity* on earth.

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

**Publications**

This year MHAAM beat its own record with thirty-eight publications. Using the latest technologies in ancient DNA, isotopic and proteomic analysis, MHAAM has produced much detailed new information about genetic relationships, geographical origins, selective processes and genetic structures of past human, plant, animal and pathogen populations. A tour through 2022 highlights our collaborative research teams' geographic and temporal reach:

In February, MHAAM made news in [Science](#) and [TheScientist](#), revealing the [oldest human DNA found in Africa](#) and the complex migrations involved in our distant human past.



**Ancient DNA Sheds New Light on Africa's Stone Age**  
The oldest DNA yet isolated from humans in Africa reveals long-range migrations around 50,000 years ago, which likely played a role in the Middle to Later Stone Age transition.

*TheScientist*, February 23, 2022



Science, March 22, 2022

In March, genetic research on [early migration in the Maya region](#) of Central America expanded our knowledge of the area's prehistory, such as how farming spread and how maize was introduced through previously unknown migrant groups from South America. The groundbreaking study was publicized by both [The New York Times](#) and [Science](#). In another, similarly understudied region, ancient genomes illuminated the [genetic history of Tibetans and their Tibeto-Burman speaking neighbors](#) in the Himalayas.

April saw the release of a new [study](#) on the bacterium *Yersinia pestis*, which causes plague. According to the study's results, Eurasian *Y. pestis* genomes from 5000 to 2500 years ago demonstrate that two genetically distinct forms of the pathogen evolved in parallel and were distributed across vast geographic distances. A concurrent study highlighted [the emergence and intensification of dairying in the Caucasus and Eurasian steppes](#). Another April publication revealed the [ancestry and rapid trans-Eurasian migration of 7<sup>th</sup>-century Avar elites](#). This population ruled Central and Eastern Europe for almost 250 years and its origin had been hotly debated and considered a mystery ever since.



Avar Horseman Reconstruction-Deri Museum



Discover Magazine, May 3, 2022

In May, genomic analyses of the [black rats](#) responsible for the spread of plague from Southwest Asia into Europe uncovered population turnovers, as publicized in [Discover](#) magazine. These changes were especially significant during the breakdown of the Roman Empire.

For June: evidence established the central Eurasian origin of the catastrophic 14<sup>th</sup>-century [Black Death pandemic](#). Ancient DNA evidence of [human migrations into Micronesia](#) revealed that the first people who colonized the islands had a population structure in which men moved to find their mates, whereas women rarely moved to join men.

July brought a first synthesis of the brief history and big future of [Paleoproteomics](#) which can, for example, explore past cuisines from dental calculus and pottery food crusts, characterize past diseases and human-animal interactions, and reconstruct ancient environments. Research on [Campeche](#), one of the Spanish Empire's primary Mexican ports, demonstrated how DNA analyses illuminate early colonial histories such as this 16<sup>th</sup> – 17<sup>th</sup> century encounter of Indigenous Americans, first-generation European immigrants and enslaved Africans.



Juan Cortes, slave & 1<sup>st</sup> African listed in New Spain



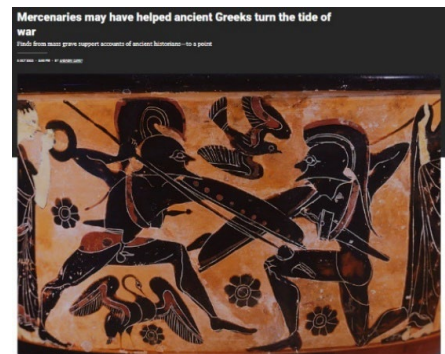
**IN DEPTH**  
**HUMAN EVOLUTION**  
**Ancient DNA from the Near East probes a cradle of civilization**  
 Studies seek clues to origins of farming, early languages

*Science*, August 26, 2022

**August** saw the publication of a trio of articles exploring the history of the Near East. Genetic evidence was taken from over 700 individuals spanning the “[Southern Arc](#)” from Croatia to modern-day Iran, dating back to the Neolithic Era and revealing at least [two separate migrations](#) into Anatolia from 10,000 to 6,500 years ago. The team even posits a new hypothesis for the origin of the Indo-European language and will gather further evidence. Further findings show that Anatolia exhibited extraordinary [continuity down to the Roman and Byzantine periods](#), with its people serving as the demographic core of much of the Roman Empire, including the city of Rome itself. Also in August, research revealed ancient *Yersinia pestis* as well as *Salmonella enterica* in [Bronze Age Crete](#), necessitating a new model for the role of infectious disease where typically other societal and climatic changes have been considered the causes of upheaval. Finally, a new isotopic and genetic study traced [human mobility](#) between mainland Greece and Crete during these time periods.

**In September**, research on [The Anglo-Saxon migration and the formation of the early English gene pool](#) showed large-scale substantial migration across the North Sea into Britain during the Early Middle Ages, detailing one of the largest population transformations in the post-Roman world. Discovered also was evidence of different burials—including grave goods—for women with immigrant ancestry versus local women, as well as results.

**October** saw the release of a [genetic study](#) of 54 individuals from 8<sup>th</sup> to 5<sup>th</sup> century BCE Himera in Sicily, clarifying the surprising composition of the Classical Greek military via one of its colonies. Mercenaries in Greek armies fighting in the Mediterranean as early as 480 BCE were recruited from as far away as northern Europe and the Caucasus—evidence entirely *absent* from historical texts. Based on new genetic evidence from mass graves, it now appears that mercenaries may have played a significant role in helping the Greeks to ward off invaders from Carthage, as publicized in [Science](#) and [The New York Times](#).



**Mercenaries may have helped ancient Greeks turn the tide of war**  
 DNA from mass graves suggests armies of ancient mercenaries – in a piece  
 in *Science* on 10/3/22

**Largest study of ancient DNA shows medieval Ashkenazi Jewry was surprisingly diverse**

Scientists find that some 700 years ago, the Jews of Erfurt, Germany, formed 2 groups, rabbinic consultants stipulated that they study only those with pre-recorded skeletons

By HANNAH REINHOLD, DNA.co.uk | 26 November 2022, 12:01 PM



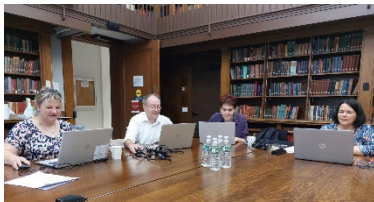
*The Times of Israel*, November 30, 2022

**In November**, MHAAM research again made global headlines in [Science](#), [The New York Times](#), and [The Times of Israel](#) as the first major genetic [study](#) of a medieval Jewish population comprised of 33 individuals from 14<sup>th</sup>-century Erfurt, Germany. This population was shown to be more genetically diverse than modern Ashkenazi Jews; interestingly, it was deduced from maternal mitochondrial DNA that the original population was quite small (even that a third of Erfurt individuals descended from a single ancestral woman). This study further confirms that today’s large Ashkenazi Jewish population (over 10 million) came from a group of only a few hundred individuals who survived pogroms more than 1000 years ago. According to Harvard’s David Reich, the project also “provides a template for how a co-analysis of modern and ancient DNA data can shed light on the past.”

**Published in December**, Christina Warinner's *JAS* study on the [archaeology of microbes](#) discusses the new field that analyzes communities of microorganisms, e.g., ancient microbiomes. Microbes make up roughly half of the earth's total biomass and more than 50% of cells in the human body; as such the emerging story of our microbial past will surely help chart our microbial future in sickness and in health.

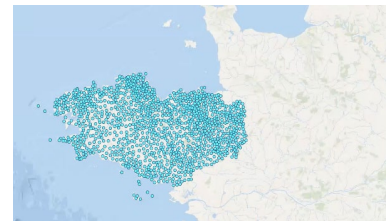
The previous are only a sample of MHAAM's many 2022 publications; at Harvard, MHAAM is generously supported by INSTAP. A full inventory of our production can be found [here](#).

## Workshops

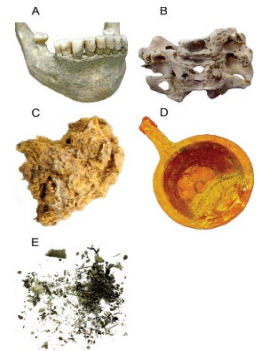


*French Archaeology Team at Harvard*

**Meanwhile in June and October respectively**, MHAAM sponsored major workshops at Harvard and Leipzig. Through the support of the Richard Lounsbery Foundation, these workshops gathered teams of French archaeologists to reconstruct the pandemic of bubonic plague (*Yersinia pestis*) which occurred in early medieval France. This is the start of a collaboration spearheaded by MHAAM postdoc Solenn Troadec, which includes colleagues from the *Centre national de la recherche scientifique* (Cnrs), *Direction régionale des affaires culturelles* (DRAC), and *Région Île-de-France – Service régionale de l'archéologie* (SRA Île-de-France), as well as Europe's largest research institute, the *Institut national de recherches archéologiques préventives* (Inrap). This collaboration will combine archaeological data of anomalous burials with pathogen genetic analysis, with the intention of creating geodatabases of early medieval funerary sites and their characteristics. Identifying plague victims through this systematic survey will unlock the impact of the disease on the early demographic, economic, and social history of France. In June, early results and methodologies were presented to an audience at Harvard and livestreamed to participants in thirteen countries.



*Early Medieval Funerary Sites- Bretagne 400-1000 CE*



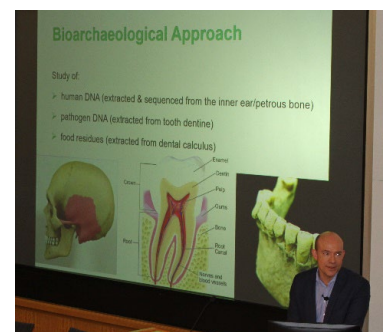
*Archaeological sources of microbes (teeth & calculus; bones; paleofeces; artifact residues; sediments)*



*EMBL Symposium, September 2022*

**In September**, MHAAM leaders David Reich and Johannes Krause co-organized the event "Reconstructing the human past: using ancient and modern genomics" at the European Molecular Biology Laboratory (Heidelberg, Germany), featuring talks and panel discussions by numerous MHAAM researchers, collaborators, and alumni.

**In November**, MHAAM Deputy Director Philipp Stockhammer, Professor of Prehistoric Archaeology at Ludwig Maximilian University (Munich, Germany), presented at Harvard "[Family, Foods, and Health in Bronze Age Greece](#)," with donor support for the event provided via the Friends of SoHP-MHAAM Gift Fund. Stockhammer discussed the latest insights into ancient Aegean food and family relations as well as the oldest infectious diseases scientifically traced in the Aegean.



*Philipp Stockhammer at Harvard*



*Alissa Mittnik, Herculaneum Update*

**In December**, the full-team MHAAM Research Meeting showcased seven current projects, spanning studies on ancestry in the Neolithic Sahara, variable population dynamics in Georgia, the early spread of pathogens from Europe to the Americas, early medieval atypical burials in France and Wales, Roman wine manufacture, kinship in Herculaneum at the time of the Vesuvius catastrophe, and the impact of early Slavic migrations.

### Graduate Student and Postdoc Work

MHAAM's three current Harvard graduate students had an extremely active year, researching at home, in Germany, and in the field.

**Megan Michel** (Human Evolutionary Biology) co-instructed 30 global participants in Prof. Christina Warinner's summer online course: "Introduction to Ancient Metagenomics." In addition to this, she excavated in Belize and presented at Heidelberg University her latest discoveries on how human subsistence strategies affected the evolution of oral microbes. She continues to train in paleopathogenomics, collaborating on new methods for ancient pathogens in Leipzig.



*Megan Michel in Belize*



*Aurora Allshouse with dental calculus in lab*

**Aurora Allshouse** (Anthropology) completed her training in protein extraction from ancient dental calculus and performed her first solo extraction. She presented on marine isotope variation at the Natural History Museum of Vienna in August and served in the Anthropology Department as Pedagogy Fellow for Prof. Warinner, assisting her in teaching courses on human diet and on the archaeology of Harvard Yard. Aurora also supervised an undergraduate senior thesis on stable isotope analysis of animal remains from Copán, receiving high praise for her work with Harvard undergrads.

**Reed Morgan** (History) worked with Prof. Dimiter Angelov to teach "The Crusades and the Making of East and West" in Spring 2022. During the summer he excavated with Prof. Margaret Andrews at Falerii Novi in Italy and participated in Prof. Warinner's summer training program. He also made sampling trips to Mosul, Iraq, and Carthage, Tunisia. Currently in Leipzig, Reed works with population geneticist expert Harald Ringbauer on the archaeogenetics of the Byzantine Empire and Punic and Late Antique Tunisia.



*Reed Morgan in Mosul*



*Solenn Troadec, May 2022 SoHP Pandemic Update*

**MHAAM postdoc Solenn Troadec** (PhD, University of Nottingham) continues her exploration of the early medieval funerary landscape of France, looking for victims of the Justinianic Pandemic. With help from the Inrap and the SRA Île-de-France, as well as support from the Richard Lounsbery Foundation, this project has now identified some two

hundred atypical burials in northern France, opening the way to a new study of alterity in death to be further illuminated by genomic analyses in Leipzig.

We congratulate our teams and their far-reaching global collaborators for their unique contributions to the field of archaeoscience in this banner year for the rapidly evolving discipline. We also thank our generous supporters who have enabled them, now Nobel-festooned!

## ***SoHP Projects***

### ***Historical Ice Core Project (HICP)***



2013 Expedition, Photo © Remo Walther

This was the final year of funding for the Historical Ice Core Project through the Arcadia Fund (UK), whose generous support allowed nine years of climate and pollution insights from the Colle Gnifetti Swiss ice core retrieved in 2013. Like the other European glaciers, Colle Gnifetti is swiftly disappearing. In 2022, the SoHP's collaboration with the Climate Change Institute led by Prof. Paul Mayewski at the University of Maine continued its ultra-high resolution measurements of environmental atmospheric deposits from the first millennium of our era; these deposits are now becoming available for careful verification, calibration, dating and analysis. The new, sub-annually resolved data promises novel insights into human-environmental interactions from Roman times forward. New measurements are expected to cast light on changing pre-Industrial Revolution levels of anthropogenic pollution from fossil fuels and metal production. Harvard undergraduates did their part too, finding gainful employ and happy research experiences during summer internships with Prof. Michael McCormick (History) and the Science of the Human Past.

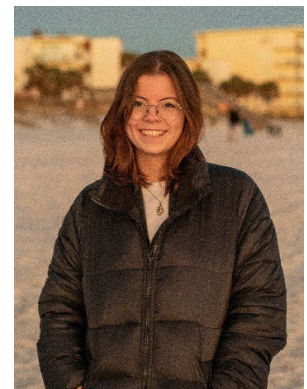
### ***Mapping Past Societies (MAPS)***



Mapping Past Societies (MAPS)

about archaeology, climate change, medicine, linguistics, and migration, as well as religious, artistic, and economic history. An associated project, the "Geodatabase of Reports of Climate and Weather From Written Sources, 23BCE to 1800 CE," is nearing completion and will be published and integrated into MAPS. Star undergraduate Lindsey Bouldin (Anthropology '23) continues to refine this massive dataset in her spare time, and her devotion to SoHP and archaeoscience has paid off: in May 2022 Lindsey was awarded a prestigious Beinecke Scholarship—one of only sixteen awarded

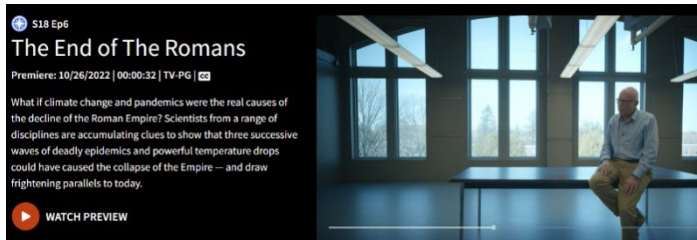
*Mapping Past Societies (MAPS)*, SoHP's free online digital atlas, plans a 2023 release to succeed its former iteration, the *Digital Atlas of Roman and Medieval Civilizations (DARMC)* which has over a million visitors each year. This resource, created over countless hours and years by teams of Harvard undergraduates, allows students and researchers to make new discoveries



Lindsey Bouldin '23

this year nation-wide—to support graduate studies in the arts, humanities, and social sciences! Lindsey was joined this year for work on the climate geodatabase by fellow undergrads Grace Seifu (Integrative Biology '24), Manav Bansal (Environmental Science and Engineering '25), and Maddy Irish (History of Science and Global Health and Health Policy '24), working under the direction of SoHP collaborator Asst. Prof. Alex More (Urban Public Health, UMass Boston).

## SoHP Media Outreach



PBS: *The End of the Romans*, October 26, 2022

In media outreach, Michael McCormick assisted European production company Arte.tv in developing a documentary on the new scientific evidence about the fall of the Roman Empire, making use of the HICP and MHAAM's pandemic investigations. The full documentary film aired on Arte.tv in Europe;

PBS also produced an abridged version, "[The End of the Romans](#)," which streamed in the US beginning in October. Additionally, growing interest in the "536 Event"—a severe climate cooling event caused by volcanic activity in the year 536 CE—landed McCormick interviews about drastic climate change with Accuweather (US), Corus Radio: Shane Hewitt (Canada), and William Shatner's "The UnXplained" (US).

Christina Warinner continues to make waves and friends with her "[Adventures in Archaeological Science](#)" coloring book aimed to introduce a very young audience to the riches of this field! It has been translated into approximately 50 languages so far, by archaeologists, biologists, linguists, and teachers around the world who have volunteered their time to help communicate to kids the fun of archaeological science.



*Adventures in Archaeological Science*

## SoHP Programs



*Inequality, Past and Present*, September 14, 2022

SoHP co-sponsored a September symposium on "[Inequality, Past and Present / A Roundtable Discussion of the Dawn of Everything: A New History of Humanity.](#)"

Speakers David Wengrow (University College London), Sue Alcock (University of Oklahoma), Gojko Barjamovic (Near Eastern Languages and Civilizations, Harvard), Philip Deloria (History and American Studies, Harvard)

and Aja Lans (Inequality in America Initiative, Harvard) discussed the origins of inequality in light of David Graeber and Wengrow's new book, *The Dawn of Everything*. Rowan Flad (Archaeology, Harvard) and Daniel Lord Smail (History, Harvard) convened this program that spotlighted how our understanding of the deep history of humanity is changing today. SoHP programming has been made possible via the Goelet-Berkowitz Fund to support the Science of the Human Past.

**In May**, we offered a post-pandemic update: “What has the Science of the Human Past Discovered Lately?” Presented were the latest advances by Harvard faculty Christina Warinner (Anthropology), Jason Ur (Anthropology), Daniel Lord Smail (History), Gabriel Pizzorno (History), David Reich (Human Evolutionary Biology), and by SoHP researchers Dr. Alex More (History), Dr. Solenn Troadec (History), and Michael Isakov (Harvard College '22). Topics ranged from genetically reconstructing Tibetan beers and Roman wines to understanding Mayan migration patterns, creating new methods for landscape archaeology, and studying the roles of digital humanities, early medieval burial archaeology, and climate reconstruction in medieval studies. Margaret Andrews (Classics) enlivened the whole with her comments: the seven talks had a standing-room only audience and livestreamed to participants in 13 countries. It was especially fun to include Harvard senior Michael Isakov (A.B. Mathematics and A.M. Statistics '22) who described his research with Harvard/MHAAM geneticists David Reich and Nick Patterson on the spread of Celtic language-speaking peoples which resulted in the 2021 *Nature* article “[Large-scale migration into Britain during the Middle to Late Bronze Age](#).” The article was highlighted in *The New York Times*, *BBC News*, and *Science*, and Isakov was listed as co-first author. Isakov’s interests first came into focus in SoHP’s 2019 undergraduate course “New Science of the Human Past: Case Studies at the Cutting Edge.” Nothing could better underscore the power of synthesizing science and the liberal arts in developing our students into the well-rounded Harvard College leaders of the future.



Michael Isakov presents at SoHP Lecture Event

### **Teaching with research: SoHP’s educational mission**



SPAAM Final Event: Instructors/Students

This summer, Christina Warinner organized a new MHAAM co-sponsored “[Introduction to Ancient Metagenomics](#)” Summer School, as part of the *Standards, Precautions, and Advances in Ancient Metagenomics* (SPAAM) community. Thirty students were trained over five days by fourteen instructors from Harvard and our Max Planck sister institution, highlighting the precious integration of our international teams as well as the sophisticated nature of our research on ancient microbes and pathogens. Participants learned the main steps of ancient metagenomic bioinformatic workflows, command lines, processing next-generation-sequencing (NGS) data, and how to perform de novo metagenomic assembly. Max Planck-Harvard grad student Megan Michel (Human Evolutionary Biology, Harvard) co-instructed during this first-of-kind summer intensive course on the new science.

Other courses in 2022 highlighted the growing interest in ancient DNA and ancient pathogen research at Harvard College. David Reich taught an advanced course called “Applying Population Genetics to Find Disease Genes” in the fall, as well as the class “Ancient DNA as a Window into the Human Past” in the spring. History grad student John Mulhall created “Conquering Pandemics: Medicine and the State in the Effort to Control Disease,” employing his own research on ancient Greek medical writers and the latest pathogen DNA discoveries.



Christina Warinner’s new course “Human Diet: from Neanderthals to the future of food,” assisted by Max Planck-Harvard graduate student Aurora Allshouse (Anthropology), surveyed how human diet has evolved from the foods of our earliest ancestors to the contents of today’s supermarkets. The class covered topics from defining food through human nutritional requirements, major dietary transitions and food innovations in human history, the roots of world cuisine, the modern food industry, and future food challenges. Students even tried their hands at making biochemically complex French sauces such as mayonnaise, hollandaise, and sabayon!



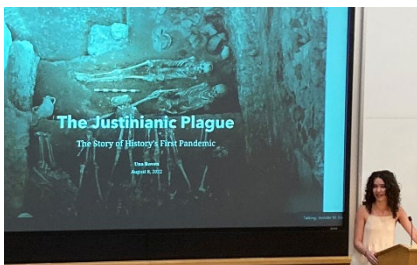
Course Module on Kitchen Chemistry: Sauces

Meanwhile, Jason Ur (Anthropology) led students in “Spatial Analysis In Archaeology” in Spring 2022, and co-taught with Rowan Flad the Gen Ed course “Can We Know Our Past?” in the Fall. The latter course helped students to answer this fundamental question: if the past is “dead and gone,” how do we know what we (think we) know about it? Furthermore, what is our degree of certainty about the past societies and cultures that historians, archaeologists and others study today? Through hands-on interaction with artifacts, experiments, and analytical methods, students gained a sense of how the seemingly distant past is intimately tied to the contemporary world.

Peter Huybers (Earth and Planetary Sciences) offered “Human Environmental Data Science: Agriculture, Conflict, and Health.” His curriculum addressed questions such as whether agricultural systems have adapted to climate change, if drought has caused conflict, and if the environment has influenced the spread of COVID-19. Daniel Lord Smail (History) and Matt Liebmann (Anthropology) taught “Deep History,” taking undergraduates on an interdisciplinary voyage through history and archaeology, art, economics, human evolution, psychology, and religion to address the entirety of the human past up to the present day. Finally, Michael McCormick’s course History 2056 was re-formatted in Spring 2022 to allow undergraduates from the prior *Science of the Human Past* course to select individual research projects. Enthusiastic to continue with the Science of the Human Past, students conducted in-depth study on historical ice cores, ancient pandemics and similar topics.

### ***SoHP Undergraduate Work***

Harvard undergraduates shone in summer fellowships.



Una Roven, SoHP Summer SHARP Fellow

**SoHP SHARP Fellow Una Roven** (History of Science and English '25) created an ArcGIS StoryMap called “[The Justinianic Plague: The Story of History’s First Pandemic](#)” to increase public understanding of this pandemic that began in 541 CE and spanned more than 200 years. Una mastered StoryMap, an interactive visual tool with which she mapped ancient eyewitness reports as well as individuals whose remains bore the ancient DNA of *Yersinia pestis*, the bacterium that causes bubonic plague.

**SoHP BLISS Fellow Shmu Padwa** (Statistics and Philosophy '25) researched the volume of maritime trade during the Roman Empire and how that changed over time by studying the contents of ancient shipwrecks and the location of Roman mines. These shipwrecks and mines were used as source locations for the many types of metal ingots discovered at sea. In his final project titled “Digitally Mapping the Creation and Movement of Ancient Wealth,” Shmu described the geodatabase of Roman shipwrecks that he expanded with recent discoveries, as well as how he restructured data to allow for better analysis, creating customizable maps to visualize the findings.



Shmu Padwa, SoHP Summer BLISS Fellow



Sophia Charles, Summer 2022

As a Riga Ghetto & Latvian Holocaust Museum summer intern, **Sophia Charles** (History and Physics '24) also began work on an archaeological inventory of metal ingots—mainly silver, lead, and tin—produced in the Roman Empire. Sophia recorded the region of deposition and production, measurements, production date, and connection to other ingots in the database in order to show how and where metal production changed over time. The database is meticulously graphed and catalogued.

## SoHP Steering Committee

[SoHP Steering Committee members](#) were quite active in research and lecturing in 2022.

**Peter Huybers** (Earth and Planetary Sciences) published on diverse topics such as [late Pleistocene sea-level variations](#), the relationship between [soil moisture and food production in Madagascar](#) using historical datasets, [new techniques for evaluating the significance of spectral peaks](#) (such as previously interpreted in the Greenland Ice Sheet Project), and [summertime temperature variability \(AGU: Earth's Future, 2022\)](#).



AGU: Earth's Future



McCormick in Max Planck clean room, Germany, Fall 2022

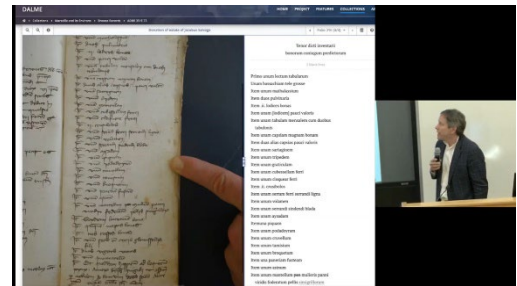
**Michael McCormick** (History) contributed a historian's perspective as co-author on "[Recognizing bias in Common Era temperature reconstructions](#) (*Dendrochronologia*), highlighting the critical shortage of high-resolution climate proxy records before the Middle Ages, which should serve as indispensable benchmarks for measuring recent climate change. In April, he lectured at the American Academy of Arts and Sciences 50<sup>th</sup> Anniversary of the *Journal of Interdisciplinary Studies* on the journal's signal contributions to the birth of modern environmental history. He presented a talk on the Science of the Human Past at the British School at Rome and University of Rome conference “‘Hard Sciences’, History and Archaeology of the Middle Ages: Towards New Paradigms?” in May. In addition to his presentations to various private foundations, McCormick spoke in Ingelheim, Germany at the University of Mainz/Institute for Advanced Study (Princeton, NJ) Symposium “Reflections on Byzantium from a Global Perspective: Europe and Beyond.”

**Nick Patterson** (Human Evolutionary Biology; Broad Institute) published research on [Distribution of Ancestry Tracts of Evolutionary Signals \(DATES\)](#), a robust new method to infer the timing of

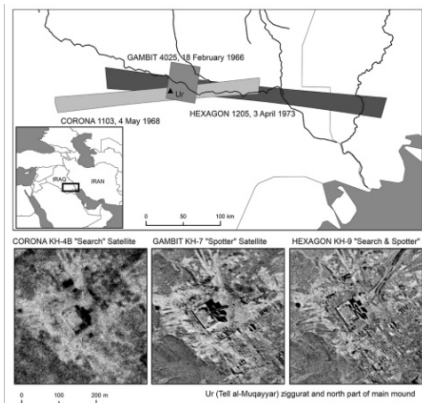
admixture events using genetic data from present-day or ancient individuals. In the study, DATES is applied to over 1,000 ancient human genomes to characterize major admixture events during the European Holocene, providing new insights on the origins and spread of farming and Indo-European languages. He also co-authored a major study published in *Science* on methodologies towards “[A unified genealogy of modern and ancient genomes.](#)”

**David Reich** (Human Evolutionary Biology; HMS) co-authored ancient DNA studies on the [Eneolithic Khvalynsk cemetery population](#) on the Volga river, the [genetic heritage of Southeast Asian populations](#), [admixture in protohistoric Cambodia](#), and on [fraternal stillborn twins from Tell el-Hesi](#) (northeast of Gaza). The Reich Lab released a compendium of published ancient and present-day DNA data in November: the [Allen Ancient DNA Resource \(AADR\)](#).

**Daniel Lord Smail** (History), along with colleague Gabriel Pizzorno (History), continues to expand and improve [The Documentary Archaeology of Late Medieval Europe](#) (DALME), a digital resource which makes vast amounts of material culture accessible online as open, well-structured and machine-actionable datasets readily amenable to linguistic and computational analysis. As Smail and Pizzorno described in their SoHP Post-Pandemic Update, the dataset includes approximately 40,000 line items (and counting), and has been upgraded for ease of use. Smail was also recently awarded the Harvard Dean’s Competitive Fund For Promising Scholarship for his current project “Global Pharmacopeias to 1850,” in order to develop a collection of historical references to drugs and other medical preparations in a form that is accessible to medical researchers, biochemists, and medical historians. The collection will consist of apothecaries’ inventories and similar lists of medicaments from Europe, European imperial dominions, and other regions.



Daniel Lord Smail presents DALME (SoHP Lecture)

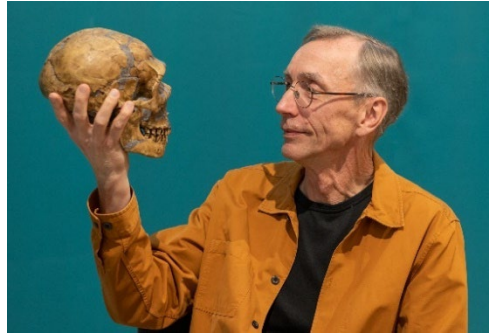


Satellite Imagery Comparisons: CORONA, GAMBIT, and HEXAGON, *Antiquity* 96 (387)

**Jason Ur** (Anthropology) published research on [the archaeology of the Erbil plain during the Hellenistic period](#) and the use of [declassified HEXAGON intelligence imagery for archaeological and historical research](#).

**Christina Warinner** (Anthropology) co-authored a host of methodological advances for archaeoscientific research, on [ZooMS applications in archaeology](#), the use of [sam2lca in shotgun metagenomics sequencing](#), [HAYSTAC for species identification in high-throughput sequencing data](#), [dental calculus metagenomics in oral microbiome research](#), [collagen fingerprinting to identify domesticated equids](#), [microbial indicators of health and disease](#), and the [use of dental calculus to understand structural violence and acute bacterial infections in a historical anatomical collection](#).

## ***In Conclusion...***



*Reed Morgan preparing samples in Mosul; Nobel Laureate Svante Pääbo, photo © Sylvio Tuepke, MPI for Evolutionary Anthropology*

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 Arcadia Fund of London, Harvard's Faculty of Arts and Sciences, INSTAP, The Richard Lounsbery Foundation, and *you*, our individual supporters. We are greatly encouraged in our pursuits this year by the Nobel recognition of Svante Pääbo, which fuels and inspires our

students to take the next steps in the wake of Dr. Pääbo and all of our intrepid team members towards revealing what connects, defines and refines us as human beings—past, present, and future.

*On behalf of the whole SoHP team,*

*Lisa Ransom Lubarr, Coordinator.*

**SoHP Steering Committee:** Thomas Benjamin (HMS Microbiology and Immunobiology, *emeritus*); Joyce Chaplin (History); Edward Hundert (HMS Global Health and Social Medicine); Peter Huybers (Earth and Planetary Sciences); Nick Patterson (Medical and Population Genetics, Broad/Harvard); David Reich (HMS Genetics; Human Evolutionary Biology); Stuart Shieber (Computer Science, SEAS); Daniel Lord Smail (History); Jason Ur (Anthro/Archaeology); Christina Warinner (Anthro/Archaeology); Walter Willett (HSPH Epidemiology and Nutrition); Michael McCormick, Chair (History).