



The New Science of the Human Past

Case Studies at the Cutting Edge



History 1056
New Foundations Lecture Course
MW 12–1:15 PM, Sever 102

Prof. Michael McCormick

Office hours: Mon. 1:30–2:30 and by appointment (Skype office hours TBA)
Robinson Hall M-04

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Office hours: Mon. 2:30–4:00

What amazing things are emerging **from life, climate, material, data sciences** that are changing everything we know about our **human history**, from our origins in **Africa** through **Roman climate change** to detecting a **medieval woman artist**, and beyond? **Harvard** is a hotbed of these discoveries right now, and this is the first course to focus on them and take you into the laboratory of ongoing discovery. Come and learn how **ancient DNA, ice cores**, and **data science** are transforming our knowledge of the human past.

We will **learn by doing**: we will use **instrumentation** to study the chemical composition of Roman and medieval pots, and do **experimental archaeology** by making Roman



21st-century historians at work, recovering ancient ice and its climate archive in the Alps.

pots in the **University Ceramic Studio**. We will study the science of reconstructing **ancient climate change** and then we will core our own tree rings and reconstruct Boston's arboreal and climate history from our rings at **Harvard's Arboretum**. We will learn how ancient DNA is changing everything we thought we knew about our **human origins, migrations, and diseases**, and discuss the latest **discoveries** with the women and men who are making them, in class and over lunch. Together we will examine case studies of ongoing discoveries in which we will learn how the natural sciences are transforming our understanding of the human past through material culture, environmental history, and our very bodies.

Topics will include **reconstructing our history from genomics**, the archaeology, history and science of **Roman pottery**, analyzing **Roman and medieval coins** with **our eyes** and with an **ice core**, discerning **paleoclimate change** and discovering **ancient plague** from **DNA** and **original documents**. It will mix classic classroom lectures with seminar-style student presentations and discussion, and meeting leading experts with classes held as field-trips to amazing Harvard institutions such as the Arnold Arboretum and the University Ceramics Studio. Most of readings are listed below. However the field is developing so fast that we may add or substitute one or another important article as the discoveries are published in the course of the semester.



Learning by doing! A Harvard student makes prehistoric ceramics in the University Ceramic Studio

*Note that **twice** this semester, on **Wednesday, October 16**, and **Wednesday, October 30** (TBA) this course will comprise **field trips** that **will require availability beyond 3pm on Wednesday**. Check your schedule now to make sure you can do the field trips. Past participants find these field trips the highlight of this or any course. Active participation in this hands-on course is absolutely vital: **attendance of all class meetings, sections, and field trips is mandatory!**

Schedule of Lectures and Labs

Week 1

Sept. 4 (W) Welcome: A Scientific Revolution Comes to Harvard and the Human Past

Readings: free-wheeling discussion of new discipline and discoveries.

Note: no Lab this week

Week 2

Sept. 9 (M) Lecture: Who Are We and Where Do We Come From, Part 1?
Demo-Presentation: Reich, *Who We Are*, Chs. 1–3.

Readings: Darwin, *Origin of Species*, Chapter 4 (“Natural Selection”); Reich, *Who We Are*, Chs. 1–3.



The Face of our
Neanderthal cousin?

Sept. 11 (W) Lab: Student Presentations of Darwin, *Origin*, ch. 4; Iosif Lazaridis et al. “Ancient human genomes suggest three ancestral populations for present-day Europeans.” *Nature* 513 (2014): 409-413; meet Prof. Reich; **free-free-wheeling** discussion.

Week 3

Sept. 16 (M) Lecture: Who Are We and Where Do We Come From, Part 2

Student Presentations on: Reich, ch. 5; Brace et al. 2019.

Readings: Reich, *Who We Are*, Chs. 4, 5, 7, 8; Selina Brace et al. 2019 “Ancient genomes indicate population replacement in Early Neolithic Britain.” *Nature Ecology & Evolution* 3, no. 5 (2019): 765-771.

Sept. 18 (W) Lab: Student presentations on Reich, chs. 7, 8; Iñigo Olalde et al. 2018. “The Beaker phenomenon and the genomic transformation of northwest Europe.” *Nature* 555: 190-196; and I. Lazaridis, A. Mitnik et al. “Genetic

origins of the Minoans and Mycenaeans.” *Nature* 548 (2017): 214-18 (with Supplementary Materials). Meet Dr. Alissa Mittnik.

Week 4

Sept. 23 (M) Lecture: Getting Specific with Human DNA and Medieval Microbiomes about Barbarian Invasions and Women Artists

Student presentations: Amorim 2018; Supplementary Materials

Readings: Reich, ch. 6, 9; Carlos Eduardo G. Amorim et al. “Understanding 6th-century barbarian social organization and migration through paleogenomics.” *Nature Communications* 9, no. 1 (2018): 35–47 (with Supplementary Materials).

Sept. 25 (W) Lab: How Afghanistan identified the first woman artist of the European Middle Ages. Student presentations: Anita Radini *et al.*, “Medieval women’s early involvement in manuscript production suggested by lapis lazuli identification in dental calculus.” *Science Advances* 5, no. 1 (2019): eaau7126 (with Supplementary Materials). (Date tentative): Meet Prof. Christina Warinner

Week 5

Sept. 30 (M) Lecture: Ancient Environments 1: Climate Change and the Roman Empire

Student Presentations: McCormick et al. 2012.

Readings: Michael McCormick et al., “Climate change during and after the Roman Empire and its successors: Reconstructing the past from scientific and historical evidence.” *Journal of Interdisciplinary History* 43 (2012): 169-220; Kyle Harper and McCormick. “Reconstructing the Roman climate,” in *The science of Roman history*, ed. W. Scheidel. Princeton: Princeton University Press, 2018. 11-52.

Oct. 2 (W) Lab: Student presentations, discussion: Harper and McCormick 2018, and M. Baillie, *A Slice Through Time*, Chapter 1 (p. 16-31) and Chapter 3 (p. 57-72).

Week 6

Oct. 7 (M) Lecture: Ancient Environments 2: Tree Rings and Ice Cores

Student presentation: Büntgen et al. 2011.

Readings: U. Büntgen et al., “2500 Years of European climate variability and human susceptibility.” *Science* 331 (2011): 578-82 (with Supplementary Materials); Büntgen et al., “Cooling and societal change during the Late Antique Little Ice Age from 536 to around 660 AD.” *Nature Geoscience* 9 (2016): 231-36 (with Supplementary Materials); Heather Clifford 2019 (in press).



What's inside a tree: the key to reconstructing the Ancient environment?

Oct. 9 (W) Lab: Student presentations, discussion on readings above.

Week 7

Oct. 14 (M) **Holiday: no class**

Oct. 16 (W) Lab: **Field Trip!** Arnold Arboretum: coring trees and analyzing tree rings. **Class continues to ~4 P.M.**

Week 8

Oct. 21 (M) Lecture: Ancient Environments, Ancient Economies (**featuring medieval coinage!**)

Student presentation: Chris Loveluck et al. “Alpine ice-core evidence for the transformation of the European monetary system, AD 640–670.” *Antiquity* 92 (2018): 1571-85

Readings: Philip Grierson. “Numismatics,” in *Medieval studies: an introduction*, ed. James M. Powell, Syracuse, 1992 (2nd ed.), 114–61.



Where did the silver come from that powered medieval empires?

- Oct. 23 (W) Lab: **Back to the Ice Cores.** Student presentations on Alex F. More et al. “Next generation ice core technology reveals true minimum natural levels of lead (Pb) in the atmosphere: insights from the Black Death.” *GeoHealth* 1 (2017): 211–19 (with Supplementary Materials); Loveluck et al. in press. Meet Dr. More.

Week 9

- Oct. 28 (M) Lecture: Roman Pots, Modern Instruments: pXRF

Readings: TBA

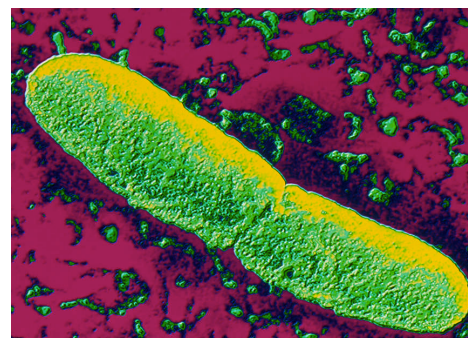
- Oct. 30 (W) Lab: **Field trip!** Making a Roman Pot at the University Ceramic Studio. **Class continues to ~4 P.M.**

Week 10

- Nov. 4 (M) Lecture: Plague! Studying Ancient Pathogens in the 21st Century

Student Presentations: Feldman et al. 2016.

Readings: Michal Feldman et al. “A high-coverage *Yersinia pestis* genome from a 6th-century Justinianic Plague victim.” *Molecular Biology and Evolution* 33 (2016): 2911–2923 (with Supplementary Materials); Marcel Keller et al. “Ancient *Yersinia pestis* genomes from across Western Europe reveal early diversification during the First Pandemic (541–750).” *Proceedings of the National Academy of Sciences* 116, no. 25 (2019): 12363–12372 (with Supplementary Materials).



The disease that destroyed Rome?
Yersinia pestis, now proven by aDNA to
be behind the Justinianic Pandemic

- Nov. 6 (W) Lab: Student presentations on readings above. Close reading of a historical report from the Justinianic Pandemic.

Week 11

- Nov. 11 (M) Lecture: Digital Humanities: Discovering a Lost Ancient City in Spain Without Digging (**guest lecturer: Jake Ransohoff**)

Student Presentation: TBA

Readings: J. Henning, et al. "Reccopolis revealed: the first geomagnetic mapping of the early medieval Visigothic royal town." *Antiquity* 93, no. 369 (2019): 735–51.

Nov. 13 (W) Lab: Going for the Gold! GIS Lab.

Week 12

Nov. 18 (M) Student Presentations of Final Posters, part 1 (10 mins. each)

Nov. 20 (W) Student Presentations of Final Posters, part 2 (10 mins. each)

Week 13

Nov. 25 (M) Student Presentations of Final Posters, part 3 (10 mins. each)

Nov. 27 (W) **Thanksgiving break: no class**

Week 14

Dec. 2 (M): Toward the future of the human past: Student Presentations of Final Posters, part 4, and **Pizza Party!**

Recommended Readings: Baillie, M. G. L. *A slice through time: dendrochronology and precision dating*. London: Batsford, 1995. **(On reserve in Lamont)**



Readings

Required reading:

Reich, David. *Who We Are and How We Got Here*. Oxford: Oxford University Press, 2018. **(Available for purchase at the Harvard COOP and on reserve in Lamont).**

All other readings will be posted on the Canvas site.

Course requirements

1. Attendance and participation in all lectures, sections and field trips
2. 1 or 2 short presentations in class or section of assigned readings
3. 1 final poster (due mid-November)
4. 1 10-minute presentation of final poster (November 18, 20, or 25)

Final Poster Project:

In lieu of a term paper, the final project for this course is to produce a scientific or archaeological conference-style poster. We will be spending time in section looking at examples and understanding the components that go into the successful presentation of research in this format. We will be having them professionally printed, and the printer will notify us the specific date by which we must submit them as a class **(if you are late, you will have to pay the printing cost yourself!)**. We aim to select the best poster(s) to feature them and their author(s) at future professional meetings of the Initiative for the Science of the Human Past at Harvard.

Grading Breakdown

Participation in class meetings and field trips:	15%
Participation in Sections:	15%
Short presentations (5-10 min. oral presentations):	10%
Final poster (due mid-November):	40%
10-minute poster presentation:	20%



**A Harvard Undergraduate
Scientist of the Human Past,
2019, Max Planck Institute for
the Science of Human History,
Jena, Germany**

Collaboration Policy

Discussion and the exchange of ideas are essential to all serious academic work. You may find it useful to discuss and debate your work with your peers. Nevertheless, you should make certain that all written work you submit for evaluation is the result of your own research and writing and that it reflects your own approach to the topic. You must also adhere to standard citation practices in history and properly cite any books, articles, reference documents, etc. that have helped you with your work. If you receive any help with your writing or research (feedback on drafts, research advice, etc.), you should acknowledge this assistance in a relevant note in your paper.

AEO Policy

Students needing academic adjustments or accommodations because of a documented disability should present a Faculty Letter from the Accessible Education Office (AEO) to the Head TF by the end of the second week of the term (Friday, September 16).