

Princeton University

HIS390 – Spring 2023

History of Science, Technology, and Medicine: Ideas & Methods

Class: Mondays & Wednesdays 1:30-2:50 pm

Location: 112 Friend Center

Professor Erika Lorraine Milam

Email: emilam@princeton.edu

Office Hours: Tuesdays 1:30 to 3:30 pm, or by appt.

Location: 135 Dickinson / remote: <https://princeton.zoom.us/my/emilam>

course description

In our contemporary world, science, technology, and medicine enjoy tremendous cultural and intellectual authority. This class introduces a set of analytical tools historians use to understand the origins and consequences of these ways of knowing, across space and time. We will discuss a variety of ideas and methods that describe the social, cultural, and intellectual conditions of possibility for creating knowledge about the natural world. In addition, the class materials invite students to reflect on the cultural and intellectual constraints that shape how societies determine which knowledge is worth pursuing and why.

HSTM Minor and History of Science Major within the History Department

This course explores the origins of ideas about the natural world and our human attempts to improve it from the perspective of the history of science, technology, and medicine. It is one of many courses that count towards the “History of Science” major and the “History of Science Technology and Medicine” minor, both administered by the History Department.



Learn more at <https://history.princeton.edu/HOSUndergrad>

Readings

This course involves 100-150 pages of reading per week. Readings will be made available through the course Canvas site.

Evaluation & Grading

Attendance and participation are mandatory.

Reflective essay (800 words) on a campus-based field trip	10%	Participation in ONE is required; essay due one week after field trip.
Midterm paper (5-6 pp.)	25%	March 10
Final project (12-15 pp.)		
- <i>Proposal & Sources</i>	5%	March 31
- <i>Final Paper</i>	30%	May 9 – Dean’s Date
Class participation	30%	incl. six 300-word reading responses, due Sundays by 2pm

Class Participation

Each week spans two days: Mondays we will read historians thinking about a particular research problem in the history of STEM; Wednesdays we will read and discuss a primary source that exemplifies that problem. Class participation will be essential to each discussion and assessed according to the History Department’s grading rubric (found at the end of the syllabus).

Over the course of the semester, you are required to turn in six reading responses of 300 words, each describing two themes you see running through the readings and posing a question for discussion. These are due via Canvas before 2pm on Sunday. These will not be graded individually but will count towards your participation grade.

Papers will be graded on the merits of their argument, use of evidence, and presentation, as outlined in the History Department’s grading rubric (found at the end of this syllabus). For the short paper, you will be given an essay prompt that you will need to answer based on the readings and discussion from class. The final, longer paper will be more open-ended and allow you to explore a topic you have found especially interesting during the semester. It will require additional independent research.

Late Policy

Late reading responses will not be accepted. The penalty for other writing assignments is as follows—a third of a grade for each 8-hour period after the deadline. It will be up to you to decide whether the deduction is worth the extra time. After 7 days, I will no longer accept papers for grading.

Regular **Office Hours** are Monday mornings. Other options may also be available. Please sign up for office appointments through Bookings.

- *You are required to meet with Professor Milam during office hours in the first three weeks of class.*

Academic Integrity

Intellectual honesty is vital to an academic community and for my fair evaluation of your work. All work submitted in this course must be your own, completed in accordance with the [University's academic regulations](#). You may not engage in unauthorized collaboration or make use of ChatGPT or other AI composition software.

Policy on Electronic Devices

Please do not use laptops and cellphones in class. Studies now conclusively show that they detract from learning -- for you and those around you. See, for instance: <https://www.scientificamerican.com/article/students-are-better-off-without-a-laptop-in-the-classroom/>. If you have an academic accommodation that requires the use of an electronic device, please be in touch with me.

Disability Services and Academic Accommodations

Students must register with the Office of Disability Services (ods@princeton.edu; 908-258-8840) for disability verification and determination of eligibility for reasonable academic accommodations. Requests for academic accommodations for this course should be made at the beginning of the semester, or as soon as possible for newly-approved students. I encourage students with approved accommodations to contact me at the beginning of the semester, and again before major course assessments. Please note that no accommodations for a disability will be made without authorization from ODS, or without advance notice.

Student Wellbeing

Princeton seeks to foster and uplift mental health, wellbeing, and accessibility resources among students. If you or someone you know needs support or is looking to access specific services, consider reaching out to these university and student-led resources:

- Your [residential college advising team](#) is a good first resource for advice and counsel. The [directors of student life \(DSLs\)](#), whose offices are located in each residential college, serve as case managers in crisis situations. They are also available to talk with you about well-being concerns and can refer you to appropriate campus resources.
- The [Office of Disability Services](#) facilitates reasonable accommodations to support students with disabilities. Contact them at 609-258-8840 or by e-mail at ods@princeton.edu to learn more about access and possible accommodations.
- If you are feeling distressed or need support, please contact [Counseling & Psychological Services \(CPS\)](#) at 609-258-3141 for immediate support or to schedule an appointment with a counselor. CPS is a confidential resource.
- The [Sexual Harassment/Assault Advising, Resources and Education \(SHARE\)](#) office is a survivor-centered, trauma-informed, confidential resource on campus. SHARE provides crisis response, support, counseling, advocacy, education, and referral services to students experiencing unhealthy relationships and abuse, including harassment, sexual assault, dating/domestic violence, and stalking.
- The [Princeton Peer Nightline](#) is a student-run anonymous peer listening service. It is not affiliated with CPS or the University administration. They offer anonymous chat/call peer support.

Academic Resources

The Writing Center <http://writing.princeton.edu/center>

The Writing Center offers free one-on-one conferences with experienced fellow writers trained to consult on assignments in any discipline.

The McGraw Center <https://mcgraw.princeton.edu/>

The McGraw Center for Teaching and Learning offers one-on-one learning consultations that can be particularly useful for developing active reading strategies, project management skills, and note-taking tactics. You can make an appointment for an individual consultation by visiting their website. The McGraw Center also supports group study hall and individual peer tutoring.

Reference Librarians <http://library.princeton.edu/hours/information>

Reference librarians can help you make a research plan, find sources (electronic and print) and provide guidance through the research and citation process

course schedule and readings

Week 1 – What is the *history* of science? While we are at it, what is science, anyway?

Monday – January 30 – Steven Shapin, “Lowering the Tone in the History of Science: A Noble Calling,” in *Never Pure: Historical Studies of Science as if it Was Produced by People with Bodies, Situated in Time, Space, Culture, and Society, and Struggling for Credibility and Authority* (Johns Hopkins University Press, 2010), 1-15.

Wednesday – February 1 – Thomas S. Kuhn, *The Structure of Scientific Revolutions*, 50th Anniversary ed. (Chicago: University of Chicago Press, 2012): Chapters 1-5, pp. 1-51.

Week 2 – Who counts in histories of STEM? On scientific credit and invisible labor

Monday – February 6 – Margaret W. Rossiter, “The ~~Matthew~~ Matilda Effect in Science.” *Social Studies of Science* 23/2 (1993): 325-41.

Steven Shapin, “The Invisible Technician,” *American Scientist* 77 (1989): 554-563.

Wednesday – February 8 – Evelyn Fox Keller, *A Feeling for the Organism: The Life and Work of Barbara McClintock* (San Francisco: W. H. Freeman, 1983), xvii-38 and 197-207, notes.

Evelyn Fox Keller, “The Anomaly of a Woman in Physics,” in *Working It Out: 23 Women Writers, Artists, Scientists, and Scholars Talk About Their Lives and Worked*, ed. Sara Ruddick and Pamela Daniels (NY: Pantheon Books, 1977), 77-91.

Week 3 – How can we trust our sources? Oral history and eye-witness accounts

Monday – February 13 – Anke te Heesen, “Thomas S. Kuhn, Earwitness: Interviewing and the Making of a New History of Science,” *Isis* 111/1 (2020): 86-97.

Olivia Weisser, *Ill Composed: Sickness, Gender, and Belief in Early Modern England* (New Haven: Yale University Press, 2016), 1-15, notes.

Wednesday – February 15 – Oral History Interview with Linus C. Pauling, conducted by Jeffrey L. Sturchio in Denver, Colorado on 6 April 1987 for the Beckman Center for the History of Chemistry.

Alfred Charles Kinsey, Wardell B. Pomeroy, and Clyde Eugene Martin, “Interviewing” in *Sexual Behavior of the Human Male* (W.B. Saunders, 1948): 35-62.

“Best Practices,” Oral History Association: <https://oralhistory.org/best-practices/>.

Week 4 – What does it mean to be healthy? Environments and disease

Monday – February 20 – Alison Bashford, “Anticolonial Climates: Physiology, Ecology, and Global Population, 1920s-1950s,” *Bulletin of the History of Medicine* 86/4 (2012): 595-626.

Shigehisa Kuriyama, *The Expressiveness of the Body and the Divergence of Greek and Chinese Medicine* (Zone Books, 1999), “Wind and Self,” 233-270, notes.

Wednesday – February 22 – Hippocrates, “On Airs, Waters, and Places.”

Beverly Gage, “Nobody Has My Condition But Me,” *New Yorker* (30 January 2023), 13 pp.

Week 5 – Does technology drive history? Plows and typewriters

Monday – February 27 – Thomas Mullaney, “The Moveable Typewriter: How Chinese Typists Developed Predictive Text during the Height of Maoism,” *Technology and Culture* 53/4 (2012): 777-814.

Lynn White, Jr., *Medieval Technology and Social Change* (Oxford University Press, 1962), “The Agricultural Revolution of the Early Middle Ages,” 39-78.

Wednesday – March 1 – Dionysius Lardner, “Influence of Improved Transport on Civilisation,” in *Railway Economy* (Taylor, Walton, and Maberly, 1850), 1-21.

Brown, *The Home Alphabet Book, with Descriptive Coloured Engravings* (Dean and Son, c. 1860), “The Railway Alphabet” 1-24 and “The Steamboat Alphabet” 1-24. Note: The *Home Alphabet Book* is for kids, so ‘reading’ it isn’t as much the point as thinking about the messages about technology that are communicated in its pages.

Leta S.Hollingsworth, “The New Woman in the Making,” *Current History* 27/1 (1927): 15-20.
“Birth Control Libel Action. *Stopes v. Sutherland and Another*,” *British Medical Journal* 1/3245 (1923): 445-448.

Week 6 – How far back did “science” exist? Why origins stories matter

Monday – February 6 – Geoffrey Lloyd and Nathan Sivin, *The Way and the Word: Science and Medicine in Early China and Greece* (Yale University Press), Aims and Methods, 1-15, and Chinese and Greek Sciences Compared, 239-251.

Daryn LeHoux, “Tropes, Facts, and Empiricism,” *Perspectives in Science* 11/3 (2003): 326-345.

Wednesday – February 8 – **Trip to Special Collections!** No advance reading.

Spring Break

Week 7 – Where is scientific knowledge generated? Place, space, knowledge

Monday – March 20 – Thomas Gieryn, “Three Truth Spots,” *Journal of History of the Behavioral Sciences* 38/2 (2002): 113-132.

Lisa Messeri, “From Outer Space to Outer Place,” in *Placing Outer Space: An Early Ethnography of Other Worlds* (Duke University Press, 2016), 1-24, notes.

Wednesday – March 22 – Cheikh Anta Diop, “The Meaning of Our Work,” in *The African Origin of Civilization: Myth or Reality* (Lawrence Hill & Co., 1974), xii-xvii.

Louis S. B. Leakey, *The Progress and Evolution of Man in Africa* (Oxford University Press, 1961), 1-50.

George Basalla, “The Spread of Western Science,” *Science* 156/3775 (1967): 611-622.

Week 8 – Who gets to do it? The politics of expertise

Monday – March 27 – Alan Sokal, “Revelation: A Physicist Experiments with Cultural Studies,” *Lingua France* (May-June 1996).

M. Norton Wise, “The Enemy Without and the Enemy Within,” *Isis* 87/2 (1996): 323-327.

Wednesday – March 29 – Max Weber, “The Scholar’s Work” [1917], in *Charisma and Disenchantment: The Vocation Lectures*, ed. Paul Reitter and Chad Wellmon, trans. Damion Searls (NYRB, 2020), 3-42.

Week 9 – Can good science be done in oppressive regimes?

Monday – April 3 – Michael Frayn, *Copenhagen* (Methuen Drama, 1998), adapted to film by BBC (2002): <https://catalog.princeton.edu/catalog/99125174133606421>.

Wednesday – April 5 – Matthias Dörries, ed. *Michael Frayn’s Copenhagen in Debate: Historical Essays and Documents on the 1941 Meeting Between Niels Bohr and Werner Heisenberg* (Office for History of Science and Technology, University of California, Berkeley, 2005), excerpts.

Week 10 – What does STEM look like? Maps, pictures, graphs, and visual representations

Monday – April 10 – William Rankin, “Mapping Time in the Twentieth (and Twenty-First) Century,” in Kären Wigen and Caroline Winterer, eds. *Time in Maps: From the Age of Discovery to Our Digital Era* (Princeton University Press, 2020), 15-35.

Gregg Mitman, “A Journey without Maps: Film, Expeditionary Science, and the Growth of Development,” in *Documenting the World: Film, Photography, and the Scientific Record*, ed. Gregg Mitman and Kelly Wilder (University of Chicago Press, 2016), 124-149.

Wednesday – April 12 – **Exercise: Bring a visual representation of/in STEM to class.**

Jorge Luis Borges, “On Exactitude in Science” [1946], in *Collected Fictions*, trans. by Andrew Hurley (Viking, 1998).

Umberto Eco, “On the Impossibility of Drawing a Map of the Empire on a Scale of 1 to 1” [1982], in *How to Travel with a Salmon and Other Essays* (Mariner Books, 1995), 95-106.

Week 11 – How can the humanities improve the practice of STEM? And vice versa?

Monday – April 17 – Hasok Chang, “How Historical Experiments Can Improve Scientific Knowledge and Science Education: The Cases of Boiling Water and Electrochemistry,” *Science and Education* 20 (2011): 317-341.

Gideon Lewis-Kraus, “Is Ancient DNA Research Revealing New Truths -- or Falling Into Old Traps?” *New York Times Magazine* (17 January 2019).

Wednesday – April 19 – Ted Chiang, “The Truth of Fact, The Truth of Feeling,” in *Exhalation* (Alfred A. Knopf, 2019), 185-230.

Isaac Asimov, “The Psychohistorians” [1951] in *Foundation* (New York: Bantam, 2004), 1-40.

Matt Stanley, “Why Should Physicists Study History?” *Physics Today* 69/7 (2016): 38-44.

Week 12 – Why trust STEM?

Monday – April 24 – Naomi Oreskes, “Why Trust Science? Perspectives from the History and Philosophy of Science,” in *Why Trust Science?* (Princeton University Press, 2019), 15-160.

Wednesday – April 26 – Wrap-up

Field Trips – Research on Campus, in Historical and Modern Perspectives

Over the course of the semester, you must go on at least **ONE** of these tours and write a short (800 word) reflective essay on the place of research on campus, in historical perspective. These sites have been chosen for their breadth across the disciplines. You are welcome to participate in multiple tours, of course! Each is restricted to 12 people (and you may be joined by a few interested graduate students in the history of science PhD program).

FIELD TRIP 1 – Infrastructures of Knowledge – Friday, February 17 1:30-3:30pm

Tour the Research Collections and Preservation Consortium ([ReCAP](#)) Facility located on Princeton’s Forrestal Campus. ReCAP is jointly owned and operated by Columbia, Harvard, the NY Public Library, and Princeton. Their technological infrastructure extends the lifespan of the more than 17 million items under their care. (Allocated time includes transportation.)

FIELD TRIP 2 – The Quest for Clean Energy – Friday, March 31 1:00-3:00pm

Learn about the fields of plasma physics, fusion energy, and the research done at the Princeton Plasma Physics Laboratory ([PPPL](#)). PPPL is a US Department of Energy national laboratory managed by Princeton University and is located on the Forrestal Campus. (Allocated time includes transportation.)

FIELD TRIP 3 – [Preservation and Conservation Lab](#) – Friday, April 14, 1:30-2:30pm

FIELD TRIP 4 – The [Imaging and Analysis Center](#) of the PMI – Friday, April 28, 1:30-2:30pm

Department of History Grading Practices

Class Participation

A student who receives an **A** for participation in discussion in precepts or seminars typically comes to every class with questions about the readings in mind. An 'A' discussant engages others about ideas, respects the opinions of others, and consistently elevates the level of discussion.

A student who receives a **B** for participation in discussion in precepts or seminars typically does not always come to class with questions about the readings in mind. A 'B' discussant waits passively for others to raise interesting issues. Some discussants in this category, while courteous and articulate, do not adequately listen to other participants or relate their comments to the direction of the conversation.

A student who receives a **C** for discussion in precepts or seminars attends regularly but typically is an infrequent or unwilling participant in discussion.

A student who fails to attend precepts regularly or to adequately prepare for discussion risks the grade of **D** or **F**.

Essays & Papers

An **A** or **A-** thesis, paper, or exam is one that is good enough to be read aloud in a class. It is clearly written and well-organized. It demonstrates that the writer has conducted a close and critical reading of texts, grappled with the issues raised in the course, synthesized the readings, discussions, and lectures, and formulated a perceptive, compelling, independent argument. The argument shows intellectual originality and creativity, is sensitive to historical context, is supported by a well-chosen variety of specific examples, and, in the case of a research paper, is built on a critical reading of primary material.

A **B+** or **B** thesis, paper, or exam demonstrates many aspects of A-level work but falls short of it in either the organization and clarity of its writing, the formulation and presentation of its argument, or the quality of research. Some papers or exams in this category are solid works containing flashes of insight into many of the issues raised in the course. Others give evidence of independent thought, but the argument is not presented clearly or convincingly.

A **B-** thesis, paper, or exam demonstrates a command of course or research material and understanding of historical context but provides a less than thorough defense of the writer's independent argument because of weaknesses in writing, argument, organization, or use of evidence.

A **C+**, **C**, or **C-** thesis, paper, or exam offers little more than a mere a summary of ideas and information covered in the course, is insensitive to historical context, does not respond to the assignment adequately, suffers from frequent factual errors, unclear writing, poor organization, or inadequate primary research, or presents some combination of these problems.

Whereas the grading standards for written work between A and C- are concerned with the presentation of argument and evidence, a paper or exam that belongs to the D or F categories demonstrates inadequate command of course material.

A **D** thesis, paper, or exam demonstrates serious deficiencies or severe flaws in the student's command of course or research material.

An **F** thesis, paper, or exam demonstrates no competence in the course or research materials. It indicates a student's neglect or lack of effort in the course.