

Sociology of Science

COURSE INFO

TIMING:**MONDAYS**1:30 - 4:30
Room TBA**INSTRUCTOR:****DR. JANET VERTESI****609-258-9053**jvertesi@princeton.edu

205B Scheide Caldwell

Office Hours: Mon. 10am - 12pm
or by appointment

Science is a critical part of our modern world. But how is it actually done? And how does it affect our daily lives? Placing science in social context is essential to understanding it as a process, as an institution, and as a powerful and influential force in society. With examples such as controversies over cold fusion and HIV-AIDS research, the practices of genetic testing and brain scan analysis, the questions of nuclear weapons and climate change, forms of expertise and public policy, this course will introduce you to the exciting and growing field of the sociology of science.

What is the Sociology of Science?

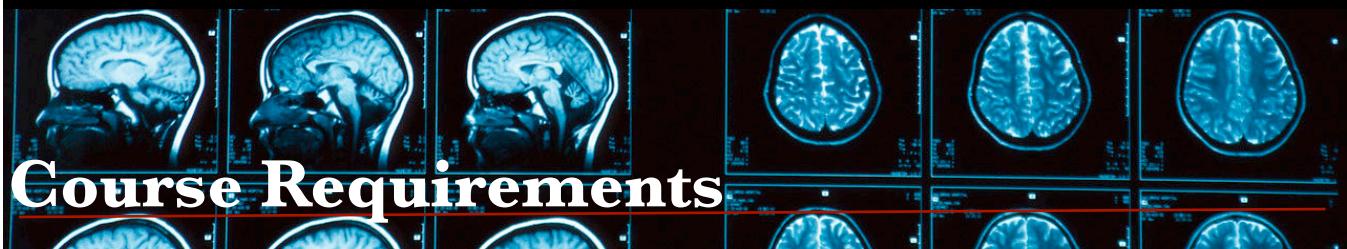
We are often used to thinking of science as something outside of the sphere of human influence: after all, facts are just facts. But we can also examine science as a **social phenomenon**. After all, it is done by people and is subject to our social norms, institutions, beliefs and practices.

For over forty years, scholars in the field of Science and Technology Studies (also called “Science Studies”) have used the tools of sociology, history, anthropology, and philosophy to understand the human dimension of scientific work. How are scientific facts made and verified? How does our social commitments on issues like gender or race affect our scientific vision? Where does science policy come from and how does it involve different kinds of expertise? In this course, you will learn how to ask important questions about how our human world affects science -- and how science affects our human world.



Where (some of) the action is...
IN THE LAB

As the place where scientific knowledge gets made, laboratories are an important focus for Science Studies. **Laboratory Ethnography**, the qualitative and immersive field study of laboratory work, is one of the primary methods that sociologists of science used to understand scientific practice, knowledge and discovery.



Course Requirements

Readings & Writings

This one semester, seminar survey course provides an overview of the field of the Sociology of Science, a focus area within Science and Technology Studies. Readings are organized around weekly themes to give students theoretical grounding in the field and provide interesting examples with scope for good discussion. From these readings and discussions, students will develop independent research projects on a relevant topic of their choice.

This is a seminar course: completion of readings prior to class, seminar attendance and participation are **mandatory and graded**.

Readings

The readings for this course are structured around **ten themes** that explore the relationship between science and society, norms, and policies. The readings are required prior to each seminar discussion, listed under the week in which they are due. These readings will be available in the course packet from the campus store.

Reading Responses

Short responses to the week's readings are due by email to the instructor **before 8am** on the morning of class. These should be a short, 1-2 page summary of the readings, including your thoughts or questions about them, or correlations you see between them or between a topic in a reading and technology in your daily life. I require 8 responses over the semester (you decide which weeks to skip).

Midterm

An **in-class midterm exam** will require short answer questions.

Final Paper

The "final" for this course is a **12-15 page research paper** on a topic of your choice. I encourage you to think about writing a research paper as a process that involves several stages, opportunities for consultation and feedback, and writing.

It is wise to **use the readings** as a jumping-off point for exploring your topic of special interest At **individual conferences** during week 4-5 we'll discuss your ideas for the paper and give you guidelines and resources to proceed.

A **paper proposal** is due in Week 8 of the class. This should be a 2-3 page summary indicating your topic of interest and sources, and outlining your research and argument. Plan to include at least two in-class sources, and at least 4 other sources not listed on this syllabus.

The best papers will involve both **empirical and analytical** components. Analytical materials will be drawn from class, but empirical materials may involve original/archival research, interviews, or ethnographic observations. If you are planning to use human subjects in your research, contact the instructor early on so that you may apply for an IRB.

In the final class, you will have five minutes to give a brief, informative, workshop-style **presentation** on the topic of your paper to your classmates. We will talk about these presentations, my expectations for them and their grading, in class.

The final paper is due DEAN'S DATE, by 5pm, by email or mailbox delivery. This paper must present a clear argument, employ at least 10 academic sources, and demonstrate engagement with the topics of concern to the course.

Deadlines are summarized on p.6.

GRADING BREAKDOWN

10% Seminar Attendance and Participation

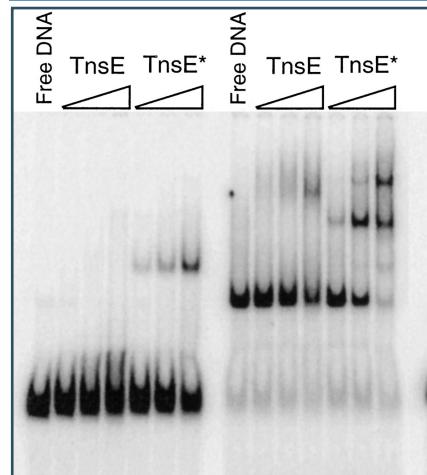
15% Weekly Reading Responses

20% Midterm Exam

15% Paper Proposal: 2-3 pages, concise, detailing your argument and sources.

10% Paper Presentation: 5 minutes, peer-evaluated

30% Final Paper: 12-15 pages double-spaced.



Scientific images and practices make great research topics! Lynch & Jordan show the role of ritual in genetic plasma preps (above), Dumit describes patients' responses to brain scans (top), and Latour argues that visual "inscriptions" are central to scientific practice.

PARTICIPATION

QUALITY OVER QUANTITY

In discussion seminars, monopolizing the conversation or intervening with off-the-cuff remarks or digressions is not a goal. Rather, we expect students to prepare assignments in advance – reading, underlining, formulating questions and comments. In class we value the ability to encourage the opinions of others and advance the conversation. Characteristics of specific grading ranges are:

A. Students come to each class with questions/ comments based on careful reading and thinking about the assignments; have grappled with the material and assumed some responsibility for it; encourage others to formulate their ideas; listen attentively and forward or debate the comments of predecessors with the goal of elucidating and going deeper into the material.

B. Students are present but their comments do not reflect a serious prior engagement with the texts; they may speak merely to be heard or wait for others to ask interesting questions and then react. They listen to other students, but they do not make an effort to integrate others' views into ongoing discussion. They express opinions as opposed to articulating ideas.

C. Students attend class regularly but their engagement is perfunctory or irrelevant; contributions may be sporadic or digressive and not informed by careful preparation. They may hammer positions or, conversely, fail to realize which issues are at stake.

D.-F. Students miss class; are not prepared. (*From: Council of the Humanities Grading Guidelines*)

ASK YOURSELF:

Are you listening to your instructor? Are you listening to your peers? Are you listening actively? Are you asking questions of your peers? Are you respecting what they have to say? Do you respond respectfully and thoughtfully to their comments? Do you prepare questions or thoughts to share in class based on your readings? Are you asking questions about material you don't understand? Are you drawing connections to other course material? Do you come to class well-rested, fed, and leaving distractions at the door? Do you give your full attention to what is going on?

Course Policies

Attendance and Participation

This is a seminar course: completion of readings prior to class, seminar attendance and participation are *mandatory and graded*. You are expected to come to class, having completed the reading and/or writing assignments due that day.

If you have to miss a class, you must contact me beforehand with a valid excuse, preferably supplemented with medical letters or notes from your Dean to excuse your absence. After two unexcused absences, every further class you miss will subtract a third of a letter (i.e. A-, B+, B...) from your final grade.

In-Class Computing

This is a course about the social effects and relationships with science in our everyday lives. In order to achieve enough analytical distance from our inventions, we will host an electronics-free classroom. No phones, laptops, media players, or digital readers. Cell phones will be permitted in cases of emergency only, by prior permission of the instructor.

Working with Sources

Academia is all about using sources: reading them, talking about them, critiquing them or exploring them. But **plagiarism**, or passing off someone else's work or ideas as your own without crediting them properly, is unacceptable. **All sources – electronic and paper – must be referenced** with the appropriate formatting. Whether you choose MLA, Chicago style, APA or typical formats in the sciences, please make sure you are consistent! Please note that I will consider your choice of sources in your paper towards your grade, so use your judgment wisely. Plagiarized assignments will result in a grade of zero, and will be subject to University policies on academic integrity. If you have any questions about what constitutes plagiarism, please do not hesitate to contact me.

Online Sources

The internet is not, wholesale, an academic source. Certainly, many academic sources can be found online, such as electronic versions of books, newspapers, academic journals, and conference proceedings. But personal, commercial, or organizational websites are not appropriate to use as sources in your college career. If you have any doubts as to whether or not a website constitutes a reliable source, send me an email with the URL and I will check it out for you as soon as I possibly can.

See the back page of the syllabus for more online resources.

Introduction

No readings for introductory session.

Laboratories

Where does science take place and what happens there?

2

Bruno Latour and Steve Woolgar, *Laboratory Life: The Construction of Scientific Facts*. 2nd ed. (Princeton University Press, 1979/1986). (Excerpt)

Bruno Latour, "Give me a laboratory and I will raise the world," (1983) in Mario Biagioli (ed.) *The Science Studies Reader* (Routledge, 1999), pp. 256-75.

Sharon Traweek, "Touring the Site: Powerful places in the laboratory," Ch.1 in *Beamtimes and Lifetimes: The World of High Energy Physics* (Harvard, 1988), 18-45.

Steven Shapin, "The Invisible Technician," *American Scientist* 77 (1989): 554-63

Controversy

How do discoveries happen, and who gets the credit?

3

Robert K. Merton, "The Normative Structure of Science [1942]" *The Sociology of Science: Theoretical and Empirical Investigations* (Chicago: University of Chicago Press, 1979), pp. 267-278.

David Bloor, "The Strong Programme in the Sociology of Knowledge," in *Knowledge and Social Imagery* (Chicago: University of Chicago Press, 1991 [1976]), pp. 3-23.

Harry Collins and Trevor Pinch, "The Sun in a Test Tube: The Story of Cold Fusion," Ch. 3 in *The Golem: What You Should Know About Science*, 3rd ed. (Cambridge, Canto), 57-78.

Peter Galison, "Introduction," Ch. 1 in *How Experiments End* (Chicago, 1987), pp. 1-20.

Experiments

What role do instruments and experience play in scientific experiments?

4

Michel Polanyi, "Tacit Knowing," Ch.1 in *The Tacit Dimension*, (Chicago, 1966), pp.1-26.

Harry Collins, "Replicating the TEA-Laser," Ch.3 in *Changing Order: Replication and Induction in Scientific Practice* (Sage, 1985), 51-78.

Harry Collins and Trevor Pinch, "Two experiments that "proved" the theory of relativity," Ch. 2 in *The Golem: What You Should Know About Science*, 2nd ed. (Cambridge, Canto, 1998), 27-56.

Kathleen Jordan and Michael Lynch, "The Sociology of a Genetic Engineering Technique: Ritual and Rationality in the Performance of the 'Plasmid Prep', in Adele Clarke and Joan Fujimura (eds.), *The Right Tools for the Job* (Princeton, 1992), pp.77-114.

Images

How do scientists represent what they know? And with what consequences?

5

Michael Lynch, "Discipline and the material form of images: an analysis of scientific visibility," *Social Studies of Science*, 15 (1985): 37-66.

Bruno Latour, "Drawing Things Together," in Michael Lynch & Steve Woolgar, eds., *Representation in Scientific Practice* (MIT Press, 1990): 19-68.

Lorraine Daston & Peter Galison, 'The Image of Objectivity,' *Representations* 40 (1992): 81-128.

Joseph Dumit (2004) Picturing Personhood: Brain Scans and Biomedical Identity (Princeton University Press). (Excerpt)

Communities

How do scientists police and transgress their borders?

6

Thomas Gieryn, "Boundary-Work and the Demarcation of Science from Non-Science: Strains and Interests in Professional ideologies of Scientists," *American Sociological Review* 48 (1983): 781-95.

Susan Leigh Star and James Greisemer, "Institutional Ecologies: Translations and Boundary Objects," *Social Studies of Science* 19 (1986): 387-420.

Peter Galison, "Trading Zones: Coordinating Action and Belief," in Mario Biagioli, ed., *The Science Studies Reader* (Routledge, 1999), pp. 137-60.

Jane Calvert and Joan Fujimura, "Calculating Life? Duelling Discourses in Interdisciplinary Systems Biology," *Studies in History and Philosophy of Biological and Biomedical Sciences* 42 (2011), 155-163.

Gender

How does our cultural understanding of gender affect our scientific knowledge?

7

Schiebinger, L. "More Than Skin Deep: The Scientific Search for Sexual Difference," in *The Mind Has No Sex?: Women in the Origins of Modern Science* (Harvard, 1989), pp. 190-213.

Emily Martin, "The Egg and the Sperm: How Science Constructed a Romance Based on Stereotypical Male-Female Roles," *Signs* 16 (1991), 485–501.

Ann Fausto-Sterling, "Sexing the Brain: How biologists make a difference," Ch. 5 in *Sexing the Body* (Basic Books, 2000), 115-145.

Donna Haraway, (1988) "Situated knowledges: The science question in feminism and the privilege of partial perspective," in Mario Biagioli, ed., *The Science Studies Reader* (Routledge, 1999), 172-188.

Animals

What role do experiments and observations of animals play in our knowledge of the world?

8

Donna Haraway, "Teddy Bear Patriarchy: Taxidermy in the Garden of Eden," *Social Text* 11 (1984), 20-64.

Karen Rader, "Mice, Medicine and Genetics," Ch. 2 in *Making Mice: Standardizing Animals for American Biomedical Research 1900-1955* (Princeton, 2004), 25-59.

Michel Callon, "Some Elements of a Sociology of Translation: Domestication of Scallops and the Fishermen of St. Brieuc Bay" in Mario Biagioli, ed., *The Science Studies Reader* (Routledge, 1999), pp. 67-83.

Eben Kirksey & Stefan Helmreich, "The Emergence of Multi-Species Ethnography," *Cultural Anthropology* 25 (2010), 545-576.

Experts

Who knows what; why; and with what consequences?

9

Brian Wynne, "Misunderstood Misunderstanding: Social identities and public uptake of science," *Public Understanding of Science* 22 (1992), 281-304.

Steven Epstein, "The Construction of Lay Expertise: AIDS Activism and the Forging of Credibility in the Reform of Clinical Trials," *Science, Technology & Human Values* 20 (1995), pp. 408-437.

Steve Hilgartner, "Staging Authoritative Reports," Ch. 2 in *Science on Stage: Expert Advice as Public Drama* (Stanford, 2000).

Sheila Jasanooff, "The Law's Construction of Expertise," Ch. 3 in *Science at the Bar: Law, Science and Technology in America*, (Harvard, 1995) pp. 42-68.

Politics

How do scientists reconcile their work with global networks of power and politics?

10

Hugh Gusterson, "Becoming a Weapons Scientist," Ch. 2 in: *Nuclear Rites: A Weapons Laboratory at the End of the Cold War* (California, 1988), pp.38-67.

Jenny Reardon, "The Human Genome Diversity Project: A case study in Coproduction," *Social Studies of Science* 31 (2001), 357-88.

Joanna Crane, "Adverse events and placebo effects: African scientists, HIV, and ethics in the 'global health sciences,'" *Social Studies of Science* 40 (2010), 843-70.

Paul Edwards, "Data Wars," Ch. 11 in: *A Vast Machine: Computer models, climate data, and the politics of global warming* (MIT, 2011), pp.287-322.

Policy

How do we - or should we - put scientific knowledge into practice as public policy?

11

Dorothy Nelkin, "The Political Impact of Technical Expertise," *Social Studies of Science* 5 (1975), 35-54.

Sheila Jasanooff, "Contested Boundaries in Policy-Relevant Science," *Social Studies of Science* 17 (1987), no.2.

Kathleen M. Vogel (2006) "Bioweapons Proliferation: Where Science Studies and Public Policy Collide," *Social Studies of Science* 36(5): 659-690.

Donald MacKenzie and Graham Spinardi, "Tacit Knowledge and the Uninvention of Nuclear Weapons," Ch. 10 in *Knowing Machines* (MIT, 1996), 215-260.

***Presentations* of individual research projects.**

Resources

Professional Associations

- <http://www.4sonline.org> - The Society for Social Studies of Science, the primary professional association for sociologists of science. Lots of great information online.
- <http://www2.asanet.org/sectionska/> - The Science, Knowledge and Technology Section of the American Sociological Association.

Journals

Sociologists of science publish in a variety of journals. Look for the top articles in these publications:

- **Social Studies of Science** (sagepub.com/ss)
- **Science, Technology, and Human Values** (sagepub.com/sth)
- **Science Studies**
- **Science as Culture** (cultural studies of science)
- **Science Communication** (public understanding of science)
- **Science and Public Policy** (policy issues)
- **Minerva** (gender and science)
- **Configurations** (science, art, and literature)

Handbooks (in course reserve)

- **The Science Studies Reader**, edited by Mario Biagioli. All the seminal texts in one place! (Routledge, 1999).
- **The Handbook of Science and Technology Studies**, short, encyclopedia-style entries on key topics in STS (MIT Press, 2008)
- **An Introduction to Science and Technology Studies**, by Sergio Sismondo (Blackwell, 2010). A text-book style approach to introducing and explaining the field.
- The **STS Wiki** (www.stswiki.org) is a consolidated, community-based resource for STS-ers, including lists of readings and previews of Science Studies programs worldwide.

Sociology of Science Programs

- **Cornell University Science & Technology Studies**: <http://sts.cornell.edu/>
- **MIT Program in Science, Technology and Society**: <http://web.mit.edu/sts/>
- **Rensselaer Polytechnic Science and Technology Studies**: <http://www.sts.rpi.edu/>
- **UC San Diego's Science Studies**: <http://sciencestudies.ucsd.edu/>
- **University College London** Science and Technology Studies: <http://www.ucl.ac.uk/sts/>
- **University of Edinburgh Science Studies Unit**: <http://www.stis.ed.ac.uk/>
- **University of Oxford, Said Business School**: <http://www.sbs.ox.ac.uk/research/sts>

RESEARCH IDEAS

Getting started with your final paper...

Add **@sciencemagazine**,
@NYTimesScience and/or
@NatureMagazine to your Twitter feed and tune into current science news to find an area, controversy, or case that interests you.

Browse online resources for STS

bibliographies on topics that you get excited about. The **Syllabus Collection** on the 4S website (4sonline.org) or the **STS Wiki**, (stswiki.org) both have terrific lists of readings and writing topics that can inspire.

Consult the **STS Handbooks** for more grounding in your choice of theoretical perspective or empirical site.

PAPER TIMELINE

Week 4: Professor Conference. Bring one or more ideas for research topics.

Week 8: Proposal Due. 2-3 pages, with sources and topics well explained.

Week 12: Presentations. Your opportunity to present and get feedback on your topic with your classmates.

Deans' Date: **Paper due.**

Note: All research papers do better with feedback. Circulate drafts to your peers in the class. I will read and provide comments on drafts up to 2 days before the deadline.

STAND BACK



**I'M GOING TO TRY
SCIENCE**