

Science and Technology Studies 201: Where Science Meets Society

Fall 2019

201 Van Hise Hall

Tues. & Thurs. 11am – 12:15pm

Professor Adam Hayes

Office hours: Tuesdays 12:30-2pm, or by appointment

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What is science? What, if anything, is special about the way that scientists and engineers generate knowledge? In university courses, we absorb many implicit rules about what makes for good scientific work—lab reports should be written in the third person, papers must have citations (but not to Wikipedia, of course!), double-blind studies are better than anecdotal evidence—but rarely do we have the opportunity to reflect on why it is that we are taught to know in this way. This course identifies and questions common (but often unstated) assumptions about what science *is* and *how it works*, with the aim of revealing the connections between the STEM fields and our social, cultural, economic, and political lives. The first unit introduces central ideas in Science and Technology Studies (STS), a field that uses perspectives from the humanities and social sciences to analyze STEM. We will examine whether the scientific method is an accurate description of how science and technology development operate in practice, and if not, what kinds of descriptions might be put in their place. Unit two examines how culture, economics, and politics interact with science and technology development. We will ask who benefits from how particular research agendas or new technologies are designed, and who bears the risks of living with uncertain science or dangerous technologies. The final unit explores how societies can engage with controversial issues in STEM. After exploring the rationales for and barriers to involving non-scientists in decision-making, we will collectively choose several controversial current topics to explore in depth (such as stem cell research, digital media and copyright, or bioterrorism), and one of these topics will be the basis for an in-class exercise in participatory science policy. This course is aimed at students with backgrounds in either the sciences or the humanities who want to think more critically about the interactions between of science, technology, and society, and it serves as the foundational course for students enrolled in the ISSuES certificate program (<http://www.sts.wisc.edu/education/ISSuES.html>). It will allow students in the STEM fields to reflect on the implications of their work for society, and students in the humanities and social sciences will develop a better understanding of how to study STEM as a social activity. There are no prerequisites for this course.

Course Objectives

After successfully completing the course you will be able to:

- Identify and reflect on your own assumptions about what science and technology are and how they work, especially your assumptions about the relationship between STEM and society;
- Explain key concepts from the field of Science and Technology Studies and apply them to novel case studies;

- Reflect on how scientific agendas or technological designs could be constructed differently with different societal aims in mind;
- Describe different models for public engagement with STEM policy issues, compare their benefits and limitations, and analyze controversial issues using these models.

Required Texts*

This course has two required texts, which you can buy online or from the UW Bookstore.

1. *An Introduction to Science and Technology Studies, 2nd Edition* by Sergio Sismondo
2. *The Golem at Large: What You Should Know about Technology* by Michael Collins and Trevor

*All other readings will be posted on canvas.

Assignments for grading:

In-Class participation	15%
(10) Weekly reflections	30%
Assignment 1	15%
Assignment 2	15%
Final Paper	25%

Discussion participation: Your participation grade will be based on your attendance in class, preparation for section, and the quality of your participation in discussions and section exercises. Participation in online Canvas discussion forums each week will also count toward class participation.

Weekly reflections: You are responsible for submitting a thoughtful reflection based on the current week's readings, for whichever 10 class sessions you choose. Each reflection should illustrate that you've read the materials and highlight any questions that you have, what was confusion? What didn't you understand? What did you agree or disagree with strongly? This will help me help you fill in the gaps and also inspire questions or thoughts for in-class discussion.

Assignments:

- 1) Controversy case study This assignment asks you to take a current scientific, medical, or technological controversy of your choosing and analyze it using the concepts learned so far in class. Applying the analytical tools you have acquired to a current case will help you both in making sure you understand key course concepts, and in formulating well-supported opinions on controversial science policy or ethics questions. Instructions and a grading rubric for this assignment will be distributed in class.
- 2) Rhetoric assignment In this assignment, you will write two short pieces on same topic in different writing styles—one in the form of a scientific report, and the other in the form of an opinion piece. The aim of this assignment is to explore how rhetorical choices create different forms authority and credibility in scientific writing, and to gain a greater

awareness of how you use rhetorical devices in your own writing. Instructions and a grading rubric for this assignment will be distributed in class.

Course policies

Absences You are allowed one freebie (no questions asked) absence from section, which you can take at any time during the semester without consulting me. After that, unexcused absences will count against your participation grade. For *excused* absences due to illness, family emergencies, scheduled conflicts, or other legitimate reasons, you can make up the missed participation grade by handing in an additional 250 word informal reading response (in addition to your 7 reflections) instead of attending class. You must contact me in advance of the missed class (except in exceptional circumstances such as illness) to clear your absence and agree on a due date for your reading response.

Assignment deadlines and grading: All assignments will receive a numeric score (e.g. 29/30), which will be displayed in Canvas. Your total numeric score will be converted into a final letter grade using the conversion table below. Scores falling below these cutoffs will not be rounded up). If you are facing circumstances are making it difficult for you to meet assignment deadlines (including personal circumstances such as uncertain housing, lack of food, health issues, family crises), I am happy to discuss deadline extensions or other accommodations with you (you can also contact the Dean of Students Office for assistance with these issues <https://doso.students.wisc.edu/studentassistance/>). If you do not make prior arrangements with me or your TA, late assignments will lose 3% of the total assignment points per day late.

A	AB	B	BC	C	D	F
93.0–100%	88.0–92.9%	83.0–87.9%	78.0–82.9%	70.0–77.9%	60.0–69.9%	<59.9%

Students with disabilities I am happy to discuss academic accommodations for students with disabilities. Please present your McBurney visa to me within the first three weeks of the semester so that there is enough time for appropriate arrangements to be made.

Academic Integrity All students are expected to adhere to the University of Wisconsin—Madison’s core values regarding academic integrity. Plagiarism or other academic misconduct may result in a zero on the assignment or exam, a lower grade in the course, or failure in the course. See the Dean of Students Office for more information about the academic misconduct process (<http://students.wisc.edu/doso/acadintegrity.html>).

Course Schedule*

*Readings denoted by a '➤' are required readings.

**Readings denoted by a '○' are optional readings – but should be considered for reflections!

Week 1: What is Science?

9/10

- Sismondo Ch. 1: The prehistory of science and technology studies
 - “Is the war between Science and Religion over?” (1986) Hall & Hall, *The Humanist*,
 - “Myth #6: That the apple fell and Newton invented the law of gravity”, Patricia Fara, in *Newton’s Apple and Other Myths about Science*

9/12

- Sismondo Ch. 2: The Kuhnian Revolution
 - Kuhn (1981) What Are Scientific Revolutions? (excerpts)

Week 2: Who makes science?

9/17

- Sismondo Ch. 3: Questioning Functionalism in the Sociology of Science
 - Excerpts from Merton, R.K. *The Sociology of Science: Theoretical and Empirical Investigation* (Chicago: The University of Chicago Press, 1973)

9/19

- Excerpts from *Leviathan and the Air pump*, (1985) Schaffer and Shefrin.

Week 3: How is Science Made?

9/24

- Sismondo, Ch. 10: Studying Laboratories
 - Latour, B. and Steve Woolgar, *Laboratory Life: The Social Construction of Scientific Facts* (Princeton: Princeton U. Press, [1979] 1987). Chapters 1, 2 and 3.

9/26

- Sismondo, Ch. 6: The Social Construction of Scientific and Technical Realities
 - Gieryn, T.F. “Boundary-Work and the Demarcation of Science from Non-Science: Strains and Interests in Professional Ideologies of Scientists,” *American Sociological Review*, vol. 48, no. 6 (December 1983): 781-795

Week 4: Scientific controversies

10/1

- Sismondo, Ch. 11: Controversies
 - Godin & Gingras. "The experimenters' regress: from skepticism to argumentation"

10/3

- Collins and Pinch (1998) "The sun in a test tube: the story of cold fusion."
 - Harry Collins and Trevor Pinch, "Alternative Medicine: The Cases of Vitamin C and Cancer," *Dr. Golem: How to Think About Medicine* (Chicago: The University of Chicago Press, 2005): 84-111

***Assignment #1 Due Monday October 7th.*

Week 5: Pseudoscience and challenging scientific 'facts'

10/8

- Sismondo, Ch. 15: The Public Understanding of Science
 - Ron Westrum, "Knowledge About Sea-Serpents," in Roy Wallis (ed.), *On the Margins of Science: The Social Construction of Rejected Knowledge*: 293-314.

10/10

- Golem, Ch. 4: Disputes about the origins of oil
 - Thearle, M. J. (1993). "The rise and fall of phrenology in Australia." *Australian and New Zealand journal of psychiatry*, 27(3), 518-525.

Week 6: Knowledge, power, and expertise

10/15

- Sismondo, Ch. 16: Expertise and Public Participation
- Golem, Ch. 7: AIDS cures and lay expertise
 - Sainath Suryanarayanan and Daniel Lee Kleinman, (2013) "Be(e)coming experts: The controversy over insecticides in the honey bee colony collapse disorder," *Social Studies of Science* 43: 215.

10/17

- Sismondo, Ch. 17: Political Economies of Knowledge
 - Golem, Ch. 6: Chernobyl and the Cumbrian sheepfarmers

Week 7: Science, gender & race

10/22

- Sismondo, Ch.7: Feminist Epistemologies of Science
 - Fujimura, J. H. (2006). Sex genes: A critical sociomaterial approach to the politics and molecular genetics of sex determination. *Signs: Journal of Women in Culture and Society*, 32(1), 49-82.

10/24

- Sismondo, Ch.4: Stratification and Discrimination
 - "Race and Science in the Twenty-First Century." (2016) Ramya M. Rajagopalan, Alondra Nelson, and Joan H. Fujimura. In *Handbook of Science and Technology Studies*

Week 8: Economic 'science' and the social studies of finance

10/29

- Golem, Ch. 5: Seven wise men and the science of economics
- Excerpts from MacKenzie (2006) "An Engine Not a Camera: The Performativity of Economics"

10/31

- Preda (2016). "Machineries of Finance: Technologies and Sciences of Markets"

Week 9: What is Technology?

11/5

- Sismondo, Ch.9: Two Questions Concerning Technology
- Golem, Introduction: the technological Golem

11/7

- 'Pinch & Bijker (2008) "The Social Construction of Facts and Artifacts"
 - Oudshoorn, N., Rommes, E., & Stienstra, M. (2004). Configuring the user as everybody: Gender and design cultures in information and communication technologies. *Science, Technology, & Human Values*, 29(1), 30-63.

Week 10: Technological accuracy, risk, and accidents

11/12

- Golem, Ch. 2: The naked launch: assigning blame for the *Challenger* explosion

11/14

- Golem, Ch. 1: the role of Patriot missiles in the Gulf War

Week 11: Algorithms, Big Data, AI, and society

11/19

- O'Neil (2016) Weapons of Math Destruction: Chapters on Going to College & Getting a Job
 - Iliadis, A., & Russo, F. (2016). Critical data studies: An introduction. *Big Data & Society*, 3(2).

11/21

- "Searching for Black Girls" in Noble (2018) Algorithms of Oppression
 - Chander, A. (2016). The racist algorithm? *Mich. L. Rev.*, 115, 1023.

Week 12: Genomics, biotechnology, and biomedicalization

11/26

- Clarke, et al. (2003) Biomedicalization: Technoscientific Transformations of Health, Illness, and U.S. Biomedicine
 - Adams, V. (2002). Randomized controlled crime: postcolonial sciences in alternative medicine research. *Social Studies of Science*, 32(5-6), 659-690.

11/28

NO CLASS - THANKSGIVING

Week 13: Presenting scientific evidence, rhetoric and arguments

12/3

- Sismondo Ch. 13: Rhetoric and discourse

12/5

- Consensus Conference activity (day 1: expert debate)

****Assignment #2 due Monday December 9th.**

Week 14: Consensus and public engagement with Science

12/10

- Consensus Conference activity (day 2: citizen consensus)

***Take Home Final Exam: Due by midnight, December 20th**