HISTORY 619/SI 719/RACKHAM 619:
Knowledge/Power/Practice in Science, Technology & Medicine

VERSION 1.0, 2 JANUARY 2012
MOST CURRENT SYLLABUS ALWAYS AVAILABLE HERE AND ON CTOOLS

Winter 201
Thursdays, 1-4
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This graduate readings seminar provides a comprehensive introduction to the major themes and issues in the field of Science & Technology Studies (STS, or S&TS). Drawing on scholarship in history, sociology, anthropology, and information studies, we will mix theoretical material with more empirically oriented studies. The course will focus particularly on the relation between social, political, and cultural contexts and the development of ideas, practices, tools, and objects within science, technology, and medicine. While some background in science, technology and/or medicine is helpful, this course does not require any particular expertise.

Work for the seminar will include reading approximately 200-350 pages per week, brief weekly response papers, two discussion papers based on a week's reading, and a final project of about 15 pages.

Requirements: Assignments and Expectations

Reading

All required readings *except books* will be available for download through the course CTools site.

Students should purchase the following books:

> Harry Collins & Trevor Pinch, *The Golem: what you should know about science* (Cambridge University Press, 1998), 2nd edition
> Chandra Mukerji, *Impossible Engineering: Technology and Territoriality on the Canal du Midi* (Princeton University Press, 2009)
> Timothy Mitchell, *Carbon Democracy: Political Power in the Age of Oil* (Verso Books, 2011)
> Bruno Latour, *Reassembling the social: an introduction to actor-network theory* (Oxford University Press, 2007)
> Warwick Anderson, *The collectors of lost souls: turning Kuru scientists into whitemen* (Johns Hopkins University Press, 2008)
> Donald MacKenzie, *Material markets: how economic agents are constructed* (Oxford University Press, 2008)

Steven Epstein, *Inclusion: the politics of difference in medical research* (University of Chicago Press, 2007)

Michelle Murphy, *Sick Building Syndrome and the Problem of Uncertainty: Environmental Politics, Technoscience, and Women Workers* (Duke University Press, 2006)

Thomas Misa, *Leonardo to the Internet: Technology and Culture from the Renaissance to the Present* (Johns Hopkins University Press, 2nd edition, 2011)

Optional for purchase (but this is an STS classic, and you should probably own it):

Steven Shapin and Simon Schaffer, *Leviathan and the Air-Pump* (University of Chicago Press, 1985)

Those interested in overviews of the field (or its subfields) may find the following texts useful:

Jan Golinski, *Making Natural Knowledge: Constructivism and the History of Science* (Cambridge: Cambridge University Press, 1998)

Sergio Sismondo, *An Introduction to Science and Technology Studies* (Oxford: Blackwell, 2004)

Edward Hackett, Olga Amsterdamska, Michael Lynch, and Judy Wajcman, eds., *The Handbook of Science and Technology Studies, Third Edition* (MIT Press, 2008)

Francesca Bray, "Gender and Technology," *Annual Review of Anthropology* 36 (2007): 37-53

Writing

There are three types of writing assignment:

1) **Weekly responses.** Every week — except for the ones in which you are leading discussions and doing the recommended reading — you must turn in a 400-600 word response to the required reading. This should be **double-spaced.** Rather than merely summarize the reading, you should engage with it analytically. ***The electronic version of this response is due no later than 8 a.m. on the day of the seminar, submitted to CTools. Aalso bring 1 printed copy to class.***

   You can skip one response paper between February and April. No skips in January.

   SEE CTOOLS SITE FOR EXAMPLES OF EXCELLENT RESPONSE PAPERS.

2) **Discussion papers**. Two are due during the semester. Your due dates will be determined on the first day of class. See below under "Discussion" for further details.

3) **Final project.** Your final project will be a paper of around 3000 words (10-12 pp). The precise choice of topic and format is up to you. You may choose to write this as a literature review, a grant proposal, an analysis of current events, or whatever other format suits your professional training or needs. You must, however, receive our approval for the format you choose. Whatever you choose, you must directly engage with some aspect of the STS literature, and must read additional material (i.e., articles and/or books beyond those assigned in the course).
   This assignment has three parts.
   (a) A *proposal* that clearly describes your topic and how it relates to course materials and concepts. This should consist of a 300-500 word narrative description, along with a preliminary bibliography of 5-7 works. **Due to both instructors by email NO LATER THAN MONDAY, MARCH 5TH AT 5 pm.** We strongly recommend that you discuss your ideas with one of us before submitting this proposal.

(b) A good draft of the paper is **due by email on Tuesday, April 10th.** This should be at least 1500 words, and should include a full bibliography with annotations of 50-70 words for each item. You are expected to read everyone's draft in order to have an effective wrap-up discussion on April 12th, the last day of class. We will divide the class up into thematic clusters; you will be providing substantial written comments on the other papers in your cluster.

(c) The *final version*, edited, revised, and proofread, is **due to both instructors by email NO LATER THAN TUESDAY April 17th AT 5 pm.**

Discussion

This is a discussion seminar. Its success depends on the commitment, involvement, and timeliness of all participants. Therefore, you are expected to arrive in class on time and thoroughly prepared to participate actively in all discussions.

Cold calling: to encourage full involvement and preparation, the professors will "cold call" several students during each class. This means that we will ask you a direct question on the readings; we will expect answers that demonstrate your knowledge of the material and your ability to draw interesting connections from them to other readings. This practice is not intended to single out or embarrass anyone. Instead, its goal is to help you prepare for class and to learn to think and talk "on your feet," a crucial skill required by almost any profession.

We will grade you on both the regularity and the quality of your participation, including your responses to cold calls. Attendance without regular, thoughtful, constructive participation is not acceptable.

Leading discussion: Twice during the term, you will help lead class discussion. This will involve:

* Selecting and reading one of the **starred** books from the "recommended reading" list for that week.
* Finding 2 scholarly reviews of the book.
* Writing an 800-1200 word "think piece" that reviews the book and relates it to the assigned reading. **You must pre-circulate this piece to the entire class no later than 5 pm on the day before the seminar. Bring a printed copy to class, stapled to a printed copy of the scholarly book reviews.**
* Meeting with the other student(s) presenting in that session and collectively preparing a one-page handout as an aid to class discussion. This handout should list what you consider to be the three or four most interesting analytical points for the week's reading, including both the main assignment and the recommended reading you did. The handout should also offer two questions designed to provoke interesting, wide-ranging general class discussion. The questions should focus on the concepts, theories, or historiographical frames from the readings.
* Distribute hard copies of this handout to all class members at the start of the seminar.
* At the beginning of that class session, presenters will jointly spend **no more than 20 minutes** outlining the themes from the common readings and elaborating your discussion questions. Presentations should draw upon the recommended readings as appropriate, but they should NOT engage in extended reviews of those readings (that's what the pre-circulated "think pieces" are for). All presenters should participate in the presentation and be involved in leading the discussion.
* **Presentations will be timed.** You will receive a 5-minute warning at the 15-minute mark. A timer will go off at the 20-minute mark, and you must stop talking then. Again, this is not intended to embarrass you. Rather, it is meant to prepare you for professional presentations, which are always time-limited. Speaking concisely and effectively is an important skill in any profession.

Grading breakdown

- Weekly responses: 25 percent
- Discussion "think piece" and presentation: 15 percent each
- Participation: 25 percent
- Final paper (including prep stages and peer comments): 20 percent

All assignments must be turned in on time. Lateness will be reflected in the final course grade.

Science, Technology, Medicine & Society colloquium series

Everyone is welcome and encouraged to attend the Science, Technology, Medicine, and Society (STeMS) faculty-graduate student colloquium. STeMS meets 4-6 times each semester, usually on Monday afternoons from 4-5:30 (usually but not always in 1014 Tisch Hall).

Students are also encouraged (but not required) to attend colloquia of the UM Science, Technology & Public Policy Program. These usually meet on Monday afternoons 4-5:30 in the Betty Ford Classroom, 1110 Weill Hall, Ford School of Public Policy.

Consult the STS program website for a [list of Winter 2012 events]().

Course Schedule

1/5: Introduction

Paul N. Edwards, "How to Read a Book"

1/12: Week 2. Some Empirical Foundations

Harry Collins and Trevor Pinch, *The Golem: What You Should Know about Science*
Thomas J. Misa, *Leonardo to the Internet*

No weekly response due

1/19: Week 3. Sociology of Scientific Knowledge (SSK) and Social Construction of Technology (SCOT)

SSK:
Steven Shapin and Simon Schaffer, *Leviathan and the Air-Pump* (Chicago: University of Chicago Press, 1985), pp. 3-79 and 332-344
David Bloor, "The Strong Programme in the Sociology of Knowledge," in *Knowledge and Social Imagery*, 2nd ed. (Chicago: University of Chicago Press, 1991) (orig. 1976), pp. 3-23
Barry Barnes and David Bloor, "Relativism, Rationalism, and the Sociology of Knowledge," in M. Hollis & S. Lukes (eds.), *Rationality and Relativism* (Blackwell, 1982)

SCOT:
David Noble, "Social Choice in Machine Design," in MacKenzie and Wajcman, *The Social Shaping of Technology, 2nd edition,* pp. 161-176
Thomas Hughes, "The Evolution of Large Technical Systems," in Wiebe Bijker, Thomas Hughes, and Trevor Pinch, eds. *The Social Construction of Technological Systems* (Cambridge MA: MIT Press, 1987), pp. 51-82.
Bryan Pfaffenberger, "The Harsh Facts of Hydraulics: Technology and Society in Sri Lanka's Colonization Schemes," *Technology and Culture* (1990): 361-397.

Recommended:
Science/SSK:
•••Michael Lynch, *Scientific Practice and Ordinary Action: Ethnomethodology & Social Studies of Science*
•••Steven Shapin, *A Social History of Truth*
•••Harry Collins, *Changing Order: Replication and Induction in Scientific Practice*
Barry Barnes, *Scientific Knowledge: A Sociological Analysis*
Trevor Pinch, *Confronting Nature*

Technology/SCOT:
•••Thomas P. Hughes, *Networks of Power*
•••David Noble, *Forces of Production*
•••Ruth Oldenziel, *Making Technology Masculine: Men, Women, and Modern Machines in America, 1870-1945*
•••Susan J. Douglas, *Inventing American Broadcasting, 1899-1922*
Wiebe Bijker, *Of Bicycles, Bakelites, and Bulbs: Toward a Theory of Sociotechnical Change*

Nelly Oudshoorn & Trevor Pinch, *How Users Matter: the Co-Construction of Users and Technology*

Claude Fischer, *America Calling: A Social History of the Telephone to 1940*

Shoshanna Zuboff, *In the Age of the Smart Machine*

1/26: Week 4. Actor-Network Theory

Bruno Latour, "Give Me a Laboratory and I will Raise the World," in Karin Knorr-Cetina and Michael Mulkay, eds. *Science Observed: Perspectives on the Social Study of Science* (Sage 1983).

Madeleine Akrich, "The De-Scription of Technical Objects," in Bijker and Law, eds., *Shaping Technology/Building Society* (MIT, 1992), pp 205-224.

Bruno Latour, *Reassembling the social: an introduction to actor-network theory* (Oxford University Press: Oxford 2007).

Recommended:
•••Bruno Latour, *Science in Action: How to Follow Scientists and Engineers through Society*
•••John Law, *Aircraft Stories: Decentering the Object in Technoscience*
•••Stefan Helmreich, *Silicon Second Nature: Culturing Artificial Life in a Digital World* (2nd edition)
John Law and John Hassard (eds), *Actor Network Theory and After*
Bruno Latour, *We Have Never Been Modern*

For the curious and committed:
Michel Callon, "Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of St. Brieuc Bay," in *Power, Action, Belief*, ed. John Law (London: Routledge and Kegan Paul, 1986), pp 196-233.

John Law (1992), "Notes on the Theory of the Actor Network: Ordering, Strategy and Heterogeneity"

Nowotny, Helga (1990), "Actor-networks vs. science as self-organizing system: A comparative view of two constructivist approaches." *Sociology of the Sciences* 14: 223-239

Callon, M. and B. Latour (1981), "Unscrewing the Big Leviathan: how actors macrostructure reality and how sociologists help them to do so," K. D. Knorr-Cetina and A. V. Cicourel (Eds.), *Advances in Social Theory and Methodology: Toward an Integration of Micro- and Macro-Sociologies:* 277-303.

2/2: Week 5. Experts, Publics, and Trust

Theodore M. Porter, *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life* (Princeton: Princeton University Press, 1995): "Introduction," "How Social Numbers are Made Valid," and "Objectivity and the Politics of Disciplines" (esp. the final section), pp. 3-8, 33-48, 193-216

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): 408-437

Michelle Murphy, *Sick Building Syndrome and the Problem of Uncertainty* (Duke University Press, 2006)

Recommended:
•••John Carson, *The Measure of Merit: Talents, Intelligence, and Inequality in the French and American Republics, 1750-1940*

•••Scott Knowles, *The Disaster Experts: Mastering Risk in Modern America*
•••Donald MacKenzie, *Mechanizing Proof: Computing, Risk, and Trust*
•••Richard Sclove, *Democracy and Technology*
•••Sheila Jasanoff, *The Fifth Branch: Science Advisers as Policymakers* OR *Science at the Bar: Law, Science, and Technology in America*
•••Steven Epstein, *Impure Science: AIDS, Activism, and the Politics of Knowledge*
Sheila Jasanoff, *Designs on Nature: Science and Democracy in Europe and the United States* (Princeton: Princeton University Press, 2005)
Harry Collins and Robert Evans, *Rethinking Expertise*
Larry Stewart, *The Rise of Public Science*
Brian Wynne, *Rationality and Ritual: The Windscale Inquiry and Nuclear Decisions in Britain*
Alan Irwin, *Citizen Science: A Study of People, Expertise, and Sustainable Development*
Ian Hacking, *The Taming of Chance*
Peter Dear, *Discipline & Experience*
Ian Hacking, *The Emergence of Probability*
Theodore M. Porter, *The Rise of Statistical Thinking, 1820-1900*

2/9: Week 6.   Constructions of Medicine and Health

Annemarie Mol, *The Body Multiple: Ontology in Medical Practice* (Durham: Duke University Press, 2003), pp. 1-85
Steven Epstein, *Inclusion: The Politics of Difference in Medical Research* (Chicago, 2007), Introduction, Chapters 1-3, 7, 10, Conclusion

Recommended:

•••Alexandra Stern, *Eugenic Nation: Faults and Frontiers of Better Breeding in Modern America*
•••Charis Thompson, *Making Parents: The Ontological Choreography of Reproductive Technologies*
••Shobita Parthasarathy, *Building Genetic Medicine: Breast Cancer, Technology, and the Comparative Politics of Health Care*
•••Joel Howell, *Technology in the Hospital: Transforming Patient Care in the Early Twentieth Century*
•••Charles Rosenberg, *The Cholera Years* OR *The Care of Strangers*
Marc Berg, *Rationalizing Medical Work: Decision-Support Techniques and Medical Practices*
Martin Pernick, *The Black Stork: Eugenics and the Death of "Defective" Babies in American Medicine and Motion Pictures since 1915*
Adele E. Clarke, *Disciplining Reproduction: Modernity, American Life Sciences, and the Problem of Sex*

2/16: Week 7. Cyborgs

Donna Haraway, "A Cyborg Manifesto" and "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective," in *Simians, Cyborgs, and Women: The Reinvention of Nature* (New York: Routledge, 1991), pp. 149-203

Paul N. Edwards, *The Closed World: Computers and the Politics of Discourse in Cold War America*, Preface and Chapters 1-2, 5, 8, and 10 (pp. 1-73, 147-173, 239-273, 303-351)

Recommended:

•••Philip Mirowski, *Machine Dreams: Economics Becomes a Cyborg Science*
•••Donna Haraway, *Modest_Witness@Second_Millennium.FemaleMan_ Meets_Oncomouse:*
   Feminism and Technoscience
Chris Hables Gray, ed., *The Cyborg Handbook*
Lucy Suchman, *Human-Machine Reconfigurations: Plans and Situated Actions*

2/23: Week 8. Technopolitics

Gabrielle Hecht, *The Radiance of France: Nuclear Power and National Identity after World War II*
   (MIT Press, 1998, 2nd ed. 2009). Read: Callon preface, Introduction, chs. 2, 3, 5, 8,
   Conclusion, Afterword. Skim: chs. 6, 7. **NOTE: the entire book is available through Mirlyn
   on ebrary (make sure you search for the 2009 edition). Some chapters are on Ctools.**

Timothy Mitchell, *Rule of Experts: Egypt, Techno-Politics, Modernity* (Berkeley: University of
   California Press, 2002), pp. 19-53.

Recommended:
•••Ken Alder, *Engineering the Revolution*
•••Donald MacKenzie, *Inventing Accuracy*
•••Toby C. Jones, *Desert Kingdom: How Oil and Water Forged Modern Saudi Arabia*
•••Sara B. Pritchard, *Confluence: The Nature of Technology and the Remaking of the Rhône*
Thomas J. Misa, *A Nation of Steel*
Judith Schueler, Materialising Identity: the Co-Construction of the Gottard Railway and Swiss
   National Identity

3/8: Week 9. Forum: Impossible Engineering

Chandra Mukerji, *Impossible Engineering: Technology and Territoriality on the Canal du Midi*
   (Princeton University Press, 2009)

Forum on *Impossible Engineering* in *History and Technology*

Recommended:
•••Edwin Hutchins, *Cognition in the Wild*
•••Peter Galison, *Image and Logic: A Material Culture of Microphysics*
•••Karin Knorr-Cetina, *Epistemic Cultures: How the Sciences Make Knowledge*
•••Pamela Smith, *The Body of the Artisan: Art and Experience in the Scientific Revolution*
James C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have
   Failed*

3/15: Week 10. Circulations

Warwick Anderson, *The Collectors of Lost Souls: Turning Kuru Scientists into Whitemen* (Baltimore:
   Johns Hopkins University Press, 2008)

Peter Galison, "The Trading Zone: Coordinating Action and Belief," in *Image and Logic: A Material Culture of Microphysics* (Chicago: University of Chicago Press, 1997), pp. 781-843

Recommended:
- •••Nancy Hunt, *A Colonial Lexicon*
- •••Adriana Petryna, *When Experiments Travel: Clinical Trials and the Global Search for Human Subjects*
- •••David Arnold, *Colonizing the Body: State Medicine and Epidemic Disease in Nineteenth-Century India*
- •••Megan Vaughan, *Curing Their Ills: Colonial Power and African Illness*

Myron Echenberg, *Plague Ports: The Global Urban Impact of Bubonic Plague*

Marcia Inhorn, *Local Babies, Global Science: Gender, Religion, and In Vitro Fertilization in Egypt*

Warwick Anderson, *The Cultivation of Whiteness: Science, Health, and Racial Destiny in Australia*

3/22: Week 11. Material Markets

Donald MacKenzie, *Material Markets: How Economic Agents are Constructed* (Oxford: Oxford University Press, 2008)

NOTE: Mackenzie will be this year's UM STS Program Distinguished Speaker, appearing on Friday, March 23, the day after this session. Details TBA.

Recommended:
- •••Donald MacKenzie, *An Engine, Not a Camera: How Financial Models Shape Markets*
- •••Philip Mirowski, *Machine Dreams: Economics Becomes a Cyborg Science*
- •••Marion Fourcade, *Economists and Societies: Discipline and Profession in the United States, Britain and France, 1890s-1990*s (Princeton University Press)
- •••Karen Ho, *Liquidated: An Ethnography of Wall Street*

Michel Callon, ed., *The Laws of the Market*

MacKenzie, Muniesa, and Siu, eds., *Do Economists Make Markets? On the Performativity of Economics* (Princeton, 2007)

Callon, Millo, and Muniesa, eds., *Market Devices*

Philip Mirowski, *More Heat Than Light: Economics as Social Physics, Physics as Nature's Economics*

S. M. Amadae, *Rationalizing Capitalist Democracy: The Cold War Origins of Rational Choice Liberalism*

3/29: Week 12. Infrastructure

Greg Downey, "Virtual Webs, Physical Technologies, and Hidden Workers: The Spaces of Labor in Information Internetworks," *Technology and Culture* 42 (2001), 209-35

Erik van der Vleuten, "Infrastructures and Societal Change: A View from the Large Technical Systems Field", *Technology Analysis & Strategic Management* 16:3 (2004), 395–414

Paul N. Edwards, Steven J. Jackson, Geoffrey C. Bowker, and Cory P. Knobel, *Understanding Infrastructure: Dynamics, Tensions, and Design*. Report of the NSF Workshop on History & Theory of Infrastructure: Lessons for New Scientific Cyberinfrastructures (Ann Arbor: Deep Blue, 2007)

Geoffrey C. Bowker, "Biodiversity Datadiversity," *Social Studies of Science* 30:5 (2000), pp. 643-683

David Ribes and Thomas Finholt, "The Long Now of Technology Infrastructure: Articulating Tensions in Development," *Journal of the Association for Information Systems* 10:5 (2009), 375-398

Recommended:
- •••Geoffrey C. Bowker and Susan Leigh Star, *Sorting Things Out*
- •••Stephen Graham and Simon Marvin, *Splintering Urbanism*
- •••Thomas Parke Hughes, *Networks of Power: Electrification in Western Society, 1880-1930*
- •••Janet Abbate, *Inventing the Internet*

Alfred Dupont Chandler and James W. Cortada, *A Nation Transformed by Information*
Bruno Latour, *Paris: Invisible City*
Paul N. Edwards, *A Vast Machine: Computer Models, Climate Data, and the Politics of Global Warming*
Lawrence Busch, *Standards: Recipes for Reality*

4/5: Week 13   Carbon Democracy

Timothy Mitchell, *Carbon Democracy: Political Power in the Age of Oil* (Verso Books, 2011)

No discussion leaders/papers this week

4/12: Week 14. Wrap-up discussion

Assignment:
- Read pre-circulated drafts of final paper
- Provide written comments on drafts in your theme cluster
- Come to class prepared to discuss the "big picture" that emerges from our semester (including the readings you did for your paper)