Sociology 522
Spring 2012
Th 1:10-3:50
Office hours: Th 12:00-1:00, and by appointment

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SOCIOLOGY OF SCIENCE

This seminar serves as an advanced introduction to the sociological analysis of the nature and practice of modern science and, by extension, other systems of expertise. As such, it offers an overview of central themes and debates in the field of science studies by drawing out the epistemic, material, cultural, and institutional parameters underlying scientific knowledge production. We will be covering a lot of ground, starting from the everyday reality of science making and the embodiment of expertise, to the management of uncertainty and credibility, all the way to science in the public sphere. I have selected these topics for their analytic significance, their empirical appeal, and their broader sociological relevance. Obviously, however, this list can only hope to be expository rather than comprehensive. The aim, ultimately, is to whet your appetite for further research in this burgeoning field of study.

COURSE LOGISTICS

Attendance and Participation:
To put it bluntly, the norm for graduate courses is: thou shalt not miss class! You must have an excellent reason to miss a session and, unless not humanly possible, you are expected to let us know well ahead of time if you cannot make it. Moreover, you are expected to come to class fully prepared to analyze, discuss, and debate the issues raised in the assigned reading material. This course is fundamentally designed as a seminar, and its success depends on active engagement and dialogic exchange.

Course Readings:
Required texts in the schedule below are indicated with an asterisk. All articles, both required and recommended, can be found on the course's Sakai website. I urge to get a copy of listed books, required and recommended, for your own library. For the purposes of class discussion, you must procure following three books, available via the usual online book vendors:

- Fleck, Ludwik. 1935 (1979). *Genesis and Development of a Scientific Fact.* Chicago: The University of Chicago Press.

- Kuhn, Thomas, S. 1962. *The Structure of Scientific Revolutions.* Chicago: The University of Chicago Press.

- Latour, Bruno and Steve Woolgar. 1979. *Laboratory Life: the Social Construction of Scientific Facts.* Princeton: Princeton University Press.

Course Requirements:

- You will be responsible for leading the discussion for one of our meetings, to be determined during the second week of class. Your job will be to critically introduce the readings for that week and come up with a few (3-5) substantive questions in the form of a one-page handout (to be electronically distributed to the rest of the group by 9:00 AM on the day of class) to get the discussion rolling. Such questions may target what you consider the key issue/problematic raised by the author(s) in question, a shortcoming in the argument/evidence, a puzzling claim, broader implications, exciting/provocative comparisons, and so forth. (20 percent of course grade)

- Two drafts of the proposal for your final paper. The first draft will be due **February 23**, the second **April 5**. The first proposal should be approximately 2 pages long, and describe your thesis, research questions, and the methods you will use (include 3-5 references). The second proposal should build on the first, be 3-5 pages long, and outline your thesis, research questions, data, methods, literature, and references. Both proposals should be submitted to Sakai no later than 12 noon Sunday, the day before class. (15 percent)

  N.B. Writing a paper is a process, so make sure to talk with me about it early and often. I will hold extra office hours during week 10 (i.e., the week of March Each of you is required to make an appointment to formally discuss your final project with me, with the first draft of your proposal in hand.

- In-class presentation of research project, **May 3**. Plan for a 10-minute power point presentation, followed by a 5-minute Q&A session. (15 percent)

- Final paper. At the end of the semester, you are to submit a research paper of approximately 20 to 25 pages. Your paper can be either (a) analytic, critically reflecting on a substantive issue covered in the course, or (b) empirical, drawing on extant theoretical perspectives to illuminate the realities of a concrete scientific enterprise. Your paper is due by **May 11** (50 percent)

CLASS SCHEDULE*

*This schedule is subject to change. Changes, if necessary, will be announced well in advance during class and on the course website on Sakai.

January 19 **Science: The Very Idea**

January 26 **The Making of a Scientific Fact**

*Fleck, 1979, *Genesis and Development of a Scientific Fact*
*Kuhn, *The Structure of Scientific Revolutions* (selections)

February 2 **Inside the Halls of Science**

*Latour and Woolgar, 1979, *Laboratory Life* (selections)
*Latour, 1983, "Give Me a Laboratory and I Will Raise the World"

Knorr-Cetina, 1981, *The Manufacture of Knowledge*
Knorr-Cetina, 1983, "The Ethnographic Study of Scientific Work"
Lynch, 1985, *Art and Artifact in Laboratory Science*
Latour, 1987, *Science in Action: how to follow scientists and engineers through society*
Fujimura, 1987, "Constructing Do-Able Problems in Cancer Research: Articulating Alignment," *Social Studies of Science* 17
Traweek, 1988, *Beamtimes and Lifetimes*
Collins, 1992, *Changing Order: Replication and Induction in Scientific Practice*
Pickering, 1992, *Science as Practice and Culture*
Lynch, 1997, *Scientific Practice and Ordinary Action: Ethnomethodology and Social Studies of Science.*
Doing, 2007, "Give me a laboratory and I will raise a discipline: The past, present, and future politics of laboratory studies," *The Handbook of Science and Technology Studies*

February 9 **Scientific Observation**

*Lynch, 1988, "The Externalized Retina: Selection and Mathematization in the Visual Documentation of Objects in the Life Sciences," *Human Studies* 11
*****Goodwin, 1994, "Professional Vision," *American Anthropologist* 96

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*Daston & Galison, 1992, "The Image of Objectivity," *Representations* 40
*Latour, 1986, "Visualization and Cognition: Thinking with Eyes and Hands," *Knowledge and Society* 6

Rudwick, 1976, "The Emergence of a Visual Language for Geological Science 1760-1840," *History of Science* 14
Knorr Cetina and Amann, 1990, "Image Dissection in Natural Scientific Inquiry," *Science, Technology and Human Values* 15
Pinch, 1985, "Towards an Analysis of Scientific Observation: The Externality and Evidential Significance of Observation Reports in Physics," *Social Studies of Science* 15
Lynch & Woolgar, 1990, *Representation in Scientific Practice*
Jones and Galison, 1998, *Picturing Science Producing Art*
Dumit, 2004, *Picturing Personhood: Brain Scans and Biomedical Identity*
Kaiser, 2005, *Drawing Things Apart: The Dispersion of Feynman Diagrams in Postwar Physics*

February 16 Tacit Knowledge and the Embodiment of Expertise

*MacKenzie and Spinardi, 1995, "Tacit Knowledge, Weapons Design, and the Uninvention of Nuclear Weapons," *American Journal of Sociology* 101
*Collins, 2010, *Tacit and Explicit Knowledge* (selections)
*Knorr Cetina, 1999, *Epistemic Cultures*, pp. 94-108, 216-40
*Hirschauer, 1991, "The Manufacture of Bodies in Surgery," *Social Studies of Science* 21
*O'Connor, 2005, "Embodied Knowledge: The Experience of Meaning and the Struggle towards Proficiency in Glassblowing," *Ethnography* 6

Polanyi, 1967, *The Tacit Dimension*
Collins, 1974, "The TEA Set: Tacit Knowledge and Scientific Networks, *Science Studies* 4
Clarke and Fujimura, 1992, *The Right Tools for the Job: at work in twentieth-century life sciences*
Suchman, 2000, "Embodied Practices of Engineering Work," *Mind, Culture and Activity* 7
Baird, 2004, *Thing Knowledge: A Philosophy of Scientific Instruments*
Delamont and Atkinson, 2001, "Doctoring Uncertainty: Mastering Craft Knowledge," *Social Studies of Science* 31
Moreira, 2004, "Coordination and Embodiment in the Operating Room," *Body and Society* 10
Prentice, 2005, "The Anatomy of a Surgical Simulation: The Mutual Articulation of Bodies In and Through the Machine," *Social Studies of Science* 35

Okely, 2007, "Fieldwork Embodied," *The Sociological Review* 55
Myers, 2008, "Molecular Embodiments and the Body-work of Modeling in Protein Crystallography," *Social Studies of Science* 38

February 23 The Institutional Aspects of Science Redux

*Vaughan, 1999, "The Role of the Organization in the Production of Techno-Scientific Knowledge," *Social Studies of Science* 19
*Owen-Smith, 2001, "Managing Laboratory Work Through Skepticism: Processes of Evaluation and Control," *American Sociological Review* 66
*Thorpe and Shapin, 2000, "Who Was J. Robert Oppenheimer? Charisma and Complex Organization," *Social Studies of Science* 30

Hessenbruch, 2000, "Calibration and Work in the X-Ray Economy," *Social Studies of Science* 30
Eden, 2006, *Whole World on Fire: Organizations, Knowledge, And Nuclear Weapons Devastation*

-FIRST PAPER PROPOSAL DRAFT DUE-

March 1 The Economics of Scientific Production

*Merton, 1973, "The Normative Structure of Science," *The Sociology* of *Science*
*Merton, 1988, "The Matthew Effect in Science, II: Cumulative Advantage and the Symbolism of Intellectual Property," *Isis* 79
*Turner, 2002, "Scientists as Agents," *Science Bought and Sold*
*Callon, 2002, "From Science as an Economic Activity to Socioeconomics of Scientific Research: The Dynamics of Emergent and Consolidated Techno-economic Networks," *Science Bought and Sold*
*Biagioli, 2003, "Rights or Rewards? Changing Frameworks of Scientific Authorship," *Scientific Authorship: Credit and Intellectual Property in Science*

Merton, 1968, "The Matthew Effect in Science," *Science* 159
Mirowski and Sent, 2002, *Science Bought and Sold: Essays on the Economics of Science*
Hermanowicz , 2006, "What Does It Take to Be Successful?" *Science, Technology and Human Values* 31
Godin, 2007, "From Eugenics to Scientometrics: Galton, Cattell, and Men of Science," *Social Studies of Science* 37

Klenk, Hickey, and MacLellan, 2010, "Evaluating the social capital accrued in large research networks: The case of the Sustainable Forest Management Network (1995-2009)," *Social Studies of Science* 40

March 8 **Feminist and Postcolonial Critiques**

*Fox Keller, "The Gender/Science System: Or, Is Sex to Gender as Nature is to Science?" *Hypatia* 2

*Haraway, 1988, "Situated Knowledges: The Science Question in Feminism and the Privilege of the Partial Perspective", *Feminist Studies* 14: 575-99.

*Harding, 1993, "Rethinking Feminist Standpoint Epistemology: What is "Strong Objectivity?," *Feminist Epistemologies*

*Hart, 1998, "On the Problem of Chinese Science", in *The Science Studies Reader*: 189-201

*Petryna, 2005, "Ethical Variability: Drug Development and Globalizing Clinical Trials," *American Ethnologist* 32

*Palladino and Warboys, 1993, "Science and Imperialism," *Isis* 84

*Pyenson, 1993, "Cultural Imperialism and Exact Sciences Revisited," *Isis* 84

Sergio Sismondo, 1995, "The Scientific Domains of Feminist Standpoints," *Perspectives on Science* 3

Harding, 1991, *Whose Science? Whose Knowledge? Thinking from Women's Lives*

Londa Schiebinger, 1997, "Creating Sustainable Science," *Gender and Science Reader*

Barad, 1999, "Agential Realism: Feminist Interventions in Understanding Scientific Practices," *Science Studies Reader*

Haraway, 1989, *Primate Visions*

Nelkin and Lindee, 2004, "Creating Natural Distinctions," *The DNA Mystique: The Gene as a Cultural Icon*

Longino, 1989, "Can There Be Feminist Science?," *Feminism and Science*

Martin, 1996, "The Egg and The Sperm: How Science Has Constructed a Romance Based on Stereotypical Male-Female Roles," *Feminism and Science*

Haraway, 1991, "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century," *Simians, Cyborgs and Women*

Shepherd, 2006, "From In Vitro to In Situ: On the Precarious Extension of Agricultural Science in the Indigenous 'Third World'". *Social Studies of Science* 36.

Bowker and Leigh Star, 2000, "The Case of Race Classification and Reclassification under Apartheid," *Sorting Things Out*

King, 2002, "Security, Disease, Commerce: Ideologies of Postcolonial Global Health," *Social Studies of Science* 32

March 15 **-SPRING BREAK: ENJOY!-**

March 22 **Building Credibility: Boundary Work and Knowledge Brokerage**

*Fujimura, 1988, "The Molecular Biological Bandwagon in Cancer Research: Where Social Worlds Meet," *Social Problems* 35
*Star, 2010, "This is Not a Boundary Object: Reflections on the Origin of a Concept," *Science, Technology & Human Values* 35
*Gieryn, 1999, *Cultural Boundaries of Science*, pp. 1-35, 336-62
*Galison, 1997, *Image and Logic*, pp. 781-844
*Burri, 2008, "Doing Distinctions: Boundary Work and Symbolic Capital in Radiology," *Social Studies of Science* 38

Star and Griesemer, 1989, "Institutional Ecology, 'Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907–39," *Social Studies of Science* 19
Henderson, 1991, "Flexible Sketches and Inflexible Data Bases: Visual Communication, Conscription Devices, and Boundary Objects in Design Engineering," *Science, Technology & Human Values* 16
Cash, 2001, "In Order to Aid in Diffusing Useful and Practical Information": Agricultural Extension and Boundary Organizations," *Science, Technology & Human Values* 26
Moody, 2004, "The Structure of a Social Science Collaboration Network: Disciplinary Cohesion from 1963 to 1999," American Sociological Review 69
Powell, White, Koput, and Owen-Smith, 2005, "Network Dynamics and Field Evolution: The Growth of Interorganizational Collaboration in the Life Sciences," *American Journal of Sociology* 110
Edwards, Mayernik, Batcheller, Bowker, and Borgman, 2011, "Science friction: Data, metadata, and collaboration" *Social Studies of Science* 41

March 29 **Managing Risk and Uncertainty**

*Zehr, 1999, "Scientists' Representations of Uncertainty", in *Communicating Uncertainty*: 3-21.
*Vaughan, 1999, "The Dark Side of Organizations: Mistake, Misconduct and Disaster," *Annual Review of Sociology* 25

*MacKenzie, 1990, *Inventing Accuracy: A Historical Sociology of Nuclear Missile Guidance,* pp. 340-85
*Evans, 1997, "Soothsaying or Science?: Falsification, Uncertainty and Social Change in Macroeconomic Modelling," *Social Studies of Science* 27

Star, 1985, "Scientific Work and Uncertainty", *Social Studies of Science* 15
Clarke, 1991, *Acceptable Risk? Making Decisions in a Toxic Environment*
Smithson, 1993, "Ignorance and Science: Dilemmas, Perspectives, and Prospects", *Knowledge: Creation, Diffusion, Utilization* 15: 133-56.
Vaughan, 1996, *The Challenger Launch Decision: Risky Technology, Culture, and Deviance at NASA*
Edwards, 1996, "Global Climate Science, Uncertainty and Politics: Data-Laden Models, Model-Filtered Data", *Science as Culture* 8: 437-72.
Price, 1996, "Now You See It, Now You Don't: Mediating Science and Managing Uncertainty in Reproductive Medicine," *Misunderstanding Science?*
Shackley and Wynne, 1996, "Representing Uncertainty in Global Change Science Policy: Boundary-Ordering Devices and Authority", *Science, Technology & Human Values* 21: 275–302.
Stocking, 1998, "On Drawing Attention to Ignorance," *Science Communication* 20
Timmermans and Angell, 2001, "Evidence-Based Medicine, Clinical Uncertainty, and Learning to Doctor," *Journal of Health and Social Behavior* 42
Delamont and Atkinson, 2001, "Doctoring Uncertainty: Mastering Craft Knowledge," *Social Studies of Science* 31
Robins, 2002, "The Realness of Risk: Gene Technology in Germany," *Social Studies of Science* 32

April 5 **Science and/in the Public**

*Hilgartner, 1990, "The Dominant View of Popularization: Conceptual Problems, Political Uses," *Social Studies of Science* 20
*Maranta et al., 2003, "The Reality of Experts and the Imagined Lay Person," *Acta Sociologica* 46
*Epstein, 1995, "The Construction of Lay Expertise: AIDS Activism and the Forging of Credibility in the Reform of Clinical Trials," *Science, Technology & Human Values* 20
*Collins and Evans, 2002, "The Third Wave of Science Studies: Studies of Expertise and Experience," *Social Studies of Science* 32
*McCormick, 2007, "Democratizing Science Movements: A New Framework for Mobilization and Contestation," *Social Studies of Science* 37

*Kinchy, 2009, "Anti-genetic Engineering Activism and Scientized Politics in the Case of 'Contaminated' Mexican Maize," *Agriculture and Human Values*

Irwin, 1995, *Citizen Science: A Study of People, Expertise and Sustainable Development*

Wynne, 1996, "Misunderstood Misunderstandings: Social Identities and the Public Uptake of Science," *Misunderstanding Science? The Public Reconstruction of Science and Technology*

Epstein, 1996, *Impure Science: AIDS, Activism, and the Politics of Knowledge.*

Moore, 1996, "Organizing Integrity: American Science and the Creation of Public Interest Organizations, 1955–1975," *American Journal of Sociology* 101

Hilgartner, 2000, *Science on Stage: Expert Advice as Public Drama*

Henke, 2000, "Making a Place for Science: The Field Trial." *Social Studies of Science* 30

Turnbull, 2000, *Masons, Tricksters and Cartographers: Comparative Studies in the Sociology of Scientific and Indigenous Knowledge*

Stilgoe, 2002, "The (Co-)Production of Public Uncertainty: UK Scientific Advice on Mobile Health Risks," *Public Understanding of Science* 16

Maasen, and Weingart, 2005, *Democratization of Expertise? Exploring Novel Forms of Scientific Advice in Political Decision-Making*

Corburn, 2005, *Street Science: Community Knowledge and Environmental Health Justice*

Frickel, and Moore, 2006, *The New Political Sociology of Science: Institutions, Networks, and Power*

-SECOND PAPER PROPOSAL DRAFT DUE-

April 12 **Marketing Science**

*Angell & Relman, 2002, "Patents, Profits & American Medicine: Conflicts of Interest in the Testing & Marketing of New Drugs," *Daedalus* 131

*Owen-Smith, 2006, "Commercial Imbroglios: Proprietary Science and the Contemporary University," *The New Political Sociology of Science*

*Evans, 2010, "Industry Induces Academic Science to Know More about Less," *American Journal of Sociology* 116

*Berman, 2008, "Why Did Universities Start Patenting? Institution-Building and the Road to the Bayh-Dole Act." *Social Studies of Science* 38

Etzkowitz, 2002, *MIT and the Rise of Entrepreneurial Science*.

Kleinman, 2003, *Impure Cultures: University Biology and the World of Commerce*
Fishman, 2004, "Manufacturing Desire: The Commodification of Female Sexual Dysfunction," *Social Studies of Science* 34
Lakoff, 2004, "The Anxieties of Globalization: Antidepressant Sales and Economic Crisis in Argentina", *Social Studies of Science* 34
Ding and Stuart, 2006, "When Do Scientists Become Entrepreneurs? The Social Structural Antecedents of Commercial Activity in the Academic Life Sciences", *American Journal of Sociology* 112: 97-144.
Randalls, 2010, "Weather Profits: Weather Derivatives and the Commercialization of Meteorology," *Social Studies of Science* 40
Oreskes and Conway, 2011, *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming*

April 19 **Controversy and Politics in Science**

*Shapin and Shaffler, 1985, *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life* (selections)
*Collins and Pinch, 1998, "A New Window On the Universe: The Non-Detection of Gravitational Radiation," *The Golem*
*Scott, Richards, and Martin, 1990, "Captives of Controversy: The Myth of the Neutral Social Researcher in Contemporary Scientific Controversies," Science, Technology, and Human Values 15
- Collins, "Captives and Victims: Response to Scott, Richards and Martin"
- Martin, Richards, and Scott, "Who's a Captive? Who's a Victim? Response to Collins' Method Talk"

*Jasanoff, 1996, "Beyond Epistemology: Relativism and Engagement in the Politics of Science," *Social Studies of Science* 26
*Wiebe Bijker, 2003, "The Need for Public Intellectuals: A Space for STS," *Science, Technology and Human Values* 28

Ashmore and Richards, 1996, "The Politics of SSK: Neutrality, Commitment and Beyond," Social Studies of Science 26
Woodhouse, Hess, Breyman, and Martin, 2002, "Science Studies and Activism: Possibilities for Reconstructivist Agendas," *Social Studies of Science* 32
Thorpe, 2002, "Disciplining Experts: Scientific Authority and Liberal Democracy in the Oppenheimer Case," *Social Studies of Science* 32
Macfarlane, 2003, "Underlying Yucca Mountain: The Interplay of Geology and Policy in Nuclear Waste Disposal," *Social Studies of Science* 33
Lynch and Cole, 2005, "Science and Technology Studies on Trial: Dilemmas on Expertise," *Social Studies of Science* 35

Vogel, 2006, "Bioweapons Proliferation: Where Science Studies and Public Policy Collide," *Social Studies of Science* 36
Gusterson, 2007, "Anthropology and Militarism," *Annual Review of Anthropology* 36
Kusiak, 2008, "Sociocultural Expertise and the Military: Beyond the Controversy,' *Military Review*
Kempner, Merz, and Bosk, 2011, "Forbidden Knowledge: Public Controversy and the Production of Nonknowledge," Sociological Forum 26

April 26 **Guest Speaker—details to follow!**

May 3 **Paper Presentations**