

Science, Technology and Public Affairs

PAF547/GLG547/BIO515/HON494

Spring 2007

Wednesdays 7:40-10:30 a.m.

Coor 5536

Professor: Dan Sarewitz

Professor: Michael Crow

Required books: Thomas Kuhn, The Structure of Scientific Revolutions
Stokes, Donald E., Pasteur's Quadrant: Basic Science and Technological Innovations

*** Indicates assignment deadline

January 17

Class 1—Introduction, Background, Expectations

January 24

Class 2—Technology and Society

January 31

Class 3—Foundations and Political History of U.S. S&T Policy

February 7***

Class 4 – Philosophies of Science Policy

February 14

Class 5 – S&T Policy Process: Budget and Human Resource Obsessions

February 21

Class 6 – Science and Technology

February 28

Class 7 – Innovation Systems

March 7

Class 8 – The Role of Universities in the R & D Enterprise

March 14

Spring Break – No Class

March 21***

Class 9 – Technology Policy

March 28

Class 10 – Issues in Science and Technology Policy: Intellectual Property

April 4

Class 11 – Issues in Science and Technology Policy: Sustainability and Science

April 11

Class 12 – Issues in Science and Technology Policy: Human Enhancement

April 18***

**Class 13 – Issues in Science and Technology Policy: Democracy and Science
– Project Presentations**

April 25

Class 14 – Project Presentations

Class 1 – January 17: Introduction, Background, Expectations

“Voting Integrity: The Controversy Over Electronic Machines and System Security,” Congressional Digest, November 2006, pp. 257

Urbina, Ian, 2006, “Polling Places Report Snags, but Not Chaos,” New York Times, 8 November 2006.

Krugman, Paul., 2006, “When Votes Disappear,” New York Times, 24 November 2006.

Mira, Leslie M., 2004, “For Brazil Voters, Machines Rule,” Wired Magazine, 24 January 2004.

Class 2 – January 24: Technology and Society

White, Lynn T., 1962, *Medieval Technology and Social Change* (London: Oxford University Press). Chapter 1, "Stirrup, Mounted Shock Combat, Feudalism, and Chivalry," pp. 1-38.

Winner, Langdon, 1986, *The Whale and the Reactor* (Chicago: University of Chicago Press). Chapter 2, “Do Artifacts Have Politics,” pp. 19-39.

Addington, Michelle, 2003, “Your Breath is Your Worst Enemy,” in: A. Lightman, D. Sarewitz, and C. Desser, eds., *Living with the Genie: Essays on Technology and the Quest for Human Mastery*, chapter 5, pp. 85-104.

Fallows, James, (1999; orig. pub'd 1981), “The American Army and the M-16 Rifle,” in D. MacKenzie and J. Wajcman, eds., *The Social Shaping of Technology, 2nd Edition* (Buckingham: Open University Press), pp. 382-394.

Class 3 – January 31: Foundations and Political History of U.S. S&T Policy

Rosenberg, Charles, *No Other Gods: On Science and American Social Thought* (Baltimore: Johns Hopkins University Press) 1976 (orig. pub'd 1961). Chapter 8, "Science and Social Values in Nineteenth-Century America: A Case Study in the Growth of Scientific Institutions," pp. 135-152.

Vannevar Bush, *Science the Endless Frontier, A Report to the President*, July 1945, at: <http://www.nsf.gov/od/lpa/nsf50/vbush1945.htm>

Kevles, Daniel, *The Physicists* (Cambridge: Harvard University Press), 1987. Chapter 21, "The Bomb and Postwar Research Policy," and chapter 22, "Victory for Elitism," pp. 325-366.

President Eisenhower farewell address, 1961, at: <http://coursesa.matrix.msu.edu/~hst306/documents/indust.html>

Brooks, Harvey, The Evolution of U.S. Science Policy, in B. Smith and C. Barfield (eds.), *Technology, R&D, and the Economy*, Washington, DC: Brookings Institution, 1995, p. 15-47.

Class 4 – February 7: Philosophies of Science Policy
Assignment Deadline: Project Proposal Due

Polanyi, Michael, The Republic of Science: It's Political and Economic Theory, *Minerva* 1(1): 54-73, Autumn, 1962.

Toulmin, Stephen, The Complexity of Scientific Choice: A Stocktaking, *Minerva* 2(3): 343-359, Spring 1964.

Sarewitz, D., G. Foladori, N. Invernizzi, and M. Garfinkel 2004. Science Policy in its Social Context, *Philosophy Today*, v. 48(5): 67-83.

Gibbons, Michael (1999). Science's new social contract with society, *Nature*, Vol.402, Supp. 2 Dec. 1999.

Guston, David H., Retiring the Social Contract for Science, *Issues in Science and Technology*, Summer 2000, at: http://www.nap.edu/issues/16.4/p_guston.htm

Class 5 – February 14: S&T Policy Process: Budget and Human Resource Obsessions

American Association for the Advancement of Science (2006), R&D Funding Update: Federal R&D Funding Stuck On Hold as FY 2007 Starts, <http://www.aaas.org/spp/rd/upd1006.pdf>

Wildavsky, Aaron, and Caiden, Naomi, *The New Politics of the Budgetary Process* (NY: Addison-Wesley Educational Publishers Inc.), 2000, pp. 1-23.

Sarewitz, Daniel. Does Science Policy Exist, and If So, Does it Matter?: Some Observations on the U.S. R&D Budget (2003), Discussion Paper for Earth Institute Science, Technology, and Global Development Seminar. http://www.cspo.org/products/papers/budget_seminar.pdf

“The Future Supply of Natural Scientists and Engineers,”1989, in: *The State of Academic Science and Engineering* (Washington, DC: National Science Foundation), pp. 189-205.

Investing in the Best and Brightest: Increased Fellowship Support for American Scientists and Engineers (2006), The Hamilton Project, Policy brief 2006-09, 8 p. http://www.brookings.edu/views/papers/200612freeman_pb.pdf

Class 6 – February 21: Science and Technology

Stokes, Donald E., *Pasteur's Quadrant* (Washington, DC: Brookings Institution), 1997. Chapter 1, "Stating the problem," pp. 1-25; Chapter 2, "The rise of the modern paradigm," pp. 34-45 only; Chapter 3, "Transforming the paradigm," pp. 58-89.

Rosenberg, Nathan, *Inside the Black Box* (NY: Cambridge University Press), 1982. Chapter 7, "How Exogenous is Science?" pp. 141-159.

Nelson, Richard R., *The Sources of Economic Growth* (Cambridge, MA: Harvard University Press), 1996. Chapter 7, "The Link between Science and Invention: The Case of the Transistor," p. 159-188.

***Kuhn Discussion

Class 7 – February 28: Innovation Systems

Rosenberg, Nathan, and Birdzell, L.E., *How the West Grew Rich* (NY: Basic Books) 1986. Chapter 8, "The Link between Science and Wealth," pp. 242-268.

Freeman, Christopher and Louca, Francisco, *As Time Goes By* (Oxford: Oxford Univ. Press), 2001, "The Second Kondratiev Wave: The Age of Iron Railways, Steam Power, and Mechanization", chapter two, pp. 188-219.

Mowery, David and N. Rosenberg, The U.S. National Innovation System, in: R.R. Nelson (ed): *National Innovation Systems: A Comparative Analysis* (NY: Oxford University Press), 1993. Chapter 2, pp. 29-75. (5): 769-794, 2002.

Viotti, Eduardo, National Learning Systems - A New Approach on Technical Change in Late Industrializing Economies and Evidences from the Cases of Brazil and South Korea, *Technological Forecasting and Social Change*, Vol. 69, Num. 7, Sept. 2002, pp. 653-680(28).

Class 8 –March 7: The Role of Universities in the R & D Policy Process

Leslie, Stuart W., (1993), *The Cold War and American Science* (NY: Columbia University Press), chapter 6, "Accelerating physics," pp. 160-187.

Rosenberg, Nathan, and Richard R. Nelson, American Universities and Technical Advance in Industry, *Research Policy* 23: 323-348, 1994.

Kennedy, Donald (1997), *Academic Duty* (Cambridge: Harvard University Press), chapter 6, "To Discover," 147-185.

Florida, Richard (1999) The Role of the University: Leveraging Talent, Not Technology, *Issues in Science and Technology*, <http://www.nap.edu/issues/15.4/florida.htm>

Duderstadt, James, et al., Envisioning a Transformed University, *Issues in Science and Technology*, Fall 2005. <http://www.issues.org/22.1/duderstadt.html>

Class 9 – March 21: Technology Policy

Assignment Deadline: Project Draft Due

Branscomb, Lewis and Richard Florida, 1998, Challenges to Technology Policy in a Changing World Economy, in: L. Branscomb and J. Keller, eds., *Investing in Innovation: Creating a Research and Innovation Policy That Works* (Cambridge, MA: MIT Press), pp. 3-39.

Kash, Don E., and Rycroft, Robert W., "Technology Policy in the 21st Century: How Will We Adapt to Complexity?" *Science and Public Policy* 25 (2) April 1998, pp. 70-86.

Invernizzi, Noela (2005) "Science and Technology Policy in Transition: New Challenges for Cardoso's Legacy," *Int. J. Technology and Globalisation*, 1(2), 162-184.
<http://www.cspo.org/ourlibrary/documents/IJTGseparata.pdf>

Compare these two documents:

Clinton, William J. and Albert Gore, Jr., *Technology for America's Economic Growth, A New Direction to Build Economic Strength*, 36 p. February 22, 1993

Office of Science and Technology Policy, *American Competitiveness Initiative: Leading the World in Innovation*, 23 p., February 2006.

Class 10 – March 28: Issues in Science and Technology Policy: Intellectual Property
Guest Speaker: Jose Lobo

Jaffe, A, The U.S. Patent System in Transition: Policy Innovation and the Innovation Process. *Research Policy* 29(2): 531-537, 2000.

Report of the Commission on Intellectual Property Rights, Integrating Intellectual Property Rights and Development Policy, Executive Summary, 22 p., 2002.
http://www.iprcommission.org/graphic/documents/final_report.htm

Thornstrom, Carl-Gustaf, *Who Owns Your Dinner?* (DC: Island Press), 2003. Chapter 11, "Living With the Genie," pp. 241-260.

Press, Eyal, Washburn, Jennifer, The Kept University, *Atlantic Monthly* v.285, n.3 Mar00, at: <http://www.mindfully.org/GE/The-Kept-UniversityMar00.htm>

Sampat, Bhaven (2005), "Universities and Intellectual Property: Shaping a New Patent Policy for Government Funded Academic Research," in: D. Guston and D. Sarewitz, eds. *Shaping Science and Technology Policy: The Next Generation of Research* (Madison, Univ. of Wisconsin Press), pp. 55-76.

Class 11 – April 4: Issues in Science and Technology Policy: Sustainability and Science

Lomborg, Bjorn, 2001, *The Skeptical Environmentalist: Measuring the Real State of the World* (Cambridge: Cambridge University Press), chapter 25: Predicament or Progress, pp. 327- 352.

Rennie, John, et al, 2002, "Misleading Math About the Earth," *Scientific American*, January, 11p., available at <http://www.sciam.com/article.cfm?articleID=000F3D47-C6D2-1CEB-93F6809EC5880000>

Harrison, Chris (2004), "Peer Review, Politics, and Pluralism," *Environmental Science and Policy* v. 7, pp. 357-368.

Pielke, Roger A., Jr., (2004), "When Scientists Politicize Science: Making Sense of the Controversy over *The Skeptical Environmentalist*," *Environmental Science and Policy* v. 7, pp. 405-417.

Cohen, Joel (1995), *How Many People Can the Earth Support* (New York: Norton), chapter 17, "Entering the Zone," pp. 367-379.

Class 12 – April 11: Issues in Science and Technology Policy: Human Enhancement
Guest Speaker: Jason Robert

Hall, Steven, The Short of It, *New York Times Magazine*, Oct. 16, 2005, at:
<http://www.nytimes.com/2005/10/16/magazine/16growth.html?ex=1133413200&en=c1a5a5e8158a7b50&ei=5070>

Bostrom, Nick, Human Genetic Enhancements: A Transhumanist Perspective, *Journal of Value Inquiry*, 2003, Vol. 37, No.4, pp. 493-506.

Wolbring, Gregor, *Confined to Your Legs*, (DC: Island Press), 2003. Chapter 8, "Living With the Genie," pp. 139-156.

Garreau, Joel, *Radical Evolution* (NY: Doubleday), 2005. Chapter 2, "Be All You Can Be," pp. 17-44.

Roco, Mihail and Bainbridge, William Sims, *Converging Technologies for Improving Human Performance*, NSF/DOC – sponsored report, June 2002, pp. 1-27 and 251-260

Class 13 –April 18: Issues in Science and Technology Policy: Democracy and Science
Assignment Deadline: Project Due

Epstein, Steven, The Construction of Lay Expertise: AIDS Activism and the Forging of Credibility in the Reform of Clinical Trials, *Science, Technology, and Human Values* 24(4): 408-437, 1995.

*Lerner, Barron, *The Breast Cancer Wars* (NY: Oxford University Press), 2001. Chapter 10, "The World Has Passed Us By," pp. 223-240.

Wynne, Brian, Sheep Farming After Chernobyl, *Environment*, Mar. 1989. Vol.31,No.2.

Kitcher, Philip, *What Kinds of Science Should Be Done?* (DC: Island Press), 2003. Chapter 11, "Living With the Genie," pp. 201-224.

Guston, David H., Forget Politicizing Science. Let's Democratize Science!, *Issues in Science and Technology*, Fall 2004, at:
<http://www.issues.org/issues/21.1/21.1preview.html>

Class Project PRESENTATIONS

Class 14 –April 25: Final Class
Class Project PRESENTATIONS