# EGRS & PSTD 251 | Fall 2011

# The Governance of Technology: An Introduction to Engineering and Public Policy

*Upon this gifted age, in its dark hour,*
*Rains from the sky a meteoric shower*
*Of facts…they lie unquestioned, uncombined.*
*Wisdom enough to leech us of our ill*
*Is daily spun; but there exists no loom*
*To weave it into fabric.*

Edna St Vincent Millay
from 'Upon this age that never speaks its mind'

## —Overview and General Information—

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| *Instructor* | Benjamin Cohen |
| *Office* | 518 Acopian Engineering Center, Engineering Studies Program |
| *Phone* | 610.330.3058 |
| *E-mail* | cohenb@lafayette.edu |
| *Office Hours* | Mon & Weds 9:00-11:00 am, and by appointment |

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| *Required Readings* | Nye, D. (2006). *Technology Matters* (MIT Press) |
| | ESRI (2010). *Getting to Know ArcGIS Desktop* (for ArcGIS 10) |
| | Vonnegut, K. (1963). *Cat's Cradle* (Viking) |
| | The *NY Times* Technology Section, on-line |
| | Numerous additional required readings available via Moodle, EGRS.PSTD.251_FA11 |

**Class times and locations**

Lecture/discussion: MWF, 1:10 pm-2:00 pm in AEC 306
Lab Section 1: Tues., 8:00-10:50 am in AEC 223b
Lab Section 2: Thurs., 8:00-10:50 am in AEC 223b
*Note that we will have GIS instructional leadership and support from Prof. Rosenbauer in lab meetings.*

**Assignment Values**

- 10% GIS quizzes + Mid-term
- 10% Debates and other lab-time exercises
- 20% HW (includes reading responses, film reviews, and others TBA)
- 20% Class participation
- 10% Group project #1
- 30% Group project #2 (final project)
  - 5% Abstract and progress report
  - 5% Annotated Bibliography
  - 20% Final product, a multi-page website

## Course Outline

This is an introductory course in the governance of technological systems. Its core purpose is to help students in engineering studies and policy studies inform the policy-making process with a robust, durable, and culturally grounded concept of technology. To paraphrase Edna St. Vincent Millay (above) and play the metaphor out, our goal is to build a loom for weaving the complexities of technology policy into a useful fabric.

Toward that end, the course introduces students to three dimensions of science, technology, engineering and public policy: (1) the political character *of* technologies, (2) the means by which decision-makers craft policies *about* those technologies, and (3) the ways technologies themselves are used *in* that process. We approach these dimensions in the first two-thirds of the class by introducing some key conceptual tools about technology-in-society from Engineering Studies (and its related field of study, science, technology, and society [STS]) and then by investigating the logistics of the policy-making process itself. In parallel, we also inform the governance of technology through the application of a specific tool, Geographical Information Systems (GIS), to aid the decision-making process. In the last third of the course, outside of class students develop a group project in an area of technology and public policy, while inside the class we pursue cases studies on energy, food, and global development to ground our analyses in real-world problems. Our goal is to draw from new tools both technical (like GIS) and non-technical alike (i.e., STS concepts) to examine the ways one can explain and suggest policy approaches for governing technological systems.

The course follows from a few cultural and historical observations. First is that ours is a technological society. To a remarkable degree, the infrastructure of our everyday world and the means through which we navigate that world are shaped by technological systems. Because of this, those who build technologies (engineers, primarily) are building infrastructure into our world in ways that will shape the options of current and future generations. Yet ours is also a democratic society, where, in its best framing, citizen participation shapes the means by which we make decisions as a polity and define our activities. The combination of these two situations introduces particular demands on civil society, since technologies—be they about communication, transportation, defense, energy, agriculture, healthcare, entertainment, or any other—are usually designed and produced by one group, experts, while the rest of the public then decides how best to manage and live within them. This tension between the expert-based technical realm of science and engineering, on the one hand, and the participatory aspirations of democratic society, on the other, provides the political basis of our study of engineering and public policy. It means that working through that tension demands particular methods and forms of analysis. Putting the course objective another way, this class introduces students to those methods and forms of analysis.

Logistically speaking, the class has a lecture and discussion meeting on MWF and a lab component on either Tuesday or Thursday (there are two sections of lab). The discussion-intensive lecture meetings will develop the key conceptual tools in STS and Engineering Studies through readings, homework, films, and various exercises. The course also requires active student involvement in classroom discussions. We will use lab time for a variety of activities. Primary among these are a series of GIS exercises intended to provide you with introductory proficiency with ArcGIS software, a program widely used in policy, planning, engineering, land development, marketing, public health, and more. We will also use lab time for debates, simulation exercises, and group project presentations.

Regardless of the student's long-term career goals, this course allows those enrolled to understand the pervasive role of government in the technical arena and the need to use/manage technology within that context either as a technical professional or member of the public. The lessons learned from our focus on technological systems can be applied to other public policy contexts such as welfare, education, the

arts, healthcare, and more. Furthermore, while this class emphasizes US policy at the federal and local levels, we will also apply that context-based understanding to international scenarios.

These are the main student learning outcomes/goals of the course:

1. To learn and use key STS tools for conceptualizing technology, society, and policy, namely:
   a. That technologies are systems of technical and non-technical components, which together characterize them as socio-technical systems
   b. That technologies are value-laden
   c. That, along with technical features, cultural values shape the motivation for and identity of technological systems
2. To bring those concepts to bear in technology policy debates;
3. To learn to apply the tools of GIS for enacting those concepts in practice;
4. To develop a basic familiarity with the GIS software as preparation for extended study and use;
5. To gain an understanding of key actors in the policy-making process;
6. To gain familiarity with the basic process of policy-making in the U.S.;
7. To gain an understanding of the ethical context of engineering and public policy.

All told, students in this course should expect to become better prepared to understand the role of policy-making in technological development, the political character of technological systems, and the place of technologies in the policy process.

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**Honor and Academic Integrity**
Student-teacher relationships require trust. For example, students must trust that teachers have made responsible decisions about the structure and content of the courses they teach, and teachers must trust that the assignments students turn in are theirs. Acts that violate this trust undermine the educational process. Lafayette College's Honor System helps maintain a community of trust. Generally I encourage you to talk to other students about the issues being addressed in the course, and I encourage you to read relevant written material in addition to that assigned in class. However, when it comes to written and oral assignments, the words must be your own and you must cite those whose ideas you use. Please note that for group projects, where some of these terms and issues are muddied, we will discuss further the boundaries of ethical behavior and academic integrity.

Ours will not be a laptop course, unless otherwise specified in class. That is, along with a standard request to silence and stow away your cell phones during class, I ask that you keep laptop screens closed out of respect for your peers and for the betterment of classroom atmosphere.

## More about course expectations

***Written assignments:*** For all submitted written work, I expect grammatical accuracy, mechanical soundness, and professional presentation. Sloppy and hurried writings reflect sloppy and hurried thinking. They are unacceptable for this course. Homework due on select days (see syllabus below) will act in part as checks on your reading comprehension, as brief writing opportunities, and as opportunities for you to work through questions and observations brought out by course readings and discussions.

Late assignments are generally not accepted. If you must miss a class, assignments are due before the class period begins. Discuss with me promptly any assignments due in a class missed because of illness.

***Keeping up with the* Times*, et al.:*** I expect students to read through the "Technology" Section of the *New York Times* and related sites before each class (three times a week, minimum, that is). We will

sometimes use those examples as part of in-class work, though many times the purpose of this requirement is simply to help you familiarize yourself with the patterns of public discussions about various technological issues. You may, and should, rotate MIT's *Technology Review*, which has a vibrant web presence, and *The Atlantic*'s on-line "Technology" blog into this thrice-weekly reading schedule.

***Class participation***: Class participation includes active attentiveness, interest, curiosity, discussion contributions, and other assorted assignments. Mere attendance, which is required, will not be sufficient to receive an outstanding participation grade. For this reason, I reserve the right to drop you (fail you) for insufficient attendance (more than two classes of *unexcused* absences). Come to class with curiosity, intellectual ambition, an open mind, some healthy skepticism, and the willingness to engage our topics. If you do that, the rest will take care of itself. To help this cause, to be prepared to participate, you need to complete assigned readings and problems **prior** to the class period, and to spend time **critically analyzing** them. Excellence in written work will not make up for delinquency in attendance or lack of preparation for class discussion.

***Group projects:*** There are two group projects for the semester. The first is a smaller, introductory project that has teams of a mix of engineering studies and policy studies majors using GIS software to help frame a local technology policy issue. The second group project is the major course product. This will be an analysis of a technology policy issue in which students work in teams (the same ones as for the first project) to produce a publicly accessible website that summarizes the basic terms of the debate, uses GIS mapping to illustrate the spatial issues at hand in the debate, and provides a set of recommendations for decision-makers about how to approach the topic. It is a policy analysis, not policy advocacy, project. I will provide more details about this project and its milestones throughout the semester at Moodle.

***Debates***: I have included several issues on the schedule for debate during lab sessions. These debates will match up mixed teams of engineers and non-engineers who represent the pro side and the con side (and rebuttals). We will reserve the remaining class time for questions/discussion, and critique of the debaters.

> Grading for the debate team is as follows:
> absent = 0; present = 5 up to a maximum of 10 depending on the quality of the arguments.

The audience will be graded as well with a 0 if absent and from 5 to 10 for quality of questions/ comments. The audience will vote for the winning team. Each present member of the winning team will receive a bonus of 2 points. I will judge your contributions based on **how well you use the course material, how well you demonstrate that you understand the topic, and how well you verbally communicate**. You may use graphs, figures, etc., but **DO NOT** prepare a formal power point presentation.

20-30 mins - Professor Cohen: Introductory lecture about the issue

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| 10 minutes – Pro Argument | 10 minutes – Con Argument |
| 10 minutes – Pro Rebuttal Argument | 10 minutes – Con Rebuttal Argument |

20-30 mins – Class: Questions/discussion/critique

**Grading Schema**

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| | A (93+) | A- (90-92) |
| B+ (87-89) | B (83-86) | B- (80-82) |
| C+ (77-79) | C (73-76) | C- (70-72) |
| D+ (67-69) | D (63-66) | D- (60-62) |

# —Course Syllabus, ver.5 (11Oct11)—

(SUBJECT TO REVISION)

Note: All readings are *to be read for* the day given below (as opposed to being *assigned* on that day). Any non-book reading is available at the class Moodle site.

| | Monday | Weds | Friday |
|---|---|---|---|
| Week 1<br>***Part I: Intro*** | | **31 Aug.** Intro to course | **2 Sept**<br>**Read:** Forster<br>**Due Sunday @ 5**: HW#1 |
| Lab topic: no lab during first week of class (due to Hurricane Irene) | | | |
| Week 2<br>***Part II: Thinking about technology*** | **5 Sept.** *On tech. & eng. in historical context*<br>**Read**: Nye, Ch. 1 | **7 Sept.**<br>**Read**: L. Marx; Sarewitz | **9 Sept.**<br>*…cont. with Marx and Sarewitz*<br>**Due by class**: HW#2 |
| Lab topic: Working with GIS; **Read**: GIS Chapters 1, 2, 3, 4 | | | |
| Week 3 | **12 Sept.** *On tech. in cultural context*<br>**Read**: Surowiecki | **14 Sept**.<br>**Read:** Shapin | **16 Sept.**<br>**Read:** Nye, Ch. 2 + 4 |
| Lab topic: Working with GIS; **Read:** GIS Chapters 5, 6, 7, 8; quiz | | | |
| Week 4 | **19 Sept.** *On tech. in political context*<br>**Read**: Winner<br>**Due:** HW #3 | **21 Sept.**<br>*…cont. with Winner* | **23 Sept.** *Class does not meet*<br>Students instead meet in groups to plan first GIS project |
| Lab topic: Working with GIS; **Read:** GIS Chapters 9, 10, 11, 12 | | | |
| Week 5<br>***Part III: Policy & Technology*** | **26 Sept.**<br>*…cont. with Winner* | **28 Sept.** *On tech., policy & the public sphere*<br>**Read:** V. Bush; Eisenhower; Leary | **30 Sept.**<br>**Read:** *Beyond Sputnik*, chapter 2<br>***Due**: "Almost-midterm," by Sunday, 10/2 @ 5 pm* |
| Lab topic: Working with GIS; **Read:** GIS Chapters 13-17; quiz | | | |
| Week 6 | **3 Oct.** *The players in policy*<br>**Read:** Stine, pp. 1-14; *Beyond Sputnik* chapter 3 | **5 Oct.** *The players in policy*<br>**Read:** Stine, pp. 25-35 | **7 Oct.** *The process*<br>**Read**: Nye, Ch. 8; *Beyond Sputnik* chapter 4 |
| Lab topic: GIS presentations of first group project (first hour); the Swedish Traffic example | | | |
| Week 7 | **10 Oct. Fall Break**<br>*Class does not meet* | **12 Oct.** *Policy briefs*<br>**Guest Lecture:** Jody Roberts, CHF | **14 Oct.**<br>**Topic**: The course project<br>**Read:** Back to Nye, Ch. 8 + *Beyond Sputnik* Ch. 4<br>**Due**: Project #1 work memo |
| *Lab does not meet this week, Fall Break* | | | |
| Week 8<br>***Part IV: Case studies*** | **17 Oct.**<br>**Read**: Vogel [Policy Analysis Example: BPA] | **19 Oct.** *Class does not meet*<br>Groups meet for project work | **21 Oct.** *Class does not meet*<br>Groups meet for project work<br>**Due**: Abstract for Final Project |
| Lab topic: field trip either to the Nurture Nature Center (for water) or the Lafayette Community Garden (for land) | | | |

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| Week 9 | **24 Oct.** *Energy*<br>**Listen to**: "Game Changer"; "Power Head" podcasts<br>*Note: a subset of students will help frame this issue based on its relevant broader contexts* | **26 Oct.**<br>…continue fracking | **28 Oct.**<br>**Topic**: The course project<br>**Due:** Film response #1 [*Gasland*]; |
| Lab topic: Debate on Fracking | | | |
| Week 10 | **31 Oct.** *Food*: GMO<br>**Read**: Kleinman; Raven<br>*Note: A subset of students will help frame this issue based on its relevant broader contexts* | **2 Nov.**<br>…continue from Monday | **4 Nov.** *Class does not meet*<br>**Due:** Annotated bibliography for Final Project |
| Lab topic: Debate on GMO | | | |
| Week 11 | **7 Nov.** *Tech.* & *Env. Justice*<br>**Read**: Lerner; Ottinger<br>*Note: A subset of students will help frame this issue based on its relevant broader contexts* | **9 Nov.**<br>…continue from Monday | **11 Nov.**<br>**Due:** Film response #2 [*Blue Vinyl*]; Web mock-up of Final Project |
| Lab topic: field trip either to the Nurture Nature Center (for water) or the Lafayette Community Garden (for land) | | | |
| Week 12 | **14 Nov.** *Global dev.*<br>**Read**: Bilger; Wainaina<br>**Listen to**: "Good Water"<br>*Note: A subset of students will help frame this issue based on its relevant broader contexts* | **16 Nov.**<br>…continue from Monday | **18 Nov.**<br>**Topic:** Project updates and discussion |
| Lab topic: Debate on solar cookers and foreign technology aid | | | |
| Week 13 | **21 Nov.**<br>**Read**: TBA | **23 and 25 Nov.**<br>**Thanksgiving Break (no class)** | |
| *Lab does not meet this week* | | | |
| Week 14<br>*Back to the Future* | **28 Nov.**<br>**Read**: *Cat's Cradle* | **30 Nov.**<br>**Read**: *Cat's Cradle* | **2 Dec.**<br>Project presentations |
| *Last lab meeting of the semester* | | | |
| Week 15 | **5 Dec.**<br>Project presentations | **7 Dec.**<br>Project presentations | **9 Dec.** |

**Required readings:**


1. Nye, D. (2006). *Technology Matters: Questions to Live With*. Cambridge, MA: MIT Press.
2. Forster, E.M. (1909). The Machine Stops. Retrieved from http://archive.ncsa.illinois.edu/prajlich/forster.html
3. Vonnegut, K. (1963). *Cat's Cradle.* New York: Viking Press.
4. Marx, L. (January 1987). Does Improved Technology Mean Progress? *Technology Review*. 33-41
5. Sarewitz D. (1996). Pas de Trois. In *Frontiers of Illusion: Science, Technology and the Politics of Progress.* Philadelphia: Temple University Press. [chapter 7]
6. Surowiecki, J. (January 2005). Technology and Happiness. *Technology Review.* 73-76. Retrieved from http://www.technologyreview.com/Biotech/14091/
7. Shapin, S. (May 14, 2007). What Else is New? *The New Yorker*. Retrieved from http://www.newyorker.com/arts/critics/books/2007/05/14/070514crbo_books_shapin?currentPage=all
8. Winner, L. (1980). Do Artifacts Have Politics? *Daedalus* (109): 129-136

9. Bush, V. (1945). Science: The Endless Frontier. A Report to the President. Washington, DC.
10. Neal, H., Tobin Smith, and Jennifer McCormick (2008). *Beyond Sputnik: US Science Policy in the 21st Century***.** Ann Arbor: University of Michigan Press.
11. Stine, D. (2009). Science and Technology Policymaking: A Primer. Congressional Research Service, CRS #RL34454. Washington, DC.
12. Vogel, Sarah (2008). Battles Over Bisphenol A. *SKAPP: Case Studies in Science Policy*. Retrieved from: http://www.defendingscience.org/case_studies/Battles-Over-Bisphenol-A.cfm.
13. Kleinman, D. 2005. Ceding Debate. In D. Kleinman, *Science and Technology in Society: From Biotechnology to the Internet*. Oxford, UK: Blackwell Publishing. 15-33
14. Raven, P. (2005). Agricultural Biotechnology and the Environmental Challenge. In D. Kleinman, A. Kinchy, and J. Handelsmna, eds. *Controversies in Science and Technology: From Maize to Menopause, Volume 1.* Madison: University of Wisconsin Press. 169-181
15. Lerner, Steve (2005). *Diamond. A Struggle for Environmental Justice in Louisiana's Chemical Corridor*. Cambridge, MA: MIT Press.
16. Bilger, B. (December 21, 2009). Hearth Stove. *The New Yorker.* Retrieved from http://www.newyorker.com/reporting/2009/12/21/091221fa_fact_bilger
17. Wainana, Binyavanga (June 2007). Pure Product. *Harper's,* 19-23
18. Koenig, Sarah and Ira Glass at WBEZ (producers). (July 8, 2011). Game Changer. *This American Life* [audio podcast] Retrieved from http://www.thisamericanlife.org/radio-archives/episode/440/game-changer
19. WYPR. (May 4, 2011). Power Head: Natural Gas. *Mid-day with Dan Rodricks*. [audio podcast] Retrieved from http://www.wypr.org/podcast/midday-dan-rodricks-5-4-11-hour-1-power-ahead-natural-gas
20. WUNC. (June 21, 2011). Good Water: A Filter That Works. *The Story* [audio podcast] Retrieved from http://thestory.org/archive/The_Story_62111.mp3/view

**Probable film options** (specifics as yet undetermined at the time of Syllabus ver.1)**:**

1. *Gasland* [energy—hydraulic fracturing]
2. *Black Diamond* [energy—mountaintop coal removal]
3. *The Last Mountain* [energy—mountaintop coal removal]
4. *Petropolis* [energy]
5. *Food, Inc.* [food—alternative agriculture]
6. *Lunch Line* [food—school lunch program, federal policy]
7. *Fresh* [food—alternatives to industrial]
8. *Food Fight* [food—alternative agriculture]
9. *Flow* [water]
10. *Tapped* [water]
11. *Thirst* [water]
12. *Blue Gold* [water]

**Extra resources, or, if this were an advanced course these readings would be on the syllabus:**

Ammon J. Salter and Ben R. Martin (2001). The Economic Benefits of Publicly Funded Basic Research: A Critical Review. *Research Policy* 30: 509-32.

Beaudrie, C. (2010). Emerging Nanotechnologies and Life-Cycle Regulation: An Investigation of Federal Regulatory Oversight from Nanomaterial Production to End of Life. *Studies in Sustainability.* Philadelphia, PA: Chemical Heritage Foundation White Paper Series.

Branscomb, Lewis M. and Keller, James, eds. 1998. *Investing in Innovation: Creating a Research and Innovation Policy That Works*. Cambridge: MIT Press.

Collins, H. and T. Pinch (1998). *The Golem at Large: What You Should Know About Technology*. Cambridge: Cambridge University Press.

Cowan, R.S. (1985). How the Refrigerator Got Its Hum. In David MacKenzie and Judy Wajcman, eds., *The Social Shaping of Technology* (1st edition). Milton Keynes: Open University Press. 202-218

Crow, M. and C. Tucker. (2001). The American Research University as America's *de facto* Technology Policy. *Science and Public Policy* 28(1):1-9.

Federation of American Scientists (2004). Flying Blind: The Rise, Fall, and Possible Resurrection of Science Policy Advice in the US. Retrieved from: http://www.fas.org/resource/12022004142618.pdf

Gummett, P (1991). The Evolution of Science and Technology Policy: A UK Perspective. *Science and Public Policy* 18(1): 31-37.

Guston, D. (1996). New Technology Role for States. *Forum for Applied Research and Public Policy* 11(3): 38-44.

Guston, D. (2000). *Between Politics and Science*. New York: Cambridge U. Press.

Guston, D. and D. Sarewitz. (2002). Real-Time Technology Assessment. *Technology in Society* 24: 93-109

Hess, D. (1995). *Science and Technology in a Multicultural World: The Cultural Politics of Facts and Artifacts*. New York: Columbia University Press.

Irwin, A. (1995). *Citizen Science.* London: Routledge.

Jasanoff, S. (2003). Technologies of humility: Citizen participation in governing science. *Minerva* 41: 223-244

Jasanoff, S. (2007). *Designs on Nature: Science and Democracy in Europe and the United States*. Princeton: Princeton University Press. 16-30.

Kraft, M. and S. Furlong (2010). *Public Policy: Politics, Analysis, and Alternatives*. Washington, DC: CQ Press. 3rd edition.

Lepore, J. (May 12, 2008). Our Own Devices. *The New Yorker*. Retrieved 17 August 2011 from http://www.newyorker.com/arts/critics/books/2008/05/12/080512crbo_books_lepore

Marburger, J. 2002. Science and Technology for Countering Terrorism. National Academy of Sciences Annual Meeting, 30 April. Retrieved from http://www.ostp.gov/html/02_5_2.html

McCain, L. (2002). Informing technology policy decisions: the US Human Genome Project's ethical, legal, and social implications programs as a critical case. *Technology in Society* 24: 111–132

McMillan, G. Steven, Francis Narin, and David L. Deeds (2000). An Analysis of the Critical Role of Public Science in Innovation: The Case of Biotechnology. *Research Policy* 29:1-8

Mowery, David C., et al. (2001). The Growth of Patenting and Licensing by US Universities: An Assessment of the Effects of the Bayh-Dole Act of 1980. *Research Policy* 30:99-119.

National Research Council (2004). Science and Technology in the National Interest: Ensuring the Best Presidential and Federal Advisory Committee Science and Technology Appointments, http://books.nap.edu/html/nationalinterest/0309092973.pdf

Nelkin, D. (1975). The Political Impact of Scientific Expertise. *Social Studies of Science* 5: 35-54

Ottinger, G. (2008). Assessing Community Advisory Panels: A Case Study from Louisiana's Industrial Corridor. *Studies in Sustainability*. Philadelphia, PA: CHF White Paper Series.

Pielke, Jr., R. A. (2005). Accepting politics in science. *The Washington Post*, January 10, p. A17. http://cstpr.colorado.edu/admin/publication_files/resource-1706-2005.13.pdf

Pielke, Jr., R. A., (2002). Policy, politics and perspective. *Nature* 416:368. http://sciencepolicy.colorado.edu/admin/publication_files/2002.05.pdf

Roberts, J. (2008). New Chemical Bodies: A Conversation on Human Biomonitoring and Endocrine-Disrupting Chemicals. *Studies in Sustainability.* Philadelphia, PA: Chemical Heritage Foundation White Paper Series.

Schwarzman, Megan R. and Michael P. Wilson. (2009). New Science for Chemicals Policy. *Science*. 326:1065-1066.

Sismondo, S (2004). *An Introduction to Science and Technology Studies.* Oxford: Blackwell. (Chapters 4, 8, 10)

Skolnikoff, Eugene B. (1994). Research in U.S. Universities in a Technologically Competitive World. In David H. Guston and Kenneth Keniston, eds. *The Fragile Contract: University Science and the Federal Government.* Cambridge: MIT Press. 194-223.

Special Analysis of R&D in the Homeland Security Department, at http://www.aaas.org/spp/rd/dhs0621.htm

Teich, Albert H., Stephen D. Nelson, and Stephen J. Lita, eds. (2002). *Science and Technology in a Vulnerable World.* Washington, DC: AAAS. Retrieved from: http://www.aaas.org/spp/yearbook/2003/yrbk03.htm

U.S. GAO (2004). Federal Advisory Committees: Additional Guidance Could Help Agencies Better Ensure Independence and Balance. Retrieved from: http://www.gao.gov/new.items/d04328.pdf

U.S. GAO (2004). Legal Principles Applicable to Selection of Federal Advisory Committee Members, B-303767, October 18, 2004. Retrieved from: http://www.gao.gov/decisions/other/303767.pdf

Vogel, Jason (2004). Tunnel Vision: The Regulation of Endocrine Disruptors. *Policy Sciences*. 37: 277-303.

Wells Jr., W. G. (1999). *Working with Congress: A Practical Guide for Scientists and Engineers*. Washington, DC: AAAS. 2nd edition.

Wyer, M, et al. (2001). *Women, Science and Technology: A Reader in Feminist Science Studies*. London: Routledge.