Science and technology intersect with myriad areas of public policy. Think of the regulatory failures behind patient deaths from Vioxx; the emergence of funding for embryonic stem cell research as a major political issue; the debate over the reality and extent of climate change; and widespread public perception of eroding American research and development competitiveness in a globalizing world. Discussion of these salient issues often turns back to a common set of questions about the relationship between science and policy. Is scientific and technological development a force beyond human control, or can it be governed? Is more and better science necessary for public political decision making? Can only scientists judge the value of scientific research programs or the validity of scientific results? Is the furtherance of scientific understanding always socially benign, and who decides?

This course examines such questions by surveying the variety of interactions between science, technology, and policy, focusing primarily on the American context, but also including comparative perspectives. The approach is multidisciplinary, drawing upon literature in a wide range of disciplines including political science, philosophy, economics, sociology, and history. It will provide students:

- Background on science and technology policy environment
- Multidisciplinary toolkit for thinking about science and technology policy
- Multidisciplinary methods for influencing science and technology policy
- Understanding of the “social science” of science and technology policy
- Expertise in conducting and presenting policy analysis

PubPol 650 is a core course in the Science, Technology, and Public Policy (STPP) Graduate Certificate Program. It is designed for graduate students from diverse backgrounds, including public policy, public health, law, business, engineering and the social, biological, and physical sciences. No scientific or technical background is necessary. A basic understanding of the concepts of American government is very helpful, but not strictly required.

Course Requirements

1. **Class preparation, attendance, and participation.** You need to do the weekly readings and come to class prepared to discuss them. This preparation should not simply be a passive process of absorbing facts; rather, while reading, you should actively identify (and write down!) questions you have, possible avenues of discussion, and potential points of application of the readings to current events. Along these lines, I would encourage students to scan the headlines of science journals (e.g., Scientific
2. **Reading Responses.** To assist you in fulfilling (1), during the course of the semester, I would like you to produce six (6) reading response memos of roughly a page (single spaced) each. These do not need to be fancy! They could even be a simple list of insights or questions derived from the readings. They should be opportunities to refine questions and insights from the readings. You can also use these to explore ideas relevant to your policy analysis exercise (see point 3 below). They should be submitted to me at least two hours before the start of class on the week the readings will be discussed; I will draw on them to frame discussion and steer the conversation toward areas of use to you. (20% of grade).

3. **Policy Analysis Exercise.** This is the major assignment for the course, and accounts for 70% of your grade in its several components. Students will be asked to choose a facet of current science and technology policy (e.g., a program, a regulation, an oversight body) and then complete a series of assignments that, taken together, could be used to brief a policymaker. For suggestions on the kind of topics you might consider, see the list at the end of this syllabus (definitely not exhaustive). The components of the exercise are as follows. More detailed guidelines will be handed out as the due dates approach:

   a. **Background memo.** Due by 17 October; maximum of 4 pages single spaced; worth 10% of your grade. Here you should give your hypothetical policymaker some context by examining some or all of the following questions. Why was the policy enacted? Who were the major players in the politics surrounding the controversy? What problem does the policy purport to solve? Is there controversy about the policy? If so, what is the nature of the policy and who is involved?

   b. **Policy assessment.** Due by 20 November in class; maximum of 4 pages single spaced; worth 20% of your grade. Policy assessments go beyond backgrounders by examining the value outcomes of a policy – constituencies served, benefits, effectiveness, and so forth. Whom does this policy serve, or not serve? What values does it uphold or fail to uphold? Is the policy effective in meeting its stated goals? On what grounds is the policy “good” or “bad”?

   c. **Final paper.** Due by 18 December at noon; maximum of 12 pages single spaced; worth 30% of your grade. The paper should revise and expand upon your earlier backgrounder and policy assessment, based on my feedback on those assignments. In addition, it will also contain a section that focuses on how your policy might be improved.

   d. **Presentation.** To be given in-class during the exam period; approximately 8 minutes duration; worth 10% of your grade. This will lay out your policy problem and make a terse argument for your proposed changes in policy. The challenge will be to make good use of the relatively short time allotted. Bring whatever slides or visual materials you think will be helpful and appropriate.

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**Course Readings**

American, [www.scientificamerican.com](http://www.scientificamerican.com); or the New York Time’s Tuesday Science Times, [www.nytimes.com](http://www.nytimes.com) to seek application for the week’s readings. (10% of grade)
Five books are required (available at any of the campus bookstores, and on reserve in the FSPP reading room.


Other readings will be available on Ctools.

**4 September. Introduction: Aims, Themes, Mechanics**

**11 September. What is Science, and how does it Work?**


**18 September. The Evolution of Science and Technology Policy in the U.S.**

NOTE: Choice of policy issue due!


**25 September. Contemporary Controversies in S&TP**

In class we'll walk through some examples of controversies in S&TP, focusing on certain projects in high-energy physics and the recent uproar over stem cells. Also note that our first installment of the fall 2007 STPP lecture series will be presented on Monday, 1 October from 4:50-5:30 pm in the Betty Ford Classroom. The speaker, Dr. Linda Hogle, will discuss the regulatory environment for stem cell research and tissue engineering.


Chris Mooney, *The Republican War on Science* Ch. 12, “Stemming Science,” pp. 195-216. Also compare Mooney’s history of science-politics interactions (given in his chapters 3-5) with Greenberg’s account.

2 October. Rethinking the “Social Contract” for Science

Lecture: case studies of cancer research, the evolution of the US global change research program.


9 October. Sociology of Innovation


[http://ets.umdl.umich.edu/cgi/t/text/pageviewer-](http://ets.umdl.umich.edu/cgi/t/text/pageviewer-)


17 October. **BACKGROUND MEMO DUE (NO MEETING ON 16 OCTOBER).**

23 October. Understanding Technology Assessment

In the first hour of class we will conduct a live videoconference with David Guston (Arizona State University) on the work of his organization, the Center for Nanotechnology and Society.


30 October. Development and Technology Transfer


6 November. **“Scientific” Controversies**


**13 November. Structures of Science Advising**


**20 November. Contemporary Problems in Science Advising and Policymaking**

**NOTE: POLICY ASSESSMENT DUE.**

Class exercise: evaluating current directions in reform of science advising, including oversight legislation and proposals to reinstitute the Office of Technology Assessment.


Derek Araujo, Daniel Horowitz, and Ronald Lindsay, “Protecting Scientific Integrity” May 2007. (Draft Legislation on reform of federal science advising procedures; see http://www.centerforinquiry.net/advocacy/protecting_scientific_integrity/)

**27 November. Experts and the Public**

[read in order]


4 December. The Management of Risk and Uncertainty


11 December. Sociotechnical Breakdowns


18 December: Democratizing Science and Technology


FINAL PAPER (INCLUDING POLICY INTERVENTION) DUE: Tuesday, 18 December in Class

FINAL PRESENTATIONS: Wednesday, 19 December, 1:30-3:30 p.m.
Choosing A Topic for Policy Analysis:
1. Choose a general policy issue
2. Do some initial research, find a specific policy.

Examples:

National Nanotechnology Initiative

NIH National Center for Complementary and Alternative Medicine

Endangered Species Act

CDC Mammographic Screening guidelines

FDA approval of Plan B

Federal policy on stem cell research

Federal policy on cloning

CA stem cell initiative

UN Convention on Biological Diversity

Kyoto Protocol on Climate Change

Net neutrality bill

Clean Air Act

Great Lakes Consortium

Organic food labeling law

Genetically modified food regulation (in the US or abroad)

USDA’s food pyramid(s)

India’s clinical trial regulations