

Course Syllabus for PMS/PS 498E

Current Issues in Science Policy

Fall 2008

Class meetings times: Tuesdays/Thursday 11:45am-1:00pm

Class meeting location: Withers Hall Room 105

Instructor Contact information:

Name: Dr. Genene Fisher

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Office hours: Tue/Thurs 1:30-2:30pm or by appointment

Course Description

This course is designed for students interested in the relationship between government and science and the issues and processes that shape science policy. Students will gain a better understanding of how public policy can influence science and how science can influence public policy. The course is aimed primarily at upper level undergraduate and graduate students and assumes the student has taken no prior courses in public policy.

Prerequisites: junior or senior level standing and at least two college science courses

Student Learning Objectives

- Understand the relationship between science and policy
- Explore examples of how policy can influence science and how science can influence policy
- Develop tools to effectively interact with policy makers
- Analyze current science policy issues

Format

Each class will revolve around discussion on reading materials. The required text books for the course are *Beyond Sputnik: U.S. Science Policy in the Twenty-First Century* and *Pasteur's Quadrant: Basic science and technological innovation*. Other required readings are available on the Internet or will be handed out in class. Each class, assigned students will be responsible for summarizing main points of the readings at the beginning of the discussion. The course will include several guest lecturers which may modify the schedule. Based on the interests of the students, the topics may vary towards the end of the semester.

Students will be responsible for three 1-2 page briefing memos and a 10 page research paper. The memos will present a science or technology policy issue, policy recommendations, and the reasoning behind them to an appropriate policy maker. It should be written as if you are either a congressional staff member writing to your boss, who is a Member of Congress; or as a staff member in an agency writing for your boss, who is a policy-level appointee. Students will also choose a topic for a research paper, analyzing a science policy issue of their choice. Papers should be 10 pages, double spaced, 12 point font, not including references or appendices. More information about potential topics, how to write a briefing memo and policy paper will be provided in class.

Grading

Grading will depend on class participation (20%) which includes summarizing the readings for each class, three policy memos (45%), and a policy research paper (35%). The research paper grade is made up of an outline (3%), presentation (7%), and written paper (25%). Students will be expected to have read the material assigned for each session in advance of class. Participation includes actively contributing to the class discussion of readings.

Grading Scheme	Grading Scale	
Class participation 20%	90-100	A-, A, A+
Policy memos 45%	80-89	B-, B, B+
Research paper 35%	70-79	C-, C, C+
	60-69	D-, D, D+
	Below 60	F

Late Assignments and Incomplete Grades:

Extensions will be granted on assignments for students with excused absences, including documented illness and/or class conflicts. Late assignments, without an excused absence, will be marked a grade lower for each day they are past due.

Absences and Scheduling Makeup Work:

With an approved excused absence by the instructor, makeup work may be completed by a date determined by the instructor.

Statement on Academic Integrity:

The instructor of this course is committed to upholding the University policy on academic integrity, as described in the Code of Student Conduct, which can be found at:

http://www.ncsu.edu/policies/student_services/student_discipline/POL11.35.1.php (see especially Section 1 and Sections 7 through 12).

Statement for students with disabilities:

Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with Disability Services for Students at 1900 Student Health Center, Campus Box 7509, 515-7653. http://www.ncsu.edu/provost/offices/affirm_action/dss/

Statement on laboratory safety or risk assumption:

N/A

Statement on extra expenses:

N/A

Statement on transportation:

N/A

Other information relevant to the course:

There is a course website located at vista.ncsu.edu

PMS/PS 498E Fall 2008

Schedule (updated 08/29)

Class	Date	Topic
1	Aug 21	Introduction & overview of course
2	Aug 26	What is science policy?
3	Aug 28	Science Policy in the Federal government
4	Sep 2	Pasteur's Quadrant
5	Sep 4	Who makes science policy?
6	Sep 9	How is science policy made?
7	Sep 11	Funding R&D
8	Sep 16	Policy Memo Discussion 1
9	Sep 18	Policy Memo Discussion 1
10	Sep 23	Science lobbying
11	Sep 25	Science and politics
12	Sep 30	Issues in space science
13	Oct 2	Policy Memo Discussion 2
14	Oct 7	Policy Memo Discussion 2
	Oct 9	Fall break
15	Oct 14	Issues in environmental science
16	Oct 16	Issues in ocean policy, outline for research paper due
17	Oct 21	Policy Memo Discussion 3
18	Oct 23	Policy Memo Discussion 3
19	Oct 28	Issues in meteorology
20	Oct 30	University research policy issues
21	Nov 4	Scientific ethics and integrity
22	Nov 6	Science and engineering education & workforce
23	Nov 11	Issues in social science
24	Nov 13	Science and the public
25	Nov 18	Impact of globalization on science and science policy
26	Nov 20	Grand challenges for science and society
27	Nov 25	Science policy and the future
	Nov 27	Thanksgiving Holiday
28-29	Dec 2, 4	Presentation of student papers

1. Introduction & overview (August 21)

This class will provide an introduction to the course, goals for the students, and what we plan to accomplish.

Student assignment:

- Before the next class, email instructor a few sentences on what you would like to learn/achieve in this course.
- Start reading the book, Pasteur's Quadrant (152 pages). We will discuss it on September 2.

2. What is science policy? (August 26)

Goal: Scientists and policy makers toss around the term "science policy," but what does it actually mean and why is it important? Is that different from science for policy and policy for science? These terms will be explored. Also, the student should be able to provide an overview of the importance of science and technology to the nation, past contributions, and future challenges.

Students should read before class:

- Beyond Sputnik: U.S. Science Policy in the 21st Century, chapter 1
- "Will the real science policy please stand up? Forays into the history and realm of science decision making," Constant Comments, <http://www.garfield.library.upenn.edu/essays/v11p375y1988.pdf>

Questions to consider:

- What is science policy and why is it important? How is it different from science politics?
- What are examples of science for policy and policy for science?
- Who is best to conduct science policy?

Other suggested readings:

- Honest Broker: Making Sense of Science in Policy and Politics, Roger Pielke Jr

3. Science Policy in the Federal government: past and present, I (August 28)

Goal: This class will discuss the relationships between science/technology and government and how they have changed over time since WWII. We will discuss how the support for research evolved. We will discuss the relationship between science and social policies and the need for a federal role in science education.

Students should read before class:

- Beyond Sputnik, chapter 2
- Science, the Endless Frontier (V. Bush), chapters 1, 3, 4, & 6
<http://www.nsf.gov/od/lpa/nsf50/vbush1945.htm>

Questions to Consider:

- How has federal support of science evolved since WWII?
- What concepts in the Vannevar Bush report are valid today?
- Why fund science with federal dollars?

Other suggested readings:

- Unlocking our Future: Toward a New National Science Policy, www.house.gov/science/science_policy_study.htm

4. Science Policy in the Federal government: past and present, II (September 2)

Goal: This class will focus on the book, Pasteur's Quadrant: Basic Science and Technological Innovation.

Students should read before class:

- Pasteur's Quadrant
- Beyond Sputnik (chapter 1, pages 6-7)

Questions to Consider:

- How has the paradigm of research evolved since WWII?
- How do policies for science shape the role of science in policy?

Other suggested readings:

- The Honest Broker, chapter 6

5. Who makes science policy? (September 4)

Goal: This class will discuss the various institutions that are involved in making policy as it relates to R&D (federal agencies, labs, congress, industry, universities, etc.)

Students should read before class:

- Beyond Sputnik, chapter 3

Questions to consider:

- Who is involved in science policy? Who should be?
- Is the right mix of players involved? Are too many involved or are there any left out?
- See policy discussion box 3.1 in Beyond Sputnik (Do we need a Dept of Science?)

Other suggested readings:

- Agendas, Alternatives, and Public Policies, chapters 2 & 3

6. How is science policy made? (September 9)

Goal: This class will discuss the various mechanisms involved in making policy as it relates to R&D (federal agencies, congress, industry, universities, etc.)

Students should read before class:

- Beyond Sputnik, chapter 4

Questions to consider:

- What are the different mechanisms for making science policy?
- See policy discussion box 4.1 in Beyond Sputnik (How to balance funding immediate needs versus long-term research investments?)

Other suggested readings:

- Agendas, Alternatives, and Public Policies, chapters 4, 5, 6, & 7

7. Funding Research & Development (September 11)

Goal: The federal budget, while essential for determining how much science and technology will get funded, is also an enigma to most scientists. A basic understanding of the federal budget and legislation process is discussed.

Students should read before class

- Beyond Sputnik, chapter 5
- NSF Science and Engineering Indicators, chapter 4 figures, <http://www.nsf.gov/statistics/seind08>

Questions to consider:

- What does the federal R&D budget look like?
- What can be used to measure the success of a scientific research program?
- How should policy makers determine levels of funding for different disciplines?

Other suggested readings:

- Teich, A. and K. Koizumi, chapter I in AAAS Report XXXII: R&D FY 2008, <http://www.aaas.org/spp/rd/rd08main.htm>

8. Policy Memo 1 discussion (September 16)

Assignment Due: Policy memos must be emailed to instructor by Wed September 15, 5pm. Be prepared to discuss your memo in class.

9. Policy Memo 1 discussion (September 18)

10. Science lobbying (September 23)

Goal: Understand what it means to “lobby” for science, the challenges, opportunities and drawbacks.

Guest speaker scheduled: Matt Peterson, Director of Federal Affairs, NCSU

11. Science and politics (September 25)

Goal: We will discuss the relationship between science and politics.

Students should read before class:

- Does Science Policy Matter? Issues in Science and Technology, Summer 2007, <http://www.issues.org/23.4/sarewitz.html#>
- Science vs. politics gets down and dirty, USA Today, 08/07/2007, http://www.usatoday.com/news/washington/2007-08-05-science-politics_N.htm

Questions to Consider:

- What is the difference between science policy and science politics?
- Which kind of players operate in those realms?
- In what cases are science policy and science politics inseparable?

Other suggested readings:

- Science, Money, and Politics
- The Honest Broker, chapter 8 & 9

12. Current issues in Space Science (September 30)

Goal: Explore some of the current policy issues in space science

Students should read before class:

- The ISS and space shuttle, CRS, <http://www.fas.org/sgp/crs/space/RL33568.pdf>
- Hubble Space Telescope, CRS, <http://www.fas.org/sgp/crs/space/RS21767.pdf>
- Read Beyond Sputnik (Ch 12, page, ISS)

Student assignment: submit your midterm evaluation to instructor

Questions to consider:

- Why should the government fund astronomy?
- Should the government continue to fund the Hubble telescope?
- Should the U.S. focus on going to Mars?

13. Policy Memo Discussion 3 (October 2)

Student Assignment: Policy memos must be emailed to instructor by October 1, 5pm. Be prepared to discuss your memo in class.

14. Policy Memo Discussion 2 (October 7)

No Class **Fall break (Oct 9)**

15. Current issues in environmental science: solid waste (October 14)

Goal: Explore some of the current policy issues North Carolina faces with solid waste management

Guest Speaker Scheduled: Paul Crissman Chief, Solid Waste Section, Division of Waste Management

16. Current issues in ocean policy (October 16)

Goal: Explore some of the current ocean policy issues

Guest speaker scheduled: Lisa Schiavinato, J.D., NC SeaGrant

Students should read before class:

- TBD

Student Assignment: Outline for policy research paper due today.

17. Policy Memo 3 Discussion (October 21)

Assignment Due: Policy memos must be emailed to instructor by October 27, 5pm. Be prepared to discuss your memo in class.

18. Policy Memo 3 Discussion (October 23)

19. Current issues in meteorology (October 28)

Goal: Explore some of the current issues in meteorology

Student should read before class:

- AMS case study on Hurricane Katrina

20. University research policy issues (October 30)

Goal: This class will discuss some of the top issues facing research universities and the role they play in science policy. Supply and demand of science professionals, conflicting demands on faculty due to research, federal policies on campus, export controls, tech transfer, ethics, etc.

Guest speaker scheduled: Dr. Len Pietrafesa, Associate Dean for External Affairs, College of Mathematical and Physical Sciences, NCSU

Students should read before class:

- Beyond Sputnik, chapter 6

Questions to consider:

- What kind of research policies do universities deal with?
- How will the universities of the future change these policies?
- Should congressional earmarking for universities be allowed?

21. Scientific ethics and integrity (Nov 4)

Goal: The class will discuss various cases to understand the different dimensions of scientific ethics.

Students should read before class:

- Read Beyond Sputnik, Chapter 14

Questions to consider:

- What are some of the ethical issues facing scientists? Policy makers?
- Policy Discussion Box 14.1 in Beyond Sputnik (Self-regulation versus government regulation)
- When is self-regulation by the scientific community of its conduct impossible or undesirable?

22. Science and engineering education & workforce (Nov 6)

Goal: The future of science and engineering depend on the supply of trained professionals in the workforce and an education system that provides the required foundation. This class will focus on understanding what science and engineering education looks like in the U.S. and compare it to other countries. The workforce in the U.S. and abroad will also be examined.

Students should read before class:

- Beyond Sputnik, chapter 15 & 16
- NSF 2008 S&E indicators, chapters 2, 3 figures, <http://www.nsf.gov/statistics/seind08>

Questions to consider:

- What is the general outlook for S&E education?
- What standards should the federal government impose in exchange for supporting elementary and secondary science education?
- What is the general outlook for the S&E workforce?
- What kinds of action should be taken to ensure the U.S. is competitive in attracting the best talent?

23. Current issues in Social Science (November 11)

Goal: Explore some of the current policy issues facing social scientists

Guest speaker scheduled: Dr. Tom Birkland, School of Public and International Affairs, NCSU

Student should read before class:

TBD

Questions to consider:

- How does the approach of dealing with science policy issues differ between social and physical scientists?

24. Science and the Public (Nov 13)

Goal: We will discuss public attitudes towards science and whether public understanding is a necessity for public support of science?

Students should read before class:

- Beyond Sputnik, chapter 10
- NSF Science and engineering indicators, chapter 7, <http://www.nsf.gov/statistics/seind08>

Questions to Consider:

- Should scientists more aggressively reach out to the public, to the media, and to policy makers?
- What can federal, state, and local governments do to educate the general public about science?
- What is to gain with outreach to the public? What are the pitfalls?

25. Impact of globalization on science and science policy (Nov 18)

Goal: As science and technology become increasingly global, what are the policy issues that exist now and what can we expect in the future?

Students should read before class:

- Beyond Sputnik, chapter 17
- NSF 2008 science & engineering indicators, chapters 2-37, 3-46, 4-35, 6-10 figures

Questions to consider:

- How is globalization changing the nature of science research?
- How is globalization changing the way science policy is conducted?
- What role does science play in international collaboration?

26. Grand challenges for science and society (Nov 20)

Goal: We will discuss what is meant by a “grand challenge” and what kind of grand challenges do science and society face.

Students should read before class:

- Beyond Sputnik, chapter 19

Questions to consider : TBD

27. Science policy and the future (Nov 25)

Goal: the class will discuss how we expect science policy to evolve in the future

Students should read before class:

- Beyond Sputnik, chapter 20

Questions to consider:

- Do you think the framework we have now will be appropriate for the future and why?
- What aspects will have to be considered in the future by government? By scientists?

No class Thanksgiving Holiday (Nov 27)

28. Presentation of student papers (Dec 2)

29. Presentation of student papers (Dec 4)

REQUIRED READINGS

Homer A. Neal, Tobin L. Smith, and Jennifer B. McCormick, 2008: *Beyond Sputnik: U.S. Science Policy in the Twenty-First Century*, University of Michigan Press.

Stokes, Donald E., 1997: *Pasteur's Quadrant: Basic science and technological innovation*, Brookings Institution Press.

The following are available on the Internet:

Bush, Vannevar, 1945: *Science the Endless Frontier*, Office of Scientific Research and Development, U.S. Government Printing Office, available online at <http://www.nsf.gov/od/lpa/nsf50/vbush1945.htm>

Unlocking Our Future: Toward a New National Science Policy, 1998: A Report to Congress by the House Committee on Science, available online at www.house.gov/science/science_policy_study.htm

National Science Board, 2008: *Science and Engineering Indicators 2008*: National Science Foundation, available online at <http://www.nsf.gov/statistics/seind08>

Teich, A. and K. Koizumi, *Federal R&D in the FY 2008 Budget: An Introduction*, chapter 1 in AAAS Report XXXII: Research and Development FY 2008, available online at <http://www.aaas.org/spp/rd/rd08main.htm>

* There may be additional online readings listed in syllabus and handed out in class *

Additional resources

- Kingdon, John A., 1995: *Agendas, Alternatives, and Public Policies*, Second Edition, Addison-Wesley Educational Publishers.
- Pielke, Jr., Roger, 2007: *The Honest Broker: Making Sense of Science in Policy and Politics*, Cambridge University Press,
- Kaul, I., I. Grunberg, and M. Stern, 1999: *Global Public Goods: International Cooperation in the 21st century*, Oxford University Press.
- AAAS Research and Development FY 2008, AAAS Report XXXII, <http://www.aaas.org/spp/rd/rd08main.htm>
- Wells Jr., William G., 1996: *Working with Congress: A Practical Guide for Scientists and Engineers*, 2nd ed, AAAS.
- Sarewitz, Daniel, 1996: *Frontiers of Illusion: Science, Technology, and Politics of Progress*, Temple University Press.
- The National Academies, 1995: *On Being a Scientist: Responsible Conduct in Research*, National Academy Press, <http://books.nap.edu/books/0309051967/html/index.html>
- Greenberg, Daniel, S., 2001: *Science, Money, and Politics: Political Triumph and Ethical Erosion*, Univ Chicago Press.
- Smith, Bruce C.R., 1990: *American Science Policy Since World War II*, Brookings Institution Press.
- Dupree, A. Hunter, 1986: *Science in the Federal Government: A History of Policies and Activities*, The John Hopkins University Press.
- The National Academies, *Issues in Science and Technology*, <http://www.issues.org/>
- Rischar, J.F., 2002: *High Noon, 20 Global Problems, 20 Years to Solve Them*, Basic Books.