

PBPL 84.4: SCIENCE AND TECHNOLOGY POLICY

COURSE SYLLABUS

Dartmouth College
Spring 2008

1. Class Information:

Location: Rockefeller 209

Times: 10A: Tuesdays and Thursdays 10:00-11:50 am

X-hour: Wednesdays 3:00-3:50 pm

Instructor: William G. O'Neal, Research Associate, Rockefeller Center, Dartmouth College

2. Instructor Information:

Office Hours: Officially T/Th 1:00-3:00 pm, but feel free to stop by anytime

Office: Rockefeller 206

Email: william.g.oneal@dartmouth.edu

Telephone: 603-646-3762

3. Course Overview:

This course will explore public policy related to science and technology in the United States. It is designed to provide a general overview of the current environment in which “science policy” is made. As such, this class should be of interest to public policy minors, science majors/minors, and anyone else who is interested in the societal impacts of how we approach the scientific enterprise. The primary goal will be to analyze the processes and interactions that lead to policy formulation and implementation. Through class discussions and case studies, participants will be exposed to a variety of current policy issues related to science. Additionally, students will have the opportunity to comprehensively examine a science policy issue of their choice.

We will begin by tracing the development of science-government interactions in the United States and examining the institutions that comprise the modern science policy apparatus. With this knowledge as our foundation, we will then evaluate the outcomes and effectiveness of the status quo, including the tensions that cause conflict and controversy. This will lead us into a full critique of the current “social contract” for science and an exploration of alternative conceptual frameworks for producing science policy. Finally, we will make use of our new understanding in discussions of current affairs and the future of U.S. science policy.

Each section of the course will be enhanced by case studies (e.g. “Space Policy 1957-2008”; “*The Republican War on Science (?)*”; and “*The Skeptical Environmentalist vs. An Inconvenient Truth*”) that provide an opportunity to explore the issues and ideas we encounter. Student

presentations will also introduce participants to many topics currently being addressed in the science and technology policy arena.

4. Course Objectives:

The learning objectives for students enrolled in this course are:

- Understand the system of interactions between the realms of science and public policy
- Understand the institutional structure of science policy in the federal government
- Explore and critique various conceptual frameworks for government-science interactions and their consequences
- Develop an awareness of science in society, especially in the policy context
- Learn to critically analyze public discourse related to science policy
- Develop an in-depth understanding of at least one current issue in science policy
- Develop skills necessary to conduct and present policy research on scientific material

5. Evaluating Performance:

Your grade will be determined by your participation in class and by your performance on two assignments and a term project. Each is briefly described below, and more details will be provided in class. Final grades will be assigned on a scale of A to E, as outlined in the *Dartmouth College Bulletin* (ORC). All assignments will be graded on a 100-point scale, with each weighted as follows:

Class Participation	15%
Agency Portfolio	15%
Briefing Memo	15%
Term Project: Presentation	20%
Term Project: Op-Ed	10%
Term Project: Report Draft	10%
Term Project: Final Report	15%

Class Participation: This course is a seminar, and your input is vital if we are to have productive discussions. Professionals are able to learn from one another in a group setting only if each individual actively contributes ideas and engages in listening to and questioning others. Course participants are expected to complete all the readings by the assigned date in order to contribute knowledgeably to the discussion. No one should receive less than an 'A' for this portion of their grade.

Agency Portfolio: Each student will prepare a brief report on a government agency that details its history, operational structure, current priorities, budget, and impacts on society. Students will describe their findings to the class in a 5-10 minute presentation.

Briefing Memo: Each student will prepare a **one-page** briefing memo on an important and timely science policy issue. The memo should be written for a high-level policymaker as if you are a staff member. It must clearly outline the background, issues, policy options, and pros/cons

associated with the topic, and it should provide a policy recommendation. We will use the memo in a class exercise.

Term Project: Over the term, each student will conduct research on a science policy topic of their choice. I will meet with you individually to approve your project and discuss your approach to the research. This should be treated as an opportunity to gain an in-depth understanding of a topic that you find particularly compelling. As such, the quality of research, analysis, presentation, and writing should reflect a term-long effort. You will deliver your findings in a variety of formats as the term progresses:

Presentation: You will deliver a 20 minute oral presentation that fully describes all aspects of your topic, including relevant scientific background, policy options, and your perspective.

Op-Ed: You will write an Op-Ed piece that makes the case for a particular policy option or set of options related to your topic. Choose wisely, and be prepared to defend your opinion. The piece will be distributed for everyone to read, and we will discuss it in class.

Report: This is the written record of your research. It should clearly and comprehensively address all elements of the policy issue. That is, it should explain the relevant science, delineate all policy options, and make a compelling case for the policy action of your choice. The grade for the report will be divided between the first draft and the final product.

6. Expectations:

Professionalism: One of the primary goals of this course is to help you develop the skills necessary to critically analyze scientific issues and policies in a manner that might be expected of a policy professional. As we will see, science is meant to uncover fact, but it is also plagued with uncertainties. Policy decisions, on the other hand, are largely values judgments. The intersection of these two realms often leads to conflict. We will discuss and debate controversial issues, and it is expected that the highest standard of professional behavior be maintained at all times.

Preparedness: All contributions to class discussions should be informed by a sound understanding and analysis of the relevant material (i.e. readings). Participants should be fully prepared for class each day in order to make a meaningful contribution.

Late Policy: Professionals are expected to manage their time effectively and to meet the deadlines set for their work. You have only a few written assignments to prepare over this term, and you will know the deadlines well in advance. No late assignments will be graded, except under extraordinary circumstances. (As we all know, “The printers failed on my way to class!” is not an extraordinary circumstance).

Academic Honor: Students are expected to fully conform to the Academic Honor Code described in the *Dartmouth College Bulletin* (ORC).

7. Resources and Readings:

The three books below will be required for class. The Kraemer and Sarewitz books will be read chapter-by-chapter at various points to help guide our topical discussions during the term. The Mooney book will be read in its entirety as the basis for one of our case studies. Other book chapters and articles will be assigned throughout the term, and these will be available on Blackboard.

Required Books:

Kraemer, Sylvia. Science & Technology Policy in the United States. New Brunswick: Rutgers University Press, 2006.

Sarewitz, Daniel. Frontiers of Illusion: Science, Technology, and the Politics of Progress. Philadelphia: Temple University Press, 1996.

Mooney, Chris. The Republican War on Science. New York: Basic Books, 2005.

8. Course Calendar:

Week	Day	Date	Topics/Readings/Assignments
1	Tu	3/25/08	<ol style="list-style-type: none"> <u>Introductions, Student Interests, Course Overview</u> <u>Science, Policy, and Science Policy</u> <u>The Beginnings of Modern Science</u> <p><i>Assignment:</i> The Term Project, due dates throughout term</p>
	W x-hour	3/26/08	NO CLASS
	Th	3/27/08	<ol style="list-style-type: none"> <u>History of Science in U.S. Society to WWII</u> <p><i>Readings:</i></p> <ol style="list-style-type: none"> Kraemer, Chapters 1 and 2 Wells, W.G. <i>Science, Technology, and the Congress: The First 200 Years</i> <ol style="list-style-type: none"> <u>WWII and Origins of The Social Contract for Science</u> <p><i>Readings:</i></p> <ol style="list-style-type: none"> Kevles, D.J. <i>The Bomb and Postwar Research Policy</i> in <u>The Physicists</u> (Chapter 21) Marcus, A.I.; Bix, A.S. <i>In The Beginning in The Future is Now</i>; pp. 13-23. Bush, V. <i>Science: The Endless Frontier</i>

2	Tu	4/1/08	<p>1. <u>Post-WWII Debate, The Cold War, & Beyond</u></p> <p><i>Readings:</i></p> <ol style="list-style-type: none"> 1) Smith, Bruce L.R. <i>Chapters 4-5 in <u>American Science Policy Since World War II</u></i> 2) Marcus, A.I.; Bix, A.S. <i>Oscillations and Perturbations Through Manipulations in <u>The Future is Now</u></i> (Chapter 4) 3) Kramer, Chapter 3 <p>2. <u>Institutions I: Government & Pseudo-Government</u></p> <p><i>Readings:</i></p> <ol style="list-style-type: none"> 1) Kraemer, Chapter 4, pp. 54-70. 2) Greenberg, D.S. <i>The Metropolis of Science in <u>Science, Money, and Politics</u></i> (Chapter 1) 3) Explore: http://www.gpoaccess.gov/gmanual/browse-gm-07.html <p><i>Assignment:</i> Agency Portfolio, due 4/9/08</p>
	W x-hour	4/2/08	<p>1. <u>Institutions I: Government & Pseudo-Government</u> (continued)</p> <p><i>Readings:</i></p> <ol style="list-style-type: none"> 1) Smith, B.L. R. <i>Chapters 3, 5, and 8 in <u>The Advisers</u></i>
	Th	4/3/08	<p>1. <u>Institutions II: Universities</u></p> <p><i>Readings:</i></p> <ol style="list-style-type: none"> 1) Crow, M.M.; Tucker, C. <i>The American Research University as America's de facto Technology Policy. Science and Public Policy, 28(1):1-9.</i> 2) Guston, D.H.; Keniston, K. <i>Introduction: The Social Contract for Science in <u>The Fragile Contract</u></i> (Chapter 1) 3) Vest, C.M. <i>Universities, the Public, and the Government: The State of the Partnership in <u>The Fragile Contract</u></i> (Chapter 2) 4) Brooks, H. <i>Current Criticisms of Research Universities in <u>The Research University in a Time of Discontent</u></i> (Chapter 13) 5) Nichols, R. W. <i>Federal Science Policy and Universities: Consequences of Success in <u>The Research University in a Time of Discontent</u></i> (Chapter 15) 6) National Science and Technology Council: <i>Renewing the Federal Government-University Partnership for the 21st Century</i> (April 1999)

			<p>2. <u>Institutions III: Industry</u></p> <p><i>Readings:</i></p> <ol style="list-style-type: none"> 1) Kraemer, Chapter 4, pp. 78-93. 2) Hall, B.H. <i>Effectiveness of Research and Experimentation Tax Credits</i> (OTA June 1995) 3) Hall, B; Reenen, J.V. <i>How effective are fiscal incentives for R&D? A review of the evidence.</i> Research Policy 29: 449-469. 4) Hart, D.M. <i>Antitrust and technological innovation in the US: ideas, institutions, decisions, and impacts, 1890-2000.</i> Research Policy 30: 923-936.
3	Tu	4/8/08	<p>1. <u>Making Science Policy: Funding</u></p> <p><i>Readings:</i></p> <ol style="list-style-type: none"> 1) Kraemer, Chapter 4, pp. 70-78. 2) Sarewitz, D. <i>Does Science Policy Exist, and If So, Does it Matter? Some Observations on the U.S. R&D Budget</i> 3) Greenberg, D.S. <i>Money, More Money, Statistics, and Science in Science, Money, and Politics</i> (Chapter 6) 4) Greenberg, D.S. <i>The Sciences' Way of Politicking in Science, Money, and Politics</i> (Chapter 12) 5) AAAS Report XXXII: <i>R&D FY 2008</i>
	W x-hour	4/9/08	Agency Portfolios & Presentations Due
	Th	4/10/08	<p><u>Case Study I: Federal Space Policy 1957-2008</u></p> <p><i>Readings:</i></p> <ol style="list-style-type: none"> 1) Kraemer, Chapter 7 2) Smith, B.L. R. <i>Symbolic Politics and the Search for Public Support: The NASA Advisory Council in <u>The Advisers</u></i>

4	Tu	4/15/08	<p>1. <u>Evaluating U.S. Policy: The Marketplace and the Public Good</u></p> <p><i>Readings:</i></p> <ol style="list-style-type: none"> 1) Greenberg, D.S. <i>The Ossified Empire</i> in <u>Science, Money, and Politics</u> (Chapter 2) 2) Sarewitz, Chapter 7 3) Salter, A.J.; Martin B.R. <i>The Economic Benefits of Publicly Funded Basic Research: A Critical Review</i> <i>Research Policy</i> 30:509-32 (2001). 4) Niskanen, W.A. <i>R&D and Economic Growth – Cautionary Thoughts</i> in <u>Science for the 21st Century</u> (Chapter 6) 5) David, P.A.; Mowery, D.C.; Steinmueller, W.E. <i>Analyzing the Economic Payoffs from Basic Research in Science and Technology</i> <u>Policy in Interdependent Economics</u> (Chapter 3)
	W x-hour	4/16/08	NO CLASS
	Th	4/17/08	<p>1. <u>Evaluating U.S. Policy: Technology Transfer</u></p> <p><i>Readings:</i></p> <ol style="list-style-type: none"> 1) Mowery, D.C. et al. <i>A Political History of the Bayh-Dole Act of 1980</i> in <u>Ivory Tower and Industrial Innovation</u> (Chapter 5) 2) Mowery, D.C. et al. <i>The Growth of Patenting and Licensing by US Universities: An Assessment of the Effects of the Bayh-Dole Act of 1980</i>. <i>Research Policy</i> 30:99-119 (2001). 3) Bozeman, B. <i>Technology Transfer and public policy: a review of research and theory</i>. <i>Research Policy</i> 29:627-655 (2000). <p>2. <u>Evaluating U.S. Policy: The Scientific Enterprise</u></p> <ol style="list-style-type: none"> 1) Greenberg, D.S. <i>The Ethical Erosion of American Science</i> in <u>Science, Money, and Politics</u> (Chapter 22) 2) Woolf, P. <i>Integrity and Accountability in Research</i> in <u>The Fragile Contract</u> (Chapter 4) 3) Chubin, D.E.; Hackett, E.J. <i>The Centrality of Peer Review and Peer Review in Theory and Practice</i> in <u>Peerless Science: Peer Review and U.S. Science Policy</u> (Chapter 1 and 2)

5	Tu	4/22/08	<p>1. <u>Evaluating U.S. Policy: Ideology, Conflict, and Controversy</u></p> <p><i>Readings:</i></p> <ol style="list-style-type: none"> 1) Kraemer, Chapter 5 2) Sarewitz, Chapter 8 3) Greenberg, D.S. <i>Chapters 25-27.</i> in <u>Science, Money, and Politics</u> 4) Starobin, P. <i>Who Turned Out the Enlightenment?</i> National Journal 38(30): 20-26. (7/29/2006) 5) Branscomb, L.M. <i>Science, Politics, and US Democracy.</i> Issues in Science and Technology, Fall 2004: 35-36. 6) Nelkin, D. <i>The Public Face of Science: What Can We Learn from Disputes?</i> in <u>The Fragile Contract</u> (Chapter 5) <p><i>Assignment:</i> Term Project Op-Ed, due 4/29/08</p>
	W x-hour	4/23/08	NO CLASS
	Th	4/24/08	<p style="text-align: center;"><u>Case Study II: The Republican War on Science?</u></p> <p><i>Readings:</i></p> <ol style="list-style-type: none"> 1) Mooney, Chris. <u>The Republican War on Science.</u> New York: Basic Books, 2005. 2) Looking for a Fight: Responses to <u>The Republican War on Science</u>
6	Tu	4/29/08	<p>1. <u>Conceptual Frameworks: Critiquing the Social Contract, the Linear Model, and Politics for Science</u></p> <p><i>Readings:</i></p> <ol style="list-style-type: none"> 1) Sarewitz, <i>Chapters 1-4 and 6</i> <p><i>Assignment: Term Project: Op-Ed due by 5pm</i></p>
	W x-hour	4/30/08	Term Project: Op-Ed Exercise

	Th	5/1/08	<p>1. <u>Conceptual Frameworks: Science in Politics</u></p> <p><i>Readings:</i></p> <ol style="list-style-type: none"> 1) Sarewitz, Chapter 5 2) Ravetz, J.R. <i>Uncertainty, Ignorance, and Policy in Science for Public Policy</i> (Chapter 7) 3) Wynne, B. <i>Uncertainty-Technical and Social in Science for Public Policy</i> (Chapter 8) 4) Sarewitz, D.; Pielke, R.A. <i>Prediction in Science and Policy in Prediction: Science, Decision Making, and the Future of Nature</i> (Chapter 1) <p><i>Assignment:</i> Briefing Memo, due 5/8/08</p>
7	Tu	5/6/08	<p>1. <u>Conceptual Frameworks: New Paradigms</u></p> <p><i>Readings:</i></p> <ol style="list-style-type: none"> 1) Sarewitz, Chapter 9 2) Greenberg, D.S. <i>Epilogue in Science, Money, and Politics</i> 3) Guston, D.H. <i>Forget Politicizing Science. Let's Democratize Science!</i> Issues in Science and Technology, Fall 2004: 25-28. <p>2. <u>Recognizing the Frameworks: Introduction to Energy Policy and the Environment</u></p> <p><i>Readings:</i></p> <ol style="list-style-type: none"> 1) Kraemer, Chapter 9
	W x-hour	5/7/08	Special Guest: Richard Parsons
	Th	5/8/08	Briefing Memos Due: Class Exercise
8	Tu	5/13/08	<ol style="list-style-type: none"> 1. <u>An Inconvenient Truth: The Movie</u> 2. <u>An Inconvenient Truth: First Impressions</u>
	W x-hour	5/14/08	NO CLASS

	Th	5/15/08	<p><u>Case Study III: The Skeptical Environmentalist vs. An Inconvenient Truth</u></p> <p><i>Readings:</i></p> <ol style="list-style-type: none"> 1) Selections from: Lomborg, Bjorn. <u>The Skeptical Environmentalist</u>. Cambridge: Cambridge University Press, 2001. 2) <i>Reading Packet</i>: Reactions to <u>The Skeptical Environmentalist</u>. <p><i>Assignment: Term Project: Report Draft Due</i></p>
9	Tu	5/20/08	Term Project: Presentations
	W x-hour	5/21/08	Term Project: Presentations
	Th	5/22/08	<ol style="list-style-type: none"> 1. <u>Current Issues in Science Policy: The Precautionary Principle and the War in Iraq</u> <p><i>Readings:</i></p> <ol style="list-style-type: none"> 1) Myers, N. <i>The Rise of the Precautionary Principle: A Social Movement Gains Strength</i> <i>Multinational Monitor</i> (Sept. 2004): 9-15. 2) <i>Reading Packet</i>: The Precautionary Principle
10	Tu	5/27/08	<ol style="list-style-type: none"> 1. <u>Current Issues in Science Policy: The 2008 Election</u> <p><i>Readings:</i> To Be Determined</p> <ol style="list-style-type: none"> 2. <u>The Future: How Can We Use Science Policy to Get There?</u> <p><i>Readings:</i></p> <ol style="list-style-type: none"> 1) Kraemer, Chapter 10 2) Coates, J. <i>A 21st Century Agenda for S&T Policy</i> 3) Kash, D.E.; Rycroft, R. <i>Technology Policy in the 21st Century: How will we adapt to complexity?</i> <i>Science and Public Policy</i> 25(2): 70-86. (1998) <p><i>Assignment: Term Project: Final Report Due 5/31/08 by 5:00 pm</i></p>