Course Goals:

For students to develop an understanding of (1) how policy processes influence scientific and technical problems and (2) how science and technology affect social policy development.

Learning Objectives:

1) Students will be able to analyze current science, technology policy in terms of key stakeholders, key issues/concerns
2) Develop clear written and verbal communication of analysis
3) Prepare policy recommendations based on analysis.

Policies:

The course format is that of a reading / discussion / project course. During most class periods, the focus will be on discussing the reading assignments. Check the Blackboard page often, as the schedule and assignments will change as the semester progresses. Access to Blackboard is restricted to students currently enrolled in the course.

Discussions/Readings
This course is a reading and discussion based course, there will be no weekly problem sets or assignments, the assignments are the readings. Completing the readings and participating in discussion are key parts of this course. As such, students will be graded on participation in discussions. At a few points throughout the semester, class may be canceled so students can attend a lecture or conference. Any assignments related to these will be included under the participation grade.

In addition, groups will be required to produce reading response memos, no more than 5 pages in length, synthesizing and summarizing the main points in the readings and raising a few questions or points of interest as a starting point for discussion with the class. Responses must be turned by 5 PM on the Sunday before the discussion so they can be reviewed and distributed to the entire class. In addition to writing a memo, each group will give a short presentation, no more than 10 minutes in length, about the main
points of the readings, it should draw on material from the memo but it should not be a verbatim reading of the memo.

Finally, we will be using Piazza to continue the discussion outside of the classroom. There will be threads for each class and the discussion questions for the day will be posted. The goal is to continue the conversation, we will run out of time in class and have to move onto other topics for the next class. You must participate in at least three threads throughout the semester.

Final Project
Each group will complete a final project with a policy recommendation on a topic of their choosing. Project proposals will be due in the 4th week of class, more information will be provided throughout the semester. The purpose of the project proposal is to for us to assess the scope of your project and help you manage the project requirements.

This is the major assignment for the course and accounts for 50% of the final grade across 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** – (10%) maximum of 4 pages single spaced. 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** (10%) - maximum of 4 pages single spaced. 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** – (15%) maximum of 12 pages single spaced. The paper should revise and expand upon your earlier backgrounder and policy assessment, based on feedback on those assignments. In addition, it will also contain a section that focuses on how your policy might be improved.

d. **Presentation** – (10%) To be given in-class during the exam period; approximately 12 minutes in duration followed by 8 minutes of Q&A. 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.

e. **Evaluation** – (5%) students will complete individual, confidential evaluations of their team members at the end of the semester. In addition, individuals will complete comments and an evaluation of each team during the final presentations.

Length guidelines are inclusive of figures and footnotes but exclusive of works cited and sources. You must include a works cited.
Formatting Guidelines:

Reading Summaries
Your reading summary should be double spaced, one inch margins, size 11 or 12 font, and justified on the page (use word formatting to make lines take up the whole page). You should include references throughout your paper and a works cited or source page at the end.

Term Project
All sections of your final paper should keep within the length guidelines. The length guideline for each section is inclusive of figures and footnotes but exclusive of a source page or works cited. Each section should be size 11 or 12 font, one inch margins, and justified on the page (use word formatting to make lines take up the whole page).

General Guidelines
Grammar, spelling, and cohesiveness make up 25% of the grade for all written assignments. Readability make for another 25%. In the real world, proposals and reports that were excellent in content were brought down by grammar issues. Make sure to take time to read and edit all of your written assignments. Include punctuation where appropriate, always use Oxford commas. Never put two spaces after a period. You will get warned on your first writing assignment of these and other issues with grammar, spelling, cohesiveness, and readability. After the first assignment you will start losing points.

Attendance
The University Regulations Handbook reads: "Students are expected to be present for every meeting of the classes in which they are enrolled." If you must miss a class you are responsible for the reading material, discussion, assignments and/or announcements made. Excessive absence (more than 2 absences) from the class will negatively affect the participation portion of the grade.

Course Grades
Because this course will be a reading / discussion / project class, grades will be based on your ability to critically read and discuss literature concerning complex subjects, to write short summaries discussing the literature readings and topics covered, to complete projects during the semester that make use of the topics and methods discussed in the course, and to prepare a final project for the semester. Computation of final course grades will use the following distribution:

Your final grade will be determined as follows:

- Discussion/Participation: 20%
- Reading/Discussion presentations: 30%
- Policy Analysis Project: 50%
- Background: 10%
- Assessment: 10%
- Final Paper: 15%
- Final Presentation: 10%
- Evaluation: 5%
Criteria for grading writing assignments

Completeness and thoroughness 50%
Grammar, spelling, and cohesiveness (logic of argument) 25%
Readability 25%

Grade assignment will use a criterion (straight-scale) approach, but the instructor reserves the right to curve the grades if appropriate. Under no circumstance will the scale be more stringent than the criterion given below (e.g. 93% or above will always earn an A), and the curve will never span more than one grade scale (e.g. the lowest A possible when grades are curved is 83%). A total score of 50% or lower will always fail.

Email Etiquette The instructor and the TA will make every attempt to respond to emails and phone messages within 24 hours of receipt. It is unrealistic to expect responses after 8 PM and before 8 AM weekdays, or before Sunday evening on weekends. Please plan accordingly.

Campus Emergencies In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances.

Academic Honesty. By this point in your professional development you should all know what constitutes plagiarism. If you do not, it is your responsibility to find out. We are happy to provide a tutorial and links to websites that give good guidance (you can do this yourself by googling the term and going to links for plagiarism guidelines offered by many universities). That you are unfamiliar for whatever reason with what constitutes plagiarism will NOT be accepted as a legitimate or mitigating excuse. Any instances of plagiarism in the class will result in a grade of F being awarded for the course and will be reported to the head of the department.

Students with Disabilities. If you have a disability that requires special academic accommodation, please make an appointment to speak with Professor Dumbacher. It is important that we talk about this at the beginning of the semester. It is the student’s responsibility to notify the Disability Resource Center (https://www.purdue.edu/drc) of an impairment/condition that may require accommodations and/or classroom modifications.

Nondiscrimination. Purdue University prohibits discrimination against any member of the University community on the basis of race, religion, color, sex, age, national origin or ancestry, marital status, parental status, sexual orientation or identity, disability, or status as a veteran. The University will conduct its programs, services, and activities consistent with applicable federal, state, and local laws, regulations, and orders and in conformance with the procedures and limitations as set forth in Executive Memorandum No. D-1, which provides specific contractual rights and remedies.

Readings

Readings will be provided on Blackboard or through the library. It is not necessary to purchase any books.
### Week 1 - What is Policy?

**Tuesday (1/12)**
- Course Introductions, Expectations - What is Policy?
- Readings: None
- Assignments Due: None

**Thursday (1/14)**
- Who, What, and Why?
- Readings: *Federalist 10; Pielke 1-38; Stone Introduction and Chapter 1; Jasanoff, Chapter 1*
- Assignments Due: Team Assignment Day

### Week 2 - Space Law/Space Policy - Introduction

**Tuesday (1/19)**
- The Basics of the US Government Process
- Readings: *The US Constitution; Videos*
- Assignments Due: None

**Thursday (1/21)**
- What is Science, and how does it Work?
- Readings: *Kuhn - Chapters 2, 3, 5, 9; Jasanoff 1996*
- Assignments Due: None

### Week 3 – The Evolution of Science and Technology Policy in the United States

**Tuesday (1/26)**
- The Evolution of Science and Technology Policy in the United States
- Readings: *Kleinman Ch 2-6; Greenberg intro Ch 1-6*
- Assignments Due: Team 1 Reading Summary due 1/24 by 5 PM

**Thursday (1/28)**
- The Apollo Program (CLASS IN STEW 209)
- Readings: *Logsdon Ch 1-6, 12, Finale, Epilogue*
- Assignments Due: None

### Week 4 – Contemporary Controversies in Science and Technology Policy

**Tuesday (2/2)**
- Contemporary Controversies in Science and Technology Policy
- Readings: *Greenberg Ch 10-14, 28; Kevles; Mooney Ch12*
- Assignments Due: Team 2 Reading Summary due 1/31 by 5 PM

**Thursday (2/4)**
- Project Work Day
- Readings: None
- Assignments Due: Project Proposal Due by 2/6 at 5 PM

### Week 5 – The Social Contract of Science

**Tuesday (2/9)**
- Rethinking the "Social Contract" for Science
- Readings: *Kleinman Ch 7; Sarewitz; Bozeman and Sarewitz; Sarewitz et al; Froegman and Mithcam; Guston*
- Assignments Due: Team 3 Reading Summary due 2/7 by 5 PM
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<tr>
<td>Thursday (2/11)</td>
<td>Guest Lecture – Henry Hertzfeld (CLASS IN STEW 209)</td>
<td>UN Treaties; Doyle; CRS; UN Legal Issues; US Space Policy 2010; Video</td>
<td>None</td>
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<td>Tuesday (2/16)</td>
<td>Sociology of Innovation</td>
<td>Hughes; Pinch and Kline; Mackenzie; Latour; Wetmore; Winner</td>
<td>Team 4 Reading Summary due 2/14 by 5 PM</td>
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<td>Thursday (2/18)</td>
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<td>Tuesday (2/23)</td>
<td>Understanding Technology Assessment</td>
<td>Guston and Sarewitz; Schot; Rodemeyer, et. al; DEMOS</td>
<td>Team 5 Reading Summary due 2/21 by 5 PM</td>
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<td>Thursday (2/25)</td>
<td>TBA</td>
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<td>Tuesday (3/1)</td>
<td>Development and Technology Transfer</td>
<td>Easterly; Scott; Miller</td>
<td>Team 6 Reading Summary due 2/28 by 5 PM</td>
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<td>Thursday (3/3)</td>
<td>Project Work Day</td>
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<td>Tuesday (3/8)</td>
<td>“Scientific” Controversies</td>
<td>Sarewitz; Pielke; Gieryn; Nelkin and Jasper</td>
<td>Team 1 Reading Summary due 3/6 by 5 PM</td>
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<td>Thursday (3/10)</td>
<td>Guest Speaker: Eric Hatch</td>
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**Background Memo due by 3/5 at 5 PM**

**Spring Break – No Class**
### Week 11 – Structures of Science Advising

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<th>Tuesday (3/22)</th>
<th>Structures of Science Advising</th>
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<td>Readings:</td>
<td>Jasanoff Ch 7, 10, 11</td>
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<td>Team 2 Reading Summary due 3/20 by 5 PM</td>
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### Week 12 - Contemporary Problems in Science Advising and Policymaking

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<th>Contemporary Problems in Science Advising and Policymaking</th>
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<td>Readings:</td>
<td>Mooney Ch 6-10, epilogue; Sarewtiz; Araujo, Horowitz, Lindsay</td>
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<td>Assignments Due:</td>
<td>Team 3 Reading Summary due 3/27 by 5 PM</td>
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<th>Project Work Day</th>
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<td>Assignments Due:</td>
<td>Policy Assessment due by 4/2 at 5 PM</td>
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### Week 13 – Experts and the Public

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<th>Tuesday (4/5)</th>
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<td>Readings:</td>
<td>Epstein; Jasanoff</td>
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<td>Team 4 Reading Summary due 4/3 by 5 PM</td>
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### Week 14 – The Management of Risk and Uncertainty

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<th>Tuesday (4/12)</th>
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<td>Readings:</td>
<td>Jasanoff; Funtowitz and Ravets; Vogel; van Zwanenberg and Stirling; Rayner</td>
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<td>Team 5 Reading Summary due 4/10 by 5 PM</td>
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### Week 15 – Sociotechnical Breakdowns and Conclusions

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<th>Tuesday (4/19)</th>
<th>Sociotechnical Breakdowns</th>
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<td>Readings:</td>
<td>Perrow; Wetmore; Hilgartner; Smith</td>
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<td>Team 6 Reading Summary due 4/17 by 5 PM</td>
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<td>Thursday (4/21)</td>
<td>Conclusions</td>
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<tr>
<td>Tuesday (4/26)</td>
<td>Final Presentation Day</td>
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<td>Thursday (4/28)</td>
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12-Jan  
Course Introductions, Expectations - What is Policy?

No Reading Assignments

14-Jan  
Who, What, and Why?

Questions:
- Where do Pielke’s descriptions of science advisors fall, the market model or the polis model? Which model does more accurately represents the way policy happens?
- There is a vested interest in the common good but representative democracy can also be transactional and there is a certain economy to power in politics.
- How does this relate to federal politics?
- Who are the major players and what are the driving interests in each of the four main content areas of the course (space, energy, environmental, and defense policy)?

Readings
- James Madison, Federalist 10

19-Jan  
The Basics of the US Government Process

Readings:
The US Constitution; Videos available on Blackboard

21-Jan  
What is Science, and how does it Work?

Questions:
- How important is objectivity?
- How does this relate to the discussion last week about the formation of policy?
- Who are the major players and interests in the scientific community?

Readings:

26-Jan  
The Evolution of Science and Technology Policy in the U.S.

Questions:
- Is it possible to create a centralized government in the U.S. whilst maintaining a two housed democracy and freedoms outlined in the Constitution, and will parts of the Constitution have to be compromised in order to create such a government.
- What entirely would it mean if health research budgets were cut?
- How much Research and Development (R&D) is too much? Even during economic decline? Why were the years of economic decline was research still booming?
- Can we justify spending grant money on building new facilities? How?

Readings:
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<td>28-Jan</td>
<td>The Apollo Program</td>
<td>Logsdon Ch 1-6, 12, Finale, Epilogue</td>
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<tr>
<td>2-Feb</td>
<td>Contemporary Controversies in Science and Technology Policy</td>
<td></td>
<td>• How does science affect politics and how do politics affect science?</td>
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<td>• Is the pursuit of science still for the sake of finding truth?</td>
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<td>• Has the integrity of science been compromised due to its involvement in politics?</td>
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<td>• What are potential consequences of science involving itself in politics?</td>
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<td>• Are the current lobbying practices just for all members of the scientific community?</td>
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<td>Why or why not?</td>
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<td>• Daniel S. Greenberg, Science, Money, and Politics: Political Triumph and Ethical Erosion</td>
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<td>• Daniel Kevles, “The Death of the Superconducting Supercollider in the Life of American Physics,”</td>
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<td>in Kevles, The Physicists: A Scientific Community in Modern America</td>
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<td>• Chris Mooney, The Republican War on Science Ch. 12, “Stemming Science,” pp. 195-216.</td>
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<td>9-Feb</td>
<td>Rethinking the &quot;Social Contract&quot; for Science</td>
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<td>• Do you think a social contract should exist between science and society?</td>
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<td>• To what extent can scientists afford to not succumb to financial backing and influences?</td>
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<td>• Utilizing the public-failure theory model, what can the government do to ensure it is</td>
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<td>investing in areas that the public can receive maximum return on investment?</td>
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<td>• Can scientists pursuing basic research compete with private industry for influence over</td>
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<td>policy decisions?</td>
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<td>• Daniel Kleinman, Politics on the Endless Frontier: Postwar Research Policy in the United</td>
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<td>• Daniel Sarewitz, “Human Well-being and Federal Science—What’s the Connection”, in D. L.</td>
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<td>• Barry Bozeman and Daniel Sarewitz, “Public values and public failure in US science policy.”</td>
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<td>Supplement, 67-83.</td>
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<td>• Robert Frodeman and Carl Mitcham “Beyond the Social Contract Myth.” Issues in Science and</td>
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<td>Technology 2000.</td>
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<td>• David Guston, “Integrity, Responsibility, and Democracy in Science.” Scipolicy. 1.2 (2001)</td>
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<td>pp. 168-189.</td>
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<td>11-Feb</td>
<td>Guest Lecture – Henry Hertzfeld</td>
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<td>• UN Outer Space Treaty</td>
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<td>• Current National Space Policy</td>
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<td>• UN Legal Issues</td>
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<td>• CRS NASA Future 2010</td>
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<td>• Doyle – Emergence of Space Law</td>
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16-Feb

**Sociology of Innovation**

Questions:
- How do people/factions/politics impact the style of a technology and influence its production?
- Are there any examples of high momentum technologies today?
- Do certain technologies compel humans to act more responsibly? Why or why not?
- Is the style and transfer of technology impacted most by the manufacturer or users? Why?

Readings:

18-Feb

**ASSIGNMENT FOR THE DAY**

13-Feb

**Understanding Technology Assessment**

Questions:
- How do public interests, values, motives, and perspectives drive the people making decisions about science?
- How do we build the bridge between science and the public in order to have a better understanding of how technology will affect society?
- Who should be held accountable for the impacts of science and technology?
- How do assumed imaginaries shape current space policy (ie going to Mars), and have public concerns been considered?

Readings:
## 25-Feb ASSIGNMENT FOR THE DAY

### 1-Mar Development and Technology Transfer

**Questions:**
- Do scientists have a moral obligation to share their data, even with the knowledge that it could be misused? Should scientists be held accountable for the ramifications of misused information?
- What rights and responsibilities do public institutions hold to set standards for the production and validation of knowledge, and how do they acquire those rights? (Miller, p. 94)
- Why do modern scientific methods/models that have success in the industrial West so often fail when applied to the Third World?
- Referring back to the quote about the citizens’ feelings on “unelected outsiders imposing rigid doctrines on the xenophobic unwilling,” (Easterly, 32), if there is a way to improve third world conditions, but the locals resist the improvement, should the outside institution step in?

**Readings:**

### 8-Mar "Scientific" Controversies

**Questions:**
- Would shifting the paradigm such that scientists not only make discoveries, but also declare potential policy implications be feasible or logical?
- Is the sequential model of technological development too conservative and the sequential model too aggressive? Is there an acceptable medium between the two?
- Is mass media, politician or public helpful in adjudication of science anyway? What roles should they play in your opinion?
- If uncertainty in science can always be considered a negative result, how can it be made into a positive political result?

**Readings:**

### 22-Mar Structures of Science Advising

**Questions**
What is the proper formulation of advisory expert panels, used by agencies as consulting groups, to ensure a smooth collaboration and policymaking process?

Scientists’ advice is often regarded as conservative when public safety is in question and thus disregarded as subjective. How could this stereotype change so they can meaningfully contribute in decision making?

Is it ethical for federal agencies to overrule expert board decisions, whenever they are against their policy position, and how does that affect the resulting policy?

When a panel of independent experts validate research findings, does that truly meet the intent of peer review?

Reading:

ASSIGNMENT FOR THE DAY

Contemporary Problems in Science Advising and Policymaking

Questions:

- What kinds of standards, if any, should be put into place for data and reports utilized by policymakers and international organizations?
- If harmful legislation such as the Data Quality Act can be passed so simply, what should be done in order to protect scientific data and individual scientists from being easily discredited by industry?
- Given the complexity of some of today’s key issues, namely climate change, how can scientists best address these problems to work with policymakers in providing useful data rather than against them?
- Is it possible to create a system in which the scientists selected for collaboration on reports can address the priorities of both science and policy without being influenced by the organizations responsible for selection?
- How do we determine what issues are most appropriately discussed via scientific discussions, ethics/values discussions, or a combination of the two?

Readings:


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/)

Experts and the Public

Questions:

- What role does activism play in the United States policy making today?
- How does the role of activists in the United States differ from that of Britain? Is one more advantageous than the other?
- Does activism influence the defense industry? Why/How?
- Are there any examples of civic dislocation today? Has civic dislocation been prevented somewhere? How?

Readings:

7-Apr

ASSIGNMENT FOR THE DAY

12-Apr

The Management of Risk and Uncertainty

Questions:
• Beyond increasing the precision of quantitative studies, how can the US reduce uncertainty in risk assessment?
• What role should economic costs and benefits play in establishing regulatory policies?
• When is the “precautionary principle” appropriate in policy making? When isn’t it?
• What can be done from a government and public stance to increase trust and decrease skepticism that comes from the public about political decisions?

Readings:

14-Apr

ASSIGNMENT FOR THE DAY

19-Apr

Sociotechnical Breakdowns

Questions:
• If “normal accidents“ are unavoidable and incomprehensible, to what extent is it society’s role to ensure a system is safe or is it acceptable to accept risks which may end in a catastrophic event to further technology?
• How might the behavior of individuals and the choices they make be affected by the organization itself and its political and economic environment? (Vaughan, 31)
• Should failures of a system be blamed on the operator of the system or the organization that supplies the system?
• How can communication be improved between organizations that are responsible for different parts of containing disaster?
• Is Hilgartner and Smith’s claim that there is no such thing as a natural disaster in advanced societies valid? Why or why not?

Readings:
• Jameson Wetmore, “Distributing Risks and Responsibilities: Flood Hazard Mitigation in New Orleans” Social Studies of Science,
• Stephen Hilgartner, “Overflow and Containment in the Aftermath of Disaster.” Social Studies of Science,
Suggested Topics for Final Presentation

When thinking about topics it’s a good idea to think about a specific topic (such as Missile Defense policy with NATO) rather than an overly general topic (like Defense Policy). Any of the topics we go over in class are fine topics to consider but we also want you to think more broadly about policies rooted in science and technology or with a large scientific/technological component that you are interested in.

In the first several weeks of class we’ll bring this point up several times but if you have any questions please ask them as early as possible, we will not be particularly receptive/responsive to frantic emails the night before the project proposal is due.

This course was heavily influenced by Paul Erickson’s Public Policy 650: Introduction to Science and Technology Policy Analysis course at Harvard