INTRODUCTION TO SCIENCE AND TECHNOLOGY POLICY ANALYSIS
PUBLIC POLICY 650
WINTER 2023
1110 WEILL
Wednesdays, 8:30-11:20 am

PROF. SHOBITA PARTHASARATHY
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OFFICE HOURS (IN PERSON/ZOOM):
TUESDAYS, 9:15-11:15AM.
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FRIDAYS 2:30-3:30pm
SIGN UP HERE.

COURSE DESCRIPTION
Science and technology intersect with multiple areas of public policy. Think of the growing
concerns over technological surveillance, the debates over policy for climate change mitigation,
the challenges posed by COVID-19, or the fear that American research and development
competitiveness is eroding in a globalized economy. These issues reflect important questions about
the relationship between science, technology, and public policy. Are scientific and technological
developments governable, and if so, how and by whom? Is more and better science always better
for policymaking? Who is the best judge of the value of scientific research programs and the
policy relevance of scientific findings? Are scientific and technological innovations generally
socially beneficial, and who decides?

This course introduces theories and methodologies for science and technology policy analysis. You
will learn how science and technology policy is made, with specific attention to the roles of
government agencies, expert advisory committees, the private sector, and the public. You will
learn analytical tools for science and technology policy analysis, including values analysis,
technology assessment, and deliberative democratic design. And you will learn to apply cutting
edge theories and approaches for governing science and technology to a number of policy
problems. This analytic toolkit will be drawn from literature in a range of disciplines, including
political science, philosophy, sociology, history, and the science of science policy.
This course will provide:
• Background on the science and technology policy environment
• An understanding of the “social science” of science and technology policy
• Skills to think critically about how science and technology can be used to help solve social
problems
• A multidisciplinary toolkit for analyzing and influencing science and technology policy
• Expertise in conducting S&T policy analysis
• An introduction to career paths in science and technology policy

PubPol 650 is a core course in the Science, Technology, and Public Policy (STPP) Graduate
Certificate Program, but is not limited to STPP students. It is designed for graduate students from
diverse disciplines, including public policy, public health, law, business, engineering and the
social, biological, and physical sciences. No scientific, technical, or policy background is required
to take the course.
A. **Class participation.** This is a discussion-intensive course. Preparation, attendance, and active participation are crucial and will be important parts of your final grade. Each class session includes discussions and activities that require that you have read the week’s readings. Active participation involves: 1) coming to class; 2) participating at least once per class; 3) making valuable contributions based on ongoing classroom discussion, the lectures, and readings; and 4) knowing when you’ve been dominating the conversation and pulling back. In addition, in order to active participation, I reserve the right to “cold call” students (i.e., call on students who have not raised their hand to participate). If you usually have trouble participating in class, please speak with me. I will be happy to give you strategies to increase and improve your participation.

Your preparation for class should not be a passive process of absorbing facts from readings; 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, you should pay attention to current news in science and technology policy, and I encourage you to bring them into class discussion as examples (I certainly will!) Some of my favorite sources are: @NatureNews; @NYTScience; and @guardianscience.

Because this course depends heavily upon discussion and in-class scenarios, I expect students to make every effort to attend all class sessions. **Notify the GSI in advance** if you will miss class; excused absences can be granted for things like illness and family emergencies, but only if we hear from you in advance. Unexplained absences will negatively affect your grade. So will repeated tardiness.

**Doing the reading:** Some of you may be unaccustomed to the amount and types (e.g., social science and humanities research) of reading required for this course. As you will see, I have tried to vary the types (academic, journalistic) and also supplement with podcast episodes and films when appropriate. I have also given you a sense of the amount of reading per week so that you can plan accordingly. Here are a few tips to get the course reading/preparation done and get the most out of it. **First, don’t attempt to do it all in one sitting!** Break it up into at least two chunks, so that you are really absorbing the material rather than just getting through it. **Second, read actively!** Take notes as you read, and underline/highlight the text when you find it interesting or important. Note the main arguments, the evidence used to support these arguments, questions that it raises for you, and other things (e.g., world events, examples) that the reading makes you think about. This approach can help you read more quickly; while you need to read everything, you’ll know when you can read more quickly and when you should read more slowly. **Third, use the introductory context and discussion questions I’ve provided!** Together, these strategies will ensure that you extract the important information from the readings (and hopefully it will help you learn to read this type of work faster and more efficiently!)
**Guest speakers:** You will notice that on occasion, I have invited guest speakers to join the class. Some are graduates of the STPP Program, others are simply important figures in the world of science and technology policy. Each will join us for approximately the first hour of class, and help you connect our classroom discussions and readings to real-world considerations. I will begin the conversation with some introductory questions, and then leave the questions up to you. We will help you prepare by providing short profiles of each speaker and links to additional information. Asking these guests questions will contribute positively to your participation grade.

**B. Weekly Reading Reflections.** To assist you in both developing the skills central to the course and fulfilling (A), during the course of the semester you will submit eleven reading reflections on Canvas. These Reading Reflections are designed to encourage you to read actively and to draw connections across readings. We will read them before class and use them to facilitate class discussions. Reflections can vary in length, but are typically around 300 words. They should not simply summarize the reading. These posts are think pieces—opportunities for you to identify the main themes and tools discussed, ask questions, and probe insights you have as you read. Your entries should reflect holistically on all the readings assigned for the day, not just one. You can use your Reflection to ask questions of the material, to explore the relationship between the readings and the topics chosen for your class papers, between a particular set of readings and readings from another week, or between the readings and current events. Treat these Reflections as formal pieces of writing. Be clear and succinct. You do not need to provide formal citations for assigned reading, but if you refer to outside material, please provide footnotes/endnotes.

**Reading reflections are due Tuesdays by 8 pm Eastern.**

The expectation is that most posts will receive a 2 to 3. Late posts will receive a 0. If you choose to submit more than 11 reflections, we will only count the 11 highest scores in our final grading.

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<th>Points</th>
<th>4 (A+)</th>
<th>3 (A)</th>
<th>2 (B)</th>
<th>1 (C)</th>
<th>0</th>
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<td>Criteria</td>
<td>Accurate, thoughtful, holistic analysis/response. Evidence of exceptional effort and insight.</td>
<td>Good effort to connect all readings. Demonstrates careful effort and serious thought.</td>
<td>Generally good. But lack of specificity, insight indicates more time was needed to complete the work.</td>
<td>Provides only summary; misses readings; shows little engagement or insight; clear that work was hurried or careless.</td>
<td>Assignment substantially incomplete or not turned in.</td>
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**Small interdisciplinary cohorts/study groups:** This is a uniquely interdisciplinary course, with students coming from a variety of fields and programs and topics ranging across technical sectors and perspectives. To help you make the most out of the opportunity to learn from one another, we will put you into small “cohorts” of 5-6 people each (by the second week of class); these will be deliberately designed to be intellectually diverse. You will share your Reading Reflections with one another each week, via Canvas (We’ll do the back-end work, but basically once you submit your Reflection, the Reflections of your group members will become visible to you—under the assignment’s submission details—and you should read them. Although this is through Canvas’s “Peer Review” function, but you don’t actually need to submit any written review.) On occasion we will have you meet in class to discuss them. You are also welcome to share notes on the readings and course requirements with one another, and perhaps ask questions and provide course support to one another (we will share your
emails when we put you into groups, and you are welcome to create text groups or Slack channels etc, we can also set up a Discussion Board for you). All course assessments, however, are on an individual basis.

C. Written Assignments. The course emphasizes writing for the policy environment, which may be a new skill for some of you. Policy writing requires front-loaded arguments, concision, clarity, and specificity. We’ll discuss the genre, individual paper requirements, and tips throughout the term and in advance of assignments. I’m also available to meet with you regarding this, as are the Ford School’s Writing Instructors. All students in the course—even if you are not a Ford student—can meet with them. If you want to make an appointment, you can do so here: https://fordschool.mywconline.com/ Note that you must first register with the site (i.e., create a login and password). Plan ahead—they fill up quickly (appointments open up on Fridays for the following week). Also note that we have a number of resources in Files on the Canvas site, under General Writing Resources.

1. Research Funding Written Testimony: Choose an area of research that you believe deserves more government funding, and a stakeholder (e.g., a scientific/professional organization, patient advocacy organization, or civil society group) who is interested in increasing research funding this area. You, on behalf of this organization, have been asked to testify in front of a U.S. Congressional committee (you must find the relevant committee and address your memo accordingly) to make your case. Using no more than 700 words, provide written testimony explaining why Congress should increase funding for your desired area of research. Compelling written testimony will include answers to the following questions: Why is this area of research in the public interest? Why and how will it benefit the country? What is the return on the investment? As you write this memo, you’ll need to think hard about how to explain and justify this area of research (and the need for government research funding in particular) to a “lay” audience and the most powerful way to make your case to decisionmakers in this particular venue. (Tip: both the audience and politics matter in terms of how you frame your argument and evidence!) Note that you are purposely making a complex argument in a very limited space. Writing must be clear and concise.

2. Science/Technology Policy Controversy Papers
   a) Topic Choice. Choose an ongoing controversy related to a specific science or technology policy that you want to focus on for your last two papers. There are a variety of possibilities to choose from, but it is very important that you choose a current, specific controversy that is being actively discussed by stakeholders and policy officials. Controversies are likely to focus on one of three questions: 1) should an area of science or technology move forward (e.g., proposals for developments pertaining to gene editing, geoengineering, small modular nuclear, etc.); 2) (how) should we regulate a particular area of science and technology (e.g., greenhouse gases/fossil fuels, genetically modified organisms, genetic testing); or 3) how we can encourage innovation in the public interest (e.g., intellectual property policies). Choose a local, state, or national context in which an actual controversy is taking place. Answer the following questions: What are the main topics of controversy? What is the evidence of a live, ongoing controversy? Who are the stakeholders involved? Who are the decisionmakers involved? Who are the experts involved? Why is this controversy of interest to you in the context of this course? Is any specific policy or legislation being debated? Your submission for the topic choice doesn’t need to be a formal piece of writing, but it should answer all of the above questions.
b) **Backgrounder.** This paper should provide an analytic explanation of your controversy. It should be addressed to a real decisionmaker in the controversy, from you as a science and technology policy analyst. It should use concepts, skills, and analytical approaches from the course to clearly, succinctly, and neutrally explain the issues underlying the controversy. Your memo should include a brief history of the controversy, an overview of the stakeholders involved (who they are, their interests, values, and positions on the issue), the main issues of controversy, the disputes over values, expertise, knowledge, power, etc., at play, and any previous efforts at resolution. Be sure to be specific and cite sources. All of this information should be conveyed in the context of your explanation of what the main issues of the controversy are. This paper should be no more than 1200 words. Be sure to use analytical concepts and tools from the course in your analysis.

c) **Governance Recommendation.** Choose one or more of the approaches that we have discussed in class that you think is/are best suited to help address or resolve your policy controversy. Write a memo to a decisionmaker involved in the controversy (i.e. someone who would be in a position to implement your proposal) that: 1) explains why this approach is the best means to address the controversy; and 2) provides a blueprint for implementing your approach. Be specific: who should be involved and how will the process work? How will you ensure that the mechanism makes a difference in the controversy? Why is this a better approach than previous or status quo approaches in this or similar policy controversies? What political benefits—in the form of transparency, democratization, etc.—does your proposal offer? What kinds of concerns might the decisionmaker have about your proposal, and how will you respond (i.e., address counterarguments)? Be specific! This paper should provide a blueprint for putting your chosen approach into action in your specific controversy. This paper should be no more than 1200 words. Be sure to use concepts from class discussion and the readings in your analysis. You do not need to revisit the background discussed in the “Backgrounder” memo.

**COURSE POLICIES:**

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<th>Paper Submission Guidelines:</th>
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<td>• All assignments must be double-spaced.</td>
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<td>• Do not put your name on the paper. Instead, just write your UM ID# (and, if appropriate, a pseudonym.)</td>
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<td>• Write down the total number of words you have used. You can calculate this easily by using MS Word’s “Word Count” feature, which is listed under the “Tools” tab. The word count does not include the header or references (i.e., endnotes, footnotes, or the bibliography).</td>
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<td>• Put the assignment in the appropriate folders under the “Assignments” tab in Canvas.</td>
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<td>• <strong>Neither Margarita nor I will edit your paper drafts before the due date.</strong> However, we are happy to speak with you about your paper (this could include answering general questions, skimming your paper and providing general comments, and also helping you understand our comments once papers have been returned to you. Please keep in mind that the Ford School’s writing tutors are willing to read and comment on your drafts in advance of paper submission (but as with us, you must plan in advance to make appointments with them).</td>
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<th>Late assignments:</th>
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<td>Don’t do it. The assignments in the class build on one another, and we have set the deadlines to ensure that we can read them and provide comments so that you can incorporate necessary changes into the next assignment.</td>
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However, we understand that extenuating circumstances can occur. If you need an extension, please email the professor well in advance of the due date. Late assignments will lose five points for each 24 hour period, or fraction thereof, that they are late.

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<tr>
<th>Response to Emails:</th>
<th>Margarita and I will do our best to respond to your emails in a timely fashion. That said, we are not likely to provide immediate responses. Allow 24 hours for a response, and do not expect responses on weekends.</th>
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<td>Syllabus:</td>
<td>While the syllabus is fairly stable (especially for the first few weeks), I reserve the right to make slight changes to it. I do not expect, however, the themes, assignments, or even the readings to change significantly. If I do make even a slight alteration, I will update the appropriate Module in Canvas at least a week in advance.</td>
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<td>Office Hours:</td>
<td>I encourage you to meet with me at least once, during office hours or by appointment. This is an opportunity to get to know each other better! And of course, these are also important opportunities for you to get help on assignments, go over material covered in class, talk about some connections between class material and your other academic work, employment experiences, and career interests, and so on.</td>
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<td>Accommodations for Students with Disabilities:</td>
<td>If you believe you need an accommodation for a disability, please let your instructor know at your earliest convenience. Some aspects of courses may be modified to facilitate your participation and progress. As soon as you make your instructor aware of your needs, they can work with the Services for Students with Disabilities (SSD) office to help determine appropriate academic accommodations. Any information you provide will be treated as private and confidential.</td>
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<tr>
<td>Student Mental Health and Wellbeing:</td>
<td>The University of Michigan is committed to advancing the mental health and wellbeing of its students. We acknowledge that a variety of issues, such as the pandemic, strained relationships, increased anxiety, alcohol/drug problems, and depression, directly impacts students’ academic performance. If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, services are available. For help, contact Counseling and Psychological Services (CAPS) and/or University Health Service (UHS). For a listing of other mental health resources available on and off campus, visit: <a href="https://uhs.umich.edu/stressresources">https://uhs.umich.edu/stressresources</a>. If you feel comfortable, you can also speak with me or Margarita. Any student who has difficulty affording groceries or accessing sufficient food to eat every day or who lacks a safe and stable place to live, and believes this may affect their performance in the course, is urged to contact Jordan Long in the Ford School’s Student Services Office. Furthermore, please notify me if you are comfortable doing so. This will enable me to provide any other resources that I may have or know about.</td>
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| Inclusivity: | Members of the Ford School community represent a rich variety of backgrounds and perspectives. We are committed to providing an atmosphere for learning that respects diversity. While working together to build this community we ask all members to:  
• share their unique experiences, values and beliefs  
• be open to the views of others  
• honor the uniqueness of their colleagues  
• appreciate the opportunity that we have to learn from each other in this community  
• value one another’s opinions and communicate in a respectful manner  
• keep confidential discussions that the community has of a personal (or professional) nature  
• use this opportunity together to discuss ways in which we can create an inclusive environment in Ford classes and across the UM community. |
| Academic Integrity: | The Ford School academic community, like all communities, functions best when its members treat one another with honesty, fairness, respect, and trust. We hold all members of our community to high standards of scholarship and integrity. To accomplish its mission of providing an optimal educational environment and developing leaders of society, the Ford School promotes the assumption of personal responsibility and integrity and prohibits all forms of academic dishonesty, plagiarism and misconduct. Academic dishonesty may be understood as any action or attempted action that may result in creating an unfair academic advantage for oneself or an unfair academic advantage or disadvantage for any other member or members of the academic community. Plagiarism involves representing the words, ideas, or work of others as one’s own in writing or presentations, and failing to give full and proper credit to the original source. Conduct, without regard to motive, that violates the academic integrity and ethical standards will result in serious consequences and disciplinary action.  
Additional information regarding academic dishonesty, plagiarism and misconduct and their consequences is available at: [http://www.rackham.umich.edu/current-students/policies/academic-policies...](http://www.rackham.umich.edu/current-students/policies/academic-policies...).  
For all papers, I expect proper sourcing and citation. I do not care which method (e.g., APA, MLA, etc.) you use, so long as you are consistent through the paper. Also, when citing a source over the course of multiple sentences, cite after the first sentence. In addition, do not use Wikipedia as a direct source. It is anonymously produced, with un-vetted contributors from all over the world, so the information you find there should never be automatically trusted as legitimate. That said, I understand that Wikipedia can be extremely useful to introduce you to a particular topic. My suggestion is that you use it to learn the basics about a particular subject, and then follow the links provided there (or the insights you gain) to find a more credible source. |
COURSE READINGS
All readings are available on the Canvas site in the Modules section.

COURSE SCHEDULE

I. Thinking Critically about Science and Technology Policy

(1) Jan. 4: Themes, Mechanics, and Introductory Discussion
In this first week, we’ll introduce ourselves and discuss the basic themes and approach to the course and the assignments and strategies for success.

(2) Jan. 11: Technology, Innovation, and the “Public Good” (~78 pages, ~40 minute film, short pre-class exercise)
In this session, we’ll explore how technology both reflects and reinforces political ideology, cultural norms, and social values. We’ll also discuss some analytic strategies to understand this relationship between technology and society, including comparative methods and the concept of “sociotechnical architectures”. As you do the readings, think about the following questions:

- How do social values and political ideologies shape technology? How might you parse out the different ways values/biases/assumptions/priorities shape tech and technology policy?
- What analytic lenses are useful to you in identifying what and how social values and political priorities shape technology and technology policy?
- If you were advising someone building, implementing, or regulating technology, how might you explain to them that technologies are always political and moral instruments, and advise them on what to do as a result?

Pre-class exercise: After doing the readings, find a specific technology (mundane ones, e.g., a coffee cup, are likely the easiest, but choose whatever you’d like!) and spend 5-10 minutes jotting down how it—in terms of its design, its development, its implementation, its use) both reflects social values and reinforces/imposes them. (One way to make this easier might be to compare two relatively similar technologies). Come to class ready to discuss your example.


(3) Jan. 18: Science, Social Construction, and Public Policy (~90 pp.+54 minutes podcast episodes)
Last week we discussed how social values and political priorities shape tech policy. This week, we’ll turn our attention to science. I’ve assembled a bunch of short readings and podcasts that I hope are thought provoking. As you dive in, consider the following questions:
• How is science socially constructed and shaped by ideology and values, and what are the consequences especially for public policy?
• What are the implications of assuming that science is separate from politics and society?
• Why is scientific racism a persistent problem?
• Can you think of an example, in the day-to-day conduct of science, of how science is socially constructed or political, reflecting social norms and values?

RECOMMENDED:

II. Rethinking Science Funding to Solve Social Problems

(4) Jan. 25: Understanding Innovation Policy (~66 pages)
Guest speaker: David Goldston, Director, Washington Office, MIT
This week is designed to introduce you to the US’s famous approach to innovation policy (also known as the “Social Contract” for science), and compare it to other approaches. We’ll learn about the history of this approach, and talk about the politics of research funding today. We will also discuss limitations in the US approach and proposals to transform it for the future, as well as other countries’ approaches. All of this should help set you up for your first memo, in which you’ll
advocate for an increase in government research funding in a particular area. As you do this week’s reading, think about the following questions:

- How did Vannevar Bush think that innovation policy should serve society? How does this compare to the National Innovation Systems approach?
- What are the limitations in the Bush/US approach to innovation policy, and how might they be addressed?
- How do governments make decisions about how to allocate funding for research? What role does politics play?


RECOMMENDED:


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**5 Feb. 1: Rebalancing Public and Private Interests for Science and Technology** (~94 pp.)

Traditionally, those making innovation policy (especially in the United States) tend to think that commercialization and supporting the interests of the private sector will ultimately produce social benefit and economic growth, which will benefit the public interest. After all, this is what Vannevar Bush wrote in his famous 1945 report, and over the last 75 years we have seen growing private enclosure of the public domain. Universities increasingly encourage patenting and licensing, but many worry that this is hurting both accessibility and availability of life-saving technologies. The open source movement has gained steam, powered by the idea that open research and technology will ensure quicker and better development. Meanwhile, there are lots of questions about whether even the category of “patentable subject matter” is too large, diminishes the contributions of non-scientific innovators, and is simply unethical. We’ll be discussing these themes this week.

- Why have governments and universities traditionally supported intellectual property in order to achieve the public interest? What assumptions (about markets, citizens, and the public interest) are embedded in this approach?
- What are the limitations in our current approaches to research funding and patent policies? Who is being served by these policies, and who isn’t?
• How is the open access movement trying to transform how science and technology serve the public? What are the assumptions embedded in this approach?

If you don’t know much about patents, read pp. 3-5 and 10-15 of *Patent Politics.*

*February 3, Noon: Research Funding Testimony Due!*

**III. The Politics of Knowledge and Expertise**

*(6) Feb. 8: Science and Scientists in Policy Controversies* (89 pp.)
Guest speaker: Patrick Donovan (PhD Earth and Environmental Sciences and STPP, ’15), Chief Policy Officer, Theodore Roosevelt Conservation Partnership
We’re now shifting explicitly to the politics of science and technology policy. Over the last couple of years especially, we’ve heard a lot of cries to “Believe Science” and increase the role of science and scientists in policymaking. What does this mean? What role do scientists traditionally play, and how does this bump up against politics? And what are the risks when scientists play a greater role? As you read for this week, think through the following questions:
• How do science and scientists shape policymaking?
• What are the benefits and drawbacks of having scientists play a larger role in policymaking? Why (and when) might we not want scientists and science to play a central role?
• What social and political work does the “dominant view of popularization” (and accompanying ideas about the complexity and objectivity of science) do for science and scientists? What are the drawbacks of this approach?


*(7) Feb. 15: Complicating the Idea of Expertise* (~87 pp. + film + podcast clip)
Discussions about science and technology policy tend to talk about “experts” and the “public”, as though each category was clear and precise. But they’re not. A focus on science-based policymaking invariably cuts out important experts for solving environmental and social problems. And some of these “experts” are actually “lay” publics who have crucial knowledge based on their lived experience or other non-scientific forms of expertise. This week, we’ll try to make sense of these complications and think about the implications of this for science and technology policymaking. As you read, think about:

- What are our traditional understandings of expertise? How do each of these readings complicate this understanding?
- How might our usually narrow understandings of expertise for policy influence public trust in science and policymaking?
- How might we expand our approaches to expertise in science and technology policymaking? What institutional changes might we need to make to accomplish this?
- Can you think of other examples of expertise that goes unrecognized in our customary approaches to science and technology policymaking?

**FILM: How to Survive a Plague (watch at least the first 45 min.)**

**February 17, noon: Controversy Papers Topic Choice due!**

**IV. The Challenge of Regulation**

(8) **Feb. 22: The Regulatory Environments of Science and Technology Policy** (~100 pp.)
Guest speaker: Hannah Rosenfeld (MPP and STPP ’21), Digital Health Specialist, Food and Drug Administration
We often hear about the term “evidence-based policymaking”. This week, we’ll learn how this isn’t self-evident, but rather highly political, shaped by immediate political circumstances as well as enduring aspects of a country’s political structure and culture. We’ll read about how bureaucrats and other government decisionmakers determine evidence and expertise for policy (navigating between scientific evidence, deeply-held social values, and political obligations), and how interest groups (e.g. industry, social movements, outside experts) influence the process. As you read, think about the following questions:
• What seem to be the major institutions involved in science and technology policymaking, and what are their roles?
• How are regulatory decisions made? Who is involved, and what do regulators consider?
• How do social values and immediate political circumstances, and longer term aspects of a country’s political environment, shape science and technology policymaking?
• How does science and technology policymaking seem to compare across countries?


(9) Mar. 8: Sociotechnical Breakdowns

*Guest speaker: Denia Djokic, Fastest Path to Zero, University of Michigan* (~83 pp. + film/docuseries)
Throughout the semester, we’ve talked about technologies as not just technical, material objects but as sociotechnical systems: humans, norms, values, policies, and processes are all part of what we call “technologies”. Too frequently, we forget these human, social, and institutional dimensions of technologies and this can contribute to their failure. We also tend to think of disasters as “natural” when they are social and technical too. This week, we’ll be talking about some of these sociotechnical failures, in the context of space shuttle, nuclear, and hurricane disasters.
• In each of these cases, what went wrong?
• How does thinking in terms of sociotechnical systems change the way you might identify what went wrong, and how to plan for disasters in the future?
• When technologies fail, what are the long-term impacts, for technology and society?

Three Mile Island movie/episode (TBD)
Science and technology policies always operate under conditions of uncertainty. Science provides important insights, but it can’t predict the future. And yet, policymakers need to rely on it to make tough calls, as we saw during the pandemic. Meanwhile, technologies aren’t magic bullets either, and sometimes break down completely. Seeing this, particularly in light of their own lived experiences, community trust can erode. This can create real challenges for science, technology, and public policy, as they seek to make social progress and gain public support for their initiatives. How can this challenge be addressed?

As you read, think about the following:

- What are the analytical tools that the readings provide to help policymakers manage uncertainty?
- What can policymakers do to maintain public trust even under conditions of uncertainty?
- How does decisionmaking under uncertainty differ across policymaking contexts?


March 17, noon: Controversy Backgrounder Due!

(11) March 22: Governance Tools I: Anticipatory Technology Assessment (~102 pp.)
Guest speaker: Tim Persons, Chief Scientist, Government Accountability Office
Over the next three weeks, we’ll be discussing different methods developed to improve the development, implementation, and governance of science and technology, to ensure that they fulfill social, equity, and environmental goals. This week’s class focuses on methods for technology assessment. Scientists, engineers, and policymakers often argue that we cannot proactively regulate technologies because we can’t anticipate their consequences. But over the last few decades, social scientists have developed a variety of approaches to anticipate the consequences of emerging technologies, so they can be developed and regulated to better serve societal goals. We’ll talk about
how to conduct these assessment methods—which include assessing responsible research and innovation, analogical case studies, scenario planning, among other things—as well as their benefits and drawbacks. These readings will be key to your final governance recommendations!

- For each of the types of technology assessment, what are the benefits and drawbacks?
- What are the challenges of using these technology assessment methods in contexts other than where they were developed?
- Are some of these methods better at anticipating the consequences of emerging technologies than others?


(12) March 29: Governance Tools II: Expanding Notions of Expertise (~97 pp.)

Another way to improve the development and governance of emerging science and technology is to incorporate public perspectives into the process. As we’ve discussed earlier in the term, citizens often have crucial expertise to bring to science and technology policymaking decisions. It is also important to include citizens in governance processes—even on technical matters—in order to ensure public representation and trust and that decisions are politically legitimate. But science and technology policy decisions are often technical and complex, and require in-depth discussion. How then, can communities engage properly with policymaking on these issues? This week, we’ll discuss how this can be done. We’ll investigate a variety of exercises in “democratic deliberation”, and also focus on an illustrative case: CRISPR gene-editing. CRISPR is a new tool to edit human genes, and there is both hope and concern that it can be used to alter the germline (i.e., future generations) as well as somatic cells (e.g., gene therapy for specific diseases). We’ll talk about the role that public deliberation might play in both cases.

- How might you categorize the different models of democratic deliberation that you read about for today?
- What are the benefits of democratic deliberative exercises? What are the drawbacks?
- Why is it important to bring citizen/community knowledge into science and technology policymaking processes?
- Can you think of particular topics where democratic deliberation might be particularly useful? How about topics where it might not be appropriate?
(13) Apr. 5: Governance Tools III: New Institutional Forms (~101 pp.)
Rethinking the governance of science and technology isn’t just about new tools like technology assessment or deliberative democratic engagement. It also may require new kinds of institutions, rules, processes, and policies. This week, we’ll discuss a variety of proposals made by social scientists and policymakers to ensure that we consider the social, equity, ethical, and ecological dimensions of science and technology in the policymaking process. As you read, think about the following questions:
• What is the problem that each of these proposals is trying to solve?
• How might you categorize the different governance proposals that you read about for today?
• In what way does it try to change bureaucracy to consider the social, equity, ethical, or ecological dimensions of science and technology?
• Are some of these proposals more likely to be successful in some contexts as opposed to others?

April 12: NO CLASS!
**Work on your final papers, and Margarita and I will be available for additional office hours!**

April 20, noon: Governance Recommendation Due!

More Key Books on Science and Technology Policy


