Discussions of science and technology policy (STP) are easily mired in the thicket of debates over research funding, or in intellectually unsatisfying explorations of the technical areas or social interests that underlie STP. This seminar seeks to expand the scope of STP theory, research, and practice to include broader aspects of governance, through a focus on emerging technologies whose potential global consequences are apparent only in anticipation and whose manifestations are still being shaped by local, domestic, and international institutions. These emerging technologies include nanotechnologies, synthetic biology and others associated with genetic modification, as well as information and cognitive science and neuro-technologies (together these technologies are often known as “NBIC,” “GRIN” or “converging technologies” because they increasingly use the same techniques, tools, materials, and operate on the same scale).

The seminar begins with basic introductions to the concepts of governance, STP and technological emergence. Governance is a capacity that includes a variety of responses to societal challenges, ranging from complete *laissez faire* to highly interventionist approaches, but distributed across civil society and not necessarily lodged in public institutions (government). To thematize the focus on governance of emerging technologies, this seminar will largely pattern its inquiry after the research programs of the Center for Nanotechnology in Society (CNS) at ASU. It will examine a suite of “real-time technology assessment” tools for understanding emerging technologies; then it will locate that understanding in three strategic areas of inquiry: 1) *foresight* of the kinds of transformations these technologies may create; 2) *engagement* with various publics over the values that underpin work on these technologies; and 3) *integration* of social science and humanist inquiry with scientific and technical work in these areas.

The class will be taught as a seminar, meaning that students in it will have a major role in the classroom dynamic by presenting and discussing material – so it is crucial to attend class, perform readings (most of which are available on Blackboard, abbreviated as BB), and prepare assignments thoroughly and on time. The readings, primarily from the current, peer-reviewed literature in the field, are designed to move students quickly into the forefront of scholarly discussions on the class topic. The class will survey a variety of research perspectives and techniques to familiarize students with the ensemble of tools that must be used to acquire a
robust understanding of and potential governance perspective on emerging
technologies. One or more of these techniques can be applied in the context of the
required research paper (see below); alternatively, students can write a theoretical
or problem-oriented paper that formulates and develops a central conceptual or
pragmatic question that relates centrally to the governance of a specific emerging
technology. Students are encouraged to speak with me individually about relating
the paper to program or thesis requirements. Students will further be encouraged
to participate in co-curricular activities related to the activities of CNS-ASU.

<table>
<thead>
<tr>
<th>Assignment</th>
<th>% Grade</th>
<th>Due Date</th>
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<tbody>
<tr>
<td>Attendance and Participation</td>
<td>20%</td>
<td>Weekly</td>
</tr>
<tr>
<td>One-page responses to readings</td>
<td>20%</td>
<td>Weekly</td>
</tr>
<tr>
<td>Topic Proposal and Presentation</td>
<td>10%</td>
<td>March 3 &amp; 10</td>
</tr>
<tr>
<td>Term paper presentation</td>
<td>20%</td>
<td>May 5</td>
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<tr>
<td>Term paper</td>
<td>30%</td>
<td>May 11</td>
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**COURSE SYLLABUS**

1 - January 20: **Science, Technology and Governance**

**Introductions, Overview of Syllabus, etc.**

**Required:**


**Optional:**


2 - January 27: **Science, Technology and Government**

**Required:**


**Optional:**


3 - February 3: **Emerging Technologies**

**Required:**


**Browse:**


Optional:


4 - February 10: Anticipatory Governance

Required:


Browse:

CNS-ASU Web Site : [http://cns.asu.edu](http://cns.asu.edu)


Optional:

5 - February 17: Innovation System Analysis

Required:


6 - February 24: Public Opinion Characterization

Required:


7 - March 3: Paper Topic Proposal Presentations

Be prepared to present and discuss in class your proposed paper topic.


8 - March 10: Public Engagement
Required:


Browse:


Optional:

CNS-ASU National Citizens' Technology Forum Background Document.
CNS-ASU National Citizens’ Technology Forum Final Reports. Available at http://www4.ncsu.edu/~pwhmds/final_reports.html

Email me your 5-page paper topic proposal, including research question, methodology and initial results.

March 13-20: SPRING BREAK

9 - March 24: Socio-Technical Integration

Required:


Optional:


10 - March 31: **Foresight**

Required:


Browse:


*Guest lecturer: Dr. Cynthia Selin*
April 7: NO CLASS

11 - April 14: Economic Philosophies of Research and Innovation

Required:

Romer, P. 1996. “In the Beginning was the Transistor.” Forbes 158(13):43-44.

Optional:

Lucena, J. 2005. “[Japanese Technology Threatens America: Making Scientists and Engineers for Economic Competitiveness.” Chapter 4 in Defending the Nation: U.S. Policy Making to Create Scientists and Engineers from Sputnik to the ‘War Against Terrorism’. University Pres of America: Lanham, MD.

12 - April 21: Public Value Mapping

Required:

Optional:


13 - April 28: **Positions, Criticisms and Commitments of Engaged Research**

Required:


Optional:


14 – May 5: **Paper Presentations**

Be prepared to make an 8-minute formal presentation of your paper. Each presenter will also have 2 additional minutes for questions.

** May 11: **Paper Due **

Submit your final paper via Blackboard.
About the Weekly One-Page Essays

Each week, students are required to turn in a one-page response to one or more of the upcoming readings. This focused, concise essay must not go over one page and will be due every Wednesday. It will be submitted electronically via Blackboard, allowing all members of the class to read it in advance of our meeting. Each essay must have a clear, unifying statement or question, which is developed throughout the rest of the essay. Students are free to use these writing exercises to identify and think through aspects of the week’s readings, to connect the week’s readings to the weekly topic or to broader course themes, to raise questions of clarity and meaning regarding the weekly readings, or to relate the weekly readings to their own term paper planning and development. However, the response should be more than a weekly “brain dump” of undigested impressions. The essay also ensures that you have several opportunities to provide me with feedback on the readings and on your intellectual progress in the course.

About the Presentations

The in-class paper presentations should be clear and informative about your research. You should plan on using either PowerPoint slides (as is fully conventional in research presentations now) or a handout. In either case, your effort should go into making the presentation interesting and understandable to the class, not making it aesthetically pleasing. The length of the presentations will depend on the number of students in the class, but you should plan on allowing time for questions from the professor and your classmates.

About the Final Paper

The course requires all graduate students to write a paper on an issue or case in the governance of emerging technologies (HON students have the option of either writing a paper or giving a presentation; PSM students may discuss other options with the professor; for HSD students this paper is an excellent preparation for your required second year paper). The paper should make some use of a method, framework, or empirical material from the course, but it should be an independent and original application of that material to something from outside of class that you have researched independently.

The paper should be approximately 15-18 double-spaced pages (4000-5000 words; exclusive of notes and references; HON students who choose to write the paper should produce 10-12 double-spaced pages.) This length will require you to do both significant research (to achieve that length) and significant editing (to present something clear and coherent within that length). If you are merely describing material that you have read, you will likely go well over the word limit. Rather, you should be able to introduce the material and an analytical framework for addressing it in, say, 500 – 750 words; conclude in 500 – 750 words; and spend 3000-4000 words describing and analyzing what you’ve researched.
All research papers should properly reference their source material. Thus, you must hand in a preliminary annotated bibliography (of at least 10 items from multiple types of sources). You should use this syllabus as a model for how to write out a bibliographic reference. The basic requirements are that all information must be complete and consistent, enabling your reader to easily identify and track down the source material. To annotate a bibliography, write approximately 50-100 words to summarize the item (its topic, method, relevance to your research topic, etc.) after it, before moving on to the next (alphabetically listed) item. The annotated bibliography should demonstrate a familiarity with a variety of sources, e.g., peer-reviewed journal articles, books, government documents, press accounts, web sites, etc.

Appropriate attribution of material is critical in all academic writing. General guidelines include:

- If the text you are writing has 3 or more important words consecutively taken from a source, you must use quotation marks around that text AND cite that source and its page number.
- If the text you are writing makes a specific and not commonly known point that is derived from a source, you must cite that source. Paraphrasing, no matter what the source (even government documents), requires citation.
- If the text you are citing makes a point, even a specific one, that is commonly known (e.g., if you could find that same point in at least several different sources), you do not need to cite that source. But you still must cite the source if you are using its own language rather than your own to make the point.

There are two important reasons for rules of attribution. One is, again, to help your reader find anything he or she might want to pursue in greater detail. The other is to give credit where credit is due. Just because something is on the web or “in public domain” does not relieve the responsibility of providing appropriate attribution. Attribution is NOT about the legalities of copyright – it is about the integrity of scholarship.

With regard to style and grammar, your writing should, above all, be clear and correct. Aim for clarity first and elegance second. If you have questions about grammar and style, please consult the Writing Center, which has a number of resources that are very helpful (http://studentsuccess.asu.edu/tempe/writing/resources/links). You should be absolutely sure to proofread your final version at least twice – do not rely on your word processor’s spell check, as there is more to good grammar and good style (and, indeed, good spelling) than spell check. But please use the spell check, with the grammar check turned on, because it will help you identify sentences that may need some work.
The paper should follow general conventions of formatting (double-spaced, paginated, left-justified, 12-point serif font, 1” to 1.25” margins).