

Science, Technology, and Public Policy
PUBP710-002
Spring 2017

Professor David M. Hart

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Class meetings: Mondays, 7:20 – 10:00 p.m., Founders Hall, room TBA
Office hours: Mondays, 4-6 p.m., Founders Hall 609

Overview

Science and technology are powerful capabilities for meeting human needs and achieving human aspirations. Science and technology policy seeks to shape these capabilities for public benefit. Physical and cyber-security, public health and improved quality of life, environmental protection, and economic prosperity are among its objectives.

Science and technology policy-making is complex and uncertain. Science and technology are not necessarily easily directed from the top down. Research fields and engineering disciplines often have substantial internal momentum. Many institutions, both within and outside of government, as well as many other governments around the world, seek to exert influence over science and technology in ways that may be at odds with any particular government's policy. The discoveries and innovations sought by policy-makers are constrained by unpredictable vagaries of the natural world as well. And the social and environmental consequences of science and technology are hard to anticipate and may run counter to the objectives of public policy

This course seeks to bring home to students both the promise and the challenges of science and technology policy. We will look back at major discoveries and innovations to dissect the role of public policy in shaping them and their consequences for society. We will also look forward at potential breakthroughs that are on the horizon today and consider what, if any, policies should be enacted to realize their benefits and limit their costs. We will consider in this context as well who should be involved in the policy-making process and how.

Learning Outcomes

1. Deeper knowledge of a broad range of science and technology policy issues
2. More incisive strategic understanding of the science and technology policy process
3. Improved writing, presentation, and qualitative analysis skills.

Course Texts and Materials

Course materials are linked through the electronic version of the syllabus or posted on the course Blackboard site. In some cases, the links may require you to provide your GMU ID to access a library database.

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Format

The course format will be mixed, including faculty presentations, guest speakers, class discussions, and student presentations.

Assignments and Grading

- ▶ Retrospective case analysis (individual or team), approximately 3000 words per person in length (50%), presentation of draft due March 6, paper due March 20.
- ▶ Policy memo and institutional design (individual), approximately 1500 words in length (40%), due May 1, with presentation of draft due on April 24.
- ▶ Class participation (10%).

Late assignments will be penalized one grade level (for instance, from A+ to A) for each calendar day or part thereof, up to a full grade (A+ to B+) each week.

Class Participation

Students need to attend regularly to participate effectively. A student who misses more than three classes will be penalized one full grade on the participation component for each additional class missed. Please consult Prof. Hart if you are in jeopardy of such a circumstance.

Written Assignments

Detailed instructions will be distributed and discussed well in advance of each of the assignment due dates. Each assignment must be submitted in hard copy. In addition, an electronic copy of each assignment must be submitted to the School's computerized plagiarism detection service within 48 hours of the due date. To avoid plagiarism, a simple rule of thumb may be of help: when in doubt, include a citation. Further details on when and how to cite sources will be discussed in class. ***The School's policy on plagiarism and my addendum to it are attached. You should become familiar with them. Ignorance of or failure to understand the policy will not lead to lenience in case of violation.***

Students with Special Needs

If you are a student with a disability and you need academic accommodation, please see the instructor and contact the Disability Resource Center (DRC) at 993-2474. All academic accommodations must be arranged through the DRC.

Course Outline

Class 1: Introduction: Science, Technology, and the Appropriate Role of Government

January 23

1. Mariana Mazzucato, [*The Entrepreneurial State*](#) (Demos, 2011), pp. 29-62 (chapters 1-2) [Note: Mazzucato has a book of the same name, published in 2014, which elaborates on her argument in this open source report.]
2. Terence Kealey, "[The Case Against Public Science](#)," *Cato Unbound*, August 5, 2013. [Note: Kealey makes this argument at greater length in his *Economic Laws of Scientific Research* (1996).]
3. David M. Hart, "[Private Technological Capabilities as Products of National Innovation Systems: Four Ways of Looking at the State](#)," *Science and Public Policy* 29:181-188 (2002).
4. Skim: John P. Holdren and Megan Smith, "[OSTP Cabinet Exit Memo](#)," January 5, 2017. (Also will be posted to Blackboard as URL may be repurposed.)

Class 2: Government Spending on Research and Development (R&D)

January 30

1. Richard R. Nelson, "[The Simple Economics of Basic Scientific Research](#)," *Journal of Political Economy* 67:297-306 (1959). [Access via JSTOR]
2. Pierre Azoulay, *et al.*, "[Public R&D Investments and Private-Sector Patenting: Evidence from NIH Funding Rules](#)," MIT working paper, September 3, 2015.
3. Matt Hourihan and David Parkes, "[Federal R&D Budget Trends: A Short Summary](#)," AAAS R&D Policy Project, December 20, 2016.
4. Visit the [AAAS R&D Policy Project home page](#) for the latest news on Federal R&D funding.

Class 3: Tax Incentives

February 6

1. Gary Guenther, "[Research Tax Credit: Current Law and Policy Issues for the 114th Congress](#)," Congressional Research Service, August 5, 2015. [Access via ProQuest Congressional]
2. Tom Sanger, "[R&D Tax Credit: New, Improved, and Permanent](#)," cfo.com, March 9, 2016.
3. Additional reading on Trump Administration tax policy TBD.

Class 4: Intellectual Property

February 13

1. Roberto Mazzoleni and Richard R Nelson, "[The Benefits and Costs of Strong Patent Protection: A Contribution to the Current Debate](#)," *Research Policy* 27:273-284 (1998). [Access via ScienceDirect]
2. Joan Farre-Mensa, Deepak Hegde, and Alexander Ljungqvist, "[The Bright Side of Patents](#)," USPTO Economic Working Paper No. 2015-5, December 2015.
3. Andrei Hagiu and David B. Yoffie, "[The New Patent Intermediaries: Platforms, Defensive Aggregators, and Super-Aggregators](#)," *Journal of Economic Perspectives* vol. 27, no. 1, pp. 45-66 (Winter 2013).

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Class 5: Diffusion Policy

February 20

1. Bronwyn Hall, "[Innovation and Diffusion](#)," National Bureau of Economic Research Working Paper no. 10212, January 2004. [Access via NBER working papers database]
2. David M. Hart, "[The Future of Manufacturing: The United States Stirs](#)," *Innovations*, Summer 2012, pp. 25-34.
3. Philip Shapira and Jan Youtie, "[Impact of Technology and Innovation Advisory Services](#)," University of Manchester, Institute for Innovation Research, 2013.

Class 6: Entrepreneurship and Competition Policy

February 27

1. Joseph A. Schumpeter, "Plausible Capitalism" and "The Process of Creative Destruction," chapters 6-7 in *Capitalism, Socialism, and Democracy* (Harper, 1942), 72-86. [Blackboard]
2. David M. Hart, "[Antitrust and Technological Innovation in the U.S.: Ideas, Institutions, Decisions, and Outcomes, 1890-2000](#)," *Research Policy* 30:923-936 (2001).
3. David M. Hart, "[Framework Conditions for High-Potential Entrepreneurship: A Theoretical Structure and Its Implications](#)," in Martin Andersson, ed., *Innovation and Growth* (Oxford University Press, 2012).
4. Kevin Carty, "[An Unpredictable Oncoming Matchup: Donald Trump vs. Big Business](#)," *Atlantic*, November 16, 2016.

March 6: Presentation of Draft Retrospective Case Analysis due in class.

Class 7: Environmental, Health, and Social Regulation

March 6

1. Michael E. Porter and Claas van der Linde, "[Green and Competitive](#)," *Harvard Business Review*, September/October 1995, pp. 120-134. [Access via Ebsco Business Source complete.]
2. Bedsworth, Louise Wells, and Margaret R. Taylor, "[Learning from California's Zero-Emission Vehicle Program](#)," *California Economic Policy*, vol. 3, no. 4, pp. 1-19, September 2007.
3. Nic Lutsey, "[Transition to a Global Zero-Emission Vehicle Fleet: A Collaborative Agenda For Governments](#)," International Council for Clean Transportation, September 2015.

MARCH 13 – SPRING BREAK – NO CLASS

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March 20: Final Retrospective Case Analysis due in class.

Class 8: Public Understanding and Democratic Control of S&T Policy

March 20

1. Skim: National Science Board, Science and Engineering Indicators 2016 (NSB, 2016), [chapter 7](#).
2. Daniel Sarewitz, "[Saving Science](#)," *New Atlantis*, Summer 2016.
3. Cary Funk, Brian Kennedy and Elizabeth Podrebarac Sciupac, "[U.S. Public Opinion on the Future Use of Gene Editing](#)," Pew Research Center, July 26, 2016.
4. David Baltimore, *et al.*, "[A Prudent Path Forward for Genomic Engineering and Germline Gene Modification](#)," *Science* 348:36-38 (3 April 2015) [Access via Science Magazine.]
5. Henry I. Miller, "[Germline Gene Therapy: We're Ready](#)," *Science* 348:1325 (19 June 2015). [Access via Science Magazine.]

Class 9: Legislative Decision-Making

March 27

1. Peter S. Adler, Patrick Field, and Jeremy Kranowitz, "[Science and Technology Policy in Congress: An Assessment of How Congress Seeks, Processes, and Legislates Complex Science and Technology Issues](#)," Keystone Center, April 2008.
2. Peter D. Blair, "[Congress's Own Think Tank: Learning from the Legacy of the Office of Technology Assessment \(1972–95\)](#)," *Science and Public Policy* 41:449-457 (2014). [Access via Oxford Academic.]
3. Additional reading on 115th Congress TBD

Class 10: Presidential Decision-Making

April 3

1. Andrew Rudalevige, "[Therefore, Get Wisdom?: What Should the President Know, and How Can He Know It?](#)," *Governance* 22: 177–187 (2009). [Access via Wiley.]
2. David M. Hart, "[An Agent, Not a Mole: Assessing the White House Office of Science and Technology Policy](#)," *Science and Public Policy* 41:411-418 (2014). [Access via Oxford Academic.]
3. Dave Levitan, "[Obama's Outgoing Science Advisor Will Keep Watch in 2017](#)," *Wired*, December 20, 2016.
4. Additional reading on Trump White House TBD

Class 11: Regulatory Decision-Making

April 10

1. Sheila Jasanoff, "[Procedural Choices in Regulatory Science](#)," *Technology in Society*, Volume 17, Issue 3, 1995, Pages 279-293. [Access via ScienceDirect.]
2. Cary Coglianese and Gary E. Marchant, "[Shifting Sands: The Limits of Science in Setting Risk Standards](#)," *University of Pennsylvania Law Review* 152:1255-1360 (2004). [Access via JSTOR.]
3. R. Alta Charo, "[Yellow Lights for Emerging Technologies](#)," *Science* 349:384-385 (24 July 2015). [Access via Science Magazine.]

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Class 12: Judicial Decision-Making

April 17

1. David E. Bernstein, "[The Misbegotten Judicial Resistance to the Daubert Revolution](#)," *Notre Dame Law Review* 89:27-70 (2013).
2. Krista M. Pikus, "[We the People: Juries, Not Judges, Should be the Gatekeepers of Expert Evidence](#)," *Notre Dame Law Review* 90:453-481 (2014).

Class 13: Student Presentations

April 24

No readings.

May 1: Policy Memo due in class

Class 14: Wrap Up

May 1

Readings TBD.

Schar School Policy on Plagiarism

The profession of scholarship and the intellectual life of a university, as well as the field of public policy inquiry, depend fundamentally on a foundation of trust. Thus, any act of plagiarism strikes at the heart of the meaning of the University and the purpose of the School of Policy, Government and International Affairs. It constitutes a serious breach of professional ethics and it is unacceptable. Plagiarism is the use of another's words or ideas presented as one's own. It includes, among other things, the use of specific words, ideas, or frameworks that are the product of another's work. Honesty and thoroughness in citing sources is essential to professional accountability and personal responsibility. Appropriate citation is necessary so that arguments, evidence, and claims can be critically examined.

Plagiarism is wrong because of the injustice it does to the person whose ideas are stolen. It is also wrong because it constitutes lying to one's professional colleagues. From a prudential perspective, it is shortsighted and self-defeating, and it can ruin a professional career.

The faculty of the School of Policy, Government, and International Affairs takes plagiarism seriously and has adopted a zero tolerance policy. This may lead to failure for the course, resulting in termination from the program and possible termination from Schar School. This termination will be noted on the student's transcript. For foreign students who are on a university-sponsored visa (eg. F-1, J-1 or J-2), termination also results in the revocation of their visa.

To help enforce the Schar School policy on plagiarism, all written work submitted in partial fulfillment of course or degree requirements must be available in electronic form so that it can be compared with electronic databases, as well as submitted to commercial services to which the School subscribes. Faculty may at any time submit a student's work without prior permission from the student. Individual instructors may require that written work be submitted in electronic as well as printed form. The Schar School policy on plagiarism is supplementary to the George Mason University Honor Code; it is not intended to replace it or substitute for it.

(<http://policy.gmu.edu/honorcode>)

Professor Hart's Addendum

I believe deeply that intellectual integrity is a fundamental element of learning. I firmly support the School's zero tolerance policy on plagiarism and will enforce it stringently. Ignorance is not an excuse. To avoid plagiarism, a simple rule of thumb may be of help: when in doubt, include a citation. Citations, including those to web sources, should include sufficient information to allow a reader to verify the source. Further details on when and how to cite sources will be discussed in class. However, providing a citation to a block of text taken with minimal change from a source is not sufficient to avoid plagiarism. You must put the block in quotation marks, thereby acknowledging the source's contribution of specific words as well as ideas in the block.