

Politics of Science and Technology

Matthew Shapiro

Illinois Institute of Technology

1. Course Description

This is an intermediate course on the connections between politics - power-oriented relationships and dynamics - and science and technology (S&T). There is no single formula for understanding these relationships, but we can identify several patterns that predominate.

First, **discussion of S&T, broadly defined, is typically held between elites.** This means that the general public is excluded intentionally. Is this absence of “democracy” in S&T ideal? Does it conflict with political ideology or legal rules? We will attempt to answer this based on theories of policy making and coordination in government.

Second, **innovation is a risky venture**, and this translates into (1) inaction by the private sector and/or the government or (2) action which does not conform to public values. We will look at the repeated attempts by the government to incentivize innovation from the private sector in the face of such risks. We will also look at how failing efforts lead to political fallout for policy makers. In this way, **the government itself is entrepreneurial** but must also limit risk by having a corps of savvy individuals to make well-informed, S&T-related decisions. We will look at a number of cases in which groups of these “technocrats” have been successful and when they have failed.

Third, **S&T typically go hand-in-hand with development and economic growth.** We can identify this today with the push from above (i.e., from our elected leaders) to focus on renewable energy, clean coal technology, and innovations in the infrastructure for curbside recycling. *Why is there this push? A reduction in costs from such innovations is equivalent to economic growth/increased income.* These innovations come with a hefty price tag, though, and we will examine how S&T transfers from the developed to the developing world, how S&T develops indigenously, and how politics plays a role in both the developed and developing worlds.

We cannot be overly deterministic about the politics-S&T relationship. This class is as much about the S&T of politics as it is about the politics of S&T, and we will examine this through study of **innovations in e-government.** This represents the cutting-edge of government design, particularly vehicles in which messages are communicated (e.g., Internet, YouTube, Twitter) as well as elections (e.g., computerized voting stations, transparency in campaign contributions). Beyond this, we will discuss how the S&T of politics – particularly through **increased communication channels with the public** – requires us to reevaluate our traditional cache of political and policy-making theories.

2. Required Readings

There are two required texts:

David Dickson (1988) *The New Politics of Science*, Chicago: University of Chicago Press.

Philip N. Howard (2006) *New Media Campaigns and the Managed Citizen*, New York: Cambridge University Press.

3. Course Requirements

Course Objectives

This class will enable the student to understand at a deep level how politics and S&T are connected. At the end of the course, the student will be able to:

- distinguish between and apply theories of policy making to S&T
- understand how market failures and government failures in S&T occur
- assess how politicians set the agenda in the context of S&T
- identify the role of technocrats in a democracy as well as in pseudo-democracies
- interpret and assess varied S&T options for low- and high-income areas and work through the complexities of measuring S&T-related “development”
- understand the various innovations representative of “e-government”
- collect data and engage in qualitative and/or quantitative analysis

Grading

Final grades are based on the following requirements:

Short papers (3 x 15%)	45%
Final project	35%
Participation	20%

1. Short papers (3 x 15% each): You will be given a set of questions that will require you to consult the readings and your lecture notes approximately one week before each short paper due date. Your response to the prompt must be between 3-4 pages (excluding bibliography), double-spaced, Times New Roman 12 pt. Keep the following in mind: The papers should be well organized, cohesive, free of errors. The best way to create a paper with such qualities is through careful revision and editing. Use whatever citation style you prefer so long as it is error-free and uniform throughout the paper.

Short paper 1 due **session 10**

Short paper 2 due **session 20**

Short paper 3 due **session 30**

2. Participation (20%): Students are expected to attend class with only one unexcused absence. Students are also expected to complete reading assignments prior to class and participate in class discussions.

3. International project (35%):

Read Chapter 4 from Dickson and World Bank (1999).

Science and technology transfers from the developed to the developing world happen but not without major political and economic challenges. For this project, you will identify an instance in which an innovation in the U.S., Germany, or Japan (currently the world's most research intensive countries) was developed for the purpose of being transferred to the developing world but has been met with opposition. The "developing world" is defined as countries with a GDP per capita of less than \$4000. (The list is available on Blackboard: see "World Bank list of developing economies".)

Task 1: Provide details about this innovation, how it was proposed, and how it qualifies as something that was developed for the purpose of being transferred to the developing world. How is the transfer of this innovation consistent with the content of Dickson, Ch. 4?

Such opposition to transfers (political, economic, or both) can come from the S&T-originating country as well as the S&T-receiving country. Also, such opposition does not necessarily have to preclude the transfer.

Task 2: Explain the nature of such opposition. How does it qualify as political, economic, or both political and economic opposition? Use the literature (especially Dickson, Ch. 4) from class to establish your qualification criteria.

After identifying this innovation and providing background information as to how it was developed, consider possible connections to the elite theory of governance. With regard to the World Bank (1999) reading, where were national strategies weak? Where were there information failures?

Task 3: If there are connections to the elite theory of governance and the elite-democratic tension, identify them.

Finally, make your own assessment.

Task 4: Identify shortcomings in the entire approach to transferring the innovation. Where could there have been greater efficiencies? Do such efficiencies align you at one end of the elite-democratic scale, and does that create any problems (and why or why not)?

Your paper must be between 5-6 pages (excluding bibliography), double-spaced, Times New Roman 12 pt. The final two sessions of the course are reserved for presentations of your work. Keep the following in mind: The papers should be well organized, cohesive, and free of errors. The best way to create a paper with such qualities is through careful revision and editing. Use whatever citation style you prefer so long as it is error-free and uniform throughout the paper.

Final project due **session 29**.

4. Class Schedule and Reading Guide

While “*” below indicates required reading, you should still expect to read some if not all of the non- required reading when drafting your short papers and your final project.

Sessions 1—4

- ❖ **An introduction to key terms and concepts**
- ❖ **A *statistics primer***
- ❖ **The underlying theory of the politics of S&T**
- ❖ **A brief history of the elitist-democratic tension**
- ❖ **Modeling behavior via cost-benefit analysis and making connections to the elitist- democratic tension**

- (1) * Vig (1988), Ch. 1 from Kraft and Vig
- (2) * Link and Link (2009), Ch. 2
- (3) Winner (1988), Ch. 2 from Kraft and Vig

(4) Ray, Appendix 2

- (5) Stone (2001), Introduction and Ch. 1
- (6) * Keller (2009), Ch. 1
- (7) “Racial discrimination in science”

- (8) * Nelkin (1979), Introduction
- (9) Hart (1998), Ch. 8
- (10) * Slayton, (2007)
- (11) Dickson, Ch. 5
- (12) Olmstead, Sheila M. (2010)
- (13) * Brooks (1988), Ch. 8 from Kraft and Vig
- (14) Dickson, Ch. 6
- (15) Krimsky (1979), Ch. 12 from Nelkin
- (16) * Greenberg (2001), Ch. 28 from Greenberg
- (17) “Stimnovation”

Sessions 5—9

- ❖ **An introduction to key actors and institutions: the President, Congress, scientists, the private sector, the courts, and the public**
- ❖ **Ethical concerns**
- ❖ **Updates: legislation, actor interactions, federalism**
- ❖ **Acknowledging how these actors and institutions operate in a theoretical context: the policy streams model**

- (18) Kraft and Furlong, Ch. 2
 (19) * Keller (2009), “Credibility and Relevance”
 (20) “Accountability and transparency”
 (21) A New Era of Responsibility (2009), Office of Management and Budget
 (22) “Holdren as Advisor”
 (23) “Presidential science advisers”
 (24) “Merck to Pay \$950 million”
 (25) * Dickson, Ch. 1
 (26) * Bimber (1998)
 (27) * Schneider (2000)
 (28) “Researchers fight against bigger slice to small business”
 (29) Weingart, et al. (2000)
 (30) “The Touchy-Feely Methods”
 (31) “Scientific Community Slams Plan B Decision”
 (32) * Dickson, Ch. 2
 (33) Mowery and Ziedonis (2001)
 (34) * “Comments on the DOI scientific integrity policy”
 (35) Union of Concerned Scientists (2008)
- (36) * Malka, et al. (2009)
 (37) “Hundreds gather to rally”
 (38) “Suffering for science”
 (39) “Personhood supporters regroup...”
 (40) “Stems Cells: The Nuclear Option”
 (41) “Ruling sets back stem-cell scientists in Europe”
- (42) Branscomb and Florida (1998), pages 14-32
 (43) “Ag Department Uproots Science”
 (44) * Berkman and Plutzer (2009)
- (45) * Branscomb and Florida (1998), pages 8-14
 (46) * Robinson and Eller (2010) “Participation in policy streams,” pages 199-205
 (47) Montpetit (2011)

Sessions 10—13

- ❖ **An introduction to “the government as entrepreneur”**
- ❖ **Standardizing, measuring, and assessing outcomes from government intervention**
- ❖ **Understanding the government’s attempts to deal with market failures in S&T**
- ❖ **Distinguishing between market failure and mission-oriented approaches**

- (48) * Link and Link (2009), Ch. 1
- (49) Rosenberg (1979)
- (50) * Noll and Cohen (1988), Ch. 6 from Kraft and Vig
- (51) National Science Board (2010), Ch. 4
- (52) Goel, Payne, and Ram (2008)
- (53) Litan, et al. (2007)

- (54) “From ships to bits”
- (55) * Jaffe, et al. (2004)
- (56) * Bozeman and Sarewitz (2005)
- (57) “A stress test”
- (58) Stoneman (1995), selections
- (59) Mowery (2009)

Sessions 14—17

- ❖ **Different forms of government intervention and mixed results**
- ❖ **Primary cases: R&D collaboration via specific programs (SBIR, ATP) and incentives (R&D subsidies)**
- ❖ **Assessing outcomes from government intervention**
- ❖ **Contemporary cases**

- (60) * Dodgson (1993), Ch. 4
- (61) * Butos and McQuade (2006)
- (62) Dickson, Ch. 2 (re-read)
- (63) Scott, et al. (2005)
- (64) * Link and Link (2009), Ch. 8
- (65) Jaffe (1998)
- (66) NIST ATP report
- (67) “Big and clever”
- (68) Klette, Moen, and Griliches (2000)

- (69) * Mansfield (1991)
- (70) Fontana, et al. (2006)
- (71) Stiglitz and Wallsten (1999)
- (72) * Wallsten (2001)
- (73) David, et al. (2000)

- (74) “Red flags for green energy”
- (75) “The Marines go renewable”
- (76) Link and Link (2009), Ch. 6
- (77) Biofuels drawbacks
- (78) “The future of physics”
- (79) “Atom Smashers” (video)

Sessions 18—22

- ❖ **Defining “development”: building on/away from orthodoxy**
- ❖ **Domestic and international factors within the two-level game structure**
- ❖ **Cases and evidence: indigenous development, technology transfer, and institutional effects**

(80) Guena, et al. (2003), General Introduction

(81) * Nelson & Phelps (1966)

(82) * Harding (1993), Introduction

(83) “Holdren as Advisor” (re-read and peruse <http://www.ostp.gov>)

(84) * Book review: “Sustainability and Sources of Wealth”

(85) Engelbrecht (2002)

(86) “Climbing Mt. Publishable”

(87) Putnam (1988)

(88) “Science Attaches”

(89) Hascic and Johnstone (2009)

(90) “Stem cells in China”

(91) Pray and Ruttan (1995)

(92) “Farmers and food prices”

(93) “Science in the future of India”

(94) “The frugal way”

(95) * Helfer (2009)

(96) Evenson (1995)

(97) Bessen and Meurer (2008), Ch. 2

(98) Kim (2003)

(99) * Caselli and Coleman (2001)

(100) Shapiro and Nugent (2012)

(101) * Mathews and Hu (2007)

(102) Comin and Hobijn (2010)

(103) “China downshifts on autos...”

(104) “Hong Kong in Honduras”

(105) Lerner and Tirole (2007)

(106) “Mosaid assumes 2,000 Nokia patents”

(107) “Big Patent Firms Sues Nine Tech Firms”

(108) “USPTO Innovation Challenge”

Sessions 23—27

- ❖ **Technology's effects on domestic governance and civil liberties**
- ❖ **Increased communication via technology**
- ❖ **A very different method of running a political campaign and voting**
- ❖ **Looking forward...**

(109) * Spar (2001), prologue

(110) * Spar (2001), Ch. 8

(111) Barber (1998)

(112) "Who should run the Internet?"

(113) Kerr (2008)

(114) * Resnick (2002)

(115) "Putnam's America"

(116) * Howard (2006), Chs. 1, 3, 4

(117) "Voter confidence in touch screen voting..."

(118) "Diebold voting machines can be hacked"

(119) * Pielke, 2006

(120) Morgan and Peha (2003), Ch. 13

(121) Resnick (2009), Ch. 4

(122) Resnick (2009), Ch. 9

(123) Bessen and Meurer (2008), Ch. 9

Sessions 28 & 29

- ❖ **Project presentations**

Session 30 (optional)

- ❖ **Short Paper 3 due**