Science and Society:
An Introduction to Science and Technology Studies
ENVS 5110
University of Colorado – Fall 2012

Roger A. Pielke, Jr.
Mondays 1:00-3:30 PM
Location: ENVS Offices IBS 5, Downstairs Seminar Room

Course Homepage:
http://sciencepolicy.colorado.edu/students/envs_5110

Office Hours: Mondays 9-10:30AM and by appointment
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Overview and Purpose of the Course

This course is part of a three course sequence that serves in partial fulfillment of the requirements for the Graduate Certificate in Science and Technology Policy. However, you need not be enrolled in the Certificate to take the course and there are no prerequisites required to take the course.

Graduate study provides you with an opportunity to gain expertise within a particular disciplinary or interdisciplinary specialty. Such expertise is essential to the processes of creating new knowledge and integrating existing knowledge to produce novel insights. But society looks increasingly to experts to do more than conduct research and produce knowledge -- society looks to experts to play a central role in securing the benefits of the nation's investment in knowledge, while at the same time, helping to protect against the misuse or unintended consequences of science and technology. In short, society expects experts to contribute to decision making in public, private and civic settings.

Understanding the roles of science and technology in broader societal context – as well as the influences of that context on the practices and uses of science and technology would thus seem to be a prerequisite to a successful career at the science-society interface.

This course seeks to contribute to such improved understandings by introducing students to the area of research typically characterized as "science and technology studies."

In the core text for this class Sismondo (2010, pp. 10-11) characterizes the discipline of science and technology studies as follows:

> Science and Technology Studies (STS) starts from an assumption that science and technology are thoroughly social activities. They are social in that scientists and engineers are always members of communities, trained into the practices of those communities and necessarily working within them. These communities set standards for inquiry and evaluate knowledge claims. There is no abstract and logical scientific method apart from evolving community norms. In addition, science and technology are arenas in which rhetorical work is crucial, because scientists and engineers are always in the position of having to convince their peers and others of the value of their favorite ideas and plans – they are constantly engaged in struggles to gain resources and to promote their views. The actors in science and technology are also not mere logical operators, but instead have investments in skills, prestige, knowledge, and specific theories and practices. Even conflicts in a wider society may be mirrored by and connected to conflicts within science and technology; for example, splits along gender, race, class, and national lines can occur both within science and in the relations between scientists and non-scientists.

We will begin the semester with a detailed exploration of Sismondo's overview of STS and proceed to explore various facets of the field of study in depth. We will seek to integrate more theoretical perspectives with practical cases. You'll have the chance to work on individual and group projects, and to help design parts of the latter phases of the course.

Do recognize that this course is being taught for the first time, so your feedback and critique will be important for helping to improve it for future generations of students.

BONUS MATERIAL (There will be lots in this class!)

Those of you wanting to dig even deeper into the field of STS are encouraged to listen to this series of lectures prepared by the Canadian Broadcasting Corporation, which touches on many of the themes of the course (and beyond) and involves many leader STS scholars:

http://www.cbc.ca/ideas/episodes/2009/01/02/how-to-think-about-science-part-1---24-listen/

HOW TO THINK ABOUT SCIENCE

If science is neither cookery, nor angelic virtuosity, then what is it?

Modern societies have tended to take science for granted as a way of knowing, ordering and controlling the world. Everything was subject to science, but science itself largely escaped scrutiny. This situation has changed dramatically in recent years. Historians, sociologists, philosophers and sometimes scientists themselves have begun to ask fundamental questions about how the institution of science is structured and how it knows what it knows. **David Cayley** talks to some of the leading lights of this new field of study.

Episode Guide

Episode 1 - Steven Shapin and **Simon Schaffer**
Episode 2 - Lorraine Daston
Episode 3 - Margaret Lock
Episode 4 - Ian Hacking and Andrew Pickering
Episode 5 - Ulrich Beck and Bruno Latour
Episode 6 - James Lovelock
Episode 7 - Arthur Zajonc
Episode 8 - Wendell Berry
Episode 9 - Rupert Sheldrake
Episode 10 - Brian Wynne
Episode 11 - Sajay Samuel
Episode 12 - David Abram
Episode 13 - Dean Bavington
Episode 14 - Evelyn Fox Keller
Episode 15 - Barbara Duden and Silya Samerski
Episode 16 - Steven Shapin
Episode 17 - Peter Galison
Episode 18 - Richard Lewontin
Episode 19 - Ruth Hubbard
Episode 20 - Michael Gibbons, Peter Scott, & Janet Atkinson Grosjean
Episode 21 -Christopher Norris and Mary Midgely
Episode 22 - Allan Young
Episode 23 - Lee Smolin
Episode 24 - Nicholas Maxwell

Requirements of the Course

Seminar Format

The course is a seminar, which means that we each share responsibility for participation and leadership. There are a considerable amount of readings in the course and consequently the course has been structured in a way to allow for sharing responsibility for learning. The formal requirements of the course include informal weekly one-pagers, frequent opportunities for student-led classes and presentations, attendance at several outside-class events and an individual term project.

Readings

There are a lot of readings for this class, and many more will be made available for those interested in pursuing issues further. All required articles will be made available either via hyperlink (which may need to be accessed from an on-campus server). by email or from the course WWW site, and most in PDF or HTML format. If you have any difficulties obtaining the readings, please just send me an email.

There are three books that we will read for the class:

- S. Sismondo, 2009. **An Introduction to Science and Technology Studies**, 2nd Edition (Wiley-Blackwell).
- B. Allenby and D. Sarewitz, 2011. **The Techno-Human Condition** (MIT Press).
- Ian Hacking, 1999. **The Social Construction of What?** (Harvard University Press).

You are responsible for obtaining access to these books. Online retailers offer the cheapest as fastest means of delivery

Guest Speakers

We currently have several guest speakers/visitors lined up. These include:

- Professor Braden Allenby, Arizona State University
- Professor Dan Sarewitz, Arizona State University
- Professor Ben Hale, University of Colorado
- Professor Lisa Kerenan, University of Colorado-Denver
- Professor Jean Goodwin, Iowa State University

As opportunities allow, we may also have other guests able to join our class.

Weekly One Pagers

Every week you are expected to turn in a one-page essay. The essay will be due every **Thursday** to be submitted via the course email list-serv:

envs5110@lists.colorado.edu

You might consider addressing the following two items in your submission:

1. The most important thing I learned from the class discussion and/or readings was . . .
2. The thing I still don't understand is . . .

You are of course free to discuss any topic related to the class beyond these two questions as well.

The purpose of this exercise is to allow you an opportunity to discuss aspects of the readings, integrate other material with the week's focus, or to raise questions about what was unclear or unanswered by the readings. A secondary purpose is to ensure that you have an opportunity to provide me with feedback on the readings and your progress/satisfaction in the course.

The first submission is due January 26 and the final one is due April 26. No submission is expected March 29, which is during Spring Break.

Periodic Assignments

There will be periodic assignments throughout the term. Several are already listed on the syllabus, there may be more.

Outside Events

There are a wide range of science and technology policy events always going on in Boulder. This fall we will have a seminar series organized by the Center for Science and Technology Policy Research. There is also a Center anniversary symposium in September and much more. Let's share responsibility for announcing upcoming events in class and via the email list.

Grading

Your grade will be determined as based on your effort and performance on all of the above, plus a final exam of some sort (details TBD).

Assignment Tracking Table

DATE	ASSIGNMENT DUE	NOTES
27 August		First class
3 September	1-pager (8/30)	NO CLASS
10 September	1-pager (9/6) First individual assignments due (1/2)	
17 September	1-pager (9/12)	In Class Workshop
24 September	1-pager (9/20) First individual assignments due (2/2)	
1 October	1-pager (9/26) First Group Projects Due in Class	
8 October	1-pager (10/4)	Dan Sarewitz and Brad Allenby class visit
15 October	1-pager (10/11) Second Group Projects Due in Class	
22 October	1-pager (10/18)	Ben Hale class visit
29 October	1-pager (10/25)	Lisa Keranan class visit
5 November	1-pager (11/1)	
12 November	1-pager (11/8)	Student-led week 1
19 November	THANKSGIVING	NO CLASS
26 November	1-pager (11/15)	Jean Goodwin class visit
3 December	1-pager (11/29)	Student-led week 2
10 December	1-pager (12/6)	Course wrap-up
TBD	FINAL EXAM	

Tentative Schedule and Readings
(which may be changed at any time)

Introduction

- **Week 1 – August 27 – Introduction, Overview**

Welcome
Introductions
Email list
Syllabus

First Introduction to the Course Themes
What you should be reading on a regular basis

Start reading Sismondo (2009)
First two assignments discussed and assigned

- **Week 2 – September 3 – LABOR DAY**

NO CLASS

Part 1 – Science, Technology and the Human Experience

- **Week 3 – September 10**

First 8 Sismondo (2009) presentations

> September 14 – Mike Hulme is speaking at the Culture and Climate Change Conference on campus, 11:30-12:30, attendance strongly recommended
>
> Full program: http://www.climateculturepolitics.com/program/

- **Week 4 – September 17**

In class workshop on group projects for second assignment

Initial group project readings:

Pistorius Group initial readings

Brendan Burkett, Mike McNamee & Wolfgang Potthast (2011): Shifting boundaries in sports technology and disability: equal rights or unfair advantage in the case of Oscar Pistorius?, *Disability & Society*, 26:5, 643-654
http://dx.doi.org/10.1080/09687599.2011.589197

Carwyn Jones & Cassie Wilson (2009): Defining advantage and athletic performance: The case of Oscar Pistorius, *European Journal of Sport Science*, 9:2, 125-131
http://dx.doi.org/10.1080/17461390802635483

Tribunal Arbitral du Sport. Court of Arbitration for Sport. Arbitration CAS 2008/A/1480 Pistorius v/ IAAF, award of 16 May 2008
http://jurisprudence.tas-cas.org/sites/CaseLaw/Shared%20Documents/1480.pdf

Gregor Wolbring (2012) Paralympians Outperforming Olympians: An Increasing Challenge for Olympism and the Paralympic and Olympic Movement *Sport, Ethics and Philosophy* 6: 2. 251-266

Gregor Wolbring (2008) Oscar Pistorius and the Future Nature of Olympic, Paralympic and Other Sports *SCRIPTed - A Journal of Law, Technology & Society* 5: 1. 139-160
http://www.law.ed.ac.uk/ahrc/script-ed/vol5-1/wolbring.pdf

Semenya Group initial readings

Tucker R, Collins M. The science of sex verification and athletic performance*. Int J Sports Physiol Perform.* 2010 Jun;5(2):127-39.
http://www.adas.org.rs/dokumenti/anado/2010.10.27/doping-The-science-of-sex-verification-and-athletic-performance-Tucker-2010.pdf

Ariel Levy, Either/Or: Sports, sex, and the case of Caster Semenya. *The New Yorker*, November 30, 2009
http://www.newyorker.com/reporting/2009/11/30/091130fa_fact_levy

Katrina Karkazis, Rebecca Jordan-Young, Georgiann Davis & Silvia Camporesi (2012): Out of Bounds? A Critique of the New Policies on Hyperandrogenism in Elite Female Athletes, *The American Journal of Bioethics*, 12:7, 3-16
http://dx.doi.org/10.1080/15265161.2012.680533

IOC Regulations on Female Hyperandrogenism Games of the XXX Olympiad in London, 2012.
http://www.olympic.org/Documents/Commissions_PDFfiles/Medical_commission/2012-06-22-IOC-Regulations-on-Female-Hyperandrogenism-eng.pdf

Kaye N Ballantyne, Manfred Kayser, J Anton Grootegoed, 2011. Sex and gender issues in competitive sports: investigation of a historical case leads to a new viewpoint, *Br J Sports Med* 2012;46:614-617
http://bjsm.bmj.com/content/46/8/614.full.html

- **Week 5 – September 24**

Second 8 Sismondo (2009) presentations

> September 27 – The CIRES Center for Science and Technology Policy Research is celebrating its 10th anniversary with an all-day symposium. You are invited to attend. President Obama's Science Advisor, John Holdren will be speaking at 7:30PM that evening. You are strongly encouraged to attend.
>
> Details:
> http://sciencepolicy.colorado.edu/news/10anniversary/index.html

- **Week 6 -- October 1**

First Group Projects Due
Present and discuss in class

Each group will have 45 minutes to structure and lead a discussion of their product.

Second Group Project Assigned (STUDENT GROUP LEAD due Oct 15)

- **Week 7 – October 8**

In-class visit (virtual) of Dan Sarewitz and Brad Allenby

To read: Allenby and Sarewitz (2012)

Part II – Science and "Truth"

- **Week 8 – October 15**

****STUDENT GROUP LEAD Assignment Due**

Ioannidis JPA (2005) Why Most Published Research Findings Are False. PLoS Med 2(8): e124. doi:10.1371/journal.pmed.0020124

D. H. Freedman, 2010. Lies, Damned Lies and Medical Science, The Atlantic, November. http://www.theatlantic.com/magazine/archive/2010/11/lies-damned-lies-and-medical-science/8269/?single_page=true

C. G. Begley and L. M. Ellis, 2012. Drug development: Raise standards for preclinical cancer research, *Nature* **483**: 531-533.

Case Study -- The Duke case

To watch and discuss in class:

- http://www.cbsnews.com/video/watch/?id=7398476n&tag=contentBody;storyMediaBox
- http://www.cbsnews.com/video/watch/?id=7398478n&tag=contentBody;storyMediaBox
- http://www.cbsnews.com/video/watch/?id=7400997n&tag=contentBody;storyMediaBox
- http://videolectures.net/cancerbioinformatics2010_baggerly_irrh/

More optional reading:
http://bioinformatics.mdanderson.org/Supplements/ReproRsch-All/Modified/StarterSet/index.html

- **Week 9 – October 22**

Guest lecture – Ben Hale, University of Colorado
What can philosophy tells us about "truth" and why it matters?

Glanzberg, Michael, "Truth", **The Stanford Encyclopedia of Philosophy** (Spring 2009 Edition), Edward N. Zalta (ed.), http://plato.stanford.edu/archives/spr2009/entries/truth/

Fallows, J. 2003. Who shot Mohammed Al-Dura?, The Atlantic Monthly, June:49-56. http://www.theatlantic.com/past/docs/issues/2003/06/fallows.htm

Other readings TBA

Part III – Social Construction

- **Week 10 – October 29**

Guest Lecture – Lisa Kerenan, CU-Denver

The Rhetoric of Science

Readings TBA

- **Week 11 – November 5**

Social Construction in STS
Hacking (1999)

Case study materials TBA

- **Week 12 – November 12**

STUDENT LED WEEK 1
Readings TBA

- **Week 13 – November 19 – THANKSGIVING WEEK**

NO CLASS

- **Week 14 – November 26**

Guest Lecture – Jean Goodwin, Iowa State University
Science Communication: What is it and why does it matter?

Readings TBA

Part IV -- Conclusions

- **Week 15 – December 3**

STUDENT LED WEEK 2
Readings TBA

- **Week 16 – December 10**

Course Wrap-Up

FINAL EXAM TBA

Boulder Campus Fall 2012 Syllabi Statements

(1) The Boulder Provost's Disability Task Force recommended syllabus statement:

If you qualify for accommodations because of a disability, please submit to me a letter from Disability Services in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities. Contact: 303-492-8671, Center for Community N200, and
http://www.colorado.edu/disabilityservices.

If you have a temporary medical condition or injury, see guidelines at http://www.colorado.edu/disabilityservices/go.cgi?select=temporary.html

Disability Services' letters for students with disabilities indicate legally mandated reasonable accommodations. The syllabus statements and answers to Frequently Asked Questions can be found at
http://www.colorado.edu/disabilityservices

(2) It is the responsibility of every instructor to clearly explain his or her\ procedures about absences due to religious observances in the course syllabus so that all students are fully informed, in writing, near the beginning of each semester's classes. Campus policy regarding religious observances states that faculty must make reasonable accommodation for them and in so doing, be careful not to inhibit or penalize those students who are exercising their rights to religious observance. Faculty should be aware that a given religious holiday may be observed with very different levels of attentiveness by different members of the same religious group and thus may require careful consideration to the particulars of each individual case. See:
http://www.colorado.edu/policies/fac_relig.html

If you have questions about providing students with religious accommodations, please contact the Office of Discrimination and Harassment at:
303-492-2797.

A comprehensive calendar of the religious holidays most commonly observed by CU-Boulder students is at:
http://www.interfaithcalendar.org/

Recommended syllabus statement:

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. See full details at:
http://www.colorado.edu/policies/fac_relig.html

(3) Faculty and students should be aware of the campus "Classroom Behavior" policy at http://www.colorado.edu/policies/classbehavior.html as well as faculty rights and responsibilities listed at:
http://www.colorado.edu/FacultyStaff/faculty-booklet.html#Part_1

These documents describe examples of unacceptable classroom behavior and provide information on how to handle such circumstances should they arise. Faculty are encouraged to address the issue of classroom behavior in the syllabus.

Recommended syllabus statement:

Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, color, culture, religion, creed, politics, veteran's status, sexual orientation, gender, gender identity and gender expression, age, disability, and nationalities. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. See policies at http://www.colorado.edu/policies/classbehavior.html
and at:
http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_code

(4) The Office of Discrimination and Harassment recommends the following syllabus statement:

The University of Colorado at Boulder Discrimination and Harassment Policy and Procedures, the University of Colorado Sexual Harassment Policy and Procedures, and the University of Colorado Conflict of Interest in Cases of Amorous Relationships policy apply to all students, staff, and faculty. Any student, staff, or faculty member who believes s/he has been the subject of sexual harassment or discrimination or harassment based upon race, color, national origin, sex, age, disability, creed, religion, sexual orientation, or veteran status should contact the Office of Discrimination and Harassment (ODH) at 303-492-2127 or the Office of Student Conduct (OSC) at 303-492-5550. Information about the ODH, the above referenced policies, and the campus resources available to assist individuals regarding discrimination or harassment can be obtained at http://www.colorado.edu/odh

(5) The Boulder campus has a student Honor Code and individual faculty members are expected to familiarize themselves with its tenets and follow the approved procedures should violations be perceived. The Honor Council recommended syllabus statement:

All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. All incidents of academic misconduct shall be reported to the Honor Code Council (honor@colorado.edu; 303-735-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). Other information on the Honor Code can be found at:
http://www.colorado.edu/policies/honor.html
and at:
http://www.colorado.edu/academics/honorcode/