Professor Michael D. Gordin
Fall 2014
M,W 10-10:50am

History 391:
History of Contemporary Science

More science has been done since 1970 than in the history of the world before that date — combined. This course traces a series of developments in contemporary science across a broad array of disciplines, with the goal of illuminating the historical processes that have brought them about and providing students with a set of tools to understand the particular position of the sciences in today's world. Topics covered include AIDS, nuclear power, string theory, evolutionary psychology, brain drain, and genomics.

Course Requirements:

Class participation	20%
5 (out of 6) short response papers	20%
10-page book analysis	20%
Take-home exam	40%

Class Participation: Students are expected to attend all precepts (see fine print below) and participate actively in discussion. In all precepts, students are expected to have done the reading for the week before precept, and to draw on that reading in the discussion. Some weeks of reading are heavier than others; please plan ahead. (It is usually helpful to have done the reading for a particular lecture *before* that lecture, whenever possible.) There are two "flavors" of precepts for this course, each occupying alternating weeks. The first kind are labeled "[Response]," and these will be dealt with in the following point. Here, suffice it to say that students should have reflected upon the question posed whether or not they write a response paper on it; discussion will be centered around that issue. For the other weeks, a particular primary-source reading has been flagged in the syllabus. We will concentrate our discussion on this particular text, reading it historically and looking for how that helps us situate it in context.

Response Papers: Students must complete a total of *five* (5) response papers by the end of the course. There are six "[Response]" precepts, so this means that you have a choice in the matter, and can skip whichever one you wish. These papers are to be 500 words in length, and to constitute a mini-argument/essay about the question at hand. These are *not* opinion pieces, and should draw directly from the material in the reading and, when possible, the lectures. They are due by 6pm the day before your precept, emailed to your precept instructor.

Book Analysis: Due in precept during Midterms Week (precept #6). In consultation with your preceptor, select a book written by a practicing scientist — that is, *not* a science writer, journalist, or historian — the core of whose career falls within the temporal bounds of this course (1970-present). Appropriate books to choose would include either autobiographies/memoirs or popular-science works. The assignment is to produce a 10-page paper (12-point font, double-spaced, normal margins) which

contextualizes this book as a *historical* document. Since this paper is due in week 6 of the course, you must consult with your preceptor by week 3 about which book you might like to write about. You may find you need to do a small amount of additional research, depending on the book, but this is not primarily a research paper; rather, you should focus on taking the material from course readings and lectures combined with a *close reading* of the book, to illustrate what this source can tell us about the historical development of contemporary science. Remember: you must have an argument! (See "How to Write a History Paper.")

Take-Home Exam: Due date and procedures to be announced.

The Fine Print:

Students are expected to attend all lectures and precepts; unexcused absences (or more than one *excused* absence) will result in penalties to your final grade. Excused absences must be cleared with the instructor in advance, or — in the case of illness — with documentation after the fact (although an email from your sickbed wouldn't hurt).

All assignments, including precept responses, must be turned in on time. Late papers will be penalized a third of a letter grade per 8 hours, for a total of a letter grade a day. Papers more than five (5) days late will receive a zero.

Device Policy:

Technologies have advanced in the past few years faster than the ability of norms of polite behavior to keep up. Hence I regretfully have to include this section in the syllabus. Please read it carefully.

I understand that for many of you it is extremely difficult to take notes without using a laptop, and I would like to make it possible for you to get the most out of this class. Therefore the slides for each lecture will be placed on Blackboard before that class begins. Feel free to download them and annotate them, or print them out and write directly on them. Any use of personal devices that enhances learning is a good thing.

Conversely, these devices can also detract from learning, not only for the user but especially for nearby students. If you intend on using a laptop or tablet and are somehow unable to sit for fifty minutes without checking Facebook, messaging your friends, tweeting, watching movies, or buying shoes, I ask that you sit in the back row. That way, your activities will not distract the cone of individuals sitting behind you. If you have a laptop open and are sitting anywhere but in the back row, I assume that you are not in fact engaging in those activities. Please don't let me find out I'm wrong.

I can imagine no reason why you should ever be looking at your phone during lecture. There is even less reason for your ringer to be turned on.

Some of you may wish to do the readings for this course electronically — whether because you are more used to this mode, or to save trees, or for any other reason — and all non-book readings are available on Blackboard precisely to facilitate this. However, it inhibits conversation in precept when a wall of laptop screens, somewhat like a War Room, surrounds the table. Therefore, if you bring your laptop to precept, please leave it closed *unless you are looking something up*, and then you should close it right afterward. (Needless to say, "looking something up" must relate to the class.) It is perfectly fine to have tablet devices (iPads, Kindles) open on the table at all times. You are obviously welcome to print out hard copies of the readings and/or bring in physical copies of the book.

Required Books: (available at Labyrinth)

Bill Devall and George Sessions, *Deep Ecology: Living as if Nature Mattered* (Layton, UT: Gibbs M. Smith, 1985). [ISBN: 978-0879052478; $17.95]

Stephen Hawking, *A Brief History of Time*, 10th anniversary edition (New York: Bantam, 1998). [ISBN: 978-0553380163; $18]

Michael Nielsen, *Reinventing Discovery: The New Era of Networked Science* (Princeton: Princeton University Press, 2011). [ISBN: 978-0691148908; $24.95]

Vandana Shiva, *Biopiracy: The Plunder of Nature and Knowledge* (Boston: South End Press, 1997). [ISBN: 978-0896085558; $15]

Paul Rabinow, *Making PCR: A Story of Biotechnology* (Chicago: University of Chicago Press, 1996). [ISBN: 978-0226701479; $20]

Lee Smolin, *The Trouble with Physics: The Rise of String Theory, the Fall of a Science and What Comes Next* (Boston: Houghton Mifflin, 2006) [ISBN: 978-0141018355; $24.25]

Richard Wrangham and Dale Peterson, *Demonic Males: Apes and the Origins of Human Violence* (New York: Mariner, 1996). [ISBN: 978-0395877432; $15.95]

Readings marked with a (*) are available electronically on Blackboard. Those with a URL can be linked to directly.

HOW TO WRITE A HISTORY PAPER

1. EVERY ESSAY IS AN ARGUMENT. This is the cardinal rule of writing history papers, or any other academic paper, for that matter. This means you must both make a claim and provide a logical structure in which to argue it. Think of the paper like a one-sided discussion you are having with your precept leader. Try to convince her/him of what you believe.

2. You must defend your argument; this is done with evidence. It sounds obvious, but this is important. For the precept response papers, you may use only the readings for this class and (sparingly) references to the lectures. No external material is permissible, nor should it be necessary. For the 10-page paper, you may use any variety of sources, *except encyclopedias, and this includes Wikipedia*. You can use Wikipedia or other such sources to help guide you to relevant primary and secondary sources, but these wiki-sources can be highly unreliable. Reliance on such sources will adversely impact your grade. Quotation from the scholarly literature, especially primary literature, accompanied with *YOUR ANALYSIS* of what those quotations mean and how they relate to your argument, is ideal. The texts say many different things; when you select a quotation from it to support your argument, make sure that you articulate why it pertains.

3. You need to consider alternative points of view. Part of making an argument is to consider other reasonable positions and explain why you don't find them as compelling as your own. Remember, you are trying to convince someone of your position — which means you must be able to refute objections.

4. Anytime you quote anything, you must provide a reference, even if it is material from the course and we all know what the reference is. Proper referencing is an indispensable habit. The most common way to do this is with a footnote or a parenthetical reference, and there are many different formats, such as those in the MLA Handbook or the Chicago Manual of Style. Pick one and use it consistently. In addition to footnotes, include a bibliography at the end of the paper (also a good habit). If you have questions about how to do this, where to learn various formats, or so on, contact your preceptor. You will be *MARKED DOWN* for poor and/or inadequate referencing.

5. Proofread. It is amazing how many errors can creep into a short paper. Read through your draft at least once *ON PAPER* so that you can correct typos, grammatical errors, and so on. (This is infinitely harder to do on the computer screen.) This sort of thing counts — and will always count in anything you write.

6. Put page numbers on it. It drives us crazy when they are absent.

7. Don't forget to sign it with the honor language! We cannot accept any papers that do not adhere to University codes of conduct.

SCHEDULE OF LECTURES

I. STRUCTURE

Lecture 1, 10 September: Manhattan
Readings:
* Vannevar Bush, *Science: The Endless Frontier* (Washington, DC: National Science Foundation, 1960 [July 1945]), 5-40. [36]

Lecture 2, 15 September: Mansfield
Readings:
* Chalmers W. Sherwin and Raymond S. Isenson, "Project Hindsight," *Science* 156, no. 3782 (23 June 1967): 1571-1577. [7]
* Philip Mirowski and Robert Van Horn, "The Contract Research Organization and the Commercialization of Scientific Research," *Social Studies of Science* 35, no. 4 (August 2005): 503-548. [46]

Lecture 3, 17 September: Communists
Readings:
* C. P. Snow, *The Two Cultures* (New York: Cambridge University Press, 1993 [1959]), 29-41. [13]
* Loren R. Graham, "Big Science in the Last Years of the Big Soviet Union," *Osiris* 7 (1992): 49-71. [23]

Precept 1: [Response] It is common for observers today to look back at the Soviet Union's science system and judge it as "pathological" or "deficient" by evaluating it according to the standards of Americanized science. Using the Graham reading for relevant background, speculate as to how a Soviet science policy-maker might view the American system of organizing science from 1945 to 1974. Which aspects of it could he or she reasonably consider to be deficient, seen from the Soviet point of view?

Lecture 4, 22 September: Brains
Readings:
* Loren R. Graham and Irina Dezhina, "Breakup of the Soviet Union and Crisis in Russian Science," in *Science in the New Russia: Crisis, Aid, Reform* (Bloomington: Indiana University Press, 2008), 18-32. [15]

II. UNIVERSE

Lecture 5, 24 September: Cosmos
Readings:
Hawking, *A Brief History of Time*, 1-191. [192]

Precept 2: Hawking.

Lecture 6, 29 September: Higgs
Readings:
* Steven Weinberg, *Dreams of a Final Theory* (New York: Pantheon, 1992), 262-275. [14]
Steven Wolfram, "What the Discovery of the Higgs Means for Scientists," *Wired* (5 July 2012). {http://www.wired.com/wiredscience/2012/07/wolfram-higgs-opinion/} [4]

Lecture 7, 1 October: Strings
Readings:
Smolin, *The Trouble with Physics*, 101-199. [98]

Precept 3: [Response] Was it good or bad for physics that the Superconducting Super-Collider (SSC) was canceled by the United States Congress in 1993? (Be sure to explain what you mean by "good", "bad," and "physics.")

Lecture 8, 6 October: Moore
Readings:
* Gordon Moore, "The Future of Integrated Electronics," in David C. Brock, ed., *Understanding Moore's Law: Four Decades of Innovation* (Philadelphia: CHF Press, 2006), 37-54. [18]
* Ray Kurzweil, *The Singularity Is Near: When Humans Transcend Biology* (New York: Penguin Books, 2006), 7-34. [28]

Lecture 7, 8 October: Data
Readings:
Nielsen, *Reinventing Discovery*, 1-87, 129-171. [131]

Precept 4: Nielsen.

Lecture 10, 13 October: ArXiv
Readings:
* Paul Ginsparg, "The Global Village Pioneers," *Physics World* (October 2008): 22-26. [5]

III. LIFE

Lecture 11, 15 October: Sequence
Readings:
Rabinow, *Making PCR*. [170]

Precept 5: [Response] Is PCR biology, chemistry, or technology? What are the stakes in the various answers to this question?

Lecture 12, 20 October: Plague
Readings:
* Allan Brandt, "'Plagues and Peoples': The AIDS Epidemic," in *No Magic Bullet: A Social History of Venereal Disease in the United States since 1880*, exp. ed. (New York: Oxford University Press, 1987 [1985]), 183-204. [22]

Lecture 13, 22 October: Neuro
Readings:
* William Gibson, "Johnny Mnemonic," in *Burning Chrome* (New York: Arbor House, 1986), 1-23. [24]
* Fernando Vidal, "Brainhood, Anthropological Figure of Modernity," *History of the Human Sciences* 22, no. 1 (2009): 5-36. [32]

Precept 6: Gibson

BOOK ANALYSIS DUE IN PRECEPT 6!

Lecture 14, 3 November: Savannah
Readings:
Wrangham and Peterson, *Demonic Males*, 1-152, 173-200. [181]

Lecture 15, 5 November: Consent
Readings:
* David J. Rothman, "The Shame of Medical Research," *The New York Review of Books* 47, no. 19 (30 November 2000): 60-64. [5]

Precept 7: [Response] Beginning in the 1960s, scientific discussions about human behavior emphasized violence. Wrangham and Peterson locate the roots of violence in the evolutionary past, but they make use of very recent scientific developments to do so. What kinds of evidence do they mobilize to make their case, and how do they balance data drawn from the present and the past?

IV. WORLD

Lecture 16, 10 November: Orbit
Readings:
* Asif Siddiqi, "Competing Technologies, National(ist) Narratives, and Universal Claims: Toward a Global History of Space Exploration," *Technology and Culture* 51, no. 2 (April 2010): 425-443. [19]
* W. Patrick McCray, "From L-5 to X-Prize: California's Alternative Space Movement," in Peter J. Westwick, ed., *Blue Sky Metropolis: Aerospace and Southern California* (Berkeley: University of California Press, 2012): 171-193. [23]

Lecture 17, 12 November: Rainforest
Readings:
Shiva, *Biopiracy*. [126]

Precept 8: Shiva.

Lecture 18, 17 November: Meltdown
Readings:
* Ulrich Beck, "The Anthropological Shock: Chernobyl and the Contours of the Risk Society," *Berkeley Journal of Sociology* 32 (1987): 153-165. [13]
* Charles Perrow, "Fukushima and the Inevitability of Accidents," *Bulletin of the Atomic Scientists* 67 (November/December 2011): 44-52. [9]

Lecture 19, 19 November: Pollution
Readings:
Devall and Sessions, *Deep Ecology*, 1-178. [179]

Precept 9: [Response] What are the *historical* differences between the accidents at Chernobyl in 1986 and Fukushima in 2011? How do these differences shape public and policy attitudes to nuclear power?

Lecture 20, 24 November: Greenhouse
Readings:
* Chi-Jen Yang and Michael Oppenheimer, "A 'Manhattan Project' for Climate Change?" *Climatic Change* 80 (2007): 199-204. [6]
Nicholas Dawidoff, "The Civil Heretic," *New York Times Magazine* (29 March 2009). (http://www.nytimes.com/2009/03/29/magazine/29Dyson-t.html?pagewanted=all) [15]

V. OUTSIDE

Lecture 21, 1 December: Design
Readings:
* *Tammy Kitzmiller v. Dover Area School District, et al.* (400 F. Supp. 2d 707, Docket no. 4cv2688), http://www.pamd.uscourts.gov/kitzmiller/kitzmiller_342.pdf. [139]

Lecture 22, 3 December: Fringe
Readings:
* Stanton T. Friedman, "The Cult of SETI," in *Flying Saucers and Science: A Scientist Investigates the Mysteries of UFOs* (Franklin Lakes, NJ: The Career Press, 2008), 129-152. [24]

Precept 10: *Kitzmiller*.

Lecture 23, 8 December: Fraud
Readings:
* Daniel J. Kevles, "The Assault on David Baltimore," *The New Yorker* (27 May 1996): 94-109. [16]
* Bruce V. Lewenstein, "From Fax to Facts: Science Communication in the Cold Fusion Saga," *Social Studies of Science* 25, no. 3 (August 1995): 403-436. [33]

Lecture 24, 10 December: Nobel
Readings:
H. David Politzer, "The Dilemma of Attribution," Nobel Lecture, 8 December 2004, http://www.nobelprize.org/nobel_prizes/physics/laureates/2004/politzer-lecture.pdf. [11]
* István Hargittai, "Who Wins Nobel Prizes?" and "Who Did Not Win," in *The Road to Stockholm: Nobel Prizes, Science, and Scientists* (New York: Oxford University Press, 2002), 48-82, 220-246. [62]

Precept 11: [Response] Would the history of contemporary science be any different if science Nobel prizes did not exist?