

History of Science 286
Honors Seminar: Studies in Science, Technology and Medicine
Topic: Global Warming: History, Science, Politics
Spring 2012

9:15-11:45 a.m. F, 204 Bradley Memorial

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Climate change is a historical science which depends on the analysis of an extraordinarily complex set of interactions, with strong but uncertain implications for our future. By setting debates on the existence, causes, and potential amelioration of global warming in historical context, this honors seminar aims to give participants a secure basis for understanding the relations between science and politics in a rapidly developing and urgently controversial field. As a relatively new field of study, analysis of climate change relies on integrating forms of research and argumentative claims that cross disciplinary boundaries between sciences like geology, meteorology, oceanography and geophysics. It has also engaged scientists, the public, and policy makers in vociferous debate, leading to the development of novel institutional forms like the Intergovernmental Panel on Climate Change, while sometimes appearing to provide merely yet another battleground for traditional interest groups in industry, science, and politics. Our methods will be historically informed and interdisciplinary, tracing developments from the 1860s onwards and examining several case studies of current research at UW-Madison and elsewhere to understand how local research engages global arguments, and how current science is shaped equally by historical context and future projections. Assessment tasks are designed to give students an appreciation of the polemical nature of public debate, as well as peer review and the collaborative nature of research in the field. They involve informal writing analyzing a variety of sources, in-class presentations, and a 10-15 page research paper.

Book List (A Room of One's Own, 307 W. Johnson St.)

Required:

James Rodger Fleming, *Historical Perspectives on Climate Change* (New York: Oxford University Press, 1998).

Spencer R. Weart, *The Discovery of Global Warming* (Cambridge, MA: Harvard Univ. Press, 2008).

Naomi Oreskes and Erik M. Conway, *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming* (New York: Bloomsbury Press, 2010).

Course Reader. Available for \$29.35 from the Social Science Copy Center, 6120 Social Science Building.

Assessment

Assessment is through three primary tasks.

Class Participation (25% in total)

Class discussion of the assigned readings will be a primary forum for the intellectual work of the seminar, and a participation grade forms a significant component of your assessment. As I approach it “participation” includes regular attendance, completion of the four informal assignments discussed below (12%), and especially a willingness to engage actively in our discussions. Given differences in temperament and personality I do not expect all class members to contribute equally all the time, and I have no intention of penalizing people who may be shy or lack the confidence to talk a lot. However, it will be important for everybody to do their best to support the discussion, and I expect everyone to be ready to answer questions when asked.

Four Critical Reviews, two Pro two Contra

Each person will be expected to complete critical reviews of four different readings over the course of the first 12 weeks of the class. In each case this brief review will present a summary of the reading and a positive or negative critique of the arguments presented (pro in two cases, contra in two cases). Whether the reading concerned is a book, website, or journal paper, the review will describe the argument and evaluate the evidence offered in two concise paragraphs. The point here is to be able to present someone else’s perspective and take a critical or appreciative stance – persuasively – independently of your own prior views on the subject. A model is the kind of discussion that follows the publication of position papers in climate change, and the process should help us recognize the creative and agonistic basis of commentary in the field, negotiating the difficult line between summary, simplification, and advocacy.

The review is to be submitted to our class website on Learn@UW one full day *before* the class concerned (by Thursday morning). These reviews will help focus our class discussions while also providing helpful practice in critical thinking and writing. *Students should also be ready to lead the class in discussion of the works they have chosen to review.*

Finally, in lieu of completing two of these critical reviews it will be possible for a student to instead take responsibility for leading the discussion of an entire week’s readings.

Writing Assignments

There are two important writing assignments. In keeping with the developmental, interdisciplinary and collaborative features of scholarship on climate change, these assignments incorporate a cycle of draft and review on the way to producing the final product – which will be a multi-authored paper. In researching and writing these papers, students will take on the roles of first author developing a project, reviewer critiquing another person’s work, and second author contributing to someone else’s project.

The first assignment is a *research proposal* of about 3 pages. In this you will set out a potential topic examining one aspect of the history, science and politics of global warming, stating the main arguments you expect to develop and outlining the key primary and secondary sources on which you are likely to draw for evidence and interpretative aid. Think of this as a grant proposal in which you argue for the funding

you will need to finish the project you have identified. Your proposal will be distributed to myself and a fellow class member.

Your fellow student will critically analyze the overall aim and the resources you expect to use, writing a short report (1-2 pages) that responds to the promise of the topic and identifies any potential weaknesses. This is primarily a response to the content of your project, but your peer may also comment on the rhetorical strengths and weaknesses of your proposal. (Note that this means each class member will both produce their own research proposal and comment on someone else's.)

The second assignment is the *research paper* itself, which will be collaborative. In this case, in the first instance you will act as the first author, producing a good quality draft of your own project, which will be critically reviewed by a second person, who will become the second author. An oral presentation of your project to the class will also give you the opportunity to describe your project to others and benefit from a still broader discussion before undertaking revisions and submitting the final version. As first author of your own project you will have the final say in its production; as second author of someone else's project you will have the opportunity to develop a positive contribution to work initiated by another person.

The different steps we work through reflect the collaborative nature of much scholarship, and the fact that good research and writing rests on critical review and rewriting, taking the opportunity to rethink what you are trying to do in a paper, and to assess critically how well you achieve your goals.

Research Proposal, 3 pages (20% in total)

An outline of a project on a topic of your choice, that sets out the main argument you envisage developing, and discusses the primary and secondary material to be used.

February 24	Oral discussion of potential projects in the seminar as a whole
March 9	Research proposal due (to be reviewed by peer): 3 pages, 15%
March 16	Peer review of a colleagues' proposal completed: 1-2 pages, 5%

Collaborative Research Papers, 10-15 pages (55% in total)

Your contribution to our understanding of global warming.

April 20	First author polished draft due (to be reviewed by second author)
April 27–May 11	Oral presentations delivered in class
May 4	Second author critical review completed
May 15 (Tues.)	Collaborative final version due
	First author contribution 40%; second author contribution 15%

Research Resources and Methods

Developing a research paper will involve using a mix of primary and secondary sources that is likely to be strongly dependent on the particular topic chosen. In the course of the semester we will pay continued attention to the mechanics of research in such an interdisciplinary field, but it is worth noting a few general points. The UW library has produced an undergraduate research guide to global warming. See <http://researchguides.library.wisc.edu/globalwarming>

For historical topics, Fleming's and Weart's books offer helpful indications for further research, and note that Weart has produced a helpful website that offers a much more complete treatment of the topic than his book:

<http://www.aip.org/history/climate/index.htm>

Similarly, those interested in scientific or political aspects will find helpful resources by mining the material discussed in relevant weeks of our class for further references. The Higher Education Academy has produced a very comprehensive model syllabus, intended to help historians and other students of the past engage with issues of anthropogenic climate change through the medium of history and related disciplines. That is accessible through:

http://www2.warwick.ac.uk/fac/cross_fac/heahistory/elibrary/internal/colleagues_pastactions_20100731/

During the semester we are likely to develop a collective bibliography as a resource.

Participation and Performance

If you have a conflict between an academic requirement and any religious observance, please notify me of the specific dates concerned within the first two weeks of the course and I will find an alternative means for you to fulfill the requirement. Such requests are confidential.

In compliance with the Americans with Disabilities Act, I will make every effort to honor requests for reasonable accommodations made by individuals with disabilities. (If you think you qualify for accommodation, please contact the McBurney Disability Resource Center [263-2741; <http://www.mcburney.wisc.edu/>] to establish your eligibility for services.) Requests for accommodation can be responded to more effectively if I receive them as far in advance as possible, preferably at the beginning of the semester. Such requests are confidential.

If any problems arise, either academic or personal, that might jeopardize your performance in the course, you must try to inform me of the problem at the next available office hour, or by leaving a message with the Department of the History of Science (262-1406).

Syllabus

Most of the material listed below may be found in the Course Reader, except for our course texts, which are listed in bold in an abbreviated form, and occasional websites, which you are asked to visit in preparation for the relevant class.

Introduction

1. Is the Climate Changing? How do *you* know what you do about climate? (*Jan. 27*)

Come to class ready to describe the most significant source of your understanding about the climate, and climate change. That might be through weather reports, an influential book or film, newspaper or scientific journal articles, public lectures, or a class; and you may have learned about climate and climate change differently. If possible bring the source or sources you have identified to class. What did you learn from them? Given what you do know, what would you like to learn more about? (Think carefully about the latter question too, because it could help form both our syllabus and the project you undertake here.)

Historical Perspectives

2. Past Climates, Current Debates: The “Early Anthropogene” Hypothesis with *Steve Vavrus*, (*UW Center for Climatic Research*) and Historical Climatology (*Feb. 3*)

S. Vavrus, W. F. Ruddiman, and J. E. Kutzbach, “Climate Model Tests of the Anthropogenic Influence on Greenhouse-induced Climate Change: The Role of Early Human Agriculture, Industrialization, and Vegetation Feedbacks,” *Quaternary Science Reviews* 27 (2008): 1410-1425.

H. Muir, “The Climate Changers: Were We Spared from an Ice Age by Stone Age Farmers?” *New Scientist* (6 September, 2008): 32-36.

Steven Stoll, “The Cold We Caused,” *Harper’s Magazine* (November, 2009): 7-10.

Rudolf Brázdil, Christian Pfister, Heinz Wanner, Hans Von Storch and Jürg Luterbacher, “Historical Climatology In Europe – The State Of The Art,” *Climatic Change* 70.3 (2005), 363-430.

L.K. Barlow, J.P. Sadler, A.E.J. Ogilvie, P.C. Buckland, T. Amorosi, J.H. Ingimundarson, P. Skidmore, A.J. Dugmore and T.H. McGovern, “Interdisciplinary Investigations of the End of the Norse Western Settlement in Greenland,” *The Holocene* 7 (1997), 489-499.

3. Climate Change Hypotheses (*Feb. 10*)

Fleming, *Historical Perspectives on Climate Change*, focusing on the earlier period (you may skim chs. 9 and 10, especially after the section on Callendar).

J. Tyndall, “On Radiation through the Earth’s Atmosphere,” *Philosophical Magazine* 4 (1863), 200-207.

T.C. Chamberlin, “A Group of Hypotheses Bearing on Climatic Changes,” *The Journal of Geology* 5 (1897), 653-683 on pp. 653-657 and 680-683.

4. From Keeling to the Intergovernmental Panel on Climate Change (Feb. 17)

Skim Weart, *The Discovery of Global Warming*.

Roger Revelle, and Hans E. Suess, "Carbon Dioxide Exchange between Atmosphere and Ocean and the Question of an Increase of Atmospheric CO₂ During the Past Decades," *Tellus* 9 (1957), 18-27.

Investigate the presentation of the results of the IPCC, "Summary for Policymakers," in S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller, eds. *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, Cambridge/New York, 2007), available online at http://www.ipcc.ch/publications_and_data/ar4/wg1/en/spm.html

5. Discussion of Research Proposals and Resource Workshop with Micaela Sullivan-Fowler (Ebling Library) (Feb. 24)

To be aware of the range and character of current debate as you begin your own work, investigate skeptics and counter-skeptics online. Two examples are:

<http://www.climatechangedispatch.com/> and

<http://www.skepticalscience.com/argument.php>, and the UW library research guide on Global Warming has a link to the Gale Center Opposing Viewpoints in Context, accessible through <http://researchguides.library.wisc.edu/globalwarming>

Each student should be ready to outline a tentative proposal for their research project, to provide the basis for an open discussion on aims, sources and strategies. The class will also involve a targeted workshop on how to locate research resources in the study of climate change, led by Micaela Sullivan-Fowler.

Political Perspectives

6. Capitalism and the Environment (Mar. 2)

Brett Clark and Richard York, "Carbon Metabolism: Global Capitalism, Climate Change, and the Biospheric Rift," *Theory and Society* 34 (2005), 391-428.

Jason W. Moore, "Environmental Crises and the Metabolic Rift in World-Historical Perspective," *Organization & Environment* 13 (2000), 123-157.

View Carolyn Merchant speaking on "Environmentalism: From the Control of Nature to Partnership," at <http://www.uctv.tv/search-details.aspx?showID=19243>

Aaron M. McCright and Riley E. Dunlap, "The Politicization of Climate Change and Polarization in the American Public's Views of Global Warming, 2001-2010," *The Sociological Quarterly* 52 (2011): 155-194.

7. Climate Change Skepticism and the History of Doubt (Mar. 9)

Oreskes and Conway, *Merchants of Doubt*.

Research proposal due (to be distributed to a peer)

8. Science and the Media with Dominique Brossard (*Life Sciences Communication*) (Mar. 16)

Screening of Al Gore, *An Inconvenient Truth*.

Henry N. Pollack, *Uncertain Science ... Uncertain World* (Cambridge/New York: Cambridge University Press, 2003), pp. 1-41.

Depending on interest, read one of the following two articles:

Chad Carpenter, "Businesses, Green Groups and the Media: The Role of Non-Governmental Organizations in the Climate Change Debate," *International Affairs* (Royal Institute of International Affairs 1944-) 77 (2001), 313-328.

Sheldon Ungar, "Knowledge, Media and the Popular Culture: Climate Change vs the Ozone Hole," *Public Understanding of Science* 9 (2000), 297-312.

Maxwell T. Boykoff and Jules M. Boykoff, "Climate Change and Journalistic Norms: A Case-Study of US Mass-Media Coverage," *Geoforum* 38 (2007): 1190-1204.

Dominique Brossard, James Shanahan and Katherine McComas, "Are Issue-Cycles Culturally Constructed? A Comparison of French and American Coverage of Global Climate Change," *Mass Communication and Society* 7(3) (2004): 359-377.

<http://pewresearch.org/pubs/1780/poll-global-warming-scientists-energy-policies-offshore-drilling-tea-party>.

Peer reviews of research proposal completed

Scientific Perspectives

9. Modeling Climate and Global Thinking (Mar. 23)

Amy Dahan, "Putting the Earth System in a Numerical Box? The Evolution from Climate Modeling toward Global Change," *Studies in History and Philosophy of Modern Physics* 41, no. 3 (2010): 282-292.

Shardul Agrawala, Kenneth Broad and David H. Guston, "Integrating Climate Forecasts and Societal Decisions Making: Challenges to an Emergent Boundary Organizations," *Science, Technology and Human Values* 26 (2001): 454-477.

Focus on the introduction, the discussion of infrastructure and its inversion, and skim the rest of: Paul Edwards, *A Vast Machine: Computer Models, Climate Data, and the Politics of Global Warming* (Cambridge, MA: MIT Press, 2010), pp. 1-26, 337-356, 397-440.

10. Local and Global Experience: Arctic Sea Ice, Ice Off on Lake Mendota (Mar. 30)

Diana M. Liverman, "Conventions of Climate Change: Constructions of Danger and the Dispossession of the Atmosphere," *Journal of Historical Geography* 35 (2009): 279-296.

Michael T. Bravo, "Voices from the Sea Ice: The Reception of Climate Impact Narratives," *Journal of Historical Geography* 35 (2009): 256-78.

Activity assessing data on the date of ice off on Lake Mendota. Class members may also wish to consult the Wisconsin Initiative on Climate Change Impacts comprehensive report, *Wisconsin's Changing Climate: Impacts and Adaptation* (2011), accessible at <http://www.wicci.wisc.edu/publications.php>.

March 31-April 8 Spring Recess: No Class

11. UW research on climate change and its consequences (*Apr. 13*)

Sources to be assigned; the activity will involve meeting UW researchers, with readings designed to give insight into their research and its broader significance, and the discussion aiming to set their work in historical, scientific and political context.

12. UW research on climate change and its consequences (*Apr. 20*)

Sources to be assigned; the activity will involve meeting UW researchers, with readings designed to give insight into their research and its broader significance, and the discussion aiming to set their work in historical, scientific and political context.

First author draft of Research Paper due

Project Presentations

13. Project presentations (*Apr. 27*)

14. Project presentations (*May 4*)

Second author collaborative review completed

15. Project presentations (*May 11*)

Tuesday May 15 Final Paper due by 4:45 p.m.