

HS-180: The Atomic Age

Instructor: Toshihiro Higuchi

3 credits. Humanities, Elementary. Open to Honors Freshmen only or consent of instructor

Time: M: 3:30 to 4:20 pm (lecture) and W: 3:30 to 5:25 (discussion)

Place: L155 Education

Office hours: T: 4:00 to 5:00; R: 4:00 to 5:00 @ Bradley Memorial, #214

Course Description:

This freshman honors seminar seeks to understand the historical origin, evolution, and latest state of the Atomic Age in which we extract a vast amount of energy from splitting and fusing the atom. The Atomic Age, however, is much more than about the law of atomic physics: it has been revolutionizing our world in a fundamental manner. The objective of the course is to capture a dynamic, two-way relationship between science and society. How did a social order in the twentieth century, the "age of extremes" driven by the fear of total war and the promise of industrial modernity, shape a new genre of science and technology? How did such epistemic practices reinforce, undermine, or change the social order? We will explore a multitude of this interrelationship between science and society in the Atomic Age, including: the role of popular sciences; the transnational network and national divide of the physics community; the new form of knowledge for nuclear survival and risk management; and the development of research objectives and tools for biomedical, earth, environmental, and social sciences. To understand the above complex relationship, we will discuss various nuclear and radiological events, including the latest Fukushima nuclear power plant accident. Although focused primarily on the United States, we will extend discussion to its allies and rivals, including Britain, France, Germany, Japan, and the Soviet Union, to place the Atomic Age in a truly international context.

Required Readings:

Spencer Weart, *The Rise of Nuclear Fear* (Cambridge, MA: Harvard University Press, 2012).

Lauren Rediness, *Radioactive: Marie & Pierre Curie: A Tale of Love and Fallout* (New York: It Books, 2010). (Available for free at the Memorial Library by using a coupon to be distributed at the beginning of the course).

Course Requirements

Attendance (Mandatory – see Attendance Policy for detail)

Blog postings (2 point x 12 weeks = 24 points)

Blog comments (1 point x 12 weeks = 12 points)

2 review essays (12 point each)

Final paper (40 point)

The numerical equivalents of final grades (letter) are as follows: A=>93; AB=92-88; B=87-83; BC=83-79; C=78-74; CD=73-69; D< 68

Attendance Policy

Attendance is mandatory for all students. Any scheduled absence during the semester due to, for example, religious holidays, extra-curriculum activities, GRE/GMAT/LSAT exams, job interviews or familial affairs, must be reported to your instructor by February 4 by email. Additional information regarding your requested leave may be asked for. Please note that this course is intended to be a discussion class for a small number of students. As such, no class can succeed without your active participation. For this reason, please refrain from taking the pre-Thanksgiving leave.

After February 4, no unreported absence is acceptable, except for the allowance of one (1) unscheduled absence. Every absence in addition to the one (1) allowable unscheduled absence will result in a 5-point penalty against the total score. This penalty can be avoided if such absences accompany the prompt submission of the Dean's letters or doctor's notes.

Blog postings

By 1 pm on the day of class every Wednesday, except for the first and last classes and one week of your choice, you are asked to post your comment on the course materials of the week at Learn@UW (<https://learnuw.wisc.edu/>). The blog should relate to, but not be limited to, a set of questions that your instructor provides regarding the materials. Each entry, which should contain at least 250 words, will count as 2 point toward the final grade (2 points x 12 out of 15 weeks = 24 points).

Blog comments

The blog is an interactive media, so please make sure to post at least one comment on any blog entry of your colleagues/instructor each week, except for the first and last classes and one week of your choice. There is no minimum word length for your comment, but it should fully engage in the substance of the blog concerned (as opposed to simply expressing your feeling). Comments each week counts as 1 point (1 point x 12 weeks = 12 points).

Writing Assignments:

This course is a writing-intensive seminar. We will have close collaboration with the Writing Center and the Wisconsin Historical Society to help you learn how to do historical research and write an analytical paper. The skills that you will acquire will be immensely helpful for your writing a Honor thesis in the future.

You are required to submit TWO review essays (up to 1,000 words each) about Unit I and Unit II (12 points each) and ONE final paper (up to 2,400 words) (40 point). Please note that the word limit excludes footnotes and bibliography.

The first review essay will be biographical. You should choose one of the scientists who played a key role in the early development of atomic sciences, read one of his/her biographies or autobiographies, and answer the following three questions: 1) Why did he/she end up being an atomic scientist? Was there any alternative career choice? 2) What was his/her professional network? Who were among his/her associates? 3) How did his/her non-scientific (private) life look like? Did it influence his/her scientific work, and if so, how? The above questions should help you read the biography/autobiography in a highly selective manner (meaning that you do not read all pages of a typically thick biography full of anecdotes). You should read only the relevant portion of the book and focus on answering the questions rather than summarizing the entire book. The paper should use both course materials and class discussion and the biographical work of your choice.

The second review essay will be a policy memo on the lessons from the 1962 Cuban Missile Crisis. You will be assigned to one of the roles: U.S. Joint Chiefs of Staff, State Department, Congressional Office, and the Office of Civil Defense as well as Britain, the USSR, and Cuba. For this purpose you will be paired with one or two of your colleagues, together investigating a set of documents designated to each office and writing a memo, no more than 1,000 words, to answer the following questions:

- 1) What goals guided your office's behavior during the 1962 Cuban Missile Crisis?
- 2) What strategies did your office adopt to best achieve these goals?
- 3) How and to what extent were the goals of your office realized in the course of the crisis? Name and explain factors that affected the actual outcomes of the policies pursued by your office.
- 4) What is a lesson from the Cuban Missile Crisis for the current nuclear crisis scenario [to be announced]?

The final paper will be informed by archival research at Wisconsin Historical Society (WHS). Choose one of the following two generic topics: a) nuclear arms race; b) social movement for nuclear disarmament, c) civil defense; d) nuclear reactors, and e) radioactive waste. You will be given a packet of materials to consult first in order to develop your research question and thesis. Then visit WHS and consult with the archivist as to what sort of information is available at the archive as well as online, finding some documents useful to answer your question and substantiate the thesis. Your paper must address the following: 1) When did the project (or problem) concerned begin? What was the background of the time? 2) Why did it begin? Who was an advocate, and who was an opponent in the project/problem? Identify the political-economic interest, ideological commitment, and social network of those involved in the project/problem.

It is strongly encouraged to consult with your instructor during office hours, before and after class. The students are also advised to visit the writing resources center in order to develop an idea for the paper, polish writing skills, and ensure proper grammar and syntax. Please feel free to forward your draft, even in a rough form, to the instructor prior to submission for comments and suggestions.

For a history paper, the indication of sources is essential. You must follow Chicago Manual of Style for your writing assignments. Visit <http://www.libs.uga.edu/ref/chicago.html#docnote> and check "Documentary-Note Style." DO NOT use an in-text reference system. An incorrect format will result in a deduction of 2 out of the total 12 points for the first two essays, or 4 out of 40 for the term paper.

The first two essays should be submitted at the beginning of class on Monday, February 25 and March 18 respectively, in hard copy. No electronic copy will be accepted. The final paper should be submitted electronically by 3:30 pm, May 13.

Late Papers Policy

You are given two grace days. You may use them whenever necessary. You can turn in two assignments one day late or one assignment two days late without penalty. In case of the mid-term paper, you are asked to bring the paper during my office hours, put it in my mailbox at Bradley Memorial, or simply bring it to Wednesday class. For the term paper, late submission means either May 14 or 15 (by 3:00 pm). After the use of the grace days, 4 points will be deducted from the total 12 points for each review essay, or 8 out of 40 for the final paper. If the paper is submitted later than a week from the due date (regardless of grace days), the points will be reduced by 50 percent unless there is a note from the Dean explaining the reasons you could not complete the work.

Academic Honesty and Plagiarism

It is your responsibility to review the Honor Code, to know the definition of plagiarism, and to know how to use proper attribution (including citations for internet sites, should you use them) in your written assignments. If you are uncertain about the limits of collaboration on assignments, please contact me at any time.

Academic honesty is not only a standard to which all of you have pledged yourselves, but is also the foundation of any intellectual exchange, and thus of any intellectual community such as a University. Academic honesty does not consist simply in the avoidance of outright cheating on exams, but more generally represents a set of standards all of us must follow in our academic work in order to protect the integrity and effectiveness of that work, and to preserve the ideals and essence of teaching, learning, and research. This implies, for instance, never submitting as our own scholarly work which we have not personally produced in its entirety, not collaborating with others on assignments and projects that are not specifically designed as collaborative efforts, and learning how to acknowledge properly all sources we may use in our written work. The latter includes not only proper documentation style for direct citations, but also references when we paraphrase sources and acknowledgements when we employ or develop ideas we have found in the work of others. These practices apply to sources of any type, from books to newspapers, from lectures to materials available on the Internet, and so on.

Learn@UW

All students in the class are automatically registered for this course on Learn@UW. When you log on to Learn@UW and access the site for this course, you will find all course documents (including this syllabus and the course assignments). Please familiarize yourselves with the course site, and let me know if you encounter any problems accessing it or the materials.

Course Schedule:

UNIT I: Glimpses into the Atomic Age

Week 1 (1/23): Introduction

Week 2 (1/28; 1/30): The Atomic Age Imagined

Since the Curies' discovery of radioactive power, the scientific and popular understanding of this phenomenon anticipated the Atomic Age to come. How did the power of imagination shape the understanding and orientation of atomic sciences?

Weart, 22-31.

Rediness, 52-75, 152-161.

Frederick Soddy, *Interpretation of Radium* (1908), pp. ix-xi, 1-8, 228-233, 245-250.

H.G. Wells, "The World Set Free" (1914), Chapter 1, Section 3; Chapter 2, Sections 1, 3, 4, and 5. (<http://www.gutenberg.org/files/1059/1059-h/1059-h.htm>)

Week 3 (2/4; 2/6): Racing for the Bomb—The Community of Atomic Physicists, One and Divisible

Atomic physicists during the age of discoveries (1930s-1950s) formed one of the most cosmopolitan scientific communities. How did the mobilization of atomic physics for the Bomb during the Second World War reshape the political status and ethical outlooks of atomic physicists?

Weart, 45-54

Rediness, 164-185

Andrew Rotter, *Hiroshima* (2009), 148-161

Jeremy Bernstein ed., *Hitler's Uranium Club*, 2nd edition (2000), 1-3.

Fryolov's letter to Stalin, April 1942

Check the website's links to the following documents:

Einstein's letter to Roosevelt, 1939

Frisch-Peierls Memorandum, 1940

Niels Bohr's memo to Roosevelt, 1944

Scientists' Petition to Roosevelt, 1945

2/6: We will visit Ebling Library's "Fallout" Exhibition. Please meet at the front of the library by 3:40.

Week 4 (2/11; 2/20): Early Reactions to the Bomb

News from Hiroshima and Nagasaki shook the world, but reactions to the Bomb varied to a surprising degree. This lecture will touch on the onset of nuclear arms race, the blooming of the atomic culture, and the mobilization of social sciences, all representing the different dimensions of the Bomb's shockwaves upon society.

Weart, 55-64

Norman Cousins, "Modern Man Is Obsolete," *Saturday Literature Review* (August 17, 1945).

Bernard Brodie, "The Absolute Weapon" (1946), 70-77.

General Advisory Committee's report on the hydrogen bomb, October 30, 1949.

Edward Teller's Testimony in the hearings for Oppenheimer's security clearance.

On 2/20: We will discuss the readings of both Week 3 and Week 4.

UNIT II: Atoms for War

Week 5 (2/18; 2/20): Security, Espionage, and Scientists

Atomic scientists, whose knowledge became a new source of power in the Atomic Age, became an object of political detention, protection and persecution. How did the scientists respond to their changing fortunes?

Weart, 64-69

Jessica Wang, "Science, Security, and the Cold War: The Case of E.U. Condon," *Isis* 83, no. 2 (1992): 238-269.

Klaus Fuchs' statement (1950)

Part of the transcript of J. Robert Oppenheimer's security clearance hearing (1954)

Week 6 (2/25; 2/27): Civil Defense and Nuclear Survival

First Essay (on Unit I) Due on 2/25

The Atomic Age put into question the very definition of survival—what do we mean by "winning" and "surviving" a nuclear war?

Weart, 70-75, 147-150

Sarah A. Lichtman, "Do-It-Yourself Security: Safety, Gender, and the Home Fallout Shelter in Cold War America," *Journal of Design History* 19, no. 1 (2006): 39-55.

Life magazine (September 1961)

Week 7 (3/4; 3/6): Scientists and the Nuclear Arms Race

In the course of the nuclear arms race, some scientists found themselves in the corridors of power as science advisers, while others organized themselves as citizen activists. What were opportunities, dangers, and limits in this new role for scientists as political insiders and outsiders?

Edward Teller, *Better a Shield Than a Sword*, 3-11

Ralph Lapp, *Arms Beyond Doubt*, 173-193.

Watch portion of Sidney Lumet's *Fail-Safe* (1964; 2000):

7:00-10:25; 14:00-39:40; 48:20-49:20; 57:20-1:00:30; 1:13:30-1:14:40; 1:16:00 to the end

Watch portion of Stanley Kubrick's *Dr. Strangelove* (1964):

24:15 to 54:00; 1:13:20 to the end

UNIT III: Atoms for Peace

Week 8 (3/11; 3/13): Atoms for Peace

The Atomic Age began with the fear of the Bomb, but atomic piles promised the future with unlimited energy supplies for medical, industrial, and scientific purposes. We will closely scrutinize the origin of this "peaceful" atom against the shadow of the military atom.

Weart, 79-95

Check the website's links to the following documents:

Newsclipping, Washington Post, "Eisenhower Pushes Operation Candor."

Memorandum of Conversation regarding Bermuda Meeting.

Press Release, "Atoms for Peace" Speech.

Watch Walt Disney's film, *Our Friend the Atom* (1957) at Youtube.

Week 9 (3/18; 3/20): "Stuff Happens"—Nuclear Accidents

Second Essay on Unit II Due on 3/18

The Atomic Age turned our world into the late-modern "risk society," where the production, distribution, and management of low-probability, high-impact risks shape our social role,

outlook, and identity. We will discuss how risk sciences came into being through the cases of TMI and Fukushima.

Weart, 162-180

Charles Perrow, *Normal Accident*, 3-12, 15-31.

Andrew Hopkins, "Was Three Mile Island a 'Normal Accident'?" *Journal of Contingencies and Crisis Management* 9, no. 2 (2001): 65-72.

Week 10 (4/1; 4/3): Movement against Nuclear Power Reactors

Weart, 184-195, 203-209

Gary L. Downey, "Reproducing Cultural Identity in Negotiating Nuclear Power: The Union of Concerned Scientists and Emergency Core Cooling," *Social Studies of Science* 18, no. 2 (1988): 231-264.

UNIT IV: Sciences in the Atomic Age

Week 11 (4/8; 4/10): Weapons Laboratory

Hugh Gusterson, *Nuclear Rites* (1996), 38-67, 131-164.

Week 12 (4/15; 4/17): Medical sciences

The Atomic Age brought in new research objects and tools for biomedical, earth, and environmental scientists, but also raised serious questions about politics and ethics behind such research.

We will have Prof. Susan Lederer, a former member of the presidential commission on human radiation experiments, as our guest speaker. The readings for his week will be announced later.

Week 13 (4/22; 4/24): Earth and environmental sciences

Joseph Masco, "Bad Weather: On Planetary Crisis," *Social Studies of Science* 40, no. 1 (2010): 7-40.

UNIT V: Conclusion

Week 14 (4/29; 5/1): Coming to Terms with the Past

An heritage of the Atomic Age is an irreconcilable clash of memories about nuclear disasters such as atomic bombing in Hiroshima and reactor accident in Chernobyl. This week will

detail the differing modes of remembering these events and explain why this difference took place and has reproduced itself.

Martin J. Sherwin, "Hiroshima as Politics and History," *The Journal of American History* 82, no. 3 (1995): 1085-1093.

One reading about the aftermath of Chernobyl [to be announced]

Week 15 (5/6; 5/8): Conclusion

Final paper due on 5/13

