# NE290D: Special Topics in Nuclear History, Politics, and Futures
## Introduction, Exposition, and Awful Icebreakers

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January 19, 2021 – W1L1

## Agenda

1. Introduction to course. Review the syllabus.
2. Icebreakers.
3. Introduction of tools for NE290D
4. Assignment of first readings.

## W1L1 Learning Outcomes

1. Describe the pedagogical intent of the NE290D course as a whole
2. Describe their own reasons for taking the NE290D course
3. Count, Identify, and Recognize the other students in the NE290D course
4. Explain the importance of Nuclear history in a preliminary sense
5. Paraphrase the tentative syllabus for the NE290 course and conclude if they are interested in attending
6. Demonstrate their understanding of what is expected in terms of work/participation in NE290D and assess if they are interested in attending

## Logistics

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| **Instructors**[a]**:** | Aaron Berliner<br>Jake Hecla<br>Peter Hosemann | **Time:** | Tue/Thu 3:30-5:00 PM<br>(1.5hr,2x/week) |
| **Email:** | aaron.berliner@berkeley.edu<br>jake_hecla@berkeley.edu<br>peterh@berkeley.edu | **Place:** | Zoom |

[a] Office Hours by Request and via Zoom

## Course Description

This course provides an overview of the history of nuclear energy and its interaction with society. It seeks to contextualize the importance of the field at its inception, in current affairs, and in future endeavors. Understanding this history is paramount in internalizing a sense of respect for the fruits of an unlocked atom, as well as its perils.

# Syllabus

## Course Description

This class will focus on the history of key developments in the nuclear field, especially those with exceptional relevance to current affairs. Topics include:

1. Nuclear prehistory in terms of the complex interactions and personal/professional politics of the 20th century physics community
2. General relativity and its impact on nuclear history
3. The early Manhattan project and downstream trial of Oppenheimer
4. Hiroshima and Nagasaki and the morality of first use of weapons
5. Establishment of Nuclear Advisory Committee and the beginning of the scientist as American hero
6. Fermi and the Nuclear Pile
7. Manhattan Project -von Neumann Computing then and now
8. Frenemies -Implications of Exclusion of the Soviets
9. Soviet Bomb Project
10. RAND (Wohlstedder–bombing study)
11. The Super -Teller, Ulam
12. Thermonuclear weapons physics–from layer cake to T-U
13. Morality/policy objections to the super
14. Nuclear Strategy in the Late Cold War
15. Nuclear Winter and ARGUS
16. The Growth of Nuclear Proliferation Networks
17. Rogue States and Nuclear Weapons in the Early 21st Century

## Course Description

As this course is focused on the history of a technical topic, it will have a large quantity of reading and a small quantity of math. Readings and high-level lectures from the instructional team will be augmented by deep-dive lectures delivered by subject matter experts from academia, think tanks, and other non-governmental organizations.

## Readings

- Readings for the course will be are described in the initial timeline following this basic syllabus.
- The readings are broken down by week and lecture to help paint a picture for the class direction throughout the semester.
- All students are expected to have an understanding of all of the readings.
- The syllabus will be updated frequently.

## Assignments and Grading

The class will be graded based on the following:

- Weekly Reading & Guest Responses/ Miro Content Additions 30%
- Class Participation 20%
- Term Paper 50%

Students will be expected to provide a thoughtful, weekly response of $\sim$1 page to the reading materials.

## Reading & Guest Lecture Responses

- We have prepared readings and other media and provide the materials to you.
  - Also sourced some fantastic guest lecturers.
- Prompt will be posted at the end of each class and due the following day.
- May be as simple as a free write; other times a specific question will be levied.

## Assignment

Please write a thoughtful $\frac{1}{2}$-1 page response and submit to bCourses. The responses will be public, unless you ask they not be. We will be placing the responses in Miro on our class timeline to illustrate the meta-relationship between the historical timeline and the class learning timeline.

## Miro Content Additions

- We have prepared an interactive Miro board across which we will all be posting materials and adding comments and suggestions.
- Additionally we have prepared an immersive Gather.Town environment to bring history to life.

## Assignment

Please add content to Miro that you feel brings the history to life. Examples of content are:

- • Links to important primary historical sources, technical articles, other media
- Gather.Town suggestions for tiles, objects, illustrations that improve the immersive learning environment
- Homemade Gather.Town content (this is the high bar)

## Attendance and Participation

- Obviously since class participation accounts for 25% of your grade, attendance should be considered mandatory.
- This class is meant to serve as a reprieve from the Nuclear Engineering department's didactic style of pedagogy; **we want you to come prepared to answer and – more importantly – ask questions**
- If you cannot attend a session because of an emergency and you notify the instructor the day before class, or provide some evidence of the emergency afterward.
- If you cannot make the zoom-time, time can be arranged to meet with instructors to ensure a sufficient participation score!

## Academic Dishonesty & Plagiarism

- As a student at Cal, you are responsible for knowing and abiding by the Student Code of Conduct (available online at `http://students.berkeley.edu/uga/conduct.asp`.
- All work submitted by you and that bears your name is presumed to be your own, original work.
- Using words or ideas that are not your own without attributing them, whether in your papers or in-class writing assignments is unacceptable.
- If you are unsure of the expectations for completing an assignment, just ask before you turn in your work! We are more than happy to discuss these matters with you.

## Inclusivity and a Safe Environment

- Every student has the right to learn, regardless of race, color, religion, creed, sex, sexual orientation, gender identity, national origin, ancestry, age, veteran status, disability, genetic information, military service, or other protected status.
- The teaching team will always strive to make every student feel welcome and safe in the learning environment.
- All students will treat each other with respect and abide by the UC Berkeley Student Code of Conduct (`http://sa.berkeley.edu/code-of-conduct`). The teaching team will not tolerate behavior that creates a hostile or unsafe learning environment for any of the students.

## Sexual Violence and Harassment

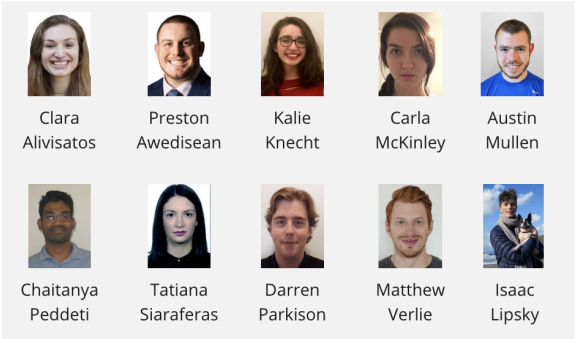
- The teaching team will not tolerate behavior that creates a hostile or unsafe environment for any of the students.
- The teaching team is legally required to report Title IX violations (such as sexual violence and harassment) to the Office of Prevention of Harassment and Discrimination.
- Students that have been the victim of sexual harassment or violence should consult the resources in the syllabus.

# Introductions and Icebreakers

## Brace Yourself For the Fun

Tell us your...

1. Name
2. Year
3. Program
4. 30 Seconds Research Pitch
5. What you want to get out of NE290D



# Objectives for NE290D

## Course Outcomes

1. Understand and appreciate the complex historical basis for 20th century physics
2. Understand and appreciate the complex historical basis for nuclear armament
3. Understand and appreciate the landmark players that shaped the nuclear engineering communities
4. Understand and appreciate the persistent problems in nuclear policy and engineering from a historical perspective
5. Understand and appreciate the impact of nuclear physics on international relations and world affairs

## ABET Outcomes

1. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
2. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
3. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

# Tools for NE290D


# Assignment of First Readings

## Required

- *Faust in Copenhagen* (FiC) Chapters 1,2
- Robison, R. F., and R. F. Mould. "St. Joachimstal: pitchblende, uranium and radon-induced lung cancer." Nowotwory 56.3 (2006): 275-281.

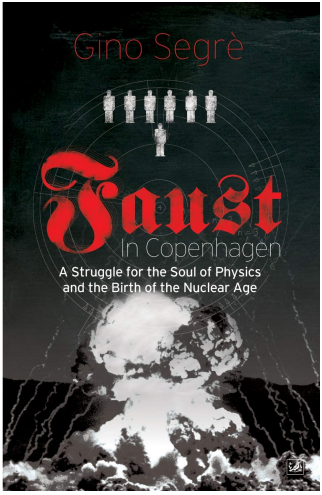
## Optional

- *Atomic Accidents* Chapter 1
- Ferri, Giovanni Maria, et al. "Estimates of the Lung Cancer Cases Attributable to Radon in Municipalities of Two Apulia Provinces (Italy) and Assessment of Main Exposure Determinants." *International journal of environmental research and public health* 15.6 (2018): 1294.

# Assignment of First Readings

## *Faust in Copenhagen* by Segrè

*A physicist himself, Gino Segrè writes about what scientists do and why they do it with intimacy, clarity, and passion. In Faust in Copenhagen, he evokes the fleeting, magical moment when physics? and the world was about to lose its innocence forever. Known by physicists as the miracle year, 1932 saw the discovery of the neutron and antimatter, as well as the first artificially induced nuclear transmutations. However, while scientists celebrated these momentous discoveries which presaged the nuclear era and the emergence of big science during a meeting at Niels Bohr's Copenhagen Institute, Europe was moving inexorably toward totalitarianism and war.*



# Assignment of First Readings

## *Faust* by Goethe

- Faust is bored so he summons the devil, Mephistopheles, so he can learn more magic and impress the ladies.
- After Mephistopheles turns himself into a poodle and back for kicks, they strike a deal: Mephistopheles will serve Faust until Faust dies or admits he wants to call it quits. In exchange, Mephistopheles will claim Faust's soul for Hell.
- Its a buddy comedy with a tragic end in the first act and an uplifting message at the finish.