

PHILOSOPHY OF EXPERIMENTS

Instructor: Jamee Elder

Email: jamee.elder@tufts.edu

Office: 221B Miner Hall

Office Hours: Thursday 10:30am-12:30pm

Semester: Spring 2026

Time: Tuesday 9:00-11:30

Room: Packard Hall Conference Room

Course Website: Canvas

This syllabus was last updated January 19, 2026

Course Description

This class will explore how experiments generate knowledge, focusing on their evolving role across the natural and social sciences. Once treated as mere tools for testing theory, experiments are now understood as complex epistemic practices shaped by instruments, models, values, and disciplinary norms. We will examine foundational issues such as the distinction between observation and experiment, the theory-ladenness of observation, and the roles of replication, error, and statistical inference. Students will engage with philosophical texts and real-world case studies to assess how experimental practices constrain theory, support inference, and shape scientific understanding across diverse domains.

1 Learning Outcomes

By the end of this course you will:

- Have a firm grounding in the contemporary literature concerning scientific experiments.
- Be able to articulate nuanced views about how experiments, data, models, and theory inter-relate.
- Have strengthened your independent research skills by producing a research paper.

2 Text(s)

There are **no required textbooks**. All required course readings will be uploaded to **Canvas** or will be freely available online.

In some cases, you may need to use your Tufts credentials to access something through the Tufts library. Please feel free to ask me if you need help accessing any of the readings.

3 Course Requirements

All written assignments should be submitted via Canvas.

3.1 Summary of Assignments:

Assignment:	Percentage:
Participation:	25%
Presentation on Readings:	15%
Presentation on Final Paper:	15%
Final Paper:	45%

Attendance and Participation (25%):

You should plan to attend every class but I understand that extenuating circumstances can arise that make this difficult. If you have to miss a class, please contact me so that we can come up with a plan for you to catch up on what you missed.

Students are expected to carefully study all required readings for each week and come prepared to discuss them, raise questions about them, and draw attention to their strengths and weaknesses.

Presentation on Readings (15%)

All registered students will sign-up to present on the readings for one week of class. In the first few (~10) minutes of class you will present the main argument and key issues contained in the assigned readings and raise questions for discussion.

Presentation on Final Paper (15%)

The final two class sessions will be allotted for presentations in which each student will present (using slides, a handout, poster, etc.) on their work to date on the final paper. In these presentations, you should (where possible) give a statement of the central question under investigation and some context for why this question is important; an indication of what literature there already is on the topic and what you intend to focus on/add to the existing literature. If you are far enough along you should also offer a statement of their thesis and central argument.

Final Paper (45%)

You will write a final paper (approx. 3000-4000 words). The topic should relate directly to issues considered in the course. Your paper should be detailed and highly focused. Considering an argument for or against a specific thesis, and/or adjudicating a specific debate between two or three authors in the literature, is better than a sweeping or general treatment of a large issue involving many arguments or people. You are strongly encouraged to meet with me individually to discuss your topic.

3.2 Letter Grade Conversion

≥ 93.00	A	73.00 - 76.99	C
90.00 - 92.99	A-	70.00 - 72.99	C-
87.00 - 89.99	B+	67.00 - 69.99	D+
83.00 - 86.99	B	63.00 - 66.99	D
80.00 - 82.99	B-	60.00 - 62.99	D-
77.00 - 79.99	C+	≤ 59.99	F

What do these grades mean?

In this class, work in the A range must be clear, accurate and insightful, both in the interpretation of other texts and in their arguments for original claims. (Note: A final grade of A+ will be given rarely, and only for consistently exceptional work). Work in the B range is good work that is mostly clear, accurate, and may offer good analysis that lacks the original insight of an A paper. Work in the C range is satisfactory work that may be unclear in places, contain inaccuracies, or lack original analysis. Assignments in the D range may be incomplete, or deficient in clarity and accuracy.

4 Course Outline

This schedule is flexible and subject to change (e.g., if we want to spend more time on a particular topic, I will adjust accordingly). The current version of this document will always be available on Canvas.

4.1 Topic Overview

*** On March 10th we will have a special guest lecturer, Prof. Miguel Ohnesorge from Boston University.

Week	Date	Topic
Week 1	20 January	Introduction: philosophy of experiments
Week 2	27 January	"New Experimentalism"
Week 3	3 February	Epistemic challenges of physics experiments
Week 4	10 February	Data omission and filtering
Week 5	17 February	!!!
Week 6	24 February	Modelling measurement
Week 7	3 March	No class (JE at Conference)
Week 8	10 March	Measurement in seismology ***
Spring Break		
Week 9	24 March	Historical and observational science I
Week 10	31 March	Historical and observational science II
Week 11	7 April	Are observations (as good as) experiments?
Week 12	14 April	TBA: Student choice!
Week 13	21 April	<i>Presentations on research papers</i>

4.2 Reading Schedule

Week	Topic	Readings
Week 1	Introduction: philosophy of experiments	Galison (1987) Ch1 -
Week 2	"New Experimentalism"	Cartwright (1983) Essay 7 Hacking (1981/5)
Week 3	Epistemic challenges of physics experiments	Boyd (2021) Ch1-2 Chang (2004) Ch2
Week 4	Data omission and filtering	Boyd Ch3 Bokulich (2020)
Week 5	Epistemic strategies: calibration	Boyd Ch4 Tal (2017a) [Calibration]
Week 6	Modelling measurement	Tal (2017b) [Model-based] Ohnesorge (2023)
Week 7	No class (JE at Conference)	- -
Week 8	Measurement in seismology ***	Ohnesorge (forthcoming) Miyake (2022)
Spring Break		
Week 9	Historical and observational science I	De Baerdemaeker (2025) Ch1-4 Currie (2018) Ch1
Week 10	Historical and observational science II	De Baerdemaeker Ch5-7 Yao (2023)
Week 11	Are observations as good as experiments?	Currie and Levy (2019) Boyd and Matthiessen (2024)
Week 12	TBA: Student choice!	TBA TBA
Week 13	<i>Presentations</i>	- -

5 Course Policies

5.1 Late or Incomplete Work

Please let me know as soon as possible (and ideally before the deadline) if you know that you will struggle to meet a deadline. When you do, we can determine a reasonable timeline for you to complete the assignment or, under some circumstances, an alternative way for you to demonstrate your learning.

Late work without such an extension will be penalized by 1/3 of a letter grade per day (so, e.g., an A- handed in one day late would become a B+).

6 Other Policies and Resources

6.1 Tufts Academic Resources

The StAAR Center offers a variety of FREE resources, available to *all students*. Students may make an appointment to work on any writing-related project or assignment, attend subject tutoring in a variety of disciplines, or meet with an academic coach to hone fundamental academic skills like time management or overcoming procrastination. Students can make an appointment for any of these services by visiting go.tufts.edu/TutorFinder, or by visiting their website: <https://students.tufts.edu/staar-center>

6.2 Accommodations

Tufts is committed to providing equal access and support to all qualified students through the provision of reasonable accommodations. If you have a disability that requires reasonable accommodations, you are encouraged to contact the StAAR Center at:

- StaarCenter@tufts.edu or
- 617-627-4539.

Please be aware that accommodations cannot be enacted retroactively, making timeliness a critical aspect for their provision.

In addition, students with or without a formally documented disability are warmly encouraged to contact me about accommodations. I am committed to collaborating with students to ensure that my course does not present unreasonable or inequitable barriers to their success.

6.3 Religious Accommodations

Tufts University faculty, staff, and administration highly value and acknowledge the religious diversity of its student body. Students seeking religious accommodations related to their holy days are encouraged to collaborate with faculty to make arrangements during the first week of each semester. The religious holy days calendar, including the holy days policy from the Faculty Handbook, is available [here](#) for your reference. Students seeking additional support may refer to the University Religious Accommodations Policy, available [here](#). The University Chaplaincy is also available to respond to questions on religious observances; their contact information is available [here](#).

6.4 Academic Integrity

All members of the Tufts community are responsible for integrity in their own behavior and for contributing to an overall environment of integrity at the university. You can find resources relating to academic integrity in the Tufts Academic Integrity handbook ([click here](#)). It is your responsibility to familiarize yourself with the requirements of ethical behavior and academic work as described in Tufts' Academic Integrity handbook.

If you ever have a question about the expectations concerning a particular assignment or project in this course, please ask me for clarification.

The Faculty of the School of Arts and Sciences and the School of Engineering are required to report suspected cases of academic integrity violations to the Dean of Student Affairs Office. If I suspect that you have cheated or plagiarized in this class, I must report the situation to the dean.

6.5 Guidelines for the use of AI

In this course, you may use AI tools for your learning, just as you can collaborate with your peers for things such as brainstorming, getting feedback, revising, or editing of your own work. However, you may not submit any work generated by an AI program as your own. This is a violation of Tufts Academic Integrity policies.

To help guide you in the use of AI in this course – consider the following guidelines:

- Familiarize yourself with AI tools, including that: Bias is embedded in the creation of these systems and in their output and you may encounter harmful language and ideas. AI platforms can produce inaccurate or false information with confidence (so called hallucinations, e.g, it frequently invent false references). Text from AI may closely mimic human knowledge, understanding and even human emotions. Many of these tools retain the rights to use your information and the content shared with them in a variety of ways.
- Cite all AI tools when used or referred to in assigned work. See **How to Cite ChatGPT** from the APA & **How to Cite Generative AI** from the MLA. Identify the way it contributed to your work. For example, you can include a statement that you asked an AI to “identify any grammatical or spelling errors” in your writing, or you used it to get started in thinking about topics for your paper. Any statement directly generated by an AI system should be in quotes.
- If you have questions please ask via email, in office hours or during class.

6.6 Student Support, Including Mental Health

As a student, there may be times when personal stressors or difficulties interfere with your academic performance or well-being. **The Dean of Student Affairs Office** offers support and care to undergraduates and graduate students who are experiencing difficulties, and can also aid faculty in their work with students. In addition, through **Tufts’ Counseling and Mental Health Service (CMHS)** students can access mental health support 24/7, and they can provide information on additional resources. CMHS also provides confidential consultation, brief counseling, and urgent care at no cost for all Tufts undergraduates as well as for graduate students who have paid the student health fee. To make an appointment, call 617-627-3360. Please visit the CMHS website: <http://go.tufts.edu/Counseling> to learn more about their services and resources.

7 Other Resources

7.1 The Stanford Encyclopedia of Philosophy

Find it online here: <https://plato.stanford.edu/>

The SEP is a good place to start when learning about a new philosophical topic. The SEP entries are written by experts in that area and generally provide a good overview of the issues.

A good next step is often to follow up by reading the sources that the SEP entry sites on a particular issue.

7.2 Writing Philosophy Papers

- Jim Pryor's guide to philosophical writing:
<http://www.jimpryor.net/teaching/guidelines/writing.html>
- Harvard guide to writing philosophy papers:
https://philosophy.fas.harvard.edu/files/phildept/files/brief_guide_to_writing_philosophy_paper.pdf