

PHIL 24: Science and Pseudoscience

Summer Session I 2025

Instructor Information

[Shelly Shi](#)

Office: RWAC 0436

Email: ysis007@ucsd.edu

Office Hours: M 2:00-4:00pm

Teaching Assistant

Patricio Avila Cardenas

Office: RWAC 0438

Email: pavilacardenas@ucsd.edu

Office Hours: MW 10:00-11:00am

Class Information

Dates: June 30 – August 02

Time: MW 11:00 am – 1:50 pm

Classroom: RWAC 0474

Course Description

Why do some people believe in Bigfoot, crystal healing, or red-light therapy, and others in miracle cures and miracle diets? What distinguishes science from pseudoscience? This course begins with classic cases of pseudoscientific belief, from homeopathy to conspiracy theories, and moves on to more consequential issues like climate change denial, vaccine misinformation, and public skepticism toward mainstream medicine.

But our goal isn't just to laugh at bad ideas. We'll ask deeper questions: Should science be trusted? What does the reproducibility crisis reveal about the scientific method? How do corporate interests – like those of Big Pharma or fossil fuel companies – shape what gets published, funded, or believed? And how should non-experts evaluate scientific claims in a world of information overload?

Along the way, we'll explore philosophical tools for evaluating evidence, identifying cognitive biases, and distinguishing reliable authority from manufactured doubt. You'll be invited to investigate real-world claims and develop your own criteria for separating legitimate inquiry from bullshit. BS or not BS, that is the question.

Reading

Required Text (please purchase a copy of the following book):

- [Bad Science: Quacks, Hacks, and Big Pharma Flacks by Ben Goldacre](#)

All other required readings will be provided electronically via Canvas. Materials will be organized chronologically, with two modules per week corresponding to our class meetings.

Recommended (but not required) Texts:

- [Carl Bergstrom and Jevin West, Calling Bullshit: The Art of Skepticism in a Data-Driven World](#)
- [Michael Gordin, On the Fringe: Where Science Meets Pseudoscience](#)
- [Naomi Oreskes and Erik Conway, Merchants of Doubt](#)

Class Format and Environment

Come to class prepared. This means completing the assigned readings *before* class and being ready to discuss them. Before each class session (by 11:00 a.m. on Mondays and Wednesdays), you'll submit a brief response on the discussion board based on the readings. There are eight total discussion posts; the first and final class sessions are excluded.

Many topics we'll cover – like ghosts, homeopathy etc. – can be controversial. You may disagree with your classmates or the instructor, and that's fine. What matters is sticking to evidence and clear reasoning. Keep the focus on arguments, not people. Disagreement is welcome; disrespect is not.

Attend every class, arrive on time, and participate. You are allowed one unexcused absence from lecture and one from discussion section. For any other absence, notify the instructor in advance and provide documentation if requested. You're responsible for all missed material and announcements.

The use of laptops, smartphones, iPads, etc. is prohibited unless used for note-taking or reading class assignments.

Grading

The course grade is determined by the following components:

Attendance & Participation	10%
Discussion Board	16% (8 × 2%)
Short Assignments	34% (2 × 7% + 2 × 10%)
• Quiz 1	7%
• Quiz 2	7%
• Pharmacy project*	10%
• Dark Influences project*	10%
Debunking Project	20%
Final Exam	20%

Fine Print

All work you submit – homework, projects, and other assignments – must be your own and properly acknowledge all sources. This includes books, articles, websites, AI tools, and conversations with classmates. You may not closely paraphrase or copy the work of others. If you're unsure whether something constitutes plagiarism, ask me before submitting.

Academic dishonesty, including plagiarism (using someone else's ideas or wording without proper credit), will be reported to the Academic Integrity Office. By enrolling in this course, you agree that your written work may be submitted to Turnitin.com for plagiarism review. Submitted work will be stored in Turnitin's database solely for plagiarism detection.

You are expected to follow UCSD's Policy on Academic Integrity, available at: <https://academicintegrity.ucsd.edu/process/policy.html>

Late work will be accepted, but penalized 5% per day.

Tentative Schedule, Topics and Readings

1. Bigfoot, Detox, Dowsing

Required: Radford, Bigfoot at 50; Goldacre, Chapter 1

2. Homeopathy, Placebo, Alternative Medicine

Required: Goldacre, Chapter 4 and 5; Oreske, Systematicity is Necessary but not Sufficient: On the Problem of Facsimile Science (intro, plus section on homeopathy)

Further: Mukerji and Ernst (2022), Why Homeopathy is Pseudoscience

Watch*: Tell Them You Love Me (documentary)

3. Falsifiability and Demarcation

Required: Popper (1962), Conjectures and Refutations; Strevens, The Knowledge Machine, Chapter 1

Further: Laudan (1983), The Demise of the Demarcation Problem

Assignment: Pharmacy project

4. Conspiracies: Anti-Vaxx, Flat Earthers

Required: Goldacre, The MMR Hoax, Chapter 12; Blume and Geesink (2000), A Brief History of Polio Vaccines

Further: North, The Long Strange History of Anti-Vaccination Movements; Kahan et al. (2017) Culturally antagonistic memes and the Zika virus: an experimental test

Watch*: Behind the Curve (documentary)

Quiz 1

5. Experimental Design and Biases

Required: Freeman, Pisani, Purves, Statistics, Chapter 1 & 2; Cartwright (2011), A philosopher's view of the long road from RCTs to effectiveness

6. Causation vs. Correlation

Required: Goldacre, chapters 6,7; Aschwanden, You Can't Trust What You Read About Nutrition

7. Is Science Broken I: Funding, Peer Review, Replication Crisis

Required: Richie, Science Fictions, Chapter 1,2; Callender (2022), Fossil Fuel Money is Warping Climate Research; Aschwanden (2015), Science Isn't Broken: It's Just a Hell of a Lot Harder Than We Give it Credit For.

Quiz 2

Assignment: Dark Influence

8. Is Science Broken II: Merchants of Doubts

Required: Richie, Science Fictions, Chapter 3,4; Cook, Supran, Lewandowsky, Oreskes, Maibach, America Misled; Lamb et al. (2020), Discourses of climate delay

Watch*: Merchants of Doubts (documentary)

9. Big Pharma, Inductive risks and feminist epistemology

Required: Goldacre, Chapter 9; Douglas (2000), Inductive Risk and Values in Science

Further: Goldenberg, A Feminist Take on Vaccine Hesitancy

10. Final Presentation and Review

The Debunking Project consists of multiple assignments: a 10-minute in-class presentation (10%), a written report (8%), comments on another presentation (2%)

Resources

These topics are widely discussed in books, articles, and online. Some sources are unreliable, but others are useful. The websites below may help.

sciencebasedmedicine.org

callingbullshit.org

www.nbtiller.com/skepticism

skepticalinquirer.org

www.theskepticsguide.org

www.skeptic.com

www.quackwatch.com

www.randi.org (defunct, but solid education modules)

desmog.com (for dark money)