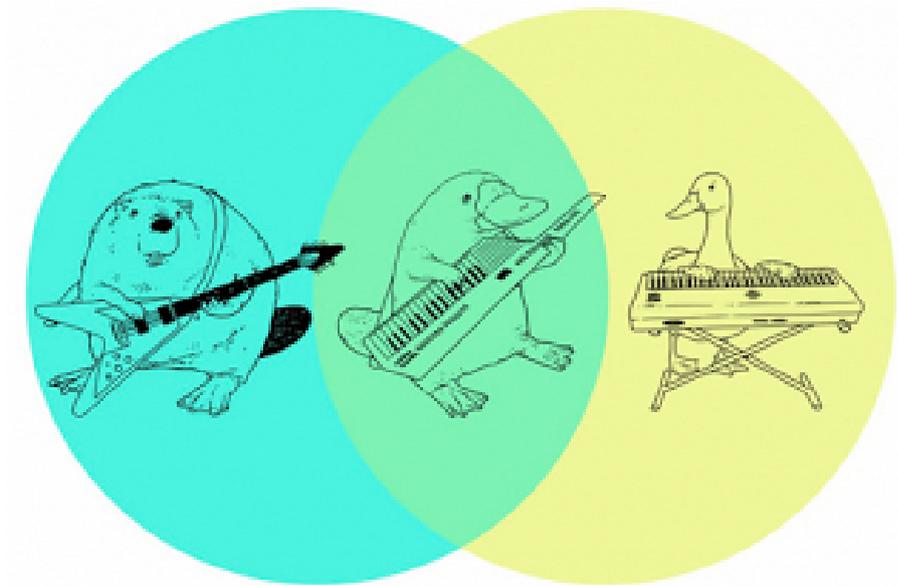


PHIL 209A / SOCG 255A / HIGR 238 / COGR 225A

INTRO TO SCIENCE STUDIES I



Fall 2017

Instructor: Kerry McKenzie

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Seminars: Tuesday 9.30-12.20pm, HSS 3027.

Office Hours: Wednesday 2-4pm, HSS 8088.

Overview.

This course is a philosophically slanted introduction to Science Studies. Our central question is a conceptual one, whose relevance to Science Studies should speak for itself – namely, *what is science*, and what distinguishes science from other fields? In grappling with this question we'll familiarize ourselves with central works in the philosophy of science canon, and make glancing acquaintance with some more contemporary issues in scientific epistemology and metaphysics. But our guiding motif is a normative one: what, if anything, makes science entitled to the privileged status that it enjoys within culture?

In more detail.

The 'question of demarcation' – that of what, if anything, makes what we call 'science' *science* – was a central preoccupation of many of the major 20th century philosophers of science. While interest in this topic waned after the appearance of Larry Laudan's 'Demise of the Demarcation Problem' in 1983, the question of what separates science from 'pseudoscience' is now making something of a comeback. In this course, we will review the approaches to demarcation offered by the philosophers Popper, Kuhn, and Lakatos – all of which serve as concise introductions to the dominant themes of their work as a whole – and then examine some more contemporary approaches more centred on pragmatics and the philosophy of language. We will then consider how homeopathy – for most a pseudoscience *par excellence* – fares with regard to the criteria we'll have studied. In the process, we'll acquaint ourselves with some fundamentals of scientific inference, including the rationale for the causal inferences that constitute the centrepiece of 'evidence-based medicine' (EBM). We'll also examine the claim, made by some anthropologists, that the methods of EBM are in principle inapplicable to homeopathy given the latter's commitment to a non-reductive, non-Western and holistic 'medical metaphysics'. We close by thinking about the origin of the recent 'replication crisis' that has brought much of what seemed to be *bone fide* science, including EBM, into disrepute, and confront its implications for the contemporary demarcation question.

Syllabus.

1. Oct 3rd. Welcome and Overview.

- Ruse: 'Creation Science is Not Science' (1982)
- Laudan: 'Science at the bar: causes for concern' (1982).
- Blog post:
<https://blogs.scientificamerican.com/cross-check/dear-skeptics-bash-homeopathy-and-bigfoot-less-mammograms-and-war-more/>
(2016)

2. Oct 10th. Popper's Falsificationism and the Duhem-Quine Problem. On falsification:

- Popper, 'Science: Conjectures and Refutations' (1963);
- Duhem, 'An Experiment in Physics Can Never Condemn an Isolated Hypothesis But Only a Whole Theoretical Group' (1914).
- Gillies, 'The Duhem Thesis and the Quine Thesis' (excerpt) .

On verisimilitude:

- Popper, 'Truth, Rationality, and the Growth of Scientific Knowledge', I-III, IX-X.
- Newton-Smith, 'Popper: The Irrational Rationalist', section 4, 'Verisimilitude' (in *The Rationality of Science*).
- Optional: Newton-Smith, 'The Rationality of Science', chapter III (on request).

3. Oct 17th. Kuhn: Paradigms and Progress.

- Kuhn, 'Progress Through Revolutions' (1962)
- Kuhn, 'Logic of Discovery or Psychology of Research?' (1970)
- Feyerabend, 'Consolations for the Specialist', Secs. 1-3. (1970)
- Optional: Kuhn, *The Structure of Scientific Revolutions*, chapters 1-8 (on request).

4. Oct 24th. Lakatos and Thagard.

- Lakatos, 'Science and Pseudoscience'. (1973)
- Lakatos, 'Falsification and the Methodology of Scientific Research Programmes' (sections) (1970).
- Thagard, 'Why Astrology is a Pseudoscience' (1978).

5. Oct 31st. Laudan and the Demise of Demarcation.

- Laudan, 'The Demise of the Demarcation Problem' (1983).
- Theories of evidence: an introduction to Bayesianism.

- Handout on simple applications of Bayes' theorem.
- Howson and Urbach, *Scientific Reasoning: A Bayesian Approach*, chapter 4.

6. Nov 7th. Pragmatic Approaches.

- Handout: Some background on the 'species problem', covering Mill; Kitcher & Dupré; Ereshefsky.
- Stanford, 'For Pluralism and Against Realism About Species' (1995).
- Ereshefsky, 'Species Pluralism and Anti-Realism' (1998).
- Resnik, 'A Pragmatic Approach to the Demarcation Problem' (1998).
- Reisch, 'Pluralism, Logical Empiricism, and the Problem of Pseudoscience' (2000)

7. Nov 14th. Pseudoscience as Bullshit.

- Ladyman, 'Toward a Demarcation of Science from Pseudoscience' (2015)
- Cohen, 'Complete Bullshit' (2002)
- Handout on homeopathy.
- Excerpts of Vithoulkas, *The Science of Homeopathy* (1980).
- van Galen, 'Homeopathy and morphic resonance' (1994) .
- Optional: Frankfurt, 'On Bullshit' (1986)
- Optional: Ruscio, 'The emptiness of holism' (2002).

8. Nov 21st. RCTs and the 'Gold Standard'.

- Handout: RCTs and Causal Inference
- Worrall, 'Evidence in Medicine and Evidence-Based Medicine' (2007)
- Backman, 'What's in a gold standard? In defence of randomised controlled trials' (2017)
- Barry, 'The role of evidence in alternative medicine: contrasting biomedical and anthropological approaches' (2005).
- Tonelli and Callahan, 'Why Alternative Medicine Cannot be Evidence-Based' (2001)

9. Nov 28th. The replication crisis

- Enger, 'Cancer Research is Broken' (and links as necessary), *Slate* magazine.
- Colquhoun, 'An investigation of the false discovery rate and the misinterpretation of p-values', secs. 1-4.
- <https://www.sheldrake.org/about-rupert-sheldrake/blog/the-replicability-crisis-in-science>

10. **Dec 5th.** Special guest: Dr. Gina Merchant, psychologist and UCSD postdoctoral researcher in Epidemiology, who will discuss some of her research on the online discourses of ‘anti-vaxxers’. Readings will be posted nearer the time.

Assessment.

- **Mid-course mini-essay.** A five or six-page essay (double-spaced) will be due in class in Week 7 (Nov 14th). The essay will be written in the form of an autobiographical account—essentially a history of your engagement with the readings—including both areas of surprise and areas of difficulty. This assignment will be marked Satisfactory/Unsatisfactory.
- **Final Essay** (double-spaced; approximately 20-25 pp.). Your final essay will be due on the Tuesday of exams week (Dec 12th), on a topic connected to the significance of the demarcation question and / or the difficulties involved in answering it. **By November 28th at the latest**, you will have proposed an essay question or approached me to help you decide on one. You are welcome to take whatever disciplinary focus you like (so that, eg., you may wish to write a more sociological essay about the relationship between pseudoscience and gender). But you **must** display some engagement with and understanding of some of the texts and concepts explicitly covered in the course in order to pass. Please deliver a hard copy to the Science Studies Program Coordinator, Jennifer Dieli, at the Science Studies Office and send an e-copy to me at: kmckenzie@ucsd.edu
- **Class discussion:** +/- to final grade on paper.

Grading scale.

97 – 100 = A ⁺	87-89=B ⁺	77-79=C ⁺	67-69=D ⁺
93-96=A	83-86=B	73-76=C	60-66=D
90-92=A ⁻	80-82=B ⁻	70-72=C ⁻	< 60=F

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UCSD is committed to academic integrity. According to their *Policy on Integrity of Scholarship*¹,

"Integrity of scholarship is essential for an academic community. The University expects that both faculty and students will honor this principle and in so doing protect the validity of University intellectual work. For students, this means that all academic work will be done by the individual to whom it is assigned, without unauthorized aid of any kind.

If you are at all unsure of what acting with integrity demands of you in this context, I'll be happy to discuss it with you.

¹Go to <https://students.ucsd.edu/academics/academic-integrity/policy.html>