

Finding the 'I' in Science

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Cait Harrigan & Shanza Ayub



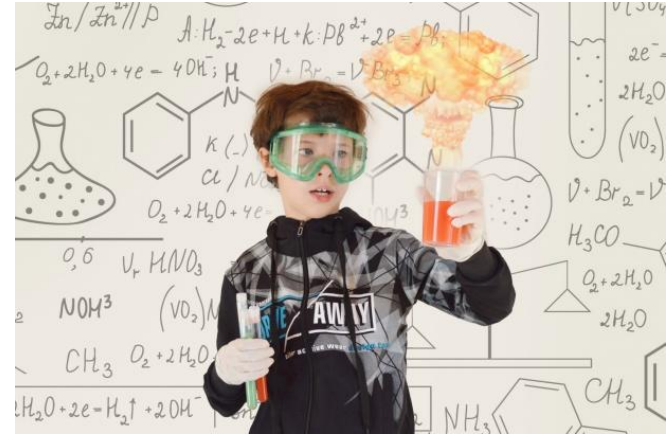
Disclaimer

We are not experts in philosophy or history of science. We are graduate students, aspiring scientists like yourself. This workshop is meant to be a healthy exchange of ideas and request everyone to respect each other's opinions and views. This workshop is meant to be interactive, so please join in!

Let's get to know each other!

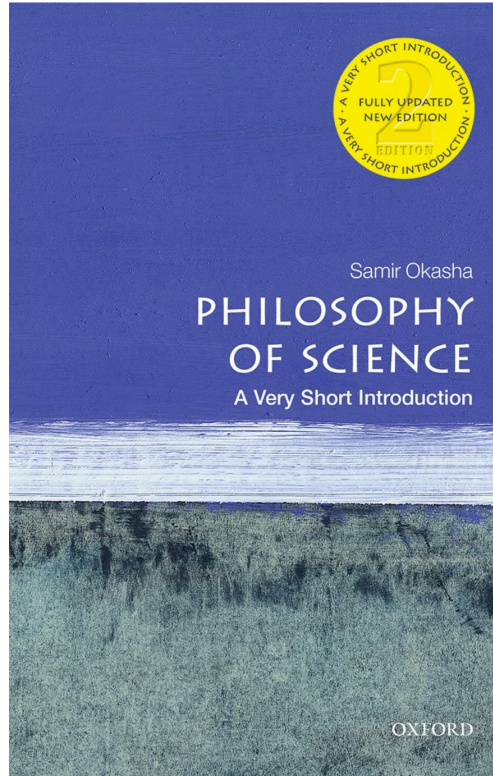
In your groups:

- Say your name
- Where are you in your scientific journey
- What is your favorite scientific piece of equipment?



Menti question: What is “science”?

The briefest intro ever to philosophy of science



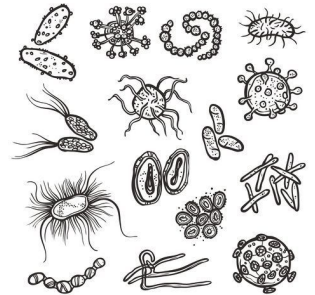
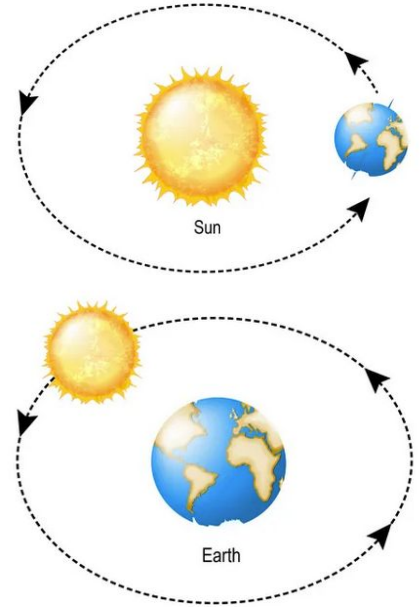
The structure of scientific revolutions (Knuth)

Most scientific progress is small steps towards some generally accepted idea of what is “truth”

Sometimes there are large overhauls of what constitutes “truth” → paradigm shift

Examples:

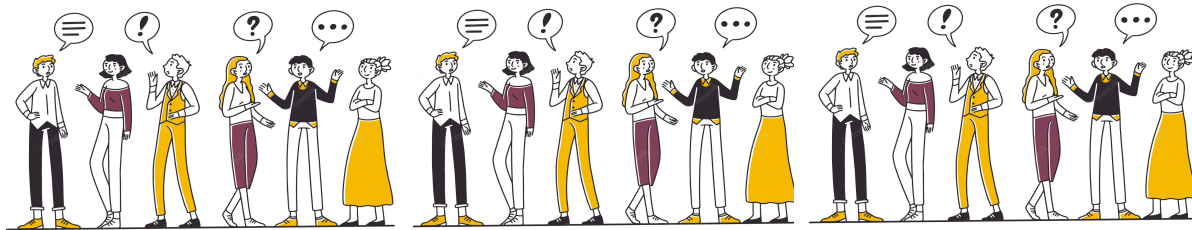
- Heliocentric model of the solar system
- Germ theory



Evaluating science

Old and new paradigms have *incommensurable standards*, meaning that it's hard for proponents of each paradigm to communicate with each other.

- What problems should be solved
- What constitutes an acceptable solution
- How do we know when to trust experts?
- What happens when experts disagree? (Ex. COVID)
- Value-driven science



Reasoning and explanation in science

Much of science relies on *inductive reasoning*

- Assumption that the simplest explanation is the best
- The “Bayesian” view

Science as a means to explain the world

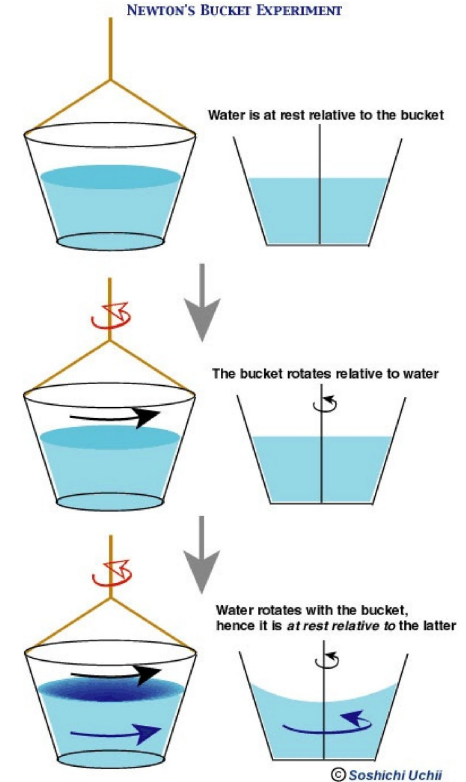
- Carl Hempel and causality
- Can science explain everything?



Philosophical problems in practice

Leibniz vs Newton on “absolute space”

- Principle of Identity of Indiscernibles
e.g. Two parallel universes
- Newton’s rotating bucket



What is “good” science?

Science done well

Science that “does good”

Is there such thing as “value free” science?

Is “value free” the same as “objective”?

Who does science serve?

Inclusion in curiosity

Inclusion in where R&D is aimed

Inclusion in executing research

Whose responsibility is it to
promote inclusion in computing?

Menti question: Why do you do science?

Resources for the curious

- A Mathematician's Apology, G. H. Hardy
- Philosophy of Science: Very Short Introduction, Samir Okasha
- The Experience Machine, Robert Nozick
- Science as Falsification (excerpt from Conjectures and Refutations), Karl Popper
- Communicating Science Effectively: A Research Agenda, National Academies Press 2017