Outline

1. What is the Philosophy of Science?

2. What’s So Great About Science?
What is the Philosophy of Science?

- General vs. Applied philosophy of science

- General philosophy of science addresses questions about
  - what the methodology of science is
  - whether/how/what it allows us to know things about the world
  - what the scientific enterprise presupposes about reality
  - what the scientific enterprise reveals about reality

- Applied philosophy of science asks questions about the content of particular scientific theories or a methodology unique to a particular science, e.g.,
  - Interpretations of quantum mechanics
  - Presentism and special relativity
  - Statistical methodology

- In this course, we will focus on general philosophy of science.
What is the Philosophy of Science?

- Metaphysics versus Epistemology
  - Metaphysics asks questions about what kind of things exist and how they exist. A metaphysics is the most general theory about the nature of reality.
  - Epistemology asks questions about how we can come to know things about the world, or how our beliefs about the world are justified.

- In both general and applied philosophy of science, we should distinguish questions of metaphysics from questions of epistemology.

- In this course, we will begin, in the first half of the semester, by asking questions about the epistemology of science. In the second half of the semester, we will ask questions about the metaphysics presupposed and revealed by scientific enquiry.
The Problem of *Demarcation*

- The Problem of *Demarcation* is the problem of demarcating *scientific* enquiries from *non-scientific* or *pseudo-scientific* enquiries.

- Many people think that there is a difference between the following two sets of enquiries:
  - Physics
  - Chemistry
  - Biology
  - Cosmology
  - Astrology
  - Phrenology
  - Creationism
  - Marxism

- What’s the difference? Popular answer: it has something to do with the *methodology* of the different enquiries.

- The first group of enquirers form their beliefs using *scientific* methods; whereas the second group forms their beliefs using *non-scientific* or *pseudo-scientific* methods.
What’s So Great About Science?

- What, then, is the scientific method of enquiry? And how is it different from non-scientific or pseudo-scientific methodologies?
- And what makes the scientific methodology so great? Not every method of forming beliefs that’s based on the outcomes of experiments is a good method of forming beliefs—one that leads to justified beliefs or knowledge.
- http://www.youtube.com/watch?v=DQaF4YXCXsc
- These questions are related: certain conceptions of the scientific method make it clear how it could produce knowledge; other conceptions of the scientific method make it less clear how it could produce knowledge.
What’s So Great About Science?

Over the entrance to Michigan’s Museum of Natural History is the quote from Louis Agassiz,

Go to Nature, take the facts into your own hands, look and see for yourself
On this way of understanding science, it is very clear how science can deliver knowledge. Looking and seeing for yourself is a paradigm way of coming to know something.

But does just *looking* tell us that the universe began with a big bang? Can we just take the fact that temporal duration is dependent upon our reference frame into our hands?

As we move to a more realistic understanding of what goes on in science, skeptical challenges to science’s ability to deliver knowledge of the unobserved and the unobservable begin to emerge.

In the first part of this course, we will be considering what the scientific methodology *is* and considering various skeptical challenges to that methodology and its ability to produce knowledge or justified belief.