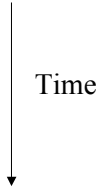


What is Cosmology Anyway?

- Cosmology: “the study of universes”.
 - Construction of a model of the universe that makes sense.
- In what sense?
 - Experiences
 - Beliefs
 - Religious reasons
 - Philosophical reasons
 - Scientific reasons
- Different societies at different times can have vastly different cosmological models, as they can have vastly different views of nature.
- **Draw Your Universe!**



Who are the cosmologists?

- Everyone could be a cosmologist.
- If you ever wondered...
 - how big the universe is,
 - our location in the universe,
 - where we came from,
 - where we are going,
 - the fate of the universe,
 - the origin of the universe,
 - the origin of stars and galaxies,
 - the shape of the universe,
 - how old the universe is,
 - etc...
- ...then, you were a cosmologist!

Cosmology is a broad subject

- “See the forest rather than the trees.”
 - Stellar astronomy
 - Galactic astronomy
 - Extra-galactic astronomy
 - Interstellar astronomy
 - Intergalactic astronomy
 - Planetary science
 - Particle physics
 - Nuclear physics
 - Chemical physics
 - Condensed matter physics
 - Etc...
- Cosmology puts everything together to make sense of the universe.

Ancient Cosmology

- The history of cosmology is the history of human beings’ appreciation of nature.
- Primitive cosmology: Anthropomorphic
 - *Anthrop(o): Human being*
 - *Morphic: Having such a form*
 - Nature around human beings (animals and plants) was associated with spirits.
 - Naturally, such an association was extended to astronomical objects such as the Sun, the Moon and stars.

The Mythic Universe

- Spirits were replaced by supernatural beings (Gods).
 - A dramatic change in appreciation of nature led to a dramatic change in cosmology.
- Supernatural beings govern creation and regulation of the universe.
 - Cosmology of this kind has the longest history.
- Beliefs and religious reasons were the most important factor to make sense of the universe.
 - Without philosophical or scientific theories and/or any systematic observations, there is no way to construct a model of the universe which goes beyond beliefs.

Anthropocentrism

- While Gods were the most powerful figure in the entire world, human beings were also given special roles.
- **Anthropocentrism: human beings are at the center of the universe.**
 - Distinguish human beings from other beings.
 - Give special reasons to human beings' life.
 - Anthropocentric cosmology dominated our picture of the universe for thousands of years.
 - In the era of science, anthropocentric cosmology survived for long because it appeared to be able to explain observations.
 - Basis of Greek Cosmology

Nicholaus Copernicus

- Transition from the geocentric universe to the heliocentric universe (16th century)
 - Human beings were removed from the center of the universe.
 - Rejection of anthropocentric cosmology.
- But, Copernican cosmology was not accepted immediately because its predictions for motion of planets was no better than those of the geocentric model.
- The mythic and anthropocentric model remained dominant.

The end of anthropocentric universe

- Tycho Brahe, Johannes Kepler, Galileo Galilei, and Isaac Newton (16th-17th century)
 - Triumph of the geocentric model
- Cosmology was still mythic.
 - Human beings were removed from the center of the universe.
 - Cosmology required Gods to explain the origin of the universe.

Modern Cosmology

- Scientific theories, backed up by scientific observations, explain the evolution and regulation of the universe without the help of supernatural beings.
 - We understand the history of the universe from a tiny fraction of second after the birth through the present epoch.
 - One hopes that even the origin of the universe could be understood scientifically.

Is the universe Anthropometric?

- “Man is the measure of all things” (Protagoras 5th century B.C.)
 - This idea is also known as Agnosticism.
 - *Agnostos: Unknown*
- The author of the book (Edward Harrison) claims that the Universe is unknowable.
 - It is probably true that some basic ideas of modern cosmology will be replaced by new ideas in future; however, would it imply that the Universe is truly unknowable?
 - Think about it.