

Life in Universe

ASTRON 1141 - Chapter 1 Introductory Matters

Introduction

- Astrobiology is now based on verifiable observations and measurements, though speculative
- Course:
 - Examine how life began and evolved on Earth
 - Ask whether there is life elsewhere in the Solar System
 - Study the properties of stars
 - Ask whether there is life in exoplanets

Imagining Other Worlds

1. People have speculated about life on other worlds since ancient times
 2. Interest in life elsewhere was simulated by the heliocentric model of Copernicus
 3. Popular culture is permeated with the idea of life on other worlds
- Ancient astronomers thought stars were small lights attached to a celestial sphere
 - The first recorded ideas about other worlds other than the Earth came from ancient Greece -> Democritus (ca. 460-370 BC) "the laughing philosopher"
 - "We live in an infinite universe, made of an infinite number of atoms with an infinite number of worlds." (Democritus)
 - The followers of Democritus (atomists) believed in many worlds, all different
 - "Maintained worlds to be infinite, and varying in bulk... And that some worlds are destitute of animals and plants, and every species of moisture." (The Refutation of All Heresies, Hippolytus of Rome AD 220)
 - Aristotle (384-322 BC) denied the existence of other worlds -> Alexander the Great's mentor
 - Aristotle's POV: Earth is a **unique** world at the center of the universe
 - Alexander the Great
 - When Alexander heard from Anaxchus (atomist) of the infinite number of worlds, he wept; "Is it not a matter of tears that, when the number of worlds is infinite, I have not conquered one?" (Alexander)
 - In the west, Church discouraged the "many worlds" concept
 - "In the beginning God created the Heaven, and the Earth" (KJV, 1611 AD)
 - Nicolaus Copernicus (1473-1543) devised a Sun-centered (heliocentric) model of the universe
 - Earth is moving
 - Earth is not central
 - Earth is just another planet
 - Space is big – really big
 - Thomas Digges (1546-1595) realized that the heliocentric model permits an **infinite** universe with an **infinite** number of stars
 - Giordano Bruno (1548-1600) famously supported the idea of extraterrestrial life
 - The universe is infinite
 - All stars have planets
 - All planets are inhabited
 - Stories about human encounters with aliens tell us more about humans than about aliens