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The Philosophy of Space Exploration and Exoplanet Science

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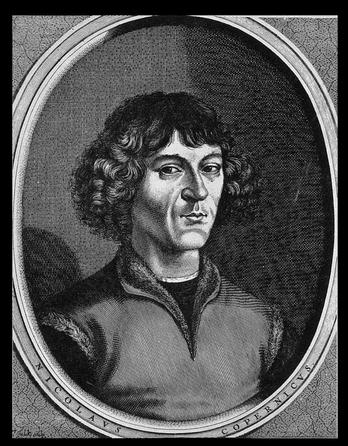
Introduction:

- Ancient fascination with the cosmos
- Astronomers like Galileo, Kepler and Copernicus revolutionised our understanding of our place in the universe
- Fast-growing field of **exoplanet science: the search for planets outside our Solar System**
- Including the quest for terrestrial **Earth-like** planets, potentially **habitable worlds** and **Earth-twins** (with a similar mass, temperature, radius and atmosphere like our Earth)



Nicolaus Copernius

Scientific Data:

- Estimated total of between one hundred billion (10^{11}) and one trillion (10^{12}) stars in the observable universe
- Milky Way Galaxy contains several hundred billion stars
- Assumption: at least **ten sextillion** (10^{22}) stars / **potential planetary systems** in the entire observable universe
- Last 25 years: **4,512 confirmed exoplanet** detections in 3,344 planetary systems

Earth-like exoplanets

Should we continue searching for exoplanets? A philosophical perspective

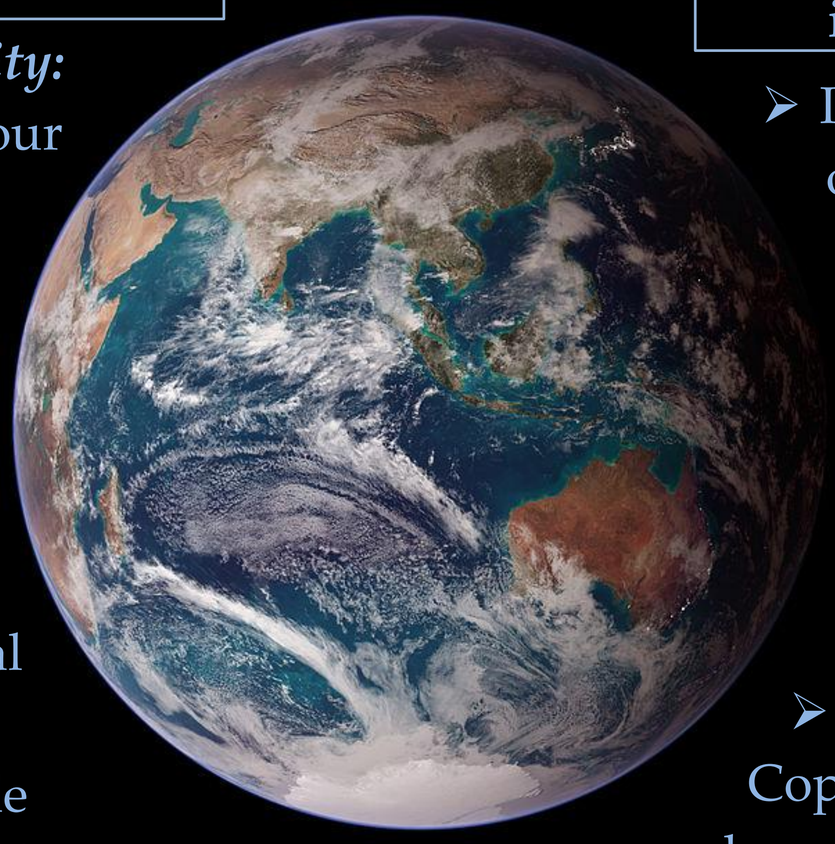
Earthrise

Ethical Argument against Exoplanet Science:

- Fear of **a *disposable planet mentality:*** the attitude of turning away from our Earth as soon as we find another habitable world

Response:

- Right now, exoplanet science can only be conducted from a "safe" distance, posing no threat to Earth
- Might even *help* with environmental concerns: by learning about other planets, we might get some valuable insights that could help protect Earth



Cosmological Philosophical Argument in favour of Exoplanet Science:

- Images like *Earthrise* or *Pale Blue Dot* offer unprecedented perspective of our home planet, highlighting its fragility and specialness
- Can be expected that discovery of Earth-like or twin planet will have similar effect of agitating feeling of **cosmic connectedness**
- Would be some sort of second Copernican Revolution, but without decentering Earth or humanity in an way

→ **Conclusion:** The endeavour of exoplanet science ***should*** be continued, when viewed from both an ethical and a more "cosmological" philosophical perspective. One could even argue that we have a **moral obligation** to do so, not only out of scientific or individual curiosity, but especially because it could teach us some **important lessons** about our **cosmic neighbourhood, ourselves and our home planet.**

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References:

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2. Ludwig Kostro, 'Are Life, Consciousness, and Intelligence Cosmic Phenomena?' in The Physics of Reality: Space, Time, Matter, Cosmos, ed. by Richard L. Amoroso, Louis H. Kauffman and Peter Rowlands, (Singapore: World Scientific Publishing, 2013)
3. ESA, How many stars are there in the Universe?, (Paris: ESA, n.d.) <https://www.esa.int/Science_Exploration/Space_Science/Herschel/How_many_stars_are_there_in_the_Universe> [accessed 28 June 2021]
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5. Lisa Messeri, 'Gestures of Cosmic Relation and the Search for Another Earth', Environmental Humanities, 9:2 (2017), 325-340) <doi:10.1215/22011919-4215325>

Images:

1. Nicolaus Copernicus. 17th century, J. Falck. *Wikimedia Commons.*
2. Relative sizes of all of the habitable-zone planets discovered to date alongside Earth. NASA/Ames/JPL-Caltech. *Wikimedia Commons.*
3. Earthrise. 24 December 1968. NASA/Bill Anders. *Wikimedia Commons.*
4. Eastern Hemisphere of Earth. 2 October 2007. NASA images by Reto Stöckli. Earth Observatory: Twin Blue Marbles. *Wikimedia Commons.*