Exoplanet Bibbliography
Astrophysics and Philosophy

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This bibliography is a compilation of scientific and philosophical references pertaining to exoplanets and space exploration. Many articles discuss issues related to extraterrestrial life and issues surrounding terraforming. Much of the philosophical work published in this area falls within the realm of ethics; where our moral obligations lie regarding space exploration and how different ethical models fare when the possibility of encountering extraterrestrial life is considered. Within philosophy of science, topics of focus are the Fermi paradox and the great filter. The work within Astrophysics focus on the origins of life and the definition of life, as well as the precautions that the human race need to take so that there is no contamination to possible life.

References

1 Astrophysics

[Claudi et al.(2016)] Atmosphere in a Test Tube
Claudi, R., Pace, E., Ciaravella, A., et al. 2016, 87, 104
Bibliographic Code: 2016MmSAI..87..104C
Keywords: Extrasolar Planets

[Wu & Chen(2001)] The discovering of extrasolar planets Wu, G. J., & Chen, D. H. 2001, Acta Astronomica Sinica, 42, 225
Bibliographic Code: 2001AcASn..42..225W
Keywords: Extraterrestrial life, Extrasolar planet

[Ceyssens et al.(2014)] Future Geopolitical Scenarios, Their Dominant Schools of Thought and the Impact Thereof on the Promotion of Deep Space Exploration
Ceyssens, F., Driesen, M., & Wouters, K. 2014, Journal of the British Interplanetary Society, 67, 440
Bibliographic Code: 2014JBIS...67..440C
Keywords: Interstellar, space exploration philosophy, future scenarios, future studies, scenario method

[Wu & Chen(2002)] Searching for extra-terrestrial intelligence and the discovering of extrasolar planets

Wu, G.-j., & Chen, D.-h. 2002, 26, 125
DOI: 10.1016/S0275-1062(02)00050-4
Bibliographic Code: 2002ChA&A..26..125W
Keywords: extraterrestrial life, extrasolar planets

[Rasool et al.(1974)] Rationale for NASA Planetary Exploration Program
Rasool, I., Herman, D., Kerrisk, D., & Brunk, W. 1974, Exploration of the Planetary System, 65, 549
Bibliographic Code: 1974IAUS...65..549R
Keywords: Interplanetary Flight, Mission Planning, Nasa Programs, Project Planning, Space Exploration, Technological Forecasting, Asteroids, Comets, Grand Tours, Interplanetary Spacecraft, Outer Planets Explorers, Pioneer Space Probes

1.1 Astrobiology

[Gayon(2010)] Defining Life: Synthesis and Conclusions
Gayon, J. 2010, Origins of Life and Evolution of the Biosphere, 40, 231
DOI: 10.1007/s11084-010-9204-3
Bibliographic Code: 2010OLEB...40..231G
Keywords: Definition, Life, Origins of life, Philosophy

[Mix(2018)] Philosophy and data in astrobiology
Mix, L. J. 2018, International Journal of Astrobiology, 17, 189
DOI: 10.1017/S1473550417000192
Bibliographic Code: 2018IJAsB..17..189M
Keywords: astrobiology, cosmology, ethics, epistemology, history, life, teaching,

[Meot-Ner & Matloff(1979)] Directed panspermia - A technical and ethical evaluation of seeding nearby solar systems
Meot-Ner, M., & Matloff, G. L. 1979, Journal of the British Interplanetary Society, 32, 419
Bibliographic Code: 1979JBIS...32..419M
Keywords: Exobiology, Extrasolar Planets, Extraterrestrial Life, Interstellar Travel, Panspermia, Planetary Environments, Ecology, Payloads, Propagation, Solar Sails

[Frank & Sullivan(2016)] A New Empirical Constraint on the Prevalence of Technological Species in the Universe
Frank, A., & Sullivan, W. T., III 2016, Astrobiology, 16, 359
DOI: 10.1089/ast.2015.1418
Bibliographic Code: 2016AsBio..16..359F
Keywords: Life, Intelligence, Extraterrestrial life. Astrobiology

[Cirkovic(2009)] Fermi's Paradox - The Last Challenge For Copernicanism?
Cirkovic, M. M. 2009, Serbian Astronomical Journal, 178, 1
DOI: 10.2298/SAJ0978001C
Bibliographic Code: 2009SerAJ.178....1C
Keywords: astrobiology, extraterrestrial intelligence, Galaxy: evolution, history and philosophy of astronomy

[Aydinoglu & Taşkın(2018)] Origins of Life Research: a Bibliometric Approach
Aydinoglu, A. U., & Taşkın, Z. 2018, Origins of Life and Evolution of the Biosphere, 48, 55
DOI: 10.1007/s11084-017-9543-4
Bibliographic Code: 2018OLEB...48...55A
Keywords: Origins of life, Astrobiology, Exobiology, Prebiotic chemistry, Bibliometrics

[Kostro(2013)] Are Life, Consciousness, and Intelligence Cosmic Phenomena?
Kostro, L. 2013, The Physics of Reality: Space, Time, Matter, Cosmos, 484
DOI: 10.1142/9789814504782_0049
Bibliographic Code: 2013prst.conf..484K
Keywords: Astrobiology, Bio-cosmology, Exobiology

[Cirkovic(2009)] Fermi's Paradox - The Last Challenge For Copernicanism?
Cirkovic, M. M. 2009, Serbian Astronomical Journal, 178, 1
DOI: 10.2298/SAJ0978001C
Bibliographic Code: 2009SerAJ.178....1C
Keywords: astrobiology, extraterrestrial intelligence, Galaxy: evolution, history and philosophy of astronomy

1.2 Extraterrestrial life

[Smith(2016)] Life is hard: countering definitional pessimism concerning the definition of life
Smith, K. C. 2016, International Journal of Astrobiology, 15, 277
DOI: 10.1017/S1473550416000021
Bibliographic Code: 2016IJAsB..15..277S
Keywords: alchemy, alchymy, Cleland, Darwinism, definition, life, natural kind, pessimism, universal biology,

[Randolph & McKay(2014)] Protecting and expanding the richness and diversity of life, an ethic for astrobiology research and space exploration
Randolph, R. O., & McKay, C. P. 2014, International Journal of Astrobiology, 13, 28
Bibliographic Code: 2014IJAsB..13...28R
Keywords: contamination, extraterrestrial, planetary protection policies, space exploration,

[Deardorff(1987)] Examination of the embargo hypothesis as an explanation for the Great Silence
Deardorff, J. W. 1987, Journal of the British Interplanetary Society, 40, 373
Bibliographic Code: 1987JBIS...40..373D
Keywords: Ethics,Extraterrestrial Intelligence, Interstellar Communication

[Wright et al.(2014)] The $\hat{\mathrm{G}}$ Infrared Search for Extraterrestrial Civilizations with Large Energy Supplies. I. Background and Justification
Wright, J. T., Mullan, B., Sigurdsson, S., & Povich, M. S. 2014, 792, 26
DOI: 10.1088/0004-637X/792/1/26
Bibliographic Code: 2014ApJ...792...26W

Keywords: extraterrestrial intelligence, infrared: galaxies, infrared: stars

[Wright et al.(2014)] The Ĝ Infrared Search for Extraterrestrial Civilizations with Large Energy Supplies. II. Framework, Strategy, and First Result
Wright, J. T., Griffith, R. L., Sigurdsson, S., Povich, M. S., & Mullan, B. 2014, 792, 27
DOI: 10.1088/0004-637X/792/1/27
Bibliographic Code: 2014ApJ...792...27W
Keywords: extraterrestrial intelligence, infrared: galaxies, infrared: stars

[Baxter(2013)] Project Icarus: Interstellar Spaceprobes and Encounters with Extraterrestrial Intelligence
Baxter, S. 2013, Journal of the British Interplanetary Society, 66, 51
Bibliographic Code: 2013JBIS...66...51B
Keywords: Project Icarus, Project Daedalus, interstellar flight, extraterrestrial intelligence, SETI, First SETI Protocol

[Stapledon(2012)] Interplanetary Man? Stapledon, O. 2012, Journal of the British Interplanetary Society, 65, 30
Bibliographic Code: 2012JBIS...65...30S
Keywords: interplanetary, philosophy, extraterrestrial life

[Crawford(2012)] Stapledon's Interplanetary Man: A Commonwealth of Worlds and the Ultimate Purpose of Space Colonisation
Crawford, I. A. 2012, Journal of the British Interplanetary Society, 65, 13
Bibliographic Code: 2012JBIS...65...13C
Keywords: Physics: History and Philosophy of Physics, Physics: Popular Physics, Olaf Stapledon, Space Colonisation, Future of Humanity, Philosophy of Space Exploration

[Baxter(2012)] Where Was Everybody? Olaf Stapledon and the Fermi Paradox
Baxter, S. 2012, Journal of the British Interplanetary Society, 65, 7
Bibliographic Code: 2012JBIS...65....7B
Keywords: Olaf Stapledon, 'Interplanetary Man?', extraterrestrial intelligence, SETI, Fermi Paradox, cosmic evolution, human destiny

[Consolmagno(2010)] Other Worlds, Other Civilizations?
Consolmagno, G. 2010, Galileo's Medicean Moons: Their Impact on 400 Years of Discovery, 269, 177
DOI: 10.1017/S1743921310007386
Bibliographic Code: 2010IAUS..269..177C
Keywords: History of science, extraterrestrial life

[Kukla(2010)] Extraterrestrials: A Philosophical Perspective
Kukla, A. 2010, Extraterrestrials: A Philosophical Perspective, by André Kukla. ISBN 978-0-7391-4244-8. Published by Lexington Books, Rowman Littlefield Publishers, Inc., Lanham, MD USA, 2010.,
Bibliographic Code: 2010epp..book.....K
Keywords: Extraterrestrial beings, Science, Philosophy

[Graham(1990)] Extraterrestrial life in the universe
Graham, R. W. 1990, NASA STI/Recon Technical Report N, 90,
Bibliographic Code: 1990STIN...9022464G
Keywords: Extraterrestrial Life, Planets, Space Flight, Universe, Astronomy, Radio Telescopes

[Gindilis(1979)] Some philosophical and methodological aspects of the CETI problem.
Gindilis, L. M. 1979, Astron. Metodol. Mirovozzrenie. Moskva, 282
Bibliographic Code: 1979asmm.conf..282G
Keywords: Extraterrestrial Life

[Klokocnik(1977)] Extraterrestrial civilisations and philosophy.
Klokocnik, J. 1977, Rise Hvezd, 58, 121
Bibliographic Code: 1977Rise...58..121K
Extraterrestrial Life

[Shklovskii(1976)] The problem of extraterrestrial civilizations and its philosophical aspects. I
Shklovskii, I. S. 1976, Astronomie und Raumfahrt, 4, 97
Bibliographic Code: 1976AR.....4...97S
Keywords: Exobiology, Extrasolar Planets, Extraterrestrial Life, Milky Way Galaxy, Intelligence, Philosophy, Technologies, Universe

[Lemarchand(2008)] Lemarchand, G. A. 2008, arXiv:0807.4518
Bibliographic Code: 2008arXiv0807.4518L
Keyword: SETI

[Consolmagno(2010)] Other Worlds, Other Civilizations?
Consolmagno, G. 2010, Galileo's Medicean Moons: Their Impact on 400 Years of Discovery, 269, 177
DOI: 10.1017/S1743921310007386
Bibliographic Code: 2010IAUS..269..177C
Keywords: extraterrestrial life

[Pay(2014)] Religion in SETI Communications
Pay, R. 2014, Journal of the British Interplanetary Society, 67, 193
Bibliographic Code: 2014JBIS...67..193P
Keywords: Extraterrestrial, civilization, religion, creation, SETI

[Randolph & McKay(2014)] Protecting and expanding the richness and diversity of life, an ethic for astrobiology research and space exploration
Randolph, R. O., & McKay, C. P. 2014, International Journal of Astrobiology, 13, 28
DOI: 10.1017/S1473550413000311
Bibliographic Code:2014IJAsB..13...28R
Keywords: contamination, extraterrestrial, planetary protection policies, space exploration

[Cockell(2005)] Cockell, C. S. 2005, Journal of the British Interplanetary Society, 58, 367
Bibliographic Code: 2005JBIS...58..367C

Keywords: Ethics, micro-organisms, teloempathy, extraterrestrial life, planetary protection, Mars

[Papagiannis(1983)] Natural selection of stellar civilizations by the limits of growth
Papagiannis, M. D. 1983, Budapest International Astronautical Federation Congress,
Bibliographic Code: 1983buda.iafcR....P
Keywords: Cosmology, Extraterrestrial Intelligence, Extraterrestrial Life, Space Colonies, Ethics, Evolution (Development), Nuclear Warfare, Pollution, Populations, Resources Management, Thermal Pollution

2 Philosophy

2.1 Interdisciplinary Texts

[Milligan, Tony and Schwartz, James S.J] The Ethics of Space Exploration, Switzerland: Springer International Publishing, 2016. DOI: 10.1007/978-3-319-39827-3]
A interdisciplinary book concerning issues of value which repeatedly emerge in discussions on space and society. Also a summary of the ethics of space travel since it emerged as a discipline.
Keywords: general readership, ethics, interdisciplinary

[Munevar, Gonzalo] "The Philosophy of Space Exploration", University of Michigan, Blog http://philosophyofspaceexploration.blogspot.com/
Keywords: general readership, ethics, philosophy of science, interdisciplinary

[Kukla, Andre] Extraterrestrials: A Philosophical Perspective, New York: Lexington Books, 2010.
Explores important philosophical issues related to SETI, including the possibility of communication with extraterrestrials, the Fermi paradox and the argument from vastness.
Keywords: Fermi paradox, philosophy of language, philosophy of science, ethics, extraterrestrial life

2.2 Philosophy of Law

[von der Dunk, F.G.] "Private Property Rights and the Public Interest in Exploration of Outer Space", Biol Theory 13, 142 (2018). https://doi.org/10.1007/s13752-017-0271-9
Examines the 'Outer Space Treaty' and the 'US Commercial Space Launch Competitiveness Act' to assess the current legal status of celestial bodies, and how this could affect private and commercial incentives.
Keywords: celestial bodies, legal theory, philosophy of law, property rights

2.3 Ethics

[Baum, Seth D.] "Universalist Ethics in Extraterrestrial Encounter" Acta Astronautica, vol.66, no.3-4 (2010): 617-623
Explores the outcomes of encounter scenarios with extraterrestrial civilisations where one or more civilisation has a universalist ethical framework.
Keywords: Fermi paradox, extraterrestrial life, universalism, metaethics

[Conway, Erik] Exploration and Engineering: The Jet Propulsion Laboratory and the quest for Mars, Baltimore: Johns Hopkins University Press, 2015.
A history and analysis of every mission to Mars that has taken place. There is also a review of this book by Janet Vertesi in Metascience (2016)
Keywords: Mars, hisotry, practical ethics

[Duemler, David G.] Bringing Life to the Stars, Maryland: University Press of America, 1993.
Attempts to create an ethical foundation for the question of whether we should spread life beyond earth. Also examines reasons for spreading life beyond the earth, claiming that evidence for these reasons must not be based on questionable dogma nor requiring huge intuitive leaps of faith; it must square with natural selection and have biological plausibility; and it must have inherent value, not requiring underlying conditions for a judgement to pass.
Keywords: ethical foundation, reasons, methodology, terraforming, pre-2000

[Daly, Erin Moore and Frodeman, Robert] 'Separated at Birth Signs of Rapprochement: Environmental Ethics and Space Exploration' Ethics and the Environment 13, no.1 (2008): 135-151.
An attempt to re-integrate philosophy and space policy by highlighting the philosophic dimensions of space exploration and pulling together issues and authors that have previously had insufficient contact with one another. Focuses on four topics: planetary exploration, planetary protection, the search for extraterrestrial life, and terraforming. Also introduces the possible benefits of a humanities-oriented approach to space policy
Keywords: interdisciplinary, extraterrestrial life, terraforming, politics, practical ethics

[Galliott, Jai] Commercial Space Exploration : Ethics, Policy and Governance Abingdon: Taylor and Francis, 2016.
Examines the practical and moral consequences of commercial space travel, and the possibility of developing policy related to commercial space travel that may influence real-world decision making.
Keywords: practical ethics, space travel, politics, legal theory

[Ginsberg, Robert] , "The Future of Interplanetary Ethics," Journal of Social Philosophy 2 (1972): 5–7 **Keywords: summary article, terraforming, space travel, pre-2000**

[Gethmann, Carl] "Manned Space Travel as a Cultural Mission", Poiesis and Praxis,Volume 4, Issue 4, (December 2006): 239–252
Advocating a theoretical distinction between the utilitarian and trans-utilitarian ends of spaceflight. Assesses arguments for and against spaceflight as a cultural option.
Keywords: spaceflight, utilitarianism

[Hartmann, William K.] , "Space Exploration and Environmental Issues", Environmental Ethics, Volume 6, Issue 3 (Fall 1984) 227-239, DOI: 10.5840/enviroethics19846325
Focuses on the idea of pursuing space exploration to alleviate environmental and resource-related problems on earth.
Keywords: Space travel, Environmental ethics, resource allocation, pre-2000

[Hayward, Laura] , "Given that there is much poverty on planet Earth, should nations be investing in the exploration of space?", Transactions of the Royal

Society of South Africa, 62:1 (2007) 37-38, DOI: 10.1080/00359190709519196
Argues that the duty to help alleviate poverty and other pressing issues on earth outweighs reasons for allocating funds to space exploration.
Keywords: moral duties, consequentialism, human rights

[MacNiven, Don,] "Environmental Ethics and Planetary Engineering", Journal of the British Interplanetary Society 48 (1995) 441–43
A more general article on the ethical issues surrounding terraforming.
Keywords: terraforming, utilitarianism, environmental ethics, pre-2000

[Manson, Neil A.] "Anthropocentrism, Exoplanets, and the Cosmic Perspective", Environmental Ethics 34, no.3 (2012): 275-290
Examines the threat to anthropocentric environmental philosophy posed by recent empirical evidence from cosmology and astrobiology.
Keywords: astrobiology, cosmology, environmental ethics, exoplanets

[Mautner, M. N.,] "Life-Centered Ethics, and the Human Future in Space" Bioethics, 23 (2009): 433-440. DOI:10.1111/j.1467-8519.2008.00688.x
Gives an argument for space exploration based on life-centred ethics.
Keywords: life-centered ethics, bioethics

[McArthur, Dan Boran, Idil,] "Agent-centered restrictions and the ethics of space exploration", Journal of Social Philosophy 35, no.1 (2004) :148–163
Keywords: agent-centred ethics, terraforming

[Schuster, Haley and Peck, Steven L.] "Mars ain't the kind of place to raise your kid: ethical implications of pregnancy on missions to colonize other planets" Society and Policy, Volume 12 (2016)
About the bioethical issues related to pregnancy and raising children during extended space travel. Also the ethical implications of temporary sterilization and contraception; medical resource costs. **Keywords: philosophy of medicine, bioethics, contraception, resources, planetary colonisation**

[Schwartz, James S. J.] , "On the Moral Permissibility of Terraforming" Ethics and the Environment 18, no.2 (2013): 1-31
Discusses whether there is any reason to believe that the terraforming of another planet is morally problematic.
Keywords: terraforming, moral duties, environmental ethics

[Schwartz, James S. J.] , "Our Moral Obligation to Support Space Exploration", Environmental Ethics, Volume 33, Issue 1 (Spring 2011): 67-88 DOI: 10.5840/enviroethics20113317
Argues that our moral obligation to support space travel follows from our obligations to protect the environment and survive as a species.
Keywords: obligations, enviornmental ethics, agent-centered ethics, surival

[Thomas, Laurence] , "Moral Behaviour and Rational Creatures of the Universe," Monist 71 (1988): 59–72.
Keywords: general issues, moral duties, pre-2000

[White, Lewis Beck] , "Extraterrestrial Intelligent Life," in Essays by Lewis Beck White, ed. P. Cicovacki (Rochester: University of Rochester Press, 1998), 101–21
Keywords: general issues, extraterrestial life, terraforming, pre-2000

2.4 Aesthetics

[Elizabeth A. Kessler] , Picturing the Cosmos: Hubble Space Telescope Images and the Astronomical Sublime, Minnesota: University of Minnesota Press, 2012.
Examines Hubble's deep space images, highlighting the remarkable resemblance they bear to nineteenth-century paintings and photographs of the American West and their invocation of the visual language of the sublime.
Keywords: beauty, sublime, history of art, hubble telescope

2.5 Philosophy of Science

[Barker, Peter Goldstein, Bernard R.] , "Distance and velocity in Kepler's astronomy", Annals of Science 51, no.1 (1994): 59-73
An examination of the first forty pages of Kepler's 'Astronomia Nova', especially his account of the relation between velocity and motion.
Keywords: Kepler, speed, scientific analysis, history of science, pre-2000

[Bostrom, Nick,] "Where are they? Why I hope that the search for extraterrestrial life finds nothing", MIT Technology Reveiw, (June 2008) 72-77
Examines the consequences of finding extraterrestrial life in our galaxy with regards to 'the great filter'.
Keywords: philosophy of physics, philosophy of biology, evolution, Fermi paradox, the great filter, von neumann probe, mars

[Cirkovic, Milan M.,] "Fermi's Paradox - the Last Challenge for Copernicanism?" Serbian Astronomical Journal, vol.178 (2009) 1-20
Analyses the methodological assumptions in answers to the Fermi Paradox, and how optimistic we should be about our current and near-future SETI efforts.
Keywords: Fermi paradox, philosophy of physics, methodology

[Crawford, I.A., "Some Thoughts on the Implications] of Faster-Than-Light Interstellar Space Travel" Quarterly Journal of the Royal Astronomical Society, Vol. 36, no.3 (1995)
Keywords: interstellar travel, speed of light, philosophy of physics, pre-2000

[Haggstrom, Olle] 'Space Colonisation and the Fermi Paradox' (pp.203-223) in Here Be Dragons: Science, Technology and the Future of Humanity, Oxford: Oxford University Press, 2016.
A more general introduction to the Fermi Paradox, the great filter and other concepts related to the possibility of finding extraterrestrial life.

Keywords: Fermi paradox, the great filter, philosophy of physics, ethics

[Hudson, Hud] , "Moving faster than light", Analysis 62 no.3 (2002): 203–205
Keywords: speed of light, philosophy of physics, relativity

[Pitts, J. Brian] , "Kant, Schlick and Friedman on Space, Time and Gravity in Light of Three Lessons from Particle Physics" Erkenntnis 83, no.2 (2018): 135-161]
Keywords: interdisciplinary, speed of light, quantum physics, philosophy of physics

[Brin, G. D.] "The 'Great Silence': The Controversy Concerning Extraterrestrial Intelligent Life." Quarterly Journal of the Royal Astronomical Society 24 (1983): 283–309.
Argues for the re-evaluation of models used to detect and evaluate evidence for extraterrestrial life.
Keywords: Fermi paradox, extraterrestrial life, philosophy of astrobiology, methodology, evidence, pre-2000

The discovery of exoplanets is one of the greatest revolutions in modern astrophysics. Twenty years ago, we had no idea whether any of the countless stars out there beyond our solar system had planets or not. Today, things are totally different.Â This is the second of four ANUx courses which together make up the Australian National University's first year astrophysics program. It follows on from the introductory course on the Greatest Unsolved Mysteries of the Universe, and is followed by courses on the violent universe and on cosmology. These courses compromise the Astrophysics XSeries. Learn more about the XSeries program and register for all the courses in the series today! More about this course. What you'll learn. Skip What you'll learn.