

Faculty of Philosophy

James Martin Advanced Research Seminar Series

Venue: Oxford Martin School, Seminar Room 1, Old Indian Institute, Broad Street

Date: MT10 Week 1 ~ Wednesday, 13 October, 15:00 – 16:30

Speaker: Milan M. Ćirković (Astronomical Observatory of Belgrade)

Title: 'Philosophical Aspects of SETI: Undermining the Traditional Skeptical Arguments'

Abstract: We live in the epoch of explosive development of astrobiology, a novel interdisciplinary field dealing with the origin, evolution, and the future of life in its widest cosmological context. In spite of big strides made roughly since 1995, there is still a strong undercurrent of scepticism toward a sector of astrobiological research usually denoted as the Search for Extraterrestrial Intelligence (SETI). Three traditional arguments advanced against a high probability of success in SETI are (1) Fermi's paradox/the "Great Silence" problem, (2) Carter's anthropic argument, and (3) the argument from biological contingency. In this talk, I shall analyse only the first two of these traditional anti-SETI arguments and show that they contain hidden assumptions which may make them, while internally consistent, still inapplicable to the real astrophysical environment of the Milky Way. In particular, I shall show how abandoning of the old-fashioned doctrine of gradualism may lead to a much richer picture in which the astrobiological complexity may be expressed by using a set of astronomical, physical and chemical parameters of the Galactic habitable zone and the Copernican assumption about the relevant scales characterizing the terrestrial biosphere. In this picture, Fermi's paradox plays the role of boundary conditions for the (still poorly understood) astrobiological dynamics.

Resulting complex nonlinear behaviour, which can be demonstrated with simple numerical models, is characterized by phase transitions as generic phenomena. I shall present selected results of two classes of models, 1-D Monte Carlo simulations and 2-D probabilistic cellular automata, clearly exhibiting this type of (quasi)chaotic behaviour. The ultimate goal of this and related future work is to build a flexible numerical framework describing the "astrobiological landscape" of the Galaxy, capable of being updated with any new results on the abundance of extrasolar planets and their properties, as well as other relevant astrobiological data.

All this is moderately good news for practical SETI projects: current and near-future searches can be expected to yield results on timescales shorter than the Fermi-Hart timescale. By adopting a sensible targeting strategy, this timescale can be significantly shortened. More theoretical studies and integration with the other aspects of astrobiological endeavour are likely to reinvigorate this field with all its – hitherto largely unrealized – promises and benefits.

Bio: *Milan Ćirković is Senior Research Associate at the Astronomical Observatory of Belgrade and Assistant Professor of the Department of Physics at the University of Novi Sad in Serbia and Montenegro. Milan's interests include astrobiology and SETI studies, the evolution of galaxies and baryonic dark matter, the philosophy of science (especially philosophy of cosmology and quantum mechanics), future studies (in particular related to existential risks and transhumanism), science fiction, and the history of physical sciences. Milan is co-editor with IEEET Chair Nick Bostrom of the 2008 volume *Global Catastrophic Risks* from Oxford University Press.*