

STIAS Public Lecture

Speaker: Lynn Margulis, Distinguished University Professor
Department of Geosciences, University of Massachusetts Amherst
and
Donald Gordon Fellow, Stellenbosch Institute for Advanced Study (STIAS)

Title: **Gaia & Symbiogenesis: The living Earth from Space**

Date & time: Thursday 11 November 2010, 13:00 – 14:00

Venue: Gericke Library Auditorium, Stellenbosch University

We will explore the basis for, extensions and current status of the Gaia hypothesis. “Gaia,” now a theory, may be best understood as “symbiosis as seen from space” and evolution perhaps best summarized as “symbiogenesis as seen from space.” Gaia theory postulates that certain surface conditions on Earth, specifically concentration of reactive atmospheric gases (e.g., oxygen, methane, carbon dioxide, hydrogen sulfide), ocean acidity/alkalinity and surface temperature are regulated by behavior, growth, reproduction and interaction of burgeoning, diverse populations of organisms. The worldview concept generated by the international space program and the lively imagination of its inventor James E. Lovelock, FRS was named by author William Golding.

The fundamental concepts of Darwinian evolution: all life forms evolved from common ancestors; more organisms are born, budded and otherwise produced than can ever survive (i.e., natural selection) and some variation is heritable have been well established by observations in genetics, anatomy and physiology, molecular biology and biochemistry and other fields. The 3500 million-year-history of life on Earth as measured by the fossil record on international geological time scale supports Darwin’s vision in general. However many beliefs taught to biology students purported to explain evolution (e.g., the “gene” or the “individual” is the unit of “selection,” group selection does not occur, evolutionary innovation derives from “gradual accumulation of random mutations,” sex generates variation) are patently absurd. We will see how the major source of evolutionary novelty (symbiogenesis) was independently detailed by Boris Mikaylovich Kozo-Polyansky (1921, 1924) and by Ivan Emanuel Wallin in 1927.