



UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II

Dipartimento di Scienze Chimiche

Prof. Daniela Montesarchio

AVVISO DI SEMINARIO

Giovedì 15 novembre 2018

il prof. **STEVEN BENNER**

terrà il seminario dal titolo:

**Redesigning Nucleic Acids
and Artificial Darwinism**

Foundation for Applied Molecular Evolution, USA

ore 12.00, aula CH2

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Abstract

By dragging scientists across uncharted terrain where they are forced to answer unscripted questions, "*Grand Challenge*" synthesis can drive discovery and paradigm change in ways that hypothesis-directed research cannot. Here, our grand challenge seeks to reproduce the Darwinism displayed by terran biology and supported by the DNA double helix, but on a different molecular platform. Access to Darwinism is believed by many to distinguish the living state from the non-living state. DNA is believed to be able to support Darwinism by two of its structural features, (a) its ability to fit into a Schrödingerian "aperiodic crystal", lattice, and (b) its "polyelectrolyte" backbone. This talk will discuss recent work that has obtained Darwinian behavior from a DNA-like biopolymer built from six letter genetics. Together with a deeper understanding of the role played in aperiodic crystal formation by the polyelectrolyte backbone and the intervening scaffolding, these results define how we might search for Darwinism, and therefore life, on Mars, Europa, Enceladus, and other watery lagoons in our Solar System.



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Steven Benner heads the Foundation for Applied Molecular Evolution, which he founded after faculty stints at Harvard, ETH Zurich, and University of Florida. His research combines two traditions in science, one from natural history, the other from the physical sciences. In making this combination, his laboratory was among the first to do large scale DNA synthesis and to redesign DNA and RNA to better understand how these molecules work, and what form they might take in alien life. To understand how DNA and its encoded proteins evolved on Earth, he developed the first web-based bioinformatics tools, the first modern biosequence databases, and the first evolution-based tools to predict how proteins fold. To bring experimental methods to bear on evolution, he initiated the field of paleogenetics, resurrecting ancient proteins from extinct organisms for study in the laboratory. His work has had impact on commerce and the public, through its launch of several biotechnology companies whose products personalize the care of HIV, hepatitis B and hepatitis C patients, detect insect-borne pathogens, and discover new drugs. The work also guides NASA missions seeking alien life and models for life's origins in the cosmos. His most recent book is: *"Life, the Universe, and the Scientific Method."*