iFAST: The International Forum on Advanced Environmental Sciences and Technology

A series of distinguished seminars by eminent scientists

8:00 am CDT; 9:00 am EDT; 1:00 pm GMT; 9:00 pm Beijing

Wednesday, October 14, 2020

Paul Falkowski

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https://marine.rutgers.edu/team/paul-falkowski/

Professor Falkowski is a Bennett L. Smith Chair in Business and Natural Resources at Rutgers University and a Board of Governors Professor and Director of the Rutgers Energy Institute. He graduated with a doctorate from the University of British Columbia in 1975. After nine months as a post-doctoral associate at the University of Rhode Island, he was hired at the Brookhaven National Laboratory as staff scientist in the newly formed Oceanographic and Atmospheric Sciences Division. He worked there for 23 years and developed the field of environmental biophysics. In 1998 he moved his research group to Rutgers University. In 2007 he was elected to the National Academy of Science for his research on the global carbon cycle. He is a fellow of the American Geophysical Union, the American Academy of Arts and Sciences, the American Academy of Microbiology, and the Ecological Society of America. He serves on the Technical Advisory Board of NASA's Center for Utilization or Biological Engineering in Space and is a member of the NSF Advisory Committees on Geosciences and on the State of the Sciences in Astrobiology. He received a Vernadsky Medal from the European Geosciences Union in 2005, a Gerald W. Prescott Award in 2008, and a Tyler Prize in 2018.

The Origin and Emergence of Global Coupled Biogeochemical Cycles

Over the course of hundreds of millions of years, prokaryotic microbes evolved to form a global metabolic network. That network is based on electron transfer reactions with and without protons. The responsible enzymes, the oxidoreductases, encoded by only 500 core genes, literally have evolved to become a planetary electrical circuit powered by solar energy. Microbial metabolism inevitably leads to gas exchanges between the organism and the environment. The gases can, on long geological time scales, lead to changes in the composition of planetary atmospheres. Indeed, the atmosphere and oceans on Earth effectively are "wires" that connect metabolic processes across the globe. A structural analysis of the oxidorectases reveals that they arose from a very small subset of protein folds. We have identified two of the core folds, the "Legos" of life, and I will discuss these very simple protein motifs evolved early in Earth's history to create an extremely robust global metabolic circuit.

INSTITUTE FOR ENVIRONMENTAL GENOMICS
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Register for the Zoom conference at www.ou.edu/ieg/seminars

Organizing Committee Chair: Jizhong Zhou (University of Oklahoma, USA; https://www.ou.edu/ieg) Xueduan Liu (Central South University, China)