BIG energy seminar series

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Solar Hydrogen Production by Nanoparticle-Hydrogenase Assemblies

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Date: Wednesday, April 16th, 2014 at 12:00pm
Location: Gamow Tower, 11th Floor Commons Room

Abstract:

Photosynthesis provides an elegant and efficient model for direct production of fuels and for inspiring the design of artificial systems for solar conversion. The primary reaction steps of light harvesting integrate with energy transduction networks that perform electron-transfer reactions required for catalysis. A long-term goal of our group is to understand the process of solar energy conversion into H2 in model photochemical systems that combine light harvesting nanoparticles, as synthetic reaction centers, and hydrogenases. In photosynthetic microbes hydrogenases couple to low potential reductant pools and help maintain electron flow under anaerobic-aerobic transitions. Molecular H2 also has a ubiquitous role as an energy carrier in microbial systems, which is underscored by extensive structural diversity among the various hydrogenase enzyme classes. Corresponding functional properties, including active site coordination, substrate transfer pathways and domain compositions of selected enzymes models are being investigated towards developing a broader fundamental understanding of hydrogenase diversity. This presentation will summarize some of our recent progress on studies of hydrogenase-nanoparticle systems, and elucidation of hydrogenase structure-function and catalytic mechanisms.

Bio:

Paul King is a postdoctoral associate with the Photobiology Group at the National Renewable Energy Lab in Golden, Colorado. He received his Ph.D. in Biochemistry and Molecular Biology from the University of Georgia-Athens. His research interests include basic and applied studies on solar production of biofuels by photobiological and artificial photosynthetic systems. Specific areas include using molecular and spectroscopic techniques to investigate the catalytic mechanisms and structure-function of hydrogenases; the biochemical control of photosynthetic hydrogen production in green algae; and solar conversion in model nanostructured photocatalytic complexes. These efforts seek to develop a more fundamental understanding of how molecules integrate into molecular assemblies to control energy transduction in photobiological and photochemical systems. The long-term goal is to apply these concepts and principles towards advancing solar conversion technologies for renewable energy applications.

CAMPUS MAP: *Gamow Tower (Duane Physics), http://www.colorado.edu/campusmap/map.html?bldg=W-GT&x=11&y=11*

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