DEPARTMENT OF CHEMISTRY AND ENVIRONMENTAL SCIENCE
SEMINAR SERIES
SPRING 2019

DATE: TUESDAY, MAY 7
LOCATION: Central King Bldg. - 303
TIME: 1:00pm – 2:20pm

GUEST SPEAKER

Julie Maresca
Associate Professor
Civil and Environmental Engineering
University of Delaware

TOPIC

Photoheterotrophs and heterotrophs use light in terrestrial environments

ABSTRACT

Light is a source of energy and an environmental cue that is available in excess in most surface environments. In prokaryotes, use of light for energy is well understood, but the use of light for information, and the cellular response to that information, has been characterized in only a few species. Freshwater Actinobacteria, which are ubiquitous in illuminated aquatic environments, often have rhodopsins in their genomes. In three actinobacterial species with inactive rhodopsins and no other photosystems, growth is faster in the light than in the dark. Transcriptomic analysis suggested that sugar transport and metabolism are upregulated in the light, while protein synthesis is upregulated in the dark, and physiological measurements have confirmed these predictions. In sunlit aquatic environments, primary producers release organic carbon and nitrogen along with other growth factors during the day. The ability of Actinobacteria to coordinate organic carbon uptake and utilization with production of photosynthate could enable them to grow more efficiently in the daytime, and potentially gives them a competitive advantage over heterotrophs that cannot sense light. Understanding how light cues the transport of organic carbon and its conversion to biomass is key to understanding biochemical mechanisms within the carbon cycle, the fluxes through it, and the variety of mechanisms by which light enhances growth.

BIO

I got my BA in Biology at the University of Chicago, worked as a postbaccalaureate fellow at NIH for 2 years, and then got my PhD in Biochemistry and Molecular Biology at Penn State. I post-doc-ed at MIT in their Civil and Environmental Engineering Department, then joined the Civil and Environmental Engineering Department at the University of Delaware in 2011. I'm also the co-director of the new Microbiology Graduate Program at UD.

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