QUANTITATIVE AND SYSTEMS BIOLOGY COLLOQUIUM: Microbial drivers of methane emissions in coastal wetlands

Susannah Tringe
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Date:

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Time:

10:30 AM - 11:45 AM

Location:

COB 1 114

About the Speaker:

Susannah Green Tringe is the Director of the Environmental Genomics and Systems Biology division at Lawrence Berkeley National Laboratory. She received her undergraduate degree in Physics from Harvard University and a Ph.D. in Biophysics from Stanford University, and joined Berkeley Lab as a postdoc at the Joint Genome Institute in 2003. There she developed techniques for using DNA sequence data for comparative analysis of whole microbial communities, rather than individual organisms. Her current research focuses on using nucleic acid sequence data to study communities of microbes from diverse environmental niches and understand their assembly and function, with the goal of harnessing them for improved environmental and agricultural outcomes. These studies involve a combination of field, lab, and computational approaches to link molecular data to ecosystem processes. Her major research interests include how microbes interact with plants to affect growth, health and stress resistance, how microbes influence greenhouse gas uptake and release in wetlands and agricultural systems, and how microbes can be exploited to enhance soil carbon storage and to break down natural and man-made contaminants.

Abstract:

Coastal wetlands are critical habitats whose many ecosystem services, including flood control, wildlife habitat, and carbon sequestration, have been increasingly appreciated in recent decades, yet they are also sources of the potent greenhouse gas methane. Efforts to convert and restore wetland environments to a more natural state are happening in parallel with sea level rise, with uncertain impacts on their biogeochemistry and greenhouse gas emissions. We have combined omics methods, biogeochemical assays, and gas flux measurements to investigate the factors influencing greenhouse gas emissions from natural and managed coastal wetlands in the San Francisco Bay-Delta region. By integrating these datasets we find that gas fluxes represent a complex interplay of biological, chemical, and physical factors that vary across habitats, and that different mechanisms of methane production and consumption dominate in different locations. In some cases the patterns of methane emissions run counter to conventional wisdom, reinforcing the importance of developing a predictive understanding of methane production to maximize climate benefits of restoration projects and mitigate the impacts of sea level rise.

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