iFAST: The International Forum on Advanced Environmental Sciences and Technology

A series of distinguished seminars by eminent scientists

8 a.m. CST, 9 a.m. EST, 2 p.m. GMT, 10 p.m. China
Wednesday, Dec. 13, 2023

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Alexandra Z. Worden holds a bachelor of arts degree in History from Wellesley College of Massachusetts Institute of Technology where she concentrated on post-colonial Africa, while also studying earth, atmospheric and planetary sciences. While working on her Ph.D. at University of Georgia's Odum School of Ecology, Worden examined growth and mortality controls acting on marine cyanobacteria as a NASA Earth Systems Science Fellow. In 2000, she became an NSF Postdoctoral Fellow at Scripps Institution of Oceanography, where her research showed that tiny unicellular eukaryotes contributed significantly to marine photosynthesis. Prior to coming to the Marine Biological Laboratory, Worden has held professorships in the USA, as well as Germany, where she founded the Ocean EcoSystems Biology Unit in Kiel. Worden's research focuses on the fate and transport of carbon in the oceans, with an emphasis on the biological entities responsible for biogeochemical transformations in the context of the broader ocean milieu. Her research currently focuses on photosynthetic microorganisms, integrating across genomics, evolutionary biology and ecology to explore microbial roles in carbon dioxide uptake and fate. Among other honors, she is a Fellow of the American Academy of Microbiology, a Fellow of the Max Planck Institute for Evolutionary Biology in Plön, Germany, a Visiting Scholar in the Department of Organismic and Evolutionary Biology at Harvard University, and a member of the German National Academy of Sciences Leopoldina.

Activities and interactions between uncultivated microbes in the open ocean

Abstract: Microbial eukaryotes (protists) are diverse and play multiple roles in marine ecosystems, yet many key taxa remain uncultured. Protists have a penchant for interacting with and frequently engulfing other cells – leading to murky situations with respect to types of symbioses, ecological roles, and ultimately fate of carbon contained in the interacting cells. Unfortunately, most methods for observing ocean communities, including some of the most widespread "-omIcs" approaches, do not resolve cell-to-cell interactions. Thus, translating either metagenomes or metatranscriptomes into concrete understanding of the ecology of individual lineages is challenging. Here, we will explore data from ocean field studies that incorporate single-eukaryote cell sorting approaches and provide new insights into interactions between marine protists in the wild and other biological entities. This research identifies new aspects of ecology that shape our knowledge of linkages within marine food webs and the carbon cycle, as well as evolutionary and genomic aspects of microbes.

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Zoom webinar ID: 934 8142 2012 (zoom.us/j/93481422012)

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