

# E201/ME160 UC Berkeley Ocean Engineering Seminar

Spring 2024

## Advancing ocean surface boundary layer models by fusing insights from physics, data, and applications

By

**Dr. Daniel Whitt**

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Friday, February 16th, 2024 – 2:30pm-4:00pm, Etcheverry 3110

### **Abstract**

Ocean surface boundary layers (OSBLs) are key participants in a wide range of high-impact weather and climate phenomena, from hurricanes to El Niño. OSBLs also mediate the transfer of anthropogenic heat and carbon dioxide from the atmosphere to the deep ocean, and hence regulate the pace of climate change. Furthermore, the ocean surface boundary layer hosts about half of all photosynthesis on Earth and regulates the light and nutrient concentrations controlling its rate. Accurate models of the ocean boundary layer are thus crucial to accurate analyses and forecasts of the weather, climate, and key biogeochemical cycles at virtually all scales. In addition, ocean boundary layer models are crucial for operational ocean prediction, including tracking the impacts of oil spills, marine debris or harmful algal blooms and quantifying the benefits of marine carbon dioxide removal efforts. Due to the increasing value of such actionable environmental information as the climate warms, high fidelity models of the ocean surface boundary layer are of high and growing value.

In this talk, I will present some highlights from my interdisciplinary research on the OSBL, in which I use a wide range of approaches to discover the key processes and their interactions and represent them in models. I hope to provide a little perspective on not only what I have learned so far but also the multitude of opportunities to make valuable progress in the future.

### **Speaker Biography**

Since 2021, Dr. Daniel Whitt has been a civil servant research scientist in the Biospheric Science Branch of the Earth Science Division at NASA's Ames Research Center. Dr. Whitt's research contributes to NASA's oceanography and related Earth science programs by advancing our understanding of upper ocean physical, biogeochemical, and ecological processes and representing them in models of the ocean as a component of the regional and global Earth system. Before NASA, Dr. Whitt was a project scientist in the Climate and Global Dynamics Lab at NCAR (2017-2020) and an NSF international post-doctoral fellow in Applied Mathematics and Theoretical Physics at the University of Cambridge (2015-2016).

*Hosted by: Prof. Alexis Kaminski (kaminski@berkeley.edu)*