



JOHNS HOPKINS
Center for Environmental
& Applied Fluid Mechanics

SPRING 2022 CEAFM HYBRID SEMINAR SERIES

“The Gulf Stream–Barrier, Blender, or...Breadmaker? Enhanced Mixing at Sharp Ocean Fronts”

Presented by Prof. Jacob Wenegrat

Department of Atmospheric & Oceanic Science
University of Maryland

Hosted by Prof. Thomas Haine (EPS)

The Gulf Stream front separates the North Atlantic subtropical and subpolar gyres, which have very distinct physical, biological, and chemical properties. How much exchange occurs across the front, and what causes it, is a long-standing question in physical oceanography. Here I will discuss unique direct observations of mixing across the front, which, along with high-resolution numerical models, show how instabilities of sharp fronts generate shear dispersion that enhances exchange between the ocean gyres. This submesoscale (horizontal scales of 0.1-10 km) source of mixing may play a significant role in the freshwater and nutrient budgets of the subtropics, but will not be directly resolved in climate models for many decades.



Jacob Wenegrat is a physical oceanographer, and an Assistant Professor in the department of Atmospheric & Oceanic Science at the University of Maryland, College Park. His research focuses on the geophysical fluid dynamics of the ocean submesoscale—horizontal scales where both planetary rotation and nonlinearity are important—with recent work on flow-topography interaction, multi-scale ocean dynamics, and air-sea interaction. Jacob is an Associate Editor for the *Journal of Physical Oceanography*, a

member of the US CLIVAR Process Study & Model Improvement Panel, and a member of the science team for the NASA Earth Venture Suborbital Sub-Mesoscale Ocean Dynamics Experiment. He has a PhD in Oceanography from the University of Washington.

Friday, March 18, 2022 at 3:00 PM

In-Person Gilman Hall 132

<https://wse.zoom.us/j/93762992307>