

School of Earth and Environmental Sciences Fall 2024 Colloquium Series

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Science Building C-207

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A Regional and Interdisciplinary Approach to Understanding the Role of the Ocean in the Carbon Cycle and Anthropogenic Climate Change

The ocean plays a crucial role in Earth's climate regulation, absorbing over 90% of excess heat trapped by the enhanced greenhouse effect and nearly a quarter of human-generated CO₂. Yet, both its role in climate dynamics and its responses to a changing planet are often oversimplified in models and discussions, treating it as a single, homogenous system. And traditionally, the study of oceanography has been compartmentalized into marine geology, chemistry, physics, and biology, with climate change addressed only in a final synthesis module, if at all.

Drawing on 20+ years of studying the marine biological pump and its role in carbon sequestration, and my experience teaching Introductory Oceanography, I've developed a new framework that focuses on carbon's role in climate change and divides the ocean into distinct regions based on depth and latitude. This methodology integrates all four disciplines to study the carbon cycle's complex dynamics, and highlights unique regional processes and climate feedback loops.

In this talk, I will advocate for this interdisciplinary, regional approach to understand, predict, and teach about the ocean's multifaceted response to, and impact on, our changing world.

