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Title: "From Months to Milankovitch: climate variability and response in a coupled Earth system"

Blurb: "How do interactions between different components of the Earth System - atmosphere, ocean, cryosphere, and the solid earth - control the Earth's ability to close its energy budget? How, in turn, do these energetic constraints determine the timing, location, and magnitude of climatic changes across a wide range of time scales."

Abstract: "Energy conservation is a strong constraint on any physical system. If we want to understand how much the Earth will warm in response to an imposed forcing, we have to understand how much the Earth *needs* to warm in other to close its energy budget. They key quantity I will discuss is the efficiency with which the Earth sheds radiation back to space, otherwise known as the net radiative feedback. I will demonstrate that this radiative feedback is a function of (a) how spatial patterns of sea-surface temperatures interact with atmospheric radiation and clouds, and (b) how these spatial patterns evolve in time. Understanding this dependence of the radiative feedback on space and time allows us to reconcile the notorious discrepancies in estimates of future warming drawn from numerical simulations, observations of ocean heat content, and the satellite record.

After establishing the feedback framework for the coupling of ocean temperatures and radiation, I will show how the same framework can help us bridge a large continuum of climate processes. We will take a journey from monthly time-scales where atmosphere-ocean interactions are mediated by stochastic weather anomalies, to the long time-scales of orbitally-induced Milankovitch cycles, where the physical atmosphere-ocean system couples to the cryosphere and the slowly evolving solid Earth."