Department of Earth Ocean and Atmospheric Sciences Ph.D. Dissertation Defense

Decomposition of *Sargassum*-derived organic matter in carbonate and silicate beach sands

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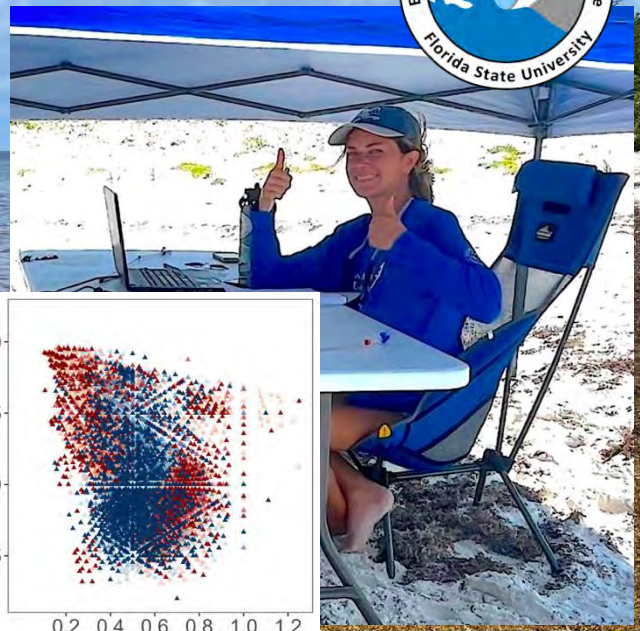
August, 31, 1:00 pm, room EOA2052
Zoom: https://fsu.zoom.us/j/94717352935

Major Professor: Markus Huettel



The annual mass strandings of *Sargassum* macroalgae on sandy beaches in the western Atlantic, Gulf of Mexico, and Caribbean are evolving into an unprecedented ecological and economic disaster. Over the past two decades, Sargassum blooms have expanded exponentially, harming coastal ecosystems and economies. Despite the growing ecological and socioeconomic impacts, the controls governing the degradation of stranded *Sargassum* in sandy beach environments remain poorly constrained, hindering educated remediation efforts. This dissertation investigates the decomposition of particulate and dissolved *Sargassum*-derived organic matter in permeable carbonate and silicate beach sands, integrating controlled laboratory experiments, field measurements, and molecular-level analyses to resolve degradation pathways across multiple scales. The results reveal how substrate form, environmental conditions, and sediment mineralogy jointly regulate carbon turnover from solid biomass to molecular constituents.