Dean's Colloquium

Ms. Pa-Shun Hawkins, Senior, Undergraduate Student
Department of Marine and Environmental Science

When: Wednesday, February 1st, 2023
Where: Turner 129
Time: 3:00 – 3:20 pm, Q&A: 10 min.

Trait Variation of a Calcifying Macroalga Predicts Herbivory Pressure on Coral Reefs

Abstract: Overfishing herbivorous fishes can weaken herbivory pressure on coral reefs, driving or maintaining shifts from coral to algal dominance in these imperiled ecosystems. Traditionally, quantifying absolute changes in herbivory pressure requires long-term data and/or population models that can be expensive and time consuming. However, trait-based ecology, a common approach in terrestrial ecology that is rarely used in marine ecosystems, could provide a simple and rapid approach for estimating herbivory on tropical reefs. We tested this hypothesis on five fringing reefs on Moorea, French Polynesia. We estimated relative herbivory with a bioassay and measured seven algal traits related to herbivory (volume, height, wet and dry weight, percent calcification, tensile strength, and toughness) of the calcifying macroalgae, Halimeda opuntia. Herbivory differed significantly among sites (ANOVA p < 0.0001), with a ~ 8-fold difference between the lowest and highest pressures. Algal traits varied concomitantly; algae from high herbivory sites were larger, allocated more mass to structure, and were more functionally diverse (PERMANOVA, p < 0.0001) than low herbivory sites. A field experiment manipulating herbivory (none, ambient, simulated) showed algae subject to simulated and ambient herbivory occupied similar trait space, confirming that herbivory caused algal trait differences. Results show the power of trait-based ecology for estimating herbivory on macroalgal-dominated coral reefs, providing an important tool for the study and management of coral reef ecosystems.

Bio: Pa-Shun Hawkins is an undergraduate student in the Marine and Environmental Science program at Hampton University. Pa-Shun is interested in understanding how climate change exacerbates animal, plant, and human diseases caused by some microbes to analyze potential impacts and predict what will happen if the cascading effects of climate change persist. More specifically, she aspires to focus on change in community composition influenced by climate change and its role in making these communities more susceptible to infection. She has been an intern for Dr. Indu Sharma at the Marine Biological Laboratory in Woods Hole, MA, and for The Diversity Project, a summer research experience affiliated with the University of California, Los Angeles. Regarding her career, she seeks to receive a Ph.D. in Environment and Sustainability and aspires to gain a career as a marine scientist.