Maggie Straight

Lim Award

Ph.D. Candidate, Ocean Science and Engineering

First Year ARCS Scholar

Georgia Tech

The Reciprocal Impacts of Bacterial-Host Interactions in Aquatic Environments

Symbiotic bacteria exchange nutrients and signaling molecules with their hosts. The exchange of these compounds results in both organisms experiencing shifts in their metabolism.

How do bacteria support the growth and health of their eukaryotic hosts?

Bacteria Increase Algal Growth

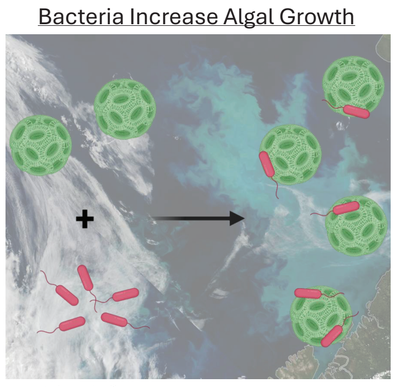


Image from NASA

Bacteria Increase Cordgrass Biomass

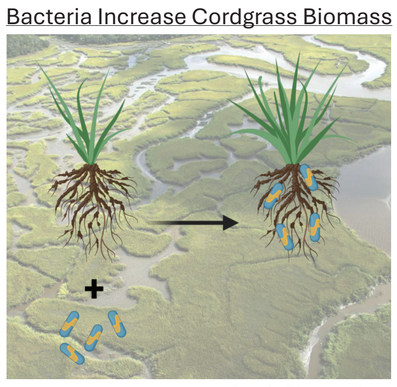
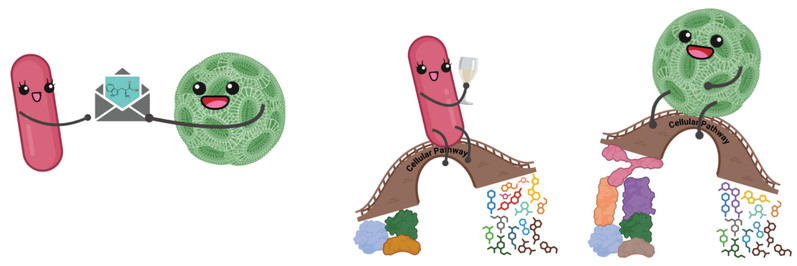
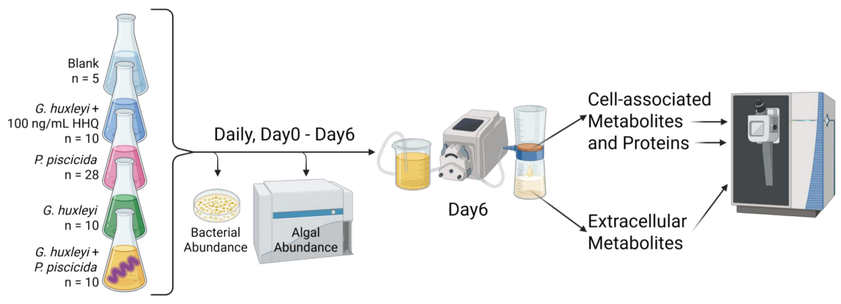


Image from Georgia Climate Project

Bacteria Exchange Nutrients or Signaling Molecules with Their Hosts that Beneficially (or Detrimentally) Alter Host Cellular Processes a.k.a. Metabolism



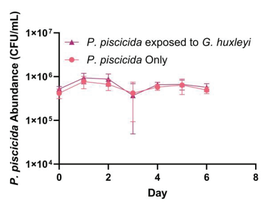
1) What nutrients and signaling molecules does the marine bacterium *Pseudoalteromonas piscicida* exchange with algal host *Gephyrocapsa huxleyi*?
2) How are the cellular processes of each organism impacted by their interaction during co-exposure?

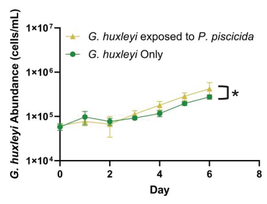


In collaboration with Dr. Brook Nunn and Anaïs Gentilhomme (UW), Dr. Kristen Whalen and Dr. Amanda Platt (Haverford), and Dr. Elizabeth Harvey and Dr. Hannah Reich (UNH)

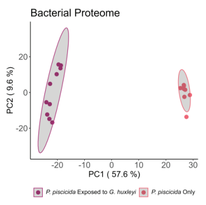
Algal Growth is Improved by the Presence of Bacteria
Algal and Bacterial Metabolisms Shift During Co-exposure

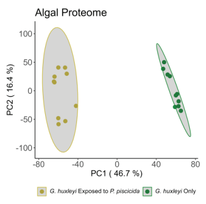
Altered Algal Growth



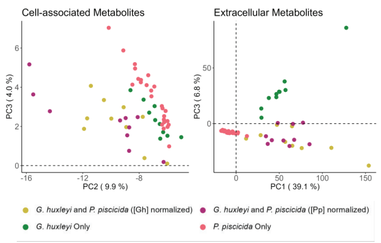


Altered Proteomes

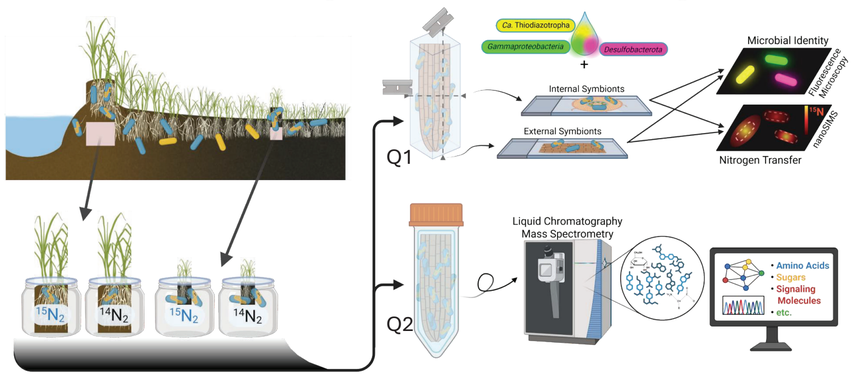




Altered Metabolomes



1) Which bacterial symbionts exchange the most nitrogen-containing compounds with their cordgrass host?
2) What compounds are exchanged / how do the bacteria or cordgrasses utilize the fixed nitrogen?



In collaboration with Dr. Joel Kostka and Dr. Jose Rolando (GT), Dr. Wiebke Mohr (MPI, Germany), Dr. Jillian Petersen (UV, Austria)

Beneficial Nitrogen Fixing Bacteria Could Become Bacterial Probiotic Candidates to Aid Salt Marsh Restoration by Improving the Growth and Health of Young Salt Marsh Cordgrasses

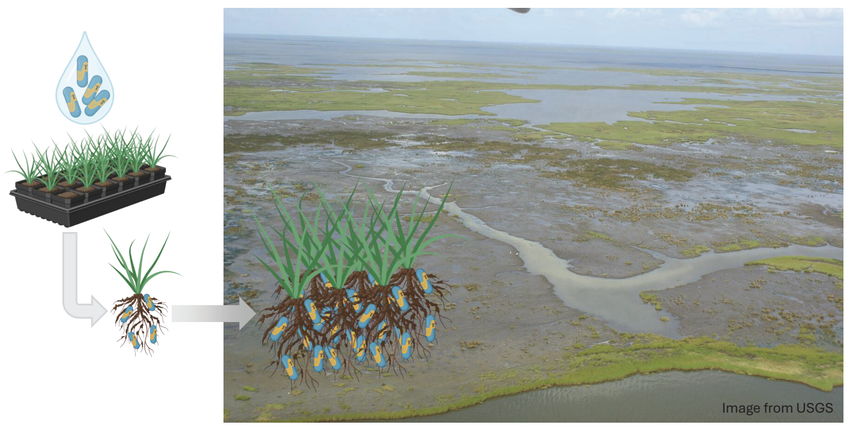


Image from USGS

Scholar Awards Celebration

November 12, 2025

ARCS Scholar Awards Celebration — ARCS Foundation Atlanta

Igniting Innovation in Georgia