

**New England Botanical Society
Graduate Student Research Award
2021 AWARD WINNER**

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**Coastal wetland carbon dynamics: Testing how salinity and light affect
root exudation rates of dominant salt marsh grasses**

Best known as ‘blue carbon’ ecosystems, coastal wetlands are recognized for their ability to sequester carbon. However, salt marshes and their capacity to sequester carbon are threatened by coastal development and accelerated sea level rise (SLR); these threats are particularly acute in New England where coastlines are heavily populated and SLR is 3-4 times the global mean. Accelerated SLR expands dominance of salt tolerant, native *Spartina* grasses, whereas tidal restriction reduces marsh salinity, leading to an expansion of the introduced haplotypes of *Phragmites australis*, making *P. australis* a common management target. However, it is not well understood how shifts in species composition alter carbon sequestration rates and the overall stability of coastal wetland soil organic matter. One plausible explanation is differential plant rhizospheric exudation of organic carbon and oxygen to stimulate microbes and increase nutrient availability, known as “priming.” I will quantify carbon and oxygen exudation rates of *S. alterniflora* and *P. australis* under manipulated salinity and light levels to parse out how plant species shifts associated with tidal restriction and SLR might influence microbial decomposition rates under different environmental scenarios. Quantifying the relative carbon and oxygen exudation rates of these dominant salt marsh species will improve our understanding of how plant species directly control carbon cycling in coastal wetlands. Not only will this work provide insight on carbon cycling in salt marshes, but it will also inform how human disturbances of salt marshes, through tidal restrictions and associated plant community shifts, will alter ‘blue carbon’ stability.

The New England Botanical Society offers awards of up to \$3,000 to graduate students to support botanical research. The awards encourage and support botanical research on the New England flora (plants, algae, and fungi), including support for field, lab, and herbarium work, as well as travel to New England by those who would not otherwise be able to work in the region. The awards are made to the graduate student(s) submitting the best research proposal dealing with systematic botany, plant ecology, genetics, plant conservation biology, or related fields pertaining to the New England flora.