

Description of Projects

I have 2 potential projects for a FFIRE mentee.

Quantifying the Mechanisms that Maintain and Shift Species Boundaries in the Coastal Ocean: Computational and Database Interdisciplinary project. This project examines how the interaction of ocean currents and ecological dynamics drives patterns of larval delivery along coastlines. The differential dispersal of these larvae has myriad repercussions for species interactions and distributions. Through database construction and analysis, and simulations of particles in oceanographic models, this project seeks to understand how currents and circulation in the coastal ocean affect 1) the origin of biogeographic boundaries, 2) the connectivity of coastal populations of marine species, and 3) the identity of coastlines most susceptible to invasion by benthic species with planktonic dispersal. This project is a funded NSF collaboration with Dr. Jamie Pringle, who is a physical oceanographer at the University of New Hampshire. Thus, the postdoc will work in an interdisciplinary environment of ecology and oceanography. The postdoc will carry out the compilation of species range boundaries and life histories into a database (SQL). These data will be acquired from both open source agencies like GBIF and the Smithsonian, and the scientific literature. Existing oceanographic models we have developed will provide a foundation for the postdoc to develop hypotheses about larval transport, delivery, and retention and their role in present and future biogeography. I expect that the postdoc will work both within this set of project questions, and on related topics of their own development. The postdoc will take the lead in writing at least 3 scientific papers focused on each of these questions and their overlap.

Estuarine Disturbance Ecology: Experiment-focused project. This field-based project focuses on disturbance in salt marshes and tidal creeks and has more open-ended project goals that the applicant can help shape. In general, this project should examine how disturbances affect ecosystem functioning, including primary productive, nutrient cycling, trophic energy flow, turbidity, and especially parasitism. Some portion of this work will be centered on Sapelo Island, which is the location of the UGA Marine Institute and the operation center of the Georgia Coastal Long Term Ecological Reserve (LTER). The LTER has an actively funded NSF grant, a portion of which goes to Dr. Byers to examine broadly the effects of various disturbances in the estuary on the biota and ecosystem functioning. Possible disturbances to examine include tidal creek bank slumping, deposition of *Spartina* wrack, hurricanes, herbivory, plus others of the applicant's interest. Target organisms might include snails, oysters, clams, mussels, shrimp, fish, crabs, *Spartina* cordgrass, mammals that use the salt marsh, or others. The LTER has 20 years of monitoring data on various marsh biota that could potentially be used as background information for a project. The LTER also has a number of other graduate students and senior investigators with whom the postdoc mentee and I can develop collaborative aspects related to our focal project. Applicants for this position should be prepared to share 2-3 specific project ideas upon application.