Michigan State University NSF Research Experience for Undergraduates (REU): Climate Effects on Species Interactions in Terrestrial and Aquatic Systems

Mentors: Kileigh Welshofer (Graduate Student), Laura Twardochleb (Graduate Student), Dr. Phoebe Zarnetske (Assistant Professor)

Affiliations: Kellogg Biological Station, Long-Term Ecological Research, Department of Forestry, Department of Fisheries and Wildlife, Ecology, Evolutionary Biology, and Behavior Program, Michigan State University

Summary: The student will have the opportunity to gain hands-on experience with field based experiments in both terrestrial and freshwater systems. Responsibilities will include assistance in field- and lab-based data collection as well as set-up of an aquatic long-term ecological experiment. The student will be expected to have a positive attitude for the duration of the program and will be responsible for working ~40 hours/week from May-August, 2016, exact dates TBD. Field work requires the ability to work in all non-hazardous weather conditions. This is a paid position that includes housing, meals, and funding for travel and research expenses.

Research Projects:
1. Warming effects on invasive species success: Rapidly increasing warmer temperatures are predicted to favor introduced plants due to their advanced ability to adapt to new abiotic conditions. In addition, plants that are introduced into novel ecosystems often lack their native herbivores that limit their success, allowing the introduced plants to outcompete the existing native species. This experiment addresses the extent to which warming affects the success of introduced plant species under two types of naturally occurring herbivore pressure, insects and small mammals. The student will gain experience working with open top chambers (OTCs) that simulate warming in terrestrial systems as well as advanced HOBO instruments that record long-term abiotic conditions. The individual will also assist in the handling and identification of plants, insects, and small mammal species.

2. Effects of climate warming on freshwater invertebrate body sizes, predator-prey dynamics, and population abundances: Climate warming is expected to shift body size distributions of freshwater invertebrate populations toward smaller body sizes. Increased temperature and shifts in body sizes that result from climate warming should influence the strength and dynamics of predator-prey interactions, and in-turn, alter equilibrium population abundances of predators and prey. We are using pond surveys and pond-mesocosm warming experiments to understand the consequences of climate warming for freshwater invertebrate body sizes and predator-prey interactions. The data from our field surveys and experiments will be used to create mathematical models that predict population abundances of freshwater invertebrates under future climate warming. The student will gain experience in standardized sampling of pond invertebrates, including benthic macroinvertebrates and zooplankton, and water sampling. Student will also gain experience in setting-up and monitoring pond-mesocosm experiments. Field sampling will occur at Lux Arbor Reserve near Kellogg Biological Station, and there is a possibility for off-site sampling in northern Michigan.

TO APPLY: email the following to Dr. Phoebe Zarnetske at plz@anr.msu.edu BY MAR. 15, 2016:
1) your resume, 2) unofficial transcript(s), 3) a well-written statement of interest (up to 350 words) that highlights how these experiences will enhance your learning and career goals, and 4) contact information for at least one reference. We encourage applications from underrepresented groups in the sciences. Funding is from the National Science Foundation. You must be an undergraduate student who is a citizen or permanent resident of the United States or its possessions.

For more on our lab see: http://www.msu.edu/~plz