Please share widely! Two NSF-funded PhD Positions Open

The Budke Lab is recruiting two PhD students in the Ecology and Evolutionary Biology program at the University of Tennessee – Knoxville (UTK), USA. We are recruiting applicants to apply by Dec 2021 and start Aug 2022. These positions include Graduate Research Assistantship funding for 3 years each, which means that the students will not have teaching responsibilities during those three years and will focus on research.

Students will join our 5-year National Science Foundation-funded project studying the functional morphology and evolution of the parent-offspring conflict in mosses. They will participate in fieldwork, analyze moss cuticles using microscopy and chemistry techniques, examine water conducting cell and haustorium anatomy, perform manipulation experiments to study resource transport, and will integrate natural history collections into these studies (Fig. 1). Students will be encouraged to build on and expand the research plans outlined in the grant to develop their own independent dissertation projects.

Graduate students will gain both mentoring and outreach experience as part of the project. They will mentor undergraduate students in independent laboratory research projects that complement the larger goals of the grant. In collaboration with other lab members, they will participate in outreach activities that engage grade 3-12 students with natural history collections and help to develop community engagement activities focusing on plants (Fig. 2).

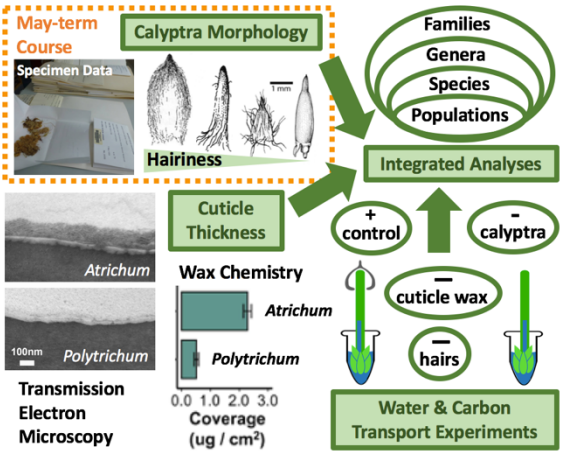

Figure 1. Integrated analysis of the functional morphology of the parent-offspring conflict. **Preliminary data showing cuticle thickness differences between species with smooth and hairy calyptra.** Line drawings from the Flora of North America (1993+).

For additional information and to learn more about the lab check out our website http://jmbudke.github.io/. These positions are open to both international and US applicants. To apply for these positions please send an email expressing your interest with your CV and unofficial transcripts attached to Dr. Jessica Budke jbudke@utk.edu.

Figure 2 (A) UTK students, faculty, staff, and community volunteers collecting plants in the field. (B) Students working with natural history specimens at the UTK herbarium.

PROJECT OVERVIEW:

This project will increase understanding of the evolution of the parent-offspring conflict through an integrated set of research and education activities. This conflict is a striking paradox that is pervasive across the tree of life. Parents must balance the investment of limited resources between provisioning their offspring during early development to increase their chances for survival and maturation, and reserving resources for their own survival and future reproduction. The primary research aim of this project is to investigate the adaptations that regulate the parent-offspring conflict across diverse species. Moss plants are an ideal system to study this conflict since their offspring remain physically attached to and nutritionally dependent on the parental plant throughout their lifespan and the structures involved in the parent-offspring conflict vary across species. The research and education activities undertaken in this project will provide training and learning opportunities for a diverse group of students. The education components of this work will bring undergraduate students into the field and behind the scenes of natural history collections during an engaging May-term course at the University of Tennessee - Knoxville (UTK), where field collections and specimen-based research will be essential components of the class. Experiences and data from the course will then be used to build educational modules and activities for UTK's grades 3-12 education programs, on campus natural history collections, and local public botanical gardens.

This research will use an innovative and integrated approach that incorporates comparative analyses of functional morphology, physiology, and evolution using field-collected plants and natural history specimens to understand the processes that have led to diverse adaptations for regulating parental-offspring resource allocation across species. An interconnected set of hypotheses examining functional morphology and physiology will be tested comparatively using sets of diverse moss species to deepen understanding of the influence of the parent-offspring conflict on survival, fitness, and ultimately evolution of plants. This project will also generate a robust, globally sampled moss phylogeny in order to reconstruct patterns of morphological evolution and test for correlations between structures influencing the parent-offspring conflict. This research will lay the groundwork for future biodiversity studies in mosses, and will improve our knowledge and understanding of parent-offspring relationships broadly across plants.