

From: Ludsin, Stuart A.
Subject: Graduate Student Position in Aquatic Ecology

Graduate Student Position in Predator-Prey Ecology
Aquatic Ecology Laboratory
The Ohio State University
Columbus, OH

Drs. Michael Fraker (<https://ael.osu.edu/people/fraker.24>) and Stuart Ludsin (www.ludsinlab.com/) have an opening for a MS (or possibly Ph.D.) student to begin during fall 2017 (with funding to begin as soon as March). The student would work on a project designed to better understand how prey integrate phenotypically-plastic antipredator defenses (behavior, morphology) over their development. The student also would work closely with collaborators on the project (Dr. Robert Denver, University of Michigan; Dr. Barney Luttbeg, Oklahoma State University) and would have opportunities to initiate independent research related to project objectives.

Project description: Amphibian tadpoles display extensive phenotypic plasticity in anti-predator defenses that enhance fitness by increasing survival to metamorphosis. While the induction of these defenses and their evolutionary and ecological significance have been extensively studied, the proximate mechanisms that underlie them are largely unknown. Because these responses are employed with different lags to predator exposure and have different consequences to species interactions, we must learn how these responses are mechanistically integrated and what tradeoffs are implicated.

We found that tadpole anti-predator defenses are partly controlled by a bimodal physiological stress response that is initiated by an alarm pheromone released from tadpole skin in response to predator attack. Tadpoles suppress behavior and their neuroendocrine stress axis in the short-term, with this behavioral inhibition enhancing survivorship by reducing exposure to predators. However, tadpoles increase stress hormonal activity over a longer time frame, which induces adaptive changes in tail and body morphology. These changes either enhance survivorship by facilitating escape behavior or by providing a decoy (large tail) to deflect lethal predator attacks from the more vulnerable body.

Our research approach will use endocrinological measurements and modifications (i.e., blocking or enhancing the stress response with exogenous hormones/drugs) in conjunction with ecological lab and mesocosm experiments and dynamic state variable modeling. We seek to learn: 1) how the prey neuroendocrine stress response operates over time under a complex predation environment; 2) how stress hormones govern the expression and integration of the prey phenotypic response (i.e., behavior, morphology) in an ecological context; and 3) what the fitness consequences of this regulation are.

Location: Successful candidates will join a dynamic, interactive group of students, post-docs, and faculty at The Ohio State University's Aquatic Ecology Laboratory (<http://ael.osu.edu/>) within the Department of Evolution, Ecology, and Organismal Biology (<http://eeob.osu.edu/>).

Qualifications: Successful applicants will be creative, motivated, and capable of working effectively both independently and in collaborative groups. A bachelor's degree in biology, ecology, or a related field is required. Strong writing and quantitative skills are essential. A background in endocrinology or computational modeling also would be useful.

Stipend: ~\$2,325/month plus full tuition waiver and health benefits. Full Graduate Research Associates (GRA) support exists for ~2.5 years, with opportunities to teach (if so desired). Graduate Teaching Associate (GTA) support also exists for those interested in staying longer to complete a PhD.

How to apply: EEOB's application deadline has been extended to **January 15, 2017** to accommodate this position. In addition to applying online (<http://eeob.osu.edu/grad/program-admissions>), please email Drs. Michael Fraker and Stuart Ludsin at apps.ael@gmail.com: **1**) a letter of interest that briefly describes your educational and research background, as well as your research interests/goals; **2**) a curriculum vitae that also includes your GRE and (if applicable) TOEFL/TSE scores; **3**) an unofficial copy of your transcripts; and **4**) contact information for at least three professional references. Please put "Graduate Student Position" in the subject line.

Contact information: For additional information, please visit <http://www.ael.osu.edu/> or contact Dr. Fraker (fraker.24@osu.edu) or Dr. Ludsin (ludsin.1@osu.edu).