Investigating Adaptive Responses to Climate Change Using Simulation Models

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Proposal Summary: Species with declining populations may adapt to evade extinction in a process termed evolutionary rescue. I propose to construct a simulation platform to enable diverse explorations and hypothesis-testing about the factors that predict successfully evolutionary rescue. Students in our upper-division, required evolution course will develop specific hypotheses, devise experimental tests, and analyze, interpret and present simulation results. The simulation code will be modular and easily abstracted, allowing students to appreciate and engage with simulation modeling without prior knowledge of syntax. Statistical and visualization tools in R will be made accessible through custom web-based applets, allowing hands-on analysis experience without the barrier of learning statistical software. Rapid generation of well-replicated simulation data will leave the students with a satisfying answer to their hypotheses and build publishable data sets. Assessments, both throughout the course and longitudinally, will track changes in students’ attitudes about research and themselves as researchers as well as their knowledge about the scientific method and threats of species extinction; these data will support the PI’s subsequent application for an NSF CAREER grant. The proposed budget will pay for one-time expenses in equipment and preparation time, allowing this course to be run repeatedly.

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