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Sabbatical Report
Fall 2024

I completed a sabbatical leave in Fall 2024, during which I worked with the research group of George Roderick and Rosemary Gillespie at the University of California, Berkeley. Their group integrates genetic, ecological, and biogeographic data to understand processes generating biological diversity on islands. The group includes graduate students and postdoctoral researchers using genetic tools to study topics such as spider diets, invertebrate community structure, and island biogeography.

During my sabbatical, I traveled regularly to the Berkeley campus to attend lab meetings and seminars in the Departments of Environmental Science, Policy, and Management; Integrative Biology; and the Graduate Group in Entomology. These activities provided exposure to current analytical approaches and conceptual frameworks in ecology and evolution. I also engaged in discussions with faculty members, postdoctoral researchers, and students working on related research topics.

A major focus of my sabbatical was to make progress toward completion of manuscripts based on prior grant-funded research conducted with graduate students and undergraduates. I worked extensively on a manuscript derived from a gene expression experiment conducted by my graduate student Joanna Elmore, following related work over the preceding summer on a physiological performance experiment conducted by my graduate student Elliott Smeds. Both projects identified gene fragments and transcripts associated with responses to heat stress and reduced oxygen availability in montane insects. To support interpretation of these results, I conducted extensive BLAST searches using resources provided by the National Center for Biotechnology Information to find and identify homologous sequences in other insects and infer putative gene functions. Given the substantial number of regions and transcripts involved (hundreds), I maintained a detailed digital notebook documenting these analyses, which will be used during final manuscript preparation.

In support of this work, I expanded my training in statistical analysis and data visualization using the *R* programming environment, which is now a standard tool in biological research. While at Berkeley, I gained access to a series of *R* workshops offered to the campus community through the Gillespie/Roderick lab and completed approximately ten hours of formal instruction. Building on this training, I spent additional time developing scripts and figures for transcriptomic analyses, including use of AI-based tools to support code and figure development. This work resulted in improved data visualization and increased quality of data analysis with genomic datasets.

During this time, I also completed the second year of my term as President of the Pacific Coast Entomological Society, an international professional organization of entomologists. In this role, I organized invited research presentations, coordinated with other officers on society operations, and contributed to long-term planning and leadership transitions. During my sabbatical, I organized a seminar by a UC Davis researcher on environmental change and insect pollinators at UC Berkeley in October, and a second presentation on the restoration of blue butterfly populations at the California Academy of Sciences in November. In addition, I presented a virtual talk entitled “Genomic variation in a cold-adapted leaf beetle” as part of a symposium associated with the California Conservation Genomics Project at the Biodiversity Genomics Conference (Sanger Institute) in October 2024.

I also served on an in-person National Science Foundation grant review panel evaluating proposals in population and community ecology. This service involved reviewing proposals, contributing to panel discussions, writing panel summaries. It provided insight into current funding priorities and proposal evaluation criteria, as well as opportunities for discussion with NSF program directors.

Near the end of the fall semester, I took part in a field-based diving trip to the Raja Ampat region of Indonesia, an area recognized for exceptionally high coral reef biodiversity. This experience deepened my understanding of tropical reef ecology and current threats to marine ecosystems, and has newly informed my teaching in ecology, evolution, and biological diversity.

I have used the graphics and analytical skills that I gained during my sabbatical for graduate and undergraduate student instruction during my subsequent teaching assignments. During the spring 2025 semester, I applied them towards instruction in a Biology 500S graduate seminar on professional skills development, focusing on generating research questions, writing about research results, and generating graphs in *R* or related programs. I also helped my finishing graduate student Justin Brasil produce high quality figures for his Master's thesis, completed in summer 2025. Finally, I adopted a model of instruction, since my sabbatical, that emphasizes constructive use of AI to help students learn biological principles by asking appropriate questions to AI models, while also shifting assessment of student work back to hand written assignments and tests, where students must use traditional study and learning tools and complete assignments in class without access to AI tools.

In summary, my sabbatical leave enabled substantial progress toward completion of manuscripts based on prior genomics and physiological research, strengthened collaborations and professional engagement with the scientific community at UC Berkeley and other institutions, and provided focused training in analytical and visualization tools essential for modern biological research. The skills and insights gained during the sabbatical have supported subsequent student mentoring and instruction, and they position me to complete and submit manuscripts arising from this work to peer-reviewed journals.