

Organismic and Evolutionary Biology (OEB) Graduate Program
Strategic Planning Spring 2015
3 April 2015

Program Overview

The Organismic and Evolutionary Biology (OEB) graduate program, founded in 1993, has two main missions: (i) to offer top-notch educational opportunities and professional guidance for our graduate students, and (ii) to serve as an intellectual, organizational, and service hub for researchers in the fields of ecology, evolution, and organismal biology. OEB draws faculty from numerous institutions across the Pioneer Valley including UMass (12 departments), Amherst, Hampshire, Smith, and Mt. Holyoke Colleges, the Conte Anadromous Fish Research Center, and Harvard Forest. Our roster of trainees currently includes 33 PhD students and 3 MS students. We are one of the largest and most active graduate training programs of our kind in New England.

Researchers in OEB emphasize and integrate ecological, organismal, and evolutionary perspectives. Ecological research in OEB spans major levels of biological organization, from individuals to populations, communities, ecosystems, and biomes. Organismal research in OEB tackles questions about morphology, physiology, biomechanics, neurobiology, endocrinology, behavior, and learning. Evolutionary research in OEB addresses wide-ranging topics including adaptation, diversification, speciation, co-evolution, mating systems, genomics, bioinformatics, and molecular evolution. Research efforts by OEB scientists often bridge basic and applied realms, for example through studies of biological communities and how they are impacted by invasive species, climate change, and human-wildlife interactions. We also possess significant experimental expertise, such as in the study of biomechanics, behavior, and learning. And we have one of the largest concentrations of evolutionary biologists in New England. Many OEB members have international profiles, our field sites and scientific collaborations span the globe.

In terms of student training, OEB is designed to help students immerse themselves in hands-on research as soon as they enter our program, and accordingly we emphasize research experience in favor of large amounts of formal coursework. In their first two years our students take two core courses, one in Ecology and one in Evolution. Our students are also expected to achieve baseline levels of expertise in statistical theory and application, through coursework and a student-led working group, which centers on data analysis and coding in the R statistics platform. Mastery of evolution, ecology, statistics, and general biology is tested in an oral comprehensive exam in the second year. Overall we emphasize the value of intellectual breadth in graduate training, and we tend to recruit self-motivated and interactive students who are specifically interested in integrating across disciplines and developing broad skill sets.

We achieve our professional development goals in a number of ways. First and foremost is our Darwin Post-doctoral fellowship program. Darwin Fellows, selected through competitive national searches, provide our graduate students with valuable near-peer advising and mentoring, and lead student discussion groups and seminars. Our Darwin program and has served as a model for post-doctoral programs at other institutions, such as Dartmouth and U. Arizona. Other professional development activities in OEB include workshops for teaching, grant writing, and science-communication; internal research grant competitions; and support for conference travel. OEB students are highly

active in programs hosted by the Center for the Integration of Research, Teaching, and Learning (CIRTL), which prepares participants for careers involving teaching. OEB members are also unusually active in outreach, exemplified by our highly successful, student-driven program "OEB Science Café".

The high satisfaction of our students in their OEB education is reflected in the 2013 UMass Doctoral Student Experiences Survey. OEB students report high satisfaction in overall experience, program emphasis, doctoral experiences, academic activities, and obstacles to academic process, at levels that exceed college and campus levels in virtually all subcategories queried. Students rated the overall quality of our program as 1.52 (n=21), on a scale from 1 (highest) to 5 (lowest).

Vision, Challenges, and Plans

Our primary vision for future years is, simply stated, to further improve the quality of our program and the graduate student experience. Achieving our vision requires that we grapple with four main sets of challenges.

The first set of challenges emerges from our standing as one of the 4 life-sciences interdepartmental graduate programs (IDGPs). As such we have no formal mechanism in place that would allow us to recruit or maintain new faculty to build to research strength. Instead we rely on departments for personnel decisions such as hiring, tenure and promotion. Ideally we would be granted a more formal "seat at the table" as hiring decisions are made, or even a chance to direct hires who would then be considered "freebies" for potential host departments.

As an IDGP we also have limited access to resources and infrastructure, and rely on departments for TA lines for a significant fraction of support for our students. Our corresponding inability to forecast future TA lines limits our flexibility during student admissions and recruitment. We often lose top applicants, including students from underrepresented groups, to programs that can make firmer and more generous offers.

Plan: The recent review of IDGP structure makes formal recommendations for policies that we hope will improve our ability to attract consistent support lines for our students. We would also like to find a mechanism that gives us a clearer voice in hiring decisions. As a start we plan to convene an internal OEB committee that will identify and prioritize areas of expertise for a nationally recognized OEB program. Our OEB community, because of its breadth, has a chance to see fairly far ahead where new areas of interdisciplinary integration are emerging, and to help advise departments in hiring accordingly. One way that we could work around financial limits (salary and start-up packages) would be to focus recommendations on field biologists or modelers, i.e., areas where people can still do excellent work with modest budgets.

We also plan to develop a new program for mentoring pre-tenure OEB faculty in successful advising and student recruitment, skills that are especially important in this increasingly competitive climate.

A second main set of challenges we face in achieving our vision centers on the declining national rates of extramural grant funding, which combined with the rising costs of hiring graduate students (including a steeply-rising curriculum fee) makes it harder for our

faculty to commit financial support to students. We have had past success with one training grant program (GAANN) but limited success with more research-focused training grants such as those administered by the National Science Foundation. We are especially interested in helping our pre-tenure faculty support and train graduate students, and a training grant would facilitate this goal.

Plan: A near-term goal is to reinvigorate our efforts in identifying and applying to training grants. In a past effort, we allocated money to hire a grant writer (adjunct faculty) who wrote a training grant that resulted in the GAANN funding. We think that new resources to support a similar hire would be a good investment.

A third main challenge for our graduate program is staffing our core courses. At present, faculty participate in our core courses as a voluntary overload, which means that individual faculty typically contribute only one or two weeks. As such the courses have devolved into the dreaded “faculty parade”, and the quality of instruction has suffered. More effective core courses would be led by a single faculty member who could devote the necessary time and effort to high-quality instruction. The real difficulty here is that departments are ever-more strapped in staffing undergraduate classes with skyrocketing enrollment, which makes it harder for departments to “loan” faculty to graduate level courses. While our faculty used to offer wide-ranging graduate courses, we now can barely staff our core course.

Plan: Negotiate a mechanism that would allow OEB faculty to return to the graduate teaching mission. Identify potential sole-instructors for our two core courses, and find a way to grant them credit for their efforts.

A final main challenge we face concerns our ability to support the Darwin Fellow program. In the first decade or so of OEB we were able to hire two fellows, each for two years and offset by a year. This enabled a strong culture of best-practices to be developed and maintained, and provided twice the focused mentoring for our students. About 10 years ago one of the lines was structured as an official state line, but we lost the other to a lack of funding.

Plan: We initiated a development fund to restart the second line, but remain far short of our goal. We need new ideas on how to reinvigorate this line of fund-raising.

In addition to meeting these major challenges, we plan to continue improve our students’ experiences through refinements to our curriculum.

Plan: We would like to offer more topical 1-credit graduate courses, which would give students additional structured opportunities for exploring topics of interest in greater depth and directed by areas of faculty expertise. Ideally we could get departmental credit for these efforts: otherwise, such courses would have to be taught as overloads, and are less likely to attract participating faculty. We are also excited about emerging opportunities to partner with the Graduate School, CIRTL, and the CNS Teaching Fellow program in offering our students wide-ranging opportunities in professional development.