



BioMass

Biology Alumnus Newsletter University of Massachusetts at Amherst



state shell



state insect

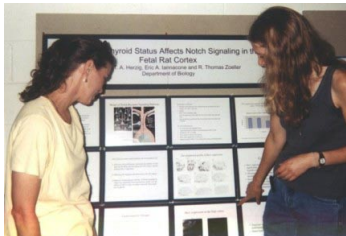
Spring 2001

No. 03

REUs Galore!

We primed the pump with our recent **Howard Hughes Grant**. Next, federal agencies, including the **National Science Foundation**, changed their focus toward a greater emphasis on undergraduate education. Now, **Research Experiences for Undergraduates** (REUs) are becoming a regular feature of undergraduate education. The incorporation of more hands-on experience in the curriculum is in response to assertions that undergraduates who participate in research do better in future endeavors. *What is your opinion of this change?* Here at UMass the REUs are administered by the Biology Graduate Programs; we have a Plant Biology REU, a Neuroscience REU, and a BioTechnology REU. A model for the administration of REUs was developed during our original Howard Hughes-funded REU (1996-2000). That model is being replicated and elaborated by the new REUs.

In a typical REU experience, undergraduate participants work in a faculty member's lab for a summer or semester. The student carries out a research project and periodically meets with other members of the REU group to discuss the experience. Several presentations by the student are included. The first deals with the research project that is planned, the next presentation focuses on work that is being done, and the last deals with what has been accomplished. On the right,



undergraduate **Carolyn Herzig** explains her project poster to another undergraduate at a BioTech REU symposium held during the summer of 2000. The REU experience will either confirm a student's enthusiasm about a discipline or convince him/her to look for a another career.

Many students must work during the summer or a school semester. The REUs provide stipends and thus obviate semester and summer jobs. As an additional way of removing barriers to participation, travel expenses to and from a home location are also covered.

When we were first awarded the Howard Hughes grant, the University made a commitment to find ways to support future REU programs through local funding. Currently, the BioTechnology REU is being funded cooperatively with BayState Medical Center, which sees the involvement of undergraduates in laboratory research as an important way of nurturing potential health science workers.

Darwin's Finches Sing a Song about Food

The classical example of evolutionary diversification, Darwin's finches, is in the news again. **Jeff Podos**, our new behavioral ecologist, has just published evidence in the journal *Nature* in which he identifies a possible cause for the rapid evolution of both vocalization and species diversity in Darwin's finches. Jeff was awarded an NSF grant to study these phenomena. He is taking annual field trips to the Galapagos to gather data to test his theories.

Jeff's research equipment includes audio and video recorders which allow him to simultaneously capture the vocalizations and behavior of his target species. To test his hypotheses, Jeff analyzes behavior, beak morphology, and vocalizations. Experiments include the playing of high quality male vocalizations to a female to see how she responds.

The audio recordings of bird song are transformed into sonograms which are plots of time, frequency, and intensity of songs. The remarkable finding is that, in eight species of Darwin's finches, certain aspects of vocalization are related

to variation in beak structure (see sonograms at right for *Geospiza fortis* (upper) and *Certhidea olivacea* (lower) abstracted from his *Nature* illustration).



Food availability could be a driving force for changes in beak structure which might lead to behavioral isolation via mating incompatibilities. Thus, two powerful interacting forces, feeding and communication at the time of mating, could be the causative agents of rapid speciation. Furthermore, in a number of species of Darwin's finches, beak structure has been shown to vary from generation to generation, depending on the types of available food. This adds credence to Podos' theories of interplay between beak shape and communication. Could the changes in food types over protracted time intervals result in the selection of beak shapes that preclude vocalizations once successful in attracting mates? This might select for species with a more variable song repertoire. In Jeff's hands, Darwin's finches have once again become a laboratory for the study of evolution.

Chairman Woodcock's Corner

Biology continues to be one of the most popular majors at UMass with over 800 at last count, and our department continues to hum with activity. One of the bigger changes that has been happening in recent years is the increasing number of faculty retirees. As a consequence of the



dramatic expansion of the University in the 60's, almost half of the UMass faculty will reach retirement age in the next decade. In Biology, we have already felt the impact of the wave of retirements (12 in the last 10 years), and this year we will be saying farewell to Stuart Ludlam, David Mulcahy, and Bernard Rubinstein. As you will read on p4, retirement is often the beginning of a new career phase for faculty as Emeritus Professors,

and right now, 7 Emeriti (Ed Davis, Arthur Mange, Jack Palmer, Hal Rauch, Ted Sargent, Art Stern, Bob Wilce), have office or lab space in the Department. Retirements also provide an opportunity for us to recruit new teachers and researchers, and this year we have been searching for new faculty in Vertebrate Evolution (see p4) and Cell Biology. Students seem to be especially attracted to work with new faculty (minimal generation gap?), and the fresh ideas they bring

to their teaching has a very positive impact throughout the department (see p2). As we look to the future, further changes are in store, one of which will be 'Distance Learning'. How does a department that emphasizes hands-on experience in teaching and research labs take maximal advantage of this opportunity? We would very much like to hear your opinion on this and other aspects of department life - by e-mail, 'snail' mail or any other conduit. *CLFW*