

2008-2009 BIOLOGY Program Review Action Update

The 2005 Biology Program Review listed 14 Recommendations for Action. Following is an accounting of progress during the 2008-09 academic year, supplemented by both new initiatives, and plans for future programs and needs. Initiatives of highest priority are noted with a **.

1. ****Explore the revision of the Environmental Management major into an interdisciplinary Environmental Studies major.**

Concern for the environment and the realization of sustainability have been, and continue to be, at the heart of the mission of both the University and the Division of Science and Mathematics. Further, in these environmentally difficult and uncertain times, the commitment to training students that can help deal with a multitude of environmental challenges is even more important.

Two Biology majors, Environmental Biology and Environmental Management offer curricula that provide such training. However, due to low enrollments in Environmental Management, the major was suspended in 2008, with the intent to implement revisions, following a study on what sort of applied environmental program would best fit student interests, market needs and faculty strengths. At present, there remains no specific target date to resurrect the undergraduate environmental management major, however we have recently begun to explore the possibility of developing of a **Doctor of Science (D. Sc.) in Environmental Technology** with a target population of students with a solid bachelor's degree or masters degree in one of the natural sciences. This initiative is being led by Dr Jones (who else?).

In addition, led by Christine Broussard, we are exploring the possibility of an interdisciplinary Environmental Studies program (major, minor, and certificates), which would involve the Natural Sciences and the Colleges of Law, Business & Public Administration, and Education.

2. **Refocus green campus efforts by involving students in environmental campus projects.**

Since the 2006-07 academic year, SPLSS (Society of Physical and Life Science Scholars - the Natural Science Division's student organization) has been directly involved in the planning and implementation of the annual Earth Day events, and each year we continue to see solid student commitment and effort in the planning of this important event.

Additionally, student participation continues on ULV's Sustainable Campus Committee, and also the Green Valley Initiative (as the Green Initiative for Village Empowerment, or GIVE). Moreover, the GIVE chapter continues to attract students from disciplines outside the sciences. In each of these important environmental initiatives students continue to make key contributions in crafting solutions to pressing environmental issues, both on and off campus.

- 3. Consider expanding the research methods and biostatistics course into a 3-4 hour course to better cover biostatistics, or possibly require students to take a statistics course offered by another department, such as Psychology.**

As noted in the 2007-08 Program Action Update, the addition of a required 2-hr statistics course (BIOL 380 Biostatistics), has strengthened the overall Biology program, helped improve the quality of senior projects, and better prepare our students for post-graduate school and careers in the sciences. We attribute at least a portion of the notable improvement in the timely completion of senior projects (note # 5 below) to the strengthening of their research skills emphasized by courses such as these.

- 4. Consider an alternative to the currently emphasized empirical senior project for meeting graduation requirements.**

The grant proposal model initiated in 2006 has become a valuable senior project option for both currently enrolled seniors, but also a significant number of students that, in past years, left the university without project completion. (Over the past two years Departmental faculty have made a focused effort to locate non-completed students and work with them to finish their projects.) While the number of students selecting this option is relatively small (6 of 24 students completing their projects in 2008-09), I believe it likely that a majority of these would have failed to finish were it not for the availability of this option.

- 5. Develop a better tracking strategy to monitor progress of senior projects and minimize the chances of students losing the momentum begun in the Fall semester of their Junior year.**

Considerable effort has been devoted of late to more careful tracking of senior project students, and the effects of new policy outlined in previous Action Updates can be readily seen. During the 2008-09 academic year 24 students completed their senior projects, of which 12 were students that had completed their coursework prior to Fall 2008. I am especially pleased with our success in this area, because too many of our 'graduates' were leaving without actually completing their degree requirements. The improvement in senior project completion success has been due in part to course restructuring and new project options, but also to a determined and renewed effort by Departmental faculty.

- 6. **Consider adjustment of teaching load expectations of faculty engaged in research, and oversight of student research projects beyond a given number.**

The consensus among Departmental faculty remains that the standard teaching load of 24 hours is excessive when added to the demands of conducting significant research, which has become a major focus of the Department. Currently, four faculty (Broussard, Novak, Weaver, Garcia) have externally funded research projects that demand heavy time investments. This important issue has been discussed with administrators at various levels and we continue to press for implementation of policy changes that offer additional course-release

time for those faculty heavily involved in research. To their credit, both Dean Yaffe and the Faculty Research Committee have been supportive in funding course releases for several faculty.

7. Rethink/revitalize the science seminar format

Modifications made during the 2006-2007 academic year have significantly improved the quality of the Science Seminar. Additionally, since Spring 2008 semester, all senior project oral presentations are scheduled for a single day in an event that is attended by all Division faculty and Biology majors. This arrangement more closely mimics the format of the typical scientific meeting and allows celebration of all student work in a single event.

Each year, some of our seniors also present their project work at a local or even national scientific meeting, and in the past 5 years three of these students have received recognition for the quality of their work. Just this past Spring, Sergio Sandoval received a top student paper award for his senior project work presented at the 2009 Southern California Academy of Science meeting.

8. Apparently low MCAT scores in recent (2004/05) years suggest that there may be a problem with preparation of students for matriculation into graduate schools and this issue warrants further analysis.

To date, no specific effort has been devoted to further investigate this concern, however, over the past two years (2008-09) the pass rate for the initial taking of Biology Senior exit exam was 70% and 82% respectively. There remains however a small number of students that are unsuccessful in passing the currently administered Departmental exam even after several efforts. The majority of these are ones that have remained in the program in spite of low performance. To help better advise marginal students, the Department has administered a **Junior candidacy** program in which second semester sophomore student must apply for candidacy into the Junior year. Those that do to meet candidacy requirements (appeals will be possible) will be counseled for alternative programs.

One of the best indicators that the Department is doing a superior job of preparing students is the number of graduates that are being accepted into post-graduate programs. Between 2003 and 2007 an mean of 6 students were accepted into professional or graduate programs, in contrast to 15 and 14 students respectively from the 2008 and 2009 graduating classes.

9. Consider revision of the biology curriculum, including identifying courses for possible deletion and courses for addition.

Following the rather extensive modification in the Biology curriculum in 2007-2008, no further changes were made in 2008-09. One new course, NASC 350 Natural Sciences Fieldwork was developed by Harvey Good and was offered fall 2009 for the initial time. This course was designed for Science students in the

Teaching Track that seek a waiver from the CSET exam normally required of all aspiring teachers in California.

10. Cultivate additional adjunct faculty to aid in the offering of additional CORE 340 courses.

Dr. Harvey Good, Professor of Biology emeritus, has been retained to teach additional CORE 340/INTD sections, and during January 2010 will offer two special CORE (340 and 310) courses in Vietnam.

11. Revise syllabi to address perceived deficiencies as identified by Dr Wright of Pomona College.

No focused evaluation has been done to monitor progress in this area, however a general review of syllabi indicate that Departmental faculty have implemented many of Dr. Wright's suggestions.

12. Plan for pending retirements and staffing needs.**

Recent hires (Dr. Kathleen Weaver, Jessica Varney, Biology Laboratory Manager) are both doing an excellent job and have already become integral to Departmental operations. Jessica, has been a particularly valuable addition, with Pablo Weaver's resignation as lab manager. Ms. Varney was one of our 2008 graduates and her Departmental experience made her transition into the position much easier. As noted in the 2007-08 report, the Biology Laboratory Manager position is very demanding, and requires the equivalent of another ½ time position in terms of workload. My main concern is, that given the considerable and diverse workload, that we will be unable to retain quality staff in this essential support position.

Dr. Neher offers no indication as to when (whether?) he might step down as Professor of Biology, and Chair of the Mathematics and Natural Science Division, a decision welcomed by all, because he continues to provide excellent and valued leadership.

Finally, the Biology Department (and the Natural Sciences Division) is rapidly gaining a national reputation for its efforts to innovate curriculum, and to recruit under-represented minorities to STEM (Science, Technology, Engineering, and Mathematics) fields. The evidence for our enhanced reputation is NSF and Department of Education funding of our programs (approximately \$4 million to date) and the solicitation of our faculty in national forums to discuss and create blueprints for action in science education. The current momentum cannot be maintained without some re-structuring of the Department. Furthermore, additional demands are being placed on the Department by Regional Campus programs to develop on-line and hybrid courses to satisfy the needs of RCA students (see point 3 under Other Accomplishments of Note). In order to ensure the quality of our program both on and off-campus, we need a dedicated full-time coordinator. We propose to hire a Biology 101 coordinator who would serve 1) to

teach BIOL 101 courses (our main adjunct Fredda Fox will be retiring in the next couple of years), 2) to innovate the curriculum of BIOL 101 and other courses in collaboration with Department faculty, 3) to write federal grant proposals to support assessment of curricular innovation, and 4) to coauthor publications in science education to highlight our efforts and the results.

We already have a Department staff member who would serve well in this role. **Pablo Weaver** continues to teach on an adjunct basis (including BIOL 101), and provides the Department with valuable expertise in the areas of aquatic and field biology. He is an excellent classroom teacher and mentor that team-taught Marine and Aquatic Biology (with me) during Spring 2009, and who has supervised several senior projects. Additionally, he supports one of our faculty with her snail research and the BIOL 325 course offered at the Montana campus. Pablo would be an ideal candidate for the Biology 101 coordinator. Moreover, he has plans to pursue an Ed.D. with a focus on assessment. His additional training would provide expertise that does not currently exist in the Department, but that is sorely needed. Federal agencies dispersing funds for science education now demand a well-developed assessment component to all grant proposals. If we are to continue to be successful securing extramural funding, we will need to have that expertise available.

13. **Explore ways to incorporate programming at the Montana Magpie Ranch campus into home campus programs.

Over the past three years, Kathleen Weaver has taken student groups to the Magpie Ranch facility as a requirement of BIOL 325, Field Biology, during which time students spend 2 weeks conducting research on terrestrial snails. Part of this work has been funded by an extramural grants from the Washington State Department of Wildlife. We continue to seek ways to incorporate the use of the Magpie Ranch facility into the home campus curriculum and hope to add an additional course next summer (2010).

During summer 2009, progress at the Montana campus was made on the completion of the new building which will provide additional student living quarters, a laboratory, and a roof solar system that will provide the majority of the station's electrical needs during summer activities.

14. **Develop programs to recruit higher quality and better-prepared students.

On March 7, 2009, the Division hosted a Math and Science Open House ("Science and your Future") for High School juniors to showcase Division programs. The event which was attended by fewer than the 43 students that had initially signed up but it was considered to be a success and is one we will continue next year.

Other initiatives outlined in this document (GIVE, Beta, Beta, Beta Biology Honorary, etc) detail additional initiatives which are helping address this goal.

Other accomplishments of note

1. **Beta Beta Beta Biological Society** – under Dr. Jerome Garcia’s leadership, the Biology Department received notification that its application for a chapter of ‘Tri-Beta’ was approved. This is a national Biology honor society.
2. **Approval of Teacher Education** – Laverne’s CSET waiver for Biology teaching track (as well as for General Science) students was one of the first to receive approval from the State Department of Education. With this approval ULV students that successfully complete all Laverne courses and requirements are exempted from having to take and pass the California State exam. Harvey Good shepherded the process and did an excellent job in negotiating a morass of state standards and requirements.

3. BIOL 101 online

Following a series of meetings between Steve Lesniak, the Department chairs of the Division, and selected faculty, the decision was made to cooperate in the development of an on-line BIOL 101/101L course that would meet the needs of students unable to come to the home campus. Two long serving adjuncts, Randall Good and Chris Morgan have taken the lead on course development with the first BIOL 101 course to be offered during the RCA winter term 2009-2010. Also, Chris Morgan will develop a NASC 103 course for the RCA fall term.

4. Grants

The 2008-09 academic year was one of unprecedented success in the successful funding of extra-mural grants, which have totals \$5.1 million in the past five years. Key to the successful receipt of these grants has been some very hard work and dedication of Departmental faculty and also the substantial support received through the Office of Sponsored Research. In particular, Bianca Hunter played a critical role in grant preparation and management, and much of the success for the funding received is because of her careful oversight and support.

Following is a brief summary of extra-mural grants for the past year (grant applications to the Faculty Research Committee have been omitted):

NSF-Course, Curriculum and Laboratory Improvement (CCLI) grant

This grant was received by Dr. Christine Broussard in 2007-08 with phase I continuing through the 2009-10 academic year. The grant provided funds to enhance and upgrade laboratories and the Biology curriculum. The award total was **\$150,000**.

Science, Technology, Engineering and Mathematics (STEM)

Professors Novak, Garcia and Weaver received a two-year Title V National Science Foundation (NSF) grant that awards \$2,159,498 in the initial year. The grant provides advising, tutoring, a summer camp (just completed), a ‘science squad of La Verne students, transfer articulation and other activities to prepare and bring science students to ULV from Citrus College and local area high schools. Also, the grant

provided \$226,200 for the creation of a new Biology Laboratory (MA 261) with state-of-the-art equipment, a new greenhouse to be used for faculty and student research, as well as \$150,000 in matching funds for the ULV endowment. We anticipate an extension of the grant for a second year of funding which will bring to award total to **\$3,680,000**.

Noyce Teacher Scholarship

Christine Broussard, in conjunction with Donna Nasmyth, Marga Madhuri, Vanessa Preisler and Yousef Daneshbod received a **\$899,746 National Science Foundation (NSF)** grant to 'promote greater advocacy and education through scholarships for prospective science and math teachers,. This is a five-year Robert Noyce Teachers Scholars project that will assist in providing education and training to prospective teachers. The goal of this program is to encourage talented science, engineering and mathematics majors to become K-12 science and math teachers in high-need school districts.

National Institutes of Health (NIH) R15 grant

Dr. Broussard has recently received notification that the Department is expected to be awarded a NIH grant R15 grant of **\$150,000** that will provide funds for purchase of reagents and supplies, hire technical help, pay for course releases to free-up time for research, and yield approximately \$50,000 in indirect costs in the first year (of 3) which we hope to use to purchase a replacement Flow Cytometer for the 18 year-old machine currently in use. Also, as a requirement for NIH funding we had to significantly upgrade our Animal Care facilities (to OSHA and OWLA standards) which was completed at the beginning of summer 2009. Funding for the upgrade was supplemented by the Office of the Provost.

At this writing we have received verbal confirmation that the grant will be awarded.

Almondson Foundation Grant

The Almondson Foundation has supported Biology programs for some years, and this year awarded the Department **\$42,000** for the purchase of a new field vehicle (a 2009 Chevy Suburban) which enhances our ability to transport students for field Coursework. Dr. Neher is currently using in support of field programs at the Montana Campus.

Allergen Foundation Grant

The Global Medical Brigades (GMB) is a nonprofit organization that provides sustainable healthcare relief to underserved communities in Honduras. GMB has united various universities throughout the U.S. for this cause, including ULV, which sent its first contingent of eight students during August 2008. This August, 17 ULV students (along with 4 physicians and 1 pharmacist) were scheduled to participate, but because of political uncertainty the trip will be postponed until 2010. The Allergen Foundation grant totals \$10,000 and would help fund purchase of medical kits, medications, and student airfare and in-country costs which would total an estimated \$27,350. The remaining funding will come from student fund-raisers and student family support.

Finally, an HSI - USDA grant for \$250,000 that proposed to develop an 'Agricultural Science option for the Biology curriculum was submitted during Spring, but we recently received word that it was not approved for funding. Other grants were prepared (such as Dr. Novak's American Orchid Society Grant) but funding was not awarded. Several of these will be resubmitted for the next granting cycle.

Future initiatives

Doctorate in Science (D.Sc.) program – previously noted in #1 above

****Center for Science and Sustainability** - As the math and science programs have grown, and greater emphasis placed on faculty and student research, the Division has become increasingly hampered by space-limited and deficient facilities. In the University master-plan a proposal exists for a science wing addition to Mainiero Hall, however during my tenure at ULV, there has been little in the way of serious planning for implementation of this goal. Further, over the past couple of years it has become increasingly apparent that what we really need is an entirely new building that is designed from the ground-up as a science facility. To this end, over the past year serious discussions have initiated, with Dr. Jay Jones as the primary visionary, to more deeply explore the possibility of such a bold commitment. Dr. Jones has discussed the needs with faculty from throughout the Math and Science Division, and also administrators at all levels (including the President) to attempt to generate serious consideration to a new building. All Departments and faculty in the Division of Mathematics and Natural Sciences have offered support - although to be candid, most feel that the project is presently beyond our reach at this time.

In spite of numerous challenges, because our facilities are presently becoming a major obstacle to further growth and development within the math and science programs, we feel that a commitment to a new facility should have **high priority**, and that serious planning should be initiated. To this end, the Provost's office provided \$15,000 for preparation of building plans by an architectural firm. These have now been completed. We intend to continue to encourage and press for a commitment for this visionary proposal.

Finally, members of the Math/Science Division have worked diligently to recruit talented students over the past several years and will continue to do so, however when several of our area competitors (Pomona College, Azusa Pacific University) have sparkling new science facilities the task becomes increasing difficult..

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