

**2007 FOLLOW-UP REPORT ON THE
CONTINUOUS IMPROVEMENT OF THE
BS PROGRAM IN BIOLOGY**

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1. Provide evidence of quality enhancement of the program since 2003.

Curricular changes have been made to enhance the quality of our program (adding physics requirement, offering additional special topic courses; see below). With the support of faculty in the Department of Mathematics and Statistics, a new course in Biostatistics (Stat 3125) will replace the existing course in Biostatistics (Math 2107) which was not fully meeting student needs in this important sub-discipline within Biology. The course was carefully to provide our students with skill sets in statistics that will enhance success in employment, graduate school, or professional school after graduation. We've also made improvements in our infrastructure by modifying laboratories and adding more equipment and supplies.

We continue to have a strong faculty. As of Fall 2007, there are 39 Full-time faculty (although one is not filled and two are filled with full-time temporary faculty). Of the 36 remaining faculty, four are lecturers holding a Masters degree while the other 32 have earned doctorates. Between 2004 and now, these faculty have produced approximately 60 peer-reviewed papers in national or international journals. Biology and Physics faculty continue to receive recognitions for advising, scholarship and research.

2. Provide evidence of productivity enhancement of the program since 2003.

The number of declared Biology majors has increased from 642 in Fall 03 to 1,008 in Fall 07. The number of graduates has remained approximately the same (average of 52 per year from 2003-2006) with a noticeable increase to 72 graduates in 2007. For 2007, the biology program ranks in 11th place among all degree programs in the university. In terms of enrollment, we have increased from serving 4465 students in 112 sections in Fall 2003 to serving 5315 students in 130 sections in Fall 2007. All of our courses continue to fill and we have not had to cancel any upper-level courses in the time period under review.

3. Identify the action plans and priorities from the 2003 Follow-Up Report that have been accomplished.

In the 2003 report, five areas of improvement were noted. Those five areas are listed below along with actions taken to address each.

- 1) We need to better prepare our students for the rigors and demands of upper level courses as well as the workforce and/or graduate school. By doing so, we will not only ensure more student success, but will also improve retention and graduation rates.*

In 2005, we added a requirement that all biology majors take a second semester of physics. This was done in recognition of the fundamental position of physics in science and with the realization that biology, as a discipline, is becoming more quantitative.

We continue to provide Internship and Directed Study and other research opportunities for our students. By 2006-2007, 56 students participated in internships and directed studies compared to 45 in 2003-2004. Our students continue to present the results of their research experiences to the department as well as at regional, national and international venues (e.g., the Association of Southeastern Biologists, Canadian Society of Microbiologists, Ecological Society of America, Georgia Academy of Sciences, and the American Society for Microbiology –Southeastern Branch Regional Meeting.) In 2003, 3 of our students were co-authors on some sort of presentation or publication. By 2006, that number had risen to 20. Additionally, at the 2006 Symposium of Student scholars, 16 of the 28 presentations from the CSM were given by biology students and at the 2007 CETL Undergraduate Research Ceremony, 54 out of 171 students from the College of Science & Mathematics were from our department. In several instances, our students have won “best poster” awards, a further independent assessment of the quality of the work being produced here.

Finally, we have begun to offer more study abroad experiences. Since 2005, Dr. Paula Jackson has taken students to do field work in the Yucatan and Dr. Premila Achar has taken students to India as part of the Biotechnology degree program (but this course is used by biology majors as an upper level elective). In Summer 2008, Dr. Joe Dirnberger will be taking students to Belize for a study-abroad experience. All of these help our students achieve a more global perspective on their studies.

- 2) *Continuing to hire high-quality faculty with strategically determined expertise will also enhance program quality. This is especially important as we are just starting a new BS in Biotechnology program.*

This has been accomplished by increasing the number of full-time faculty from 28 in 2003-2004 to 39 in 2007-2008 (one line is not filled in Fall 07). Several of these lines were lecturer positions filled by faculty with Master’s degrees. The lecturers primarily teach our service courses (e.g., Sci 1101, Sci 1102, Biol 2221, Biol 2222 and Physics) which allows tenure-track faculty to teach courses for our majors. The tenure-track lines that we have filled have been in the area of, Biology Education and Physics Education (to help address the teacher shortage faced in Georgia) as well as Biology and Physics faculty who can teach courses for our majors (e.g., biology, biotechnology and physics).

- 3) *Seek extramural funding to supplement the state-allocated budget in order to increase the quality of our facilities and equipment.*

The number and amount of grants applied for and received continues to increase. For example, in 2005, Paula Jackson received an NSF- RUI grant entitled “*Differences in Source Water Use of Woody Vegetation of Dzibilchatun in the Yucatan Peninsula, Mexico*” for \$300,000. This was the first major non-education grant received by one of

the faculty in our department. This was followed in 2006 by the receipt of an NSF grant for \$190,000 by Nicolas Kidonakis to study “*Top Quark and Higgs Physics, and Two-Loop Calculations*”. This is significant in that it represents a major grant obtained by a physics faculty in spite of the fact that we don’t have a physics program at KSU. Scott Reese and John Pratte were successful in having their grant “*IBEAM: Integrative Biology Experimental Activity Modules*” funded by NSF for approximately \$85,000. Other faculty have received smaller grants (e.g., \$30,000 FACES grant for Melanie Griffin; \$25,000 grant for a Teacher Institute in Physical Science awarded to Taha Mzoughi; Bill Ensign received a \$4500 grant from Paulding County to study stream fish). All of this funding reflects well on the quality of the faculty submitting proposals and helps to enhance research opportunities not only for faculty but for our students as well.

In addition, with the implementation of a \$35.00 per course lab fee, we’ve been able to greatly improve our equipment and supply situation. For example, in AY 2006-2007, between grant monies, lab fees and end-of-year money, we spent approximately \$83,000 on equipment such as refrigerators and incubators, workstations for cytogenetics, support for directed study projects, new centrifuges as well as repairs and maintenance of microscopes, pipettes and centrifuges. Over the past three years, we’ve also used money to add audio-visual equipment to certain teaching laboratories (e.g., SC 250, SC 370). These expenditures have allowed us to expand and improve on our course offerings and help us provide a higher quality experience for our students.

- 4) *Continue to monitor our course structure and course offerings to provide an attractive program that prepares students for their subsequent career goals and to offer those courses on a schedule that permits the timely progression of our students through (and eventually out of) our program.*

We are constantly monitoring our courses and course offerings. We continue to offer a mixture of courses for our majors, always making certain that courses required for their program of study are offered every semester. We continue to offer classes in all time slots from 0800 in the morning to 1100 at night with some courses being offered on Friday and Saturday. Over the past five years, we’ve offered several special topics classes (e.g., Plant Ecology, Plant Systematics, Bioinformatics, Gene Regulation) as a way of increasing the amount of upper-level courses available to our majors.

As indicated in the last follow-up report, we implemented Biology 2101 (Introduction to the Culture and Methods of Biology). This course was designed to help students succeed in other biology/biotechnology classes so as to improve retention in and progression through our programs. While successful in some ways, we have determined that this course is creating a bottleneck for students and requires the redirection of faculty from upper-level courses. So, in order ensure an adequate number of faculty to teach upper-level course and to facilitate student progression (and hopefully improve graduation rates), the decision was made to eliminate Biol 2101. This change will be effective Fall 2008. Furthermore, I have gone to offering fewer sections of Science 1101 and Science 1102, but have increased class size in all sections to 200. This has allowed me to re-assign faculty to courses for our majors. We’ve also incorporated labs back into the

lectures so that the students only enroll in a single course. This has cut down on registration problems and ensures that students get enrolled in both lecture and labs (something that did not always happen when lecture and lab were separate courses). These changes have been made to ease progression through the program and to improve graduation rates.

- 5) *Continue high-quality personal advising for our students and provide up-to-date and easily understood advising tools in hard copy and on the departmental web site so that students can effectively plan and monitor their own progress through the program.*

Ms. Debra Phillips has been hired as our department advisor. She sees several hundred students per semester and is the initial point-of-contact for all students entering our programs (faculty also advise upper-level students). Furthermore, she attends orientation and PREVIEW sessions and works closely with the registrars' office on issues dealing with transfer evaluations, course substitutions etc. She is also responsible for revising our advisement sheets and distributing them/posting them on-line.

4. Identify the action plans and priorities from the 2003 Follow-Up Report that still need to be addressed and indicate a timeline for their completion. If specific action plans and priorities have changed since 2003, please explain.

One area in which the Program Review council rated the Biology program as weak was in the area of operational funding. Unfortunately, our overall budget has remained stagnant since the last program review. And, in real terms, it has decreased especially since we now have more faculty. As mentioned above, the institution of lab fees in 2003-2004 has been a great help. However, we continue to struggle due to lack of faculty and lack of space. We are having a difficult time offering enough classes while trying to get teaching loads for research active faculty down to a 4/3 (and eventually a 3/3) level. We are out of lab space and offices for new faculty. While a new lab building is on the horizon (hopefully to be occupied in 2012), until that becomes a reality we will continue to struggle with increased demands for scholarship from faculty and teaching more classes to support our students.

Since the 2003 CPR follow-up, we continue to administer graduate exit surveys to find out what is working and what is not working in the program as far as students are concerned. We send out letters and e-mail to prospective students informing them about our program and encouraging them to declare a major and speak to an advisor. Finally, we continue to update our website to provide more advising information on it. We are still working on finding more effective ways to get feedback from students and to provide them with information about our program.

We still need to increase progression of students through our program and increase graduation rates. The elimination of Biol 2101 and other changes described above are a step in that direction.

5. Address the current status of the program's viability. If viable, justify whether the program should be sustained, reconfigured, or enhanced.

The BS in Biology continues to be a viable program. Based on data provided by Enterprise Information Management, the number of biology majors has almost doubled since 2003 (gone from 538 to 910). The rolling admissions report for Fall 2007 shows that 376 accepted freshmen declared biology as a major. This represents approximately 50% of the students admitted into the College of Science & Mathematics and represents the largest number of any major at KSU. Biology (and related fields) continues to provide students with knowledge and skills necessary for the 21st century. According to the US Bureau of Labor Statistics, they predict that jobs in the biological sciences will continue to grow "as fast as average" through the year 2014. In order for us to keep up with demands, our program will need to be enhanced, primarily through the addition of faculty and space.

a. Indicate how the program advances specific goals and action steps of KSU's Strategic Plan.

Our increase participation in study abroad advances Strategic Plan Goal #1, action step 2 while our increased expenditure on lab equipment and increasing student internships and faculty publications advances Goal #1, action step 3.

b. Identify resources needed to strengthen the program's ability to meet the goals of KSU's Quality Enhancement Plan.

We have begun to engage in more study abroad programs (see above). However, in order to continue the trend of offering more study abroad courses, financial support for both faculty and students will be needed. We are already addressing Goal 2, action step 4 with the continuous up-dating and publication of our two year schedule.

c. If the program is delivered off-campus, please provide a cost analysis of the off-site delivery. Not Applicable

d. Indicate the resources needed to sustain, reconfigure, or enhance the program's quality and productivity.

As indicated above, we need both additional faculty and additional space for both teaching and research. Without these additional resources, we will not be able to continue to support this program and others related to it at current levels. We need to increase research opportunities for faculty and students alike.