

## **4b.5 Research and teaching interactions with other units at the College**

June 19, 2008

### **Undergraduate interactions**

The Mathematics Department has built curricular linkages with the Biology Department through our participation in the Howard Hughes (HHMI) grant and the NSF-UBM grant that has faculty from Biology and Mathematics as co-PIs. This has led to creation of two new calculus courses (Math 131, 132) for students interested in life sciences, and two upper division courses (Math 345, Mathematical Biology and a special section of Math 410 taught in the spring with varying topics).

The Mathematics Department has also built curricular relationships with the Computer Science and Applied Science departments through the NSF-CSUMS grant. That grant has two goals: to increase the focus on computational mathematics issues in standard mathematics courses, and to increase the amount of undergraduate research in computational mathematics here at William and Mary. So far this has led to creation of a special topics course Math 410 (co-taught by members of the Mathematics and Computer Science departments) and a computational mathematics freshman seminar (Math 150) in spring 2008, and has identified eight undergraduates who will work in an REU experience in a computational topic in summer 2008, and who will write honors theses in computational topics in one of the three participating departments in the 2008-09 academic year.

In addition, to make it easier for students to arrange double majors in mathematics and computer science, the mathematics department has identified two upper division computer science courses that can count toward an applied mathematics major (and computer science allows the two numerical analysis courses in mathematics to count toward a computer science major).

### **Graduate interactions**

The mathematics and computer science departments share a graduate program in Computational Operations Research (COR). The COR program is officially housed in computer science, but the vast majority of the program's courses are taught by operations research faculty in the mathematics department. Students in the COR program are required to attend the computer science colloquium series (as are all computer science graduate students).

From time to time, the COR program enrolls graduate students who are also seeking a masters degree in public policy at the College. At least three such students have pursued this dual degree in the last ten years. In addition, it sometimes happens that graduates of the COR masters program stay on at the College as computer science or applied science doctoral students. Currently there are two former COR graduate students in each of the computer science and applied science doctoral programs.

Certain members of the mathematics department are identified as associate members of the applied science department. As such they have the right to supervise doctoral students in the applied mathematics track of the applied science department. There are currently three doctoral students in the applied science department who are supervised by mathematics department members. See section 4b.3 for a list of mathematics and operations research doctoral students over the past ten years.

From time to time, advanced doctoral students in applied science have taught undergraduate courses (primarily Calculus I and II) in the mathematics department. These include a few students

working under the supervision of mathematics department members, and also doctoral students working with regular members of the applied science department.

### **Research interactions**

Growing out of the HHMI and NSF-UBM grants, during the last three years there has been a bi-weekly meeting of College faculty who are interested in biomathematics. These meetings are devoted to lunch and research discussions and the faculty come from applied science, biology, VIMS, and mathematics. Several joint papers have grown out of these lunchtime discussions. In 2007-08, about half of the seminars were presented by members of, and visitors to, the mathematics department.

There was also a weekly lunch meeting of the NSF-CSUMS personnel (from mathematics, computer science, and applied science) and their undergraduate students in 2007-08, where faculty, students, and visitors presented talks on their work. We expect to see several joint research projects and research articles growing out of these meetings.

Each week for the last four years, there has been a meeting of the mathematical physics seminar, consisting of two or three members of the mathematics department and four or five members of the physics department, plus some of their doctoral students. Growing out of this seminar, members of the mathematics department have become members of physics doctoral committees and have consulted with physics doctoral students about mathematical issues in their research, particularly because we have added a new tenure track faculty member whose interests are in mathematical physics.

In the relatively near future, the School of Business will move to a new building very close to the mathematics department. At that time we hope to revive the operations research seminar that we formerly shared with the Business School.

Faculty members at VIMS have become more interested in the department's biomathematics and statistics. We are arranging the schedule for our Math 401 (Probability) and Math 452 (Mathematical Statistics) so that VIMS can require their doctoral students to take those courses. In addition, one of our statisticians will be working with a VIMS doctoral student in 2008-09 on the student's research project.

### **Outreach interactions with Education**

Over at least the last five years, the mathematics department and the School of Education have maintained a strong interactive program for upgrading the skills of in-service middle-school teachers. Originally a summer program, starting in fall 2008, this cooperation has expanded to include an academic-year program designed to prepare middle-school teachers to teach high-school algebra. All of these interactions are funded by external grants. In 2008-09, the total funding is close to \$ 1 million dollars per year. The grant proposals are required to be joint proposals from the mathematics department and the School of Education, but because of William and Mary's system for recording grants and distributing overhead funds to academic units, the grants are reported as belonging only to the School of Education.