

4b.2 Graduate student mentoring, and career preparation, in the mathematics department

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Background: two graduate programs

The first mathematics graduate program is the Computational Operations Research (COR) masters program, which is officially housed in the Computer Science department but whose courses are taught primarily by members of the Mathematics department. This is a two-year program that aims to prepare students for post-masters employment, although some COR students decide to pursue doctoral study here or elsewhere. In fall 2007, there were 17 students enrolled in the COR program.

The second mathematics graduate program exists through our association with the Applied Science department. Some mathematics department members are associate members of Applied Science and therefore have the right to supervise mathematics doctoral study through Applied Science. This program is best described as a “research apprenticeship” program. Students are admitted to the program only after they have completed the basic graduate courses elsewhere (so that they already have a masters degree in mathematics or operations research) and spend three years working as a research apprentice under the supervision of their doctoral supervisor. In March 2008 there were three doctoral students in this program, two in operations research and one in matrix analysis. See Section 4b.3 for more details about the ten-year history of this second program.

Graduate student mentoring in the COR program

Given the small size of the COR program and the fact that all COR graduate students take mostly the same courses and share a large office in the department, close contact develops between COR students and their faculty, and advising information learned by one student is shared with others. Members of the operations research faculty assist COR students in finding summer internships after their first year and permanent positions after graduation and this helps current students see what will be expected of them once they leave the College. Graduates of the COR program return to campus as recruiters for their employers. Some COR masters students stay on at William and Mary after completing their COR masters degrees, entering the Applied Science or Computer Science doctoral programs. Currently there are two COR graduates in each of those doctoral programs.

One way to measure effectiveness of the COR program is to compare the number of students admitted to the COR program in year N with the number who graduated no later than year $N + 2$. That is the goal of the next table.

COR Program Effectiveness: Two-Year Graduation Rate of Full-Time Students

Entering COR class of year $N =$	99	00	01	02	03	04	05	06	07	08
Number admitted in year N	9	6	4	6	7	7	7	8	6	8
Number graduating by year $N + 2$	9	6	4	5	6	7	7	8	NA	NA

In addition, during the ten-year period in the above table we have admitted eight part-time students to the COR program and four of them graduated within two years of admission.

Doctoral student mentoring

As explained above, the mathematics doctoral program in Applied Science is a research apprenticeship. The relationship between advisor and doctoral student is very close, and students often graduate from the program having published several joint papers with their doctoral advisor.

As part of their professional preparation, doctoral students who are aiming for academic careers are invited to teach undergraduate courses in the Mathematics department. The normal pattern is for the student to teach one course per semester in each of the student's third, fourth, and fifth semesters at the College, provided the student's doctoral advisor believes that such a schedule will not impede the student's progress toward his or her degree. Sometimes students in the program have time-limited financial support (e.g., Army officers who come to the operations research doctoral program here often must leave at the end of three years, whether their degree is complete or not) and in such cases their doctoral advisors have told them not to become involved in teaching here.

Once a student is near the end of his or her doctoral program, the student's doctoral advisor actively supports the student's job search. This typically involves the doctoral supervisor in making many calls and writing many letters in support of the student's job search.