

Computer Science

A department in the College of Natural Sciences and Mathematics offering the B.S., M.S., and Ph.D. in Computer Science.

■ The Review Process

This was a standard AQAD review. Reviewers were:

Philip Bernstein (Microsoft Research)
Susan Graham (University of California, Berkeley)
Tom Mitchell (Carnegie Mellon University)
Michael Pazzani (Rutgers, the State University)
Jennifer Rexford (Princeton University)
Eva Tardos (Cornell University)

■ Main Issues

The visiting team reported being “impressed by the quality of the department” and “supportive of recent developments and future plans.” Strong recent faculty hires, and “impressive” placement of Ph.D.s and peer-reviewed funding, left the team “with the impression that the department, while not in the top 10, was a very strong department.” The principal disappointment expressed by the team was its sense that the department “did not appear to have played a central role in the recent NSM College vision process.”

■ **Undergraduate Education.** The team described the current computer science curriculum as a “strong traditional program” that “prepares students very well both for graduate study and for jobs in the computer or software industry.” The department’s commitment to undergraduate research experiences was praised. One disadvantage of the current curriculum noted by the team is the large number of core courses focusing on programming skills that must be completed before students can gain access to courses that “emphasize great ideas of computer science.” The team expressed strong support for the department’s plans to revise the B.S. curriculum to allow more flexibility, and easier and earlier access to “the more attractive applied courses.” The team also noted plans to develop a somewhat less intensive B.A. program in computer science (representing a subset of the B.S. curriculum), a more flexible computer science minor, and various concentrations in the University-wide Information Technology minor. The team reported a desire on the part of undergraduates to be “more integrated into the departmental community,” and also expressed concern that “the quality of teaching assistants varies greatly,” which might be addressed if “learning to teach well were part” of the graduate educational experience.

■ **Graduate Education.** The department was found to have “a strong graduate program with the students actively contributing to cutting edge research.” Faculty were described as “very approachable,” and women students in particular reported that the department is very supportive. Graduate student concerns included the heavy workload, and lack of clarity as to how entering graduate students are matched with faculty advisors. The team made note of innovations in the graduate education “that are quite successful and could serve as models for other departments at UMass and elsewhere,” and in particular the use of a student portfolio

including course work, recommendation letters and the results of a “synthesis project” in place of the traditional doctoral comprehensive exam. The team expressed some concern that the department has had difficulty recruiting graduate students in newer areas in which UMass is not already established. Overall, graduate student financial support was found to be insufficient, and the team recommended greater use of first-year fellowships vs. research or teaching assistantships.

- **Research and applications of Computer Science.** The team praised the way in which “most faculty members are engaged in applying their expertise in core computer science areas to fields outside of computer science, such as fraud detection, neuroscience, biology, environmental science, molecular biology, medicine, and business.” These collaborations “extend the state of the art in computer science while at the same time help to solve a problem in another field.” Noting that the whole field of computer science is increasingly “outward facing,” the team found the UMass program to be “well poised to capitalize on these trends given the many ongoing research projects” that involve collaborators in other disciplines. Given this collaborative orientation, the team expressed surprise that “the department is not visibly featured” in the College’s “excellence initiative.”
- **Junior Faculty.** The team noted that the department had hired an “impressive set of 13 junior faculty over the past five years” who appear to be well-supported by senior faculty and who constitute a “key strength of the department” with whose development “the department’s reputation is likely to rise.” The team observed, however, that “growth of over 33% in tenure-track faculty is not unusual for computer science departments” over the past decade, and that despite the number and quality of recent hires UMass Amherst has “not gained ground” on other computer science programs. The department’s aspiration to increase to 45 faculty was therefore supported.
- **Department governance and culture.** The department was found to have an “exceptionally collegial and supportive culture,” with graduate students agreeing that “it was just a friendly, supportive place to be.” Consensus-based decision making and a “supportive and healthy” relationship among junior and senior faculty were seen as contributing to an atmosphere that “appears to be a strength in recruiting new junior faculty.” The team did express caution about the “uneven demographics” of the faculty, with few at the mid-career level. Continued hiring was urged both to build departmental strength and to smooth the effects of anticipated retirements.

■ Results of the Review

The department indicated that it “wholeheartedly endorses” the team’s recommendations, noting that many have significant resource implications. The team’s report “accurately reflects the strengths and weaknesses of the department.” The department reported that it had “increased the intensity” of efforts to improve the undergraduate curriculum; that it is considering dropping the requirement that graduate students teach for at least one semester; and that it would review the “heavy course load” and availability of fellowships for graduate students. The department also indicated that it had been involved in the several aspects of the NSM visioning process, and is “eager to take on prominent and lead roles” in these initiatives. The Dean endorsed the department’s response.