

Electrical and Computer Engineering

A department in the College of Engineering offering the B.S. in Computer Systems Engineering, the M.S. and Ph.D. in Electrical and Computer Engineering, and the B.S. in Electrical Engineering.

■ The Review Process

This was a standard AQAD review. Reviewers were:

B. Ross Barmish (University of Wisconsin, Madison)
Paul Penfield, Jr. (Massachusetts Institute of Technology)
Sudhakar M. Reddy (University of Iowa)
Mark E. Russell (Vice President, Raytheon Company)

■ Main Issues

The visiting team had considerable praise for the department, its recent accomplishments, and its future prospects. Departmental morale was found to be “positive and strong;” leadership has been “highly successful;” and the curriculum is “eminently relevant, rigorous, current and coherent.” Recent efforts to make the undergraduate program more “thematic” were endorsed and encouraged. The faculty were found to be “increasingly productive,” and the team noted the importance of the department’s recent success in winning the competition for the NSF’s Engineering Research Center for Collaborative Adaptive Sensing of the Atmosphere (CASA), a \$40 million enterprise to lead the nation’s efforts to revolutionize understanding and predictability of weather in the lower atmosphere.

The central question confronting the department, according to the team, is how to secure a stronger national reputation. The represents an “unusual challenge” because of the close proximity of so many high quality programs in the New England area. The team observed that “it is hard to be perceived as a national leader when there are so many other national leaders nearby.” A further challenge is that “the Department cannot reasonably aspire to research excellence in a large number of technical areas. The Department is small, world-class research is expensive, experimental work requires specialized facilities, and super-star professors do not come cheap.” Nonetheless, the team believed the department can become an “important national resource in selected technical areas,” especially if it capitalizes on the opportunities presented by CASA.

The team offered four suggestions toward this end:

- Encourage more undergraduate research in CASA-related projects. “If a larger number of the Department's undergraduates stayed for an advanced degree, the current reliance on foreign graduate students would be reduced.” Several strategies, including a combined B.S./M.S. program, were suggested.
- Give prominence to CASA in recruiting faculty and students, and take advantage of the fact that research in this area “can be described in ways that the public can understand.”
- Encourage excellent, small research projects in areas related to CASA.

- Use CASA as a model for putting together another major interdisciplinary research effort. The team believed that the department could sustain a second such effort, and suggested three areas which it should consider: nanotechnology, bioelectronics, and emerging electronics. The team emphasized that the department should pick one of these areas and focus its energies in that direction.

The team also noted two general issues that the department should address as it moves forward. First, in recent years the department has deliberately pursued faculty hiring at the senior level. While this strategy accomplished its purpose, the team found that the department is “currently top heavy,” with no faculty under the age of thirty, and stated that it is “imperative” to return to a more typical pattern of junior-level hiring. Second, the team noted that department relies strongly on students from other countries at the graduate level, a widespread concern in the field. Given recent shifts of federal research dollars towards U.S. citizens, the team urged the department to increase its efforts to recruit domestic graduate students.

■ **Results of the Review**

The Dean concurred with the team’s main findings and recommendations, and reported that the department is in the process of identifying the research area around which it will marshal its resources. The Dean has urged the department to consider partnerships with other parts of the campus as part of this effort. The Dean also expressed agreement with the team’s proposed strategy of leveraging the CASA effort, and “strongly urged” the department to consider those suggestions.

The idea of encouraging more UMass undergraduates to stay on for graduate study was welcomed by the Dean, and a 5-year B.S./M.S. degree option will be explored.

Finally, the Dean reported that all four new faculty hired in the most recent year were at the assistant professor level, which will help restore the balance of the faculty.