Change in the Department of Geological Sciences at Arizona State University

Workshop on Geoscience Departments: Developing Pathways to Strong Programs for the Future

James A. Tyburczy, Professor and Chair
11 February 2005

From its beginnings in the late 1950's, the Arizona Sate University Department of Geological Sciences has grown to be a leading research and teaching unit on campus and nationally. The first M.S. degree was awarded in 1965 and the first Ph.D. in 1974. In the 1993 NRC survey our Department ranked 26th and in 1999 the U.S. News and World Report rated the Department 25th in the nation. Since then we have added 7 new faculty members and have expanded strengths in planetary sciences, geochemistry, biogeochemistry, geophysics and geoscience education. The Department has 26 tenure-track faculty members (21 full time equivalents), about 60 graduate students and about 60 undergraduate students. We offer B.S., M.S., and Ph.D degrees in Geological Sciences.

From its inception, the Department has benefited from strong leadership that demanded high levels of research activity. At the same time, it was recognized that a growing department needed to find niches wherein it could excel. For ASU these areas became planetary sciences-cosmochemistry-meteoritics-astrobiology and geochemistry-mineralogy-petrology. Other areas of strength and investment include biogeochemistry, astrobiology, volcanology, geoscience education, and geophysics. These areas have served us well, but have lead to a department with uneven coverage. We have a long and productive tradition of interdisciplinary science; we have had faculty members with joint appointments between Geological Sciences and the Department of Chemistry & Biochemistry continuously for over 40 years. As part of a young and growing university and owing to faculty participation in a number of planetary missions, our external research funding led the university for most of the last 15 years, with current annual funding of approximately $10 million. Our departmental strengths have been built from strong individual research programs.

Our undergraduate program is currently fairly traditional and strong in field work. Our capstone summer geology field camp course has recently been divided into a 3-semester unit spring term course on mapping basics followed by an intensive 3-week, 3-unit summer course of advanced mapping. This allows undergraduates more options for summer activities and employment and makes the sequence (all or part) more attractive for graduate students who may benefit from it. Over 40% of our undergraduates participate in research. Our introductory courses serve over 1200 students per semester.

Approaches that we have employed that we feel are successful in advancing the department include 1) annual peer evaluations in which every faculty member evaluates every other member, 2) annual evaluations in which teaching is a significant part, 3) faculty searches that are generally targeted broadly to attract the best candidates, 4)

encouraging geoscience education research which has an effect of improving teaching throughout the department..

Current challenges, as in many departments, include modernization of the undergraduate curriculum, building on strength versus expanding into important areas in which we are not currently so strong, maintaining strength in field geology particularly in the graduate program versus satisfying the focused needs of faculty research, space needs and physical fragmentation of the department, maintaining and increasing undergraduate enrollments, and enhancing the success and graduation speed of the many undergraduate majors who come to us from the community college system.

A new administration at ASU has challenged our department to advance its competitiveness nationally. We are responding to this opportunity with a proposal to form a new School of Earth and Space Exploration that will bring together the faculty of Geological Sciences and Astronomy (currently in the Department of Physics & Astronomy) along with systems engineers and other disciplines to form a unit with 'exploration of the universe' as one of its core themes. Major changes to curriculum, degree programs, and research climate will come about by having science and engineering students work side by side in a learning community environment from the moment of their entry to the university. The objective is to train scientists with experience in engineering and engineers with experience in science. Such a school would be attractive to undergraduate and graduate students, would foster trans- and multi-disciplinary research efforts, and would provide graduates in high demand in any field. This broad view is still very much a work in progress. There are significant challenges ahead as we move forward to develop and implement this vision. We are working toward possible deployment in the 2006 or 2007 time frame.