

Department of Chemistry Program Review

Dean's Response

June 16, 2008

The mission of the College of Science states:

The College of Science provides quality education in the natural sciences and mathematics. The college offers majors and minors in seven departments (Botany, Chemistry, Geosciences, Mathematics, Microbiology, Physics, and Zoology). The college also supports students through its Developmental Mathematics Program. The departments and programs of the College of Science support professional and graduate school preparatory programs, and contribute significantly to the general education of students by improving scientific understanding of the natural world and quantitative literacy. Education is provided through formal classes, laboratory and field experiences, and undergraduate research projects. Student learning is also supported by departmental clubs and professional preparatory organizations. The college promotes science and mathematics teaching through the Center for Science and Mathematics Education, and community outreach through such facilities as the Layton P. Ott Planetarium and Museum of Natural Science.

The programs in the Department of Chemistry are designed to contribute to the overall mission of the College of Science by providing general education courses, support courses for other programs, and major programs that prepare students for employment or further education.

The Department of Chemistry also offers a B.S. degree in Chemistry that is certified by the American Chemical Society's Committee on Professional Training. The ACS certified degree requires annual reports to the ACS along with a full report every five years. In Spring, 2008, the ACS CPT significantly revised the criteria for the certified degree which will require careful consideration and discussion within the Department regarding possible program revisions.

The program review team noted a number of strengths in the current program: (1) faculty commitment to education and their students; (2) strong relationships between faculty and students; (3) strong core base of faculty in all fields of chemistry; (4) innovative online chemistry courses at the 1000-level; (5) CTC is an innovative way of interacting with the local business/technology community; and (6) an associates degree program that is imbedded in the BS program, providing a useful waypoint for students.

The Dean certainly agrees with the assessment of the program review team that the Department is strongly committed to the education of its students. This is evident by the focused efforts on classroom and online teaching, along with innovative teaching pedagogies. The Department also

has a remarkable record of textbook and laboratory manual writing. The Chemical Technology Center also provides opportunities for a small number of select students to work with high-quality instrumentation in an industrial environment. The current A.A.S. provides what almost amounts to a 2 + 2 program in attaining a B.S. degree in chemistry, providing students with opportunities to go immediately into industry with the A.A.S. with the possibility of supporting their own education in attaining the B.S.

Along with its strengths, the review team identified a number of challenges of the programs in the Department of Chemistry: (1) there is a notable lack of necessary laboratory equipment, both for teaching and research; (2) there appears to be a deficiency in the mentoring of junior faculty; (3) there exist significant challenges in conducting chemistry research given the 12 TCH per semester teaching loads; and (4) there may exist a discrepancy between the expectations of the department and the College of Science with regard to rank and tenure evaluations.

Again, the Dean believes that the review team has done a good job of identifying significant challenges that should be addressed as the Department of Chemistry continues to move forward and build its program over the next five years.

The reference to the need for modern research and teaching equipment in the Department is one that has been and continues to be an ongoing concern. This issue is also an ongoing concern for the entire College of Science. Needless to say, E&G funding is far too limited to be able to support the many, expensive pieces of equipment that are required of modern laboratory programs in the life and physical sciences. However, significant progress has been made in this area in the past couple of years, and it continues to be a point of major focus for the College collectively. Equipment that has been, or is about to be, purchased since last year that are specifically dedicated to or available for use by the Department of Chemistry includes (a) a 90 MHz FT-NMR (an NMR is required by the new ACS certification requirements and costs in excess of \$130,000), (b) a gas chromatograph/mass spectrometer, (c) an X-Ray diffractometer, and (d) an environmental scanning electron microscope with an energy dispersive X-Ray spectrometer. The total cost of these important instruments total approximately \$500,000. In addition, a 132 node supercomputer cluster is also available for the entire College of Science, valued at roughly \$250,000. Although significant purchases have been made thanks to a significant private donation, some support from the CTC, a grant from the George S. and Dolores Doré Eccles Foundation, special one-time funding from the Provost's office, support from the Hemingway Trustees, a NASA grant, and funding through the College of Science, it is not anticipated that this level of funding can be provided routinely. It is imperative that the Department of Chemistry search for other funding sources, including significantly increased grant writing and perhaps increases in student fees for its laboratory programs.

While major grant writing is strongly encouraged within the College of Science, such activity requires a significant commitment on the part of the departmental faculty, combined with appropriate support from the College and the University. With a growing focus on obtaining

external funding, the University has just completed a search for a new director of the Office of the Sponsored Projects. It is anticipated that the hiring of the new director will enhance the support provided to grant writers in the College of Science and across the campus. The College of Science Chairs Council has also discussed the possibility of hiring an individual, or creating an Associate Dean or an Assistant to the Dean position, that will support Principle Investigators with grant writing and post-award support. This decision is pending, based on the future direction and support of the Office of Sponsored Projects.

In addition, the Chairs' Council has determined that it is important to support a College of Science information technology specialist. Although this individual will have significant responsibility for support of the geographic information systems laboratory in Geosciences and the 132-node supercomputer in Physics, the individual will also be available to support IT needs across all of the departments in the College of Science. A search committee has been organized to conduct the search that reflects the interdisciplinary requirements of the position, with the expectation that a person will be hired during Fall Semester, 2008.

While it would be extremely helpful to also support the hiring of an equipment maintenance staff specialist, with the many needs in the College, it is unlikely that such an individual will be able to be funded through E&G support in the near future. However, should significant indirect cost capture be possible through grant writing or perhaps a funding stream could become available from other sources, such a position may be considered on "soft money".

Space constraints are also serious and ongoing issues in the College of Science, negatively impacting all departments. The Science Laboratory building is now nearly 40 years old (completed in 1969) and the adjacent Lind Lecture Hall is only one year younger. The design and current status of the Science Lab building is highly restrictive to collaborative projects and suffers from significant fire, earthquake, and asbestos issues. However, more immediately, there is no available space in the building for expansion of programs, or for necessary support of research by faculty and students. Efforts are continually underway to identify temporary and long-term solutions to the severe space constraints that the College of Science currently operates under. Several relocations within the College are planned that will ultimately free up another small research space in the Chemistry Department. In addition, remodeling will be required to house the new FT-NMR when it arrives later this summer or fall.

The review team also mentioned the limited time for faculty to participate in research activities with undergraduates, given the heavy 12 TCH per semester teaching load. The College of Science Chairs' Council has been discussing the issue and plans to revisit it in a more focused way during Fall Semester, 2008. The issue is becoming increasingly important to the entire college given (a) the rapid growth in undergraduate research, (b) the very conservative policy of providing 0.25 TCH per SCH, which is far too restrictive for the time-intensive mentoring required of undergraduate research, and (c) the importance of supporting active research programs for faculty interested in remaining current in their disciplines, which is a fundamental

requirement of excellent teaching in the rapidly evolving disciplines of the life and physical sciences. The Dean anticipates that a formal policy regarding reassigned time for research and scholarship activities will emerge from this fall's discussion.

It must be pointed out, however, that the ability of faculty in the Department of Chemistry to pursue research activities is not only impacted by equipment and space needs, and by the 12 TCH teaching load, but it is also impacted by the significant amount of overload teaching that occurs in the Department. The Department's participation in overload teaching far exceeds that of any other department in the College of Science. While it is certainly understandable that the additional income is helpful, and much of the teaching is in support of the evening and summer programs, overload teaching should not supersede the fundamental faculty expectations of teaching, research and scholarship, and service. In addition, it may become a significant issue for ACS certification of their B.S. Option I degree, given the new requirements adopted in Spring, 2008, if the number of hours that Chemistry faculty teach is not reduced. It may be possible to identify an additional faculty line for the Chemistry Department in the next few years should the willingness of the faculty to increase research activities with undergraduates be clearly established. This would also be consistent with the Department's recent adoption of research requirements for their degree programs, together with the new emphasis on undergraduate research in the ACS criteria.

Curiously, the student credit hours in the Chemistry Department rose significantly from 2002-03 to 2003-04, from 14,079 to 17,365, but have declined steadily since then, reaching 14,560 in 2006-07. This is roughly consistent with the SCHs produced by the large online chemistry program. According to data provided by WSU Online, the SCHs due to online courses were 3047 in 2002-03, peaking at 6260 in 2004-05, and declining again to 5188 in 2006-07. However, it appears that in 2007-08 the online enrollments have again increased to 5643 SCHs. Currently one-half of the Chemistry Department faculty members are engaged in online instruction for overload pay; in addition, two adjuncts also participate in online instruction. Other faculty are heavily engaged in overload teaching in face-to-face courses.

In part to address recent downturns in SCHs in some departments in the College of Science, the Chairs' Council began a conversation this past spring about developing new and inviting general education offerings that meet the recently revised and adopted Life Science and Physical Science general education goals and criteria. This conversation will continue into this fall and will integrate with the campus-wide conversation regarding general education assessment. It is of paramount importance that graduates of Weber State University develop a significantly deeper understanding of and appreciation for science and mathematics, and that the number of students majoring in the sciences and mathematics increase. Of course this is not simply a Weber State University issue, but it reflects national trends. As documented in countless state and national reports, the low level of understanding and expertise in STEM fields (Science, Technology, Engineering, and Mathematics) is at a crisis level for United States in terms of maintaining a competitive advantage in the world economically, technologically, and scientifically.

Along with the issues of laboratory equipment and time available for research, the review team also identified two other issues that are closely related: the need for improved mentoring of junior faculty, and the apparent disconnect between departmental expectations for tenure and the expectations of the College of Science. As noted in the program review team report, and reiterated in the response by the Department, “A concern is that the department does not seem to have the respect of the College in the tenure process.” The Department suggests that perhaps the process should be changed so that each department is represented on the College committee every year. While this is certainly possible, such a change would require a university-wide change in the Policies and Procedures Manual (specifically PPM 8-16).

It should be pointed out that the tenure requirements are specific to the College of Science and are identified in the tenure document approved by the Faculty Senate on March 27, 2003 (available at http://www.weber.edu/FacultyAndStaffResources/science_tenure.html). Rather than consider revisions of the Policies and Procedures Manual and/or the current College of Science tenure policy, the Dean would suggest that a more deliberate and proactive mentoring process would be advisable for faculty during their probationary period, clearly identifying the requirements for tenure within the College of Science. It is important that faculty understand the importance of establishing research programs early in their time at Weber State University, and the time-management implications that are associated with an active research program.

The Dean makes a specific point of discussing tenure expectations with faculty during the hiring process. In addition, a modest amount of start-up funding is provided to new faculty to help them establish research programs at Weber State University. Although the start-up funding has been very modest at best, the Provost has been able to provide additional start-up funding for life and physical science faculty beginning with the new faculty in 2008-2009. The Dean is also working on strategies to further improve start-up packages. Numerous in-house funding opportunities are also available for faculty as identified on the Provost’s web site at http://www.weber.edu/Research/faculty_development_funding.html. Of course, the Office of Sponsored Projects is also available for faculty seeking larger funding opportunities through public granting agencies, such as NSF, NASA, NIH, DOE, the Department of Education, and so on.

The Dean greatly appreciates the thoughtful self-study developed by the Department of Chemistry, the numerous informed comments made by the program review team, and the reflective response by the Department. Many of the concerns and recommendations suggested by the review team are already being addressed, but the many recommendations will also certainly be very helpful in strategically planning for the next five years of the program.