THE GRADUATE SCHOOL

UNIVERSITY of WASHINGTON

March 15, 2012

To: Robert C. Stacey, Interim Dean
College of Arts and Sciences

From: Gerald J. Baldasty, Vice Provost and Dean
James S. Antony, Associate Vice Provost and Associate Dean for Academic Affairs

Re: Department of Chemistry 2011-2012 Review

This memorandum outlines the recommendations for the Department of Chemistry academic program review. Detailed comments can be found in the documents that were a part of the following formal review proceedings:

- Charge meeting between review committee, department, and administrators (April 15, 2011)
- Department self-study (September 20, 2011)
- Site Visit (October 24-25, 2011)
- Review committee report (November 21, 2011)
- GPSS report (November 14, 2011)
- Department response to the review committee report (January 31, 2012)
- Graduate School Council consideration of review (March 1, 2012)

The review committee consisted of the following faculty:

David Morris, Professor, UW Department of Biochemistry (Committee Chair)
R. G. Hamish Robertson, Professor, UW Department of Physics
Charles Laird, Professor, UW Department of Biology
Carol Fierke, Professor and Chair, Department of Chemistry, University of Michigan, Ann Arbor, MI
Clifford Kubiak, Professor, Department of Chemistry and Biochemistry, University of California, San Diego, CA

A subcommittee of the Graduate School Council presented a summary of findings and recommendations to the full Council at its meeting on March 1, 2012. The Department offers the Bachelor of Arts in Chemistry, Bachelor of Science in Chemistry, Bachelor of Science in Chemistry (ACS certified), Bachelor of Arts in Biochemistry, Bachelor of Science in Biochemistry (offered jointly with the Department of Biochemistry, Master of Science in Chemistry, and Doctor of Philosophy in Chemistry. Following are the specific comments and recommendations regarding the department and its degree programs.

Program Strengths

The department's strengths were identified as the following:

1. It has an excellent national reputation and strong graduate programs. It attracts high levels of grant and contract funding, and faculty have received numerous professional honors.

2. It is in the top 10 nationally for research funding, including three federally-funded research centers.
3. The Chair and Associate Chairs leadership is outstanding even when demand is high and resources are in short supply. The office and technical staff is dedicated, motivated and effective.
4. It has open communication and interaction across sub-divisions of the field that are often separate in other Chemistry departments.
5. The faculty express great enthusiasm for and investment in the department.
6. The undergraduate program is robust and growing, granting more bachelor's degrees per year than any other unit in the nation.
7. The graduate program remains healthy although its size has been reduced by more than 15% from its earlier high. The quality of students is high and time to degree is excellent. Students are satisfied with the program. (Data on placement of Ph.D. graduate is limited and should be improved to help assess the success of the training.)

Challenges and Risks

Four main areas were identified as challenges/risks:

1. **Undergraduate Education.** An existing need is to preserve/improve the quality of undergraduate instruction given its growth in demand over the last two decades and the reduced state budget. The department and the review committee concluded that the "instructional program size is far out of line with the resource base." Specific concerns that could diminish the quality of the educational experience include: (a) very large undergraduate classes, (b) drastic reduction in lab classes (every other week) and lab course content, (c) reduced one-to-one instruction due to limited TA and faculty contact hours, and (d) increasing the time to degree. Significantly, the number of TA lines has not kept up with the phenomenal growth of the undergraduate program.
2. **Graduate Education.** Concerning the undergraduate instructional capacity, graduate students are facing elevated TA workloads and limited course offerings due to faculty loads in undergraduate courses which are leading to graduate students' stress and may negatively impact future recruiting efforts.
3. **Faculty Diversity.** The department has made efforts to increase faculty diversity but there remains a "profound skewing of its gender and racial demographics." For example, the gender ratio for the faculty (% female for junior faculty) is in stark contrast to the graduate students (46/% females). Considering the national averages, the department is only slightly lower (12% female faculty) than the national average (16%). The department is making an effort to increase faculty diversity but it may require additional investment of resources for it to be successful.
4. **Physical Space.** Despite the resources the College of Arts and Sciences invested in the department, the renovation to Bagley Hall are not complete, particularly undergraduate laboratories and an undergraduate lounge space. The continued renovation of laboratory space is critical for teaching and safety reasons.

Areas of Concurrence

Although the review committee and the department concurred on the identified challenges, it is unclear if there is agreement on prioritization of those concerns. The order of the review committee's report was faculty diversity, undergraduate and graduate education, and physical space. The committee's report does not state whether the challenges were discussed in order of priority, but if so, it is an area where the department and Graduate School Council representatives felt there was some disagreement based on the site visit exit discussion. The

potential to deliver quality undergraduate education with the diminished resource base was the primary concern discussed in the exit meeting.

1. Both the committee and the department agree that the imbalance between the size of the instructional program and the resource base should be resolved. There is a dire need for additional TA lines to keep up with the growth of the undergraduate program. Secondarily, additional tenure-line faculty (+7 FTE) and lecturers (+5 FTE) are needed to meet the needs of the large undergraduate program. Additional TA lines are needed to improve the quality of the undergraduate program and to prevent excessive teaching stress on current graduate students. The current load is 96:1 for the first quarter of freshman chemistry and 48:1 for the subsequent two quarters. This has forced a drastic reduction of the number of student lab hours, a blasphemous change for a laboratory science. The Council questioned whether the reduction of lab hours could affect accreditation.
   Progress has been made on the deficit in lecturers and tenure-line faculty since the department website (2/23/12) announced the hiring of one tenure-track professors and two lecturers. The lecturer hires raise the department lecturer FTE to 2.5 filling half of the gap in that instructional need. Without a resource boost the department will have to cut the size of their undergraduate program by approximately 20% which would limit access to "gateway" courses to numerous majors on campus. Additionally, no new resources would mean cutting their advanced majors program such that approximately 230 degree recipients would need to shift to other majors.
2. The department concurs with the need to increase the gender and ethnic diversity of the faculty but notes that it is among the most ethnically diverse and is typically gender diverse compared to other departments nationwide. It agrees with the review committee suggestion that "the Chair, the Faculty, the Dean, the Provost work together to rethink and remedy this issue." Progress appears to have been made on this since all three hires referenced above are women.
3. The department agreed with the need to continue the renovation of Bagley Hall instructional laboratories.
4. The department did not address the committee's concerns about the effect of the undergraduate program size on the teaching load placed on graduate students or its effect on the range of course offerings available in the graduate program. The majority of graduate students who responded to the GPSS survey rated the department's academic standards and its facilities as high and rated their academic experience as very good to excellent.
   The Graduate School Council questioned whether the department has considered any other delivery models, e.g., the use of technology in offering Chemistry 101 to majors and non-majors. They suggested that the department consider exploring how peers may be dealing with similar undergraduate program issues. The Council also noted their concern about the impact of the undergraduate program growth on graduate students.

Graduate School Council Recommendations

1. Increasing the number of teaching assistant lines assigned to the department is critical to maintain the quality of the undergraduate program and a fair workload for graduate assistants. The Chair, Faculty, Dean, and Provost should work together to develop a plan which would rebalance the resources to undergraduate program size through a combination of new TA lines, strategic hiring of lecturers and tenure-line faculty and, if necessary, a reduction in size of the number of undergraduate majors. A major reduction

in program size should only be viewed as a last resort given the tremendous societal need for citizens knowledgeable in the natural science.

2. The department should engage in a thorough assessment of their hiring and retention practices to determine why qualified women decline offers and/or leave the department prematurely.
3. All degree programs offered by the department should be continued with a review to occur in 10 years (2021-2022)

We concur with the Council's comments and recommendations.

c: Ana Mari, Provost, Office of the Provost
Douglas Wadden, Executive Vice Provost, Office of the Provost
Werner Stuetzle, Divisional Dean, Natural Sciences, College of Arts and Sciences
Janice DeCosmo, Associate Dean, Undergraduate Academic Affairs
Paul Hopkins, Professor and Chair, Department of Chemistry
Members of the Chemistry Review Committee
Graduate School Council
GPSS President
Augustine McCaffery, Senior Academic Program Specialist, The Graduate School