THE UNIVERSITY OF UTAH

July 28, 2014

Ruth V. Watkins
Senior Vice President for Academic Affairs
205 Park Bldg.
Campus

RE: Graduate Council Review
Department of Chemistry

Dear Vice President Watkins:

Enclosed is the Graduate Council's review of the Department Chemistry. Included in this review packet are the report prepared by the Graduate Council, the Department Profile, and the Memorandum of Understanding resulting from the review wrap-up meeting.

After your approval, please forward this packet to President David Pershing for his review. It will then be sent to the Academic Senate to be placed on the information calendar for the next Senate meeting.

Sincerely,

David B. Kieda
Dean, The Graduate School

Encl.

XC: Cynthia Burrows, Chair, Department of Chemistry
Henry S. White, Dean, College of Science

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The Graduate School – The University of Utah

GRADUATE COUNCIL REPORT TO THE SENIOR VICE PRESIDENT
FOR ACADEMIC AFFAIRS AND THE ACADEMIC SENATE

April 28, 2014

The Graduate Council has completed its review of the Department of Chemistry. The External Review Committee included:

Paul W. Bohn, PhD
Arthur J. Schmitt Professor
Department of Chemical and Biomolecular Engineering
and Department of Chemistry and Biochemistry
University of Notre Dame

Charles P. Casey, PhD
Homer B. Atkins Emeritus Professor
Department of Chemistry
University of Wisconsin

Joseph S. Francisco, PhD
William E. Moore Distinguished Professor
Department of Chemistry
Purdue University

The Internal Review Committee of the University of Utah included:

Brenda L. Bass, PhD
Distinguished Professor
Department of Biochemistry

David L. Strayer, PhD
Professor
Department of Psychology

Kent S. Udell, PhD
Professor
Department of Mechanical Engineering

This report of the Graduate Council is a consolidation of information based upon the following:

- 2013 external reviewer report (based on Nov. 21-22, 2013 site visit)
- 2013 University of Utah internal reviewer report (based on Oct. 30, 2013 site visit)
- 2013 Graduate School exit interview with external reviewers (Nov. 22, 2013)
- 2013 department self-study (October, 2013)
- 2014 response to the internal and external reviews by the Chair, Dr. Cynthia Burrows (please note that the College of Science Dean indicated his approval of the Chair's response and had no further comments) (February 12, 2014)

DEPARTMENT PROFILE

Program Overview

The Department of Chemistry is housed within the College of Science and is ranked in the nation's top 30 Chemistry departments for excellence. The Department is divided into five subdivisions: Analytical, Biological, Inorganic, Organic, and Physical Chemistry. The Department is committed to excellence in teaching, research and service at both the graduate and undergraduate levels. The Department offers both Bachelor of Arts and Bachelor of Science degrees and a PhD in Chemistry. There is no formal master's degree program at this time. The internal and external reviewers noted that the faculty are nationally and internationally recognized for their research and scholarship, are extremely collegial, provide innovative programs for undergraduate and graduate students, and have an exceptional outreach program. It was noted in the external review that the Department has addressed many of the concerns from the prior review in 2006. Finally, as mentioned in the letter from the Chair, the Department is already moving towards enacting many of the recommendations from the current internal and external reviews. However, of paramount concern is the issue of safety that is compromised by insufficient numbers of teaching assistants (TAs) and the failing infrastructure and outdated facilities in the Henry Eyring Building.

Faculty

According to the self-study, the Chemistry Department recently hired four new USTAR faculty members, thus bringing the total faculty to 33 members. The faculty is currently comprised of 8 Distinguished Professors, 12 Professors, 6 Associate Professors and 7 Assistant Professors. Of these tenured or tenure-track faculty, 8 are women and 3 are from underrepresented minorities. Increasing diversity with future hires was viewed as an important goal by the reviewers. In addition, the Department has 28 auxiliary faculty members, 18 of whom are adjuncts and 10 of whom are designated as lecturers or research-track faculty. The faculty are collegial, of high quality, service oriented, and it was noted in the reviews that they enjoy good morale. Likewise, it was noted that the staff is also committed to excellence and serves the Department well. However, it was noted in the self-study that faculty and staff salaries were low and that staff are overburdened due to budget cuts from 2008-2010 that have not been reinstated. Similarly, it was noted that more endowed chair positions for faculty would provide security against losing valued colleagues to other institutions.

It was noted in the reviews that both faculty scholarship and teaching are impressive and publication records are very strong. As a consequence, the faculty has won many international, national and local honors for their work. It was felt that junior faculty, who now receive very good mentoring, would benefit from an improvement in graduate student support in the form of additional Teaching and Research Assistantships (TAs and RAs). While research is strong, consistent with national trends, funding levels have declined and the Department budget likewise has decreased. Identification of alternative funding sources should be included in the development of a strategic plan for the Department. In addition, it is noted that there will be several faculty members retiring over the next 10 years. Therefore, a plan to hire 1-2 new faculty members per year was appropriately recommended by the internal reviewers.

Students, Curriculum, and Programs

As of Fall 2013, there were 320 undergraduate (major and pre-major) and 164 doctoral students in the Department. As mentioned above, the Chemistry Department offers both Bachelor of Arts and Bachelor of Science degrees and a PhD in Chemistry. There is no formal master's degree program at this time. Reviewers noted that the undergraduate program is strong, with a good gender balance that is likely due to innovative and successful efforts in outreach programs, such as the Curie Club. Undergraduates were enthusiastic about the advanced lab courses, the recent renovations, and the opportunities to serve as TAs. However, exceptional undergraduates find it difficult to compete with the graduate students for the limited TA positions available. There was also enthusiasm at the undergraduate level for research opportunities, but it was felt that perhaps a better mechanism could be instituted to alert undergraduates to research opportunities. In addition, an area of concern for the undergraduates is the increased reliance on standardized tests in the general Chemistry courses. With respect to undergraduate curriculum and courses, the reliance of the University on the Department for the sheer volume of service teaching considerably stretches the Department resources. Of some concern is the fact that the University of Utah Chemistry Department ranks the lowest in number of funded TAs per 1,000 undergraduates on campus among peer institutions. The large section size of discussion groups in the introductory courses is not an optimal model. Thus, it would be prudent to work with the University to identify new revenue models for undergraduate education to improve the quality of the educational experience and safety of the students. There are currently plans to implement a combined BS/MS degree program and the external reviewers agreed that it would strengthen the undergraduate mission and serve the students well.

The graduate students were on the whole very positive about their graduate student experiences. Of particular note was the opportunity to participate in ChemSAC, the excellent support staff, and the technical support. Some concerns, such as the low stipends (especially in contrast to students from graduate programs working side-by-side in the same labs) have already been addressed by the Department Chair. Of particular note, the students raised the issue of safety and failing infrastructure in the Henry Eyring Building as a major concern. One other concern was the impression that it was sometimes difficult to identify a dissertation laboratory due to funding issues, and there was the belief among the students that some of their peers had left the program due to a lack of laboratory opportunities. An assessment of the number of graduate students admitted each year would complement strategic planning for the Department. Likewise, the Department might want to consider increasing the frequency with which students meet with committees, as the students viewed this as a concern.

Diversity

As reported, of 33 faculty members in the Department, 8 are women and 3 are from underrepresented minority groups. Since the last review, the number of women on the faculty has doubled from 4 to 8. In addition, one Hispanic female was added to the faculty.

The Department reports that there have been favorable increases in the percentage of undergraduate students from underrepresented groups since the last review (10.92% in Fall 2012 as compared to 4.83% in 2006). Numbers of underrepresented graduate students are low (fewer than 5 per year during the last 5 years). There has been little change in the student gender ratio during the period of review, with females comprising roughly 40% of the student population.

Increasing the diversity of the students and faculty is a stated concern of the external reviewers. An excellent suggestion made by the external reviewers is to establish student Chemistry chapters of SACNAS and NOBCChE and to use new hiring opportunities to strategically increase diversity. It was noted that the Department has done well to increase gender diversity.

Program Effectiveness and Outcomes Assessment

The main assessment tool for the undergraduate program is use of the American Chemical Society Standard Exams in Analytical, Biological, Inorganic, Organic, and Physical Chemistry. The average performance of students on these exams places them in the 50th percentile and students are not followed post-graduation. Given the high national ranking of the Chemistry Department, it might be appropriate to set a higher goal for student performance on these exams.

Assessment of the graduate program is largely done through exit interviews of the students and tracking the employment status of graduates. One concern with the methods employed is that there seem to be missing data for a significant fraction of students. Given NSF and NIH training requirements going forward, it would benefit the Department to have more complete data regarding the graduates.

Facilities and Resources

The lack of TAs was viewed by the reviewers and the Department as the most serious threat to undergraduate education, with impacts on both quality as well as safety of undergraduate instruction. Reviewers noted that safety is of the utmost concern for the Department and the recent renovations of the Thatcher Building have improved the physical safety for faculty and students in the Department. However, it was noted by the reviewers and stated in the Chair's response letter that the Henry Eyring Building is in "dire need of an upgrade or demolition." This is a concerning issue and should be a matter of urgency for the University.

It was noted that the shops and user facilities available to faculty and students were staffed with well-qualified personnel.

COMMENDATIONS

1. The Department of Chemistry maintains an outstanding level of scholarship and research, teaching, and service and is to be commended for their high ranking for Chemistry programs in the U.S.

2. The Department of Chemistry has responded well to the prior review, with increasing faculty gender diversity, new strategic hires, and the successful renovation of the Thatcher Building.

3. The Department should be commended for their excellence in community outreach.

4. The Department and Chair should be congratulated for making improvements to the graduate program and faculty in a rapid fashion following the receipt of the current program reviews.

RECOMMENDATIONS

1. Safety issues are viewed as a ***very high priority*** and need to be addressed. Notably, the Department has responded well to reviewers' concerns by increasing the number of members on the internal safety committee, creating a chemical safety course, and developing safety manuals. However, renovation of the Henry Eyring Building should be viewed by the University as absolutely essential for the safety of the occupants.

2. The generation and implementation of a Departmental strategic plan, which was initiated soon after receiving the external reviews, should continue and incorporate a hiring strategy to increase faculty diversity. In addition, goals regarding undergraduate performance on national exams, potential curriculum revisions and programmatic elements for both undergraduate and graduate programs, as well as plans for tracking student outcomes, should be considered for inclusion in a strategic plan. Regular assessments of the strategic plan should be performed.

3. In order to retain high quality faculty that the Department currently has, the Department Chair and Dean should continue their efforts to provide endowed chairs and obtain funding to considerably increase the numbers of TAs and RAs, as well as to hire new faculty to meet the needs of the Department. The University should consider alternate revenue models to support the high volume of service teaching that stretches Departmental resources. Furthermore, the policies regarding TAs and RAs should be reassessed, and it is noted that the dire need for more TAs is both a safety and "quality of education" concern. Likewise, staff workloads and pay should be evaluated in order to retain outstanding staff.

4. Establish a mechanism, such as the BioURP program, to advertise research opportunities for undergraduates. Likewise, publicize undergraduate manuscripts and other successes.

5. Establish Chemistry chapters of SACNAS and NOBCChE to enhance student ethnic diversity.

Submitted by the Ad Hoc Committee of the Graduate Council:

Karen S. Wilcox, PhD (Committee Chair)
Professor, Department of Pharmacology and Toxicology

Ginette A. Pepper, PhD
College of Nursing

Hong Yong Sohn, PhD
Department of Metallurgical Engineernig

Debra J. Mascaro, PhD (Undergraduate Council Representative)
Department of Mechanical Engineering

Chemistry

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
FACULTY: With Doctoral Degrees Including MFA and other terminal degrees							
Full Time Tenured Faculty	24	21	23	23	21	21	25
Full Time Tenure Track	5	6	7	5	7	11	7
Full Time Auxiliary Faculty	8	6	4	7	5	3	2
Part Time Tenure/Tenure Track	3	3	2	2	3	2	1
Part Time Auxiliary Faculty	0	1	3	4	2	2	2
With Masters Degrees							
Full Time Tenured Faculty	0	0	0	0	0	0	0
Full Time Tenure Track	0	0	0	0	0	0	0
Full Time Auxiliary Faculty	0	0	0	0	0	1	1
Part Time Tenure/Tenure Track	0	0	0	0	0	0	0
Part Time Auxiliary Faculty	0	0	0	0	0	0	0
With Bachelor Degrees							
Full Time Tenured Faculty	0	0	0	0	0	0	0
Full Time Tenure Track	0	0	0	0	0	0	0
Full Time Auxiliary Faculty	0	0	0	0	0	0	0
Part Time Tenure/Tenure Track	0	0	0	0	0	0	0
Part Time Auxiliary Faculty	0	0	0	0	0	0	0
Total Headcount Faculty							
Full Time Tenured Faculty	24	21	23	23	21	21	25
Full Time Tenure Track	5	6	7	5	7	11	7
Full Time Auxiliary Faculty	8	6	4	7	5	4	3
Part Time Tenure/Tenure Track	3	3	2	2	3	2	1
Part Time Auxiliary Faculty	0	1	3	4	2	2	2
FTE from A-1/S-11/Cost Study Definition							
Full-Time Salaried	34	34	29	32	32	32	34
Part-Time or Auxiliary Faculty	0	1	2	2	2	1	2
Teaching Assistants	0	0	0	1	0	0	0

Chemistry

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Number of Graduates							
Bachelor's Degrees	39	60	65	57	67	70	75
Master's Degrees	8	14	9	4	10	14	28
Doctoral Degrees	21	26	29	17	21	22	27
Number of Students Based on Fall Third Week Semester Data							
Undergraduate Pre-Majors	78	100	65	65	99	93	87
Undergraduate Majors	154	184	222	236	245	258	265
Enrolled in Masters Program	4	1	1	2	2	11	12
Enrolled in Doctoral Program	173	176	170	170	184	173	163
Department FTE Undergrad	821	790	798	840	966	1,005	988
Department FTE Graduate	192	203	202	207	211	205	198
Department SCH Undergrad	24,643	23,702	23,942	25,214	28,993	30,152	29,629
Department SCH Graduate	3,848	4,054	4,040	4,149	4,223	4,092	3,958
Undergraduate FTE per Total Faculty F	24	23	26	24	29	31	27
Graduate FTE per Total Faculty FTE	6	6	7	6	6	6	5
Cost Study Definitions							
Direct Instructional Expenditures	8,027,615	8,057,582	8,943,897	8,122,218	8,291,128	9,622,759	9,862,512
Cost Per Student FTE	7,918	8,116	8,943	7,751	7,041	7,955	8,319
Funding							
Total Grants	10,624,527	11,245,128	12,446,430	12,607,233	11,242,327	9,152,890	9,886,657
Appropriated Funds	7,488,236	7,754,394	8,799,513	8,409,346	8,374,072	9,218,013	9,208,342
Teaching Grants	0	0	47,000	30,000	0	0	0

Memorandum of Understanding
University of Utah - Department of Chemistry
Graduate Council Review 2013-14

This memorandum of understanding is a summary of decisions reached at a wrap-up meeting on July 7, 2014, and concludes the Graduate Council Review of the University of Utah Department of Chemistry. Ruth V. Watkins, Senior Vice President for Academic Affairs; Henry S. White, Dean of the College of Science; Cynthia Burrows, Chair of the Department of Chemistry; David B. Kieda, Dean of The Graduate School; and Donna M. White, Associate Dean of The Graduate School, were present.

The discussion centered on but was not limited to recommendations contained in the review summary report presented to the Graduate Council on April 28, 2014. Corrections made in the Chair's response to the report are noted and have been incorporated into the summary report. At the wrap-up meeting, the working group agreed to endorse the following actions:

Recommendation 1: Safety issues are viewed as a ***very high priority*** and need to be addressed. Notably, the Department has responded well to reviewers' concerns by increasing the number of members on the internal safety committee, creating a chemical safety course, and developing safety manuals. However, renovation of the Henry Eyring Building should be viewed by the University as absolutely essential for the safety of the occupants.

Safety issues in the Department are taken very seriously and are a high priority for all parties involved. It was determined that renovations in the Henry Eyring Building should primarily involve labs. One strategy suggested by the Chair, and supported by the Sr. VPAA and the Dean, was to work with both College and University Development to raise funds for renovations by focusing on a research theme that would appeal to donors as well as benefit current top researchers in the Department. The Sr. VPAA related that the plan for building a Science Corridor was prioritized in the state budget proposal. The Dean will follow through on a planning meeting with the director of Facilities Planning to discuss the specifics of such a plan. The Sr. VPAA stated that the University wants to construct a building for the next 50 years, not the last 50 years. In the meantime, progress has been made by the Department to address important safety procedures, including creating a semester-length safety course, expanding the Committee on Safety and Sustainability, and creating best practices manuals for labs. Hiring a safety officer to coordinate with the office of Environmental Health and Safety (EHS) is also considered to be a high priority. Due to budget constraints, the Dean and Chair will explore the possibility of a College-wide safety officer who would partner effectively with EHS. Progress on all of these initiatives will be reported in regular updates to The Graduate School and in a meeting with the Dean of The Graduate School in year three post-review.

Recommendation 2: The generation and implementation of a Departmental strategic plan, which was initiated soon after receiving the external reviews, should continue and incorporate a hiring strategy to increase faculty diversity. In addition, goals regarding undergraduate performance on national exams, potential curriculum revisions and programmatic elements for both undergraduate and graduate programs, as well as plans for tracking student outcomes, should be considered for inclusion in a strategic plan. Regular assessments of the strategic plan should be performed.

The Chair is committed to continue developing and updating the Department's strategic plan. Since the review, a faculty hire has been made that will increase both gender and racial/ethnic diversity, and strategies to continue this trend are included in the plan. Additionally, plans to improve the tracking of student outcomes, make curriculum revisions (including creating a new BS/MS degree track, approved spring 2014), implement a streamlined BS in Chemical Education (to be implemented during the coming academic year), and implement an accelerated timeframe for PhD advancement to candidacy, have all been addressed as part of the new strategic plan. The Department will be involved in regular assessments of the plan as part of regular updates to The Graduate School.

Recommendation 3: In order to retain high quality faculty that the Department currently has, the Department Chair, Dean and SVPAA should continue their efforts to provide endowed chairs and obtain funding to considerably increase the numbers of TAs and RAs, as well as to hire new faculty to meet the needs of the Department. The University should consider alternate revenue models to support the high volume of service teaching that stretches Departmental resources. Furthermore, the policies regarding TAs and RAs should be reassessed, and it is noted that the dire need for more TAs is both a safety and "quality of education" concern. Likewise, staff workloads and pay should be evaluated in order to retain outstanding staff.

The Sr. VPAA has supported increased funding for graduate assistantships for the College. Although the funds awarded to the Department are not completely adequate, they do help to mitigate the gap, and more funding will be provided annually for the next three years as part of the agreement. Due to this influx of funds, the Department has been able to raise their graduate stipends. The Graduate Dean encouraged the Chair to step up the Department's efforts to encourage and prepare graduate students to apply for NSF fellowships. Additionally, the Department will be eligible for matching funds for scholarship awards offered through The Graduate School. Staff workloads, pay and retention issues continue under the circumstances of limited budgets during recent years; however, several merit and equity increases were given to staff members for the current fiscal year, and two career-line faculty members were promoted and received pay raises.

Recommendation 4: Establish a mechanism, such as the BioURP program, to advertise research opportunities for undergraduates. Likewise, publicize undergraduate manuscripts and other successes.

The Department has a new website with listings of all research opportunities for undergraduates as well as highlights of student successes. The Chair will upgrade the photos used on the site in hopes of increasing and improving advertising and marketing for the different undergraduate programs offered.

Recommendation 5: Establish Chemistry chapters of SACNAS and NOBCChE to enhance student ethnic diversity.

The prioritization of this recommendation was questioned by the Chair and Dean due to the amount of resources required to establish departmental chapters of SACNAS and NOBCChE for what they consider to be very little potential impact at this time. However, the Dean of The Graduate School pointed out that there now exists an active Chapter of SACNAS on campus (See https://www.facebook.com/utah.sacnas). The Chair will work to make faculty and students aware of the local chapter of SACNAS, and encourage student participation in local and national SACNAS activities.

The Chair was also encouraged to have the Chair of Graduate Admissions make use of Graduate School Asst. Dean Colin Ben's resources for the recruitment of qualified students from underrepresented groups.

This memorandum of understanding is to be followed by regular letters of progress from the Chair of the Department of Chemistry to the Dean of The Graduate School. Letters will be submitted until all of the actions described in the preceding paragraphs have been completed.

Ruth V. Watkins
Henry S. White
Cynthia Burrows
David B. Kieda
Donna M. White

David B. Kieda
Dean, The Graduate School
July 28, 2014