Memorandum of Understanding
Department of Chemistry
Graduate Council Review 2006 – 2007

This memorandum of understanding is a summary of decisions reached at a wrap-up meeting on 24 March 2008, concluding the Graduate Council Review of the Department of Chemistry. David W. Pershing, Senior Vice President for Academic Affairs; Pierre Sokolsky, Dean of the College of Science; Henry White, Chair of the Department of Chemistry; David S. Chapman, Dean of the Graduate School; and Frederick Rodewalt, Associate Dean of the Graduate School were present.

The discussion centered on but was not limited to the recommendations contained in the Graduate Council review completed on 7 May 2007, which addressed the following issues:

At the wrap-up meeting, the working group agreed to endorse the following actions:

**Recommendation 1: Laboratories.** The out-dated state of the teaching laboratories has led to a sub-standard curriculum. Research laboratories are over-crowded to unsafe levels. The aging infrastructure needs upgrading, to alleviate overcrowding and improve safety and curriculum quality. Obsolete equipment needs replacement. Operating costs should be met.

The Department of Chemistry has recently taken or will soon take several actions to address problems with outdated and potentially unsafe undergraduate teaching laboratories. The Department has invested approximately $150,000 in the complete renovation of the advanced synthetics teaching labs including the installation of new exhaust hoods. In addition to synthetics, physical and analytical chemistry undergraduate laboratory sections are taught in the remodeled labs. The undergraduate general chemistry laboratories remain substandard and instrumentation and glassware are outdated and in short supply. The Chair of Chemistry is proposing a $27 per student increase in laboratory fees which would generate approximately $100,000 per year for instruments and supplies. The Department will seek approval of the fee increase from the Undergraduate Council.

**Recommendation 2: Graduate recruitment.** The Department should continue efforts to recruit higher-quality graduate students, especially out-of-state domestic students, in order to meet its aspirations of being a top-ranked department.

The Department is taking the following steps to increase its domestic applicant pool. It has redone its web page with particular attention to descriptions of its graduate programs. This semester it has sponsored 25 potential students to campus for recruiting visits. The Department is attempting to rebuild relationships with feeder schools including the support of faculty recruiting visits to these schools. The Department will assess the success of these efforts by comparing number of applications, admissions offers, and enrollments to the benchmark year of 2006-2007.
Memorandum of Understanding
Department of Physics
page 2

Recommendation 3: Faculty recruiting. The Department has several vacancies, as well as phased retirements. The Department, in consultation with the College of Science and the University, should consider how best to address the costs associated with junior and senior hires. Nationally, huge startup funds are typically requested by junior hires; a realistic strategy for hiring junior faculty is required. For senior hires, ways of obtaining additional funds should be considered. This might include USTAR positions, and development efforts by the Department and College which have not been conducted to date. Diversity should be considered in all future hires.

The Department reports that the Dean of Science and the Senior Vice President for Academic Affairs have been very helpful with recruiting and retention efforts. The Department is currently recruiting to fill three open lines. To date they have interviewed seven senior candidates and one junior candidate. The recent USTAR hire in Chemical Engineering will teach several chemistry courses for the Department of Chemistry. The Department faculty is increasing efforts to seek funding through grant submissions including an IGERT grant.

Recommendation 4: Graduate students. A uniform stipend should be considered. The Department should disassociate the independent research proposal from the pre-oral examination. Problems with course offerings should be addressed, including availability especially of bioinorganic courses and obsolete listings. Better graduate student orientation is required, covering both academic and non-academic issues.

The Department has revamped its graduate curriculum so that the independent research proposal and pre-oral examination are separate activities. The Department contends that stipends are uniform for the majority of graduate students ranging from $20,500 to $21,500 for twelve months. The one exception is students who enter the program from the biochemistry program. The biochemistry program stipends are higher than chemistry’s and the Department would not be competitive in attracting biochemistry students if they required that they accept a reduced stipend. A faculty member has accepted the assignment of managing graduate student orientation.

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

David W. Pershing
Pierre Sokolsky
Henry White
Fred Rhodewalt

David S. Chapman
Associate VP for Graduate Studies
Dean, The Graduate School

5/21/08
### Department Review by Academic Year

**College of Science: Chemistry**

| Faculty Headcount - Source: OBIA, Updated annually during Autumn term. |
|------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Full Professors        | 21        | 21        | 21        | 22        | 20        |
| Associate Professors   | 3         | 4         | 3         | 5         | 4         |
| Assistant Professors   | 6         | 5         | 7         | 5         | 6         |
| Instructors            | 0         | 0         | 0         | 0         | 0         |

| Research Expenditures - Source: OBIA 'B' tables, Updated annually during Spring term. |
|---------------------------------------------|---------------------|---------------------|---------------------|---------------------|
| Research Expenditures (Department)          | $11,142,601          | $11,143,412          | $11,422,289          | $11,414,502          | NA               |
| Research Expenditures (College)             | $29,197,529          | $32,373,556          | $31,456,325          | $31,467,436          | NA               |

| Student Credit Hours (Budget Model) - Source: OBIA, Updated annually during Summer term. |
|---------------------------------------------|---------------------|---------------------|---------------------|---------------------|
| Lower Division                             | 20,560              | 20,548              | 21,012              | 21,076              | 0                 |
| Upper Division                             | 2,943               | 3,536               | 3,780               | 3,330               | 0                 |
| Total Undergraduate                        | 23,503              | 24,084              | 24,792              | 24,406              | 0                 |
| Basic Graduate                             | 981                 | 1,065               | 886                 | 876                 | 0                 |
| Advanced Graduate                          | 3,936               | 4,176               | 4,511               | 3,025               | 0                 |
| Total Graduate                             | 4,917               | 5,241               | 5,397               | 3,901               | 0                 |

| Course / Instructor Evaluations - Source: OBIA, Updated annually during Autumn term. |
|---------------------------------------------|---------------------|---------------------|---------------------|---------------------|
| Undergraduate Courses                      | 4.79                | 4.81                | 4.95                | 4.94                | NA                |
| Undergraduate Instructors                  | 4.88                | 4.91                | 5.01                | 5.03                | NA                |
| Graduate Courses                           | 4.98                | 5.04                | 4.99                | 5.10                | NA                |
| Graduate Instructors                       | 5.18                | 5.18                | 5.09                | 5.26                | NA                |

| Enrolled Majors - Source: OBIA, Updated annually during Autumn term. |
|-------------------------------------------------|---------------------|---------------------|---------------------|---------------------|
| Pre-Majors                                     | 71                  | 73                  | 77                  | 78                  | 100               |
| Full Majors (including Intermediate)           | 137                 | 164                 | 200                 | 154                 | 184               |
| Master's                                       | 7                   | 2                   | 1                   | 4                   | 1                 |
| Doctoral                                       | 144                 | 170                 | 171                 | 173                 | 176               |

| Degrees Awarded - Source: OBIA, Updated annually during Autumn term. |
|-------------------------------------------------|---------------------|---------------------|---------------------|---------------------|
| Bachelor's                                      | 57                  | 52                  | 82                  | 39                  | NA                |
| Master's                                        | 17                  | 14                  | 14                  | 8                   | NA                |
| Doctoral                                        | 21                  | 22                  | 14                  | 21                  | NA                |

Office of Budget & Institutional Analysis (OBIA)
110 Park Building, 201 South President's Circle, Salt Lake City, UT 84112
Office: 801-581-6948 | Fax: 801-581-7541 | Email: info@obia.utah.edu
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5/21/2008
The Graduate School - University of Utah

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

May 4, 2007

The Graduate Council has completed its review of the Department of Chemistry. The external reviewers were:

Sylvia T. Ceyer
Department of Chemistry
MIT

Royce W. Murray
Department of Chemistry
University of North Carolina

Larry E. Overman
Department of Chemistry
University of California, Irvine

The Internal Review Committee of the University of Utah included:

Gerald B. Stringfellow
Distinguished Professor
Department of Materials Science and Engineering

Dennis R. Winge
Professor
Department of Hematology

Vladimir Hlady (Chair)
Professor
Department of Bioengineering
This report by the Graduate Council's ad hoc review committee is based on the Department of Chemistry's self-study, the report of three external reviewers and the exit interview with them, the report of three internal reviewers, the response of the chair of the Department, and the response of the dean of the College of Science.

DEPARTMENT PROFILE

Faculty

There are 30 regular faculty, 5 lecturers, 6 research faculty, and 23 adjunct faculty. Of the 30 regular faculty, there are 7 Distinguished Professors, 12 Professors, 3 Associate Professors, and 8 Assistant Professors. One faculty member is Dean of the College of Science, another is Assistant Vice President for Undergraduate Studies. There are 4 women, and ethnic diversity is modest.

The faculty have obtained numerous prestigious awards, both at Utah and externally. As noted above, 7 are Distinguished Professors, more than any other department; 4 have been awarded the Rosenblatt prize. There are numerous other awards for teaching and from professional societies.

There is a strong record of externally-funded research, which has grown steadily over the past years. In 2005, the Department secured $10.7M in external funding. The average is roughly $370,000 per faculty member, with 90% of the faculty directing funded research.

The faculty also have a strong record of publishing. The record of external service is also strong. Examples are the Editor-in-Chief positions for the Journal of the American Chemical Society (ACS), the Journal of Organic Chemistry, and Applied Spectroscopy.

The Department has recently lost 3 productive faculty; altogether, there are four vacant faculty slots. Two other faculty are in phased retirement. Difficulties in hiring new faculty that were cited include large startup packages demanded by junior hires, the lack of endowed chairs to compete with the best departments, and the quality of space and lack of infrastructure for research. The need to hire in the Biochemistry area was cited by the External Review Committee.

In a 1995 NRC report, the Department was ranked 31 out of 168 PhD-granting institutions.

Curriculum

For undergraduate studies, the Department offers both the Bachelor of Arts and the Bachelor of Science Degrees. Most students complete one of two BS programs certified by the American Chemical Society. A Biological Chemistry option has proved to be a popular option, given that the Medical School does not have such an undergraduate option.

There are also degree tracks in Business, Chemical Engineering, Chemical Physics, Education, Geology, Materials Science, and Mathematics.

For graduate studies, the MS and PhD degrees are offered in the traditional areas of analytical, biological, inorganic, organic, and physical chemistry and in chemical physics.

In 2005-2006, there were 207 majors and premajors, 2 MS students, and 170 PhD students. There were 82 Bachelors, 12 Masters, and 14 PhD degrees awarded. Since 2001, there has
been a 35% increase in Bachelors degrees granted, whereas nationally there has been a slight decrease.

**Students**

The undergraduate program has a robust enrollment, and the overall morale of students is high. The Department is ranked 24th in the total number of Chemistry degrees awarded and 11th in the number of ACS-certified degrees. Nearly 45% of majors graduate with some significant research experience. Approximately 25% of graduates enter medical or dental school. The percentage of women is 35%, compared with a national average of 50%. Recently, the students formed an Undergraduate SAC.

For graduate recruitment, the Department is proactive by visiting regional colleges and universities, and by a Summer Research Program for undergraduates. Nevertheless, the Department struggles to recruit qualified domestic students, which is apparently a nationwide problem for all but the top institutions. While only one measure of qualification, the average GRE score for enrolled domestic students is 1079 while for enrolled international students it is 1242. By this metric, the quality of students is not consistent with a highly ranked department and may augur future difficulties. As another indication, the Graduate Admissions Committee of the Graduate School has handled in the recent past a number of appeals from the Department for students denied admission due to low qualifications.

There were some student concerns. The most serious concerns center on the quality of the teaching and research labs, discussed below. Undergraduate students expressed a desire for a tutoring program. Graduate students felt that disparate levels of financial support between research groups was unfair. They requested that the research proposal requirements should not coincide with the qualifying examination at the pre-oral examination. Graduate courses were not always available, and a number of course listings were obsolete. The problem seems particularly acute for inorganic chemistry courses, due to a current loss of faculty.

**Facilities**

Most of the Department is currently housed in the Eyring Building, but four theoretical groups are situated in INSCC. The new Gauss Haus will provide additional research space.

The Department operates facilities, shops, and a stockroom which also serve the whole University. The Chemistry Computer Center provides for the departmental computing needs.

The state of the teaching and research labs is dire, worse even than identified in the previous Graduate Council Review. The labs are unsafe due to overcrowding and the lack of infrastructure such as fume hoods and proper building ventilation. Instrumentation is antiquated and must be replaced. The lack of fume hoods restricts how many experiments can be carried out due to a need to share. The quality of instruction is severely affected by these various problems. Graduate students commented unfavorably on the poor state of the labs relative to their previous institutions.

There are plans to add a South Wing to the Eyring Building that would provide modern research space, teaching labs, and lecture rooms. However, the funding to construct this Wing is not yet in place.
COMMENDATIONS

1. Faculty quality. The faculty is distinguished in its research, professional service, and teaching.

2. Research. There has been a steady growth of research funding. The Department raised half the funds for the Gaus Haus.

3. Students. Enrollment growth has been strong. Undergraduate preparation results in good placements and success in ACS-certified degrees. The graduate program has a solid national reputation.

4. The Department chair is highly respected. There is a high level of collegiality.

RECOMMENDATIONS

1. Laboratories. The out-dated state of the teaching laboratories has led to a sub-standard curriculum. Research laboratories are over-crowded to unsafe levels. The aging infrastructure needs upgrading, to alleviate overcrowding and improve safety and curriculum quality. Obsolete equipment needs replacement. Operating costs should be met.

2. Graduate recruitment. The Department should continue efforts to recruit higher-quality graduate students, especially out-of-state domestic students, in order to meet its aspirations of being a top-ranked department.

3. Faculty recruiting. The Department has several vacancies, as well as phased retirements. The Department, in consultation with the College of Science and the University, should consider how best to address the costs associated with junior and senior hires. Nationally, huge startup funds are typically requested by junior hires; a realistic strategy for hiring junior faculty is required. For senior hires, ways of obtaining additional funds should be considered. This might include USTAR positions, and development efforts by the Department and College which have not been conducted to date. Diversity should be considered in all future hires.

4. Graduate students. A uniform stipend should be considered. The Department should disassociate the independent research proposal from the pre-oral examination. Problems with course offerings should be addressed, including availability especially of bioinorganic courses and obsolete listings. Better graduate student orientation is required, covering both academic and non-academic issues.

Submitted by the Ad Hoc Review Committee of the Graduate Council

John Hollerbach (Chair), School of Computing
Nicola Camp, Biomedical Informatics
John McDonnell, Special Education