

**CALIFORNIA STATE UNIVERSITY FULLERTON
DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY
PROGRAM PERFORMANCE REVIEW COMMITTEE REPORT**

Prepared by

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SUMMARY

This document serves as an external evaluation of CSU Fullerton's Department of Chemistry and Biochemistry (hereinafter referred to as the Department). The Program Performance Review Committee (hereinafter referred to as the Committee) evaluation consisted of a review of the Department's self study document, advising materials, and other documentation, as well as a full day of interviews of administrators, faculty, staff, and students on August 31, 2009. Lists of facilities toured, documents reviewed, and participants interviewed are included at the end of this document. The charge to the Committee was to highlight particular strengths, concerns, and recommendations to the Department in three major areas: faculty, programs, and resources and facilities.

The Committee acknowledges significant strengths of the Department: faculty who are committed to the pursuit of excellence in teaching and research; expanding enrollments in courses and undergraduate programs; an outstanding record in undergraduate and graduate student research mentoring; and impressive instructional teaching laboratory and research facilities. The Committee also acknowledges the adverse impact that the state budget crisis has had and *will continue to have* on course offerings, class sizes, faculty teaching loads, supplies and services, and the efficient and effective operation of the Department. In light of new ACS Guidelines for undergraduate chemistry degree programs, the Department is strongly urged to revise its undergraduate programs to take advantage of the flexibility offered by these new recommendations for foundation, depth, and elective courses. In doing so, the Department has the opportunity to address the *status quo* in its programs and preserve limited instructional budgets for its key priorities (i.e., core classes for undergraduate majors and graduate students, lab sections, service courses). The Committee noted that tenure and tenure-track faculty morale has been impacted by ever increasing faculty workloads as well as the recent loss of four faculty in the past two years, and recommends revision of the Department's requirements for tenure and promotion as soon as possible, especially with respect to new hires in the area of chemical education.

The Department has a reputation of excellence in teaching and research across the CSU system. In fact, one of the committee members noted that the BS Chemistry program appeared to be on the same level as a smaller, self-supported, private institution with much better resources. Nevertheless, efficient operation of the Department has become *impaired* by factors from both within and outside the Department (i.e., excessive number of units for the BS Chemistry degree, a required undergraduate research experience for all undergraduate majors, large numbers of

core classes at the graduate level, mandatory advising, summer research programs, rising tenure and promotion requirements, and budget cuts). As the Department transitions to new leadership, it must address several *urgent and needed changes* directed towards reducing faculty workloads, decreasing the time required to complete the bachelors and masters degrees, increasing graduation rates, and making its programs more sustainable in the current economic climate.

FACULTY

Strengths

1. The Department faculty are committed, dedicated, and hard working. In addition to teaching a wide array of courses and being research active, several faculty are making substantive contributions to university governance, college level administration, NIH review panels, and other service activities.
2. The Department faculty work above and beyond the call of duty in supervising a mandatory research experience for all undergraduate student majors. This represents a huge time and resource commitment with respect to identifying and planning different projects for each student, monitoring their progress, and assisting them in their poster development.
3. The Department lecturers continue to fill a vital role in teaching a significant portion of the Department's course offerings for both majors and non-majors.

Concerns and Recommendations

1. The recent loss of four faculty members over the past two years is a concern. In one case, the loss was due to personal issues but in another it appears that the loss may be partially attributed to uncertainty regarding the how the Department's tenure requirements would be applied towards a person hired in the chemistry education area. Given that recruitment and development of probationary faculty represents a significant time and effort commitment by the faculty, the Committee recommends that the Department begin a dialogue to address these concerns, provide more consistent mentoring of tenure-track faculty, and work towards a better balance between expectations for teaching and research.
2. The Committee was unclear as to specific division of tasks between the chair and vice chair. The current vice chair noted that his duties included scheduling classes, advising, and office management and sundry Department administrative tasks, which seems to be the significant portion of the normal duties of a chair for the three units of release time provided for this service. The Department faces a number of issues and challenges: shrinking budgets, growing enrollment, major curricular needs and revisions, and poor faculty morale. The Committee feels that more proactive Department leadership is needed to address these issues, as past practices and status quo will no longer suffice.
3. The Committee did not get a good feel for the Department's future hiring plans but noted that current hiring plans focus on identifying individuals who could teach specific courses (i.e., Gen Chem, OChem, Quant). Future hiring plans should be made more flexible, especially with respect to hiring more interdisciplinary faculty versus faculty in one of the traditional sub-disciplines. Given that 75% of the Department's undergraduate students major in biochemistry coupled with the fact that only 25% of the faculty are biochemists, the Department should consider new hires that bridge between traditional disciplines and biochemistry (i.e., bioanalytical). The Department is urged to reconsider its commitment to hiring and support of faculty in the area of chemical education, especially considering the loss of a recent hire and three consecutive failed searches in this area.
4. The Department recognizes that its documentation regarding retention, tenure, and promotion (RTP) requirements is in need of major revisions, and is apparently working on completing a

draft by the end of this semester. Several faculty commented that it was inflexible, inappropriate for faculty in the area of chemical education, and overly restrictive as to what types of grants count towards tenure and promotion (several faculty pointed out that co-PI, MRI, chemical education, and student training grants should be given some consideration). The Committee urges the Department to move quickly on its revisions of its RTP policy, suggests that the Department consider a more holistic approach towards evaluating faculty contributions across the three major areas (teaching, research, and service), and recommends that RTP decisions be made by a “committee of the whole” comprised of all tenured faculty (versus a committee of three faculty).

5. The Department is urged to provide more regular and/or informal mentoring of junior faculty, and consider structuring junior faculty workload in ways that support their efforts toward tenure. Several tenure track faculty noted that they are teaching larger sized classes and/or were in some cases not given the option to teach certain classes historically taught by more senior faculty. They also pointed out that senior faculty have not been observing their lectures and providing feedback on their teaching performance, which is important for tenure and promotion considerations. Two tenure track faculty were assigned two new class preps in the same semester. One tenure track faculty noted keeping more than 10 office hours per week, which is laudable in terms of helping out students but will eventually lead to decreased research productivity. More attention, advice, and consideration to tenure track faculty on these and related workload issues is vitally important for their morale and professional growth.
6. The loss of some faculty and major budget cuts have and will continue to make it difficult to support the large number of courses at the graduate and undergraduate levels and ultimately translate to larger faculty workloads. The Committee heard that some faculty have more than 12 WTUs and have volunteered to teach additional classes. This comes at a cost, with respect to faculty health or their ability to devote adequate time to research and service duties. The Department is urged to address these issues (note that more comments and specific recommendations on this issue are provided in the curriculum section).
7. The graduate coordinator currently has only two units of release time for this task with little or no staff support for the day-to-day administrative duties that go along with this position. These units should be increased back to three to make it more representative of the workload involved and to facilitate recruitment of a new graduate coordinator.

CURRICULA

Strengths

1. The Department offers one of the strongest BS Chemistry degree programs in the CSU system. This includes a number of innovative components, including mandatory writing course within the discipline and a research requirement. The Department is also to be commended for its strong commitment to serving lower division classes – 80% of its Gen Chem lectures are taught by tenure and tenure-track faculty which is larger than many other comparable universities.
2. The Department is to be congratulated for providing a well documented and written graduate handbook, and for strengthening the prerequisites necessary to qualify for their MS program. Although grad students are the “lifeblood” of university research, faculty can often waste significant amounts of time and effort on poor quality grad students who subsequently drop from the program. Hence, this raising of standards appears to be justified.
3. The Department continues to provide excellent support for service courses for nursing majors.

4. The Department is to be commended for their active Chemistry Club. They have raised funds for Department functions and social events, initiated visits to high schools about chemistry and biochemistry, and assisted with College and Department outreach activities.

Concerns and Recommendations

1. With an eye towards reducing faculty workloads and preserving ever shrinking teaching budgets, the Department is urged to consider a number of options. These can range from offering on-line courses to the “heretical” suggestion that the Department drop its requirement for undergraduate research. While an authentic research experience is invaluable, one must question whether such an experience should be required, especially for BA Chem majors who may be going into teaching at a K-12 level, sales, or dental school.
2. The Department’s BS Chemistry degree program has perhaps the most units of any such program in the CSU system. At 84 units, this is far in excess of typical BS programs which typically have a maximum of 72 units of major classes. In one semester (sophomore year), the Department’s advising materials recommend students take *17 units* of major classes, which is way too heavy a load for most students. The math requirement is too large at 16 total units. Although the Department is to be congratulated for being among the very few across the entire U.S. to have an ACS-approved concentration in environmental chemistry, there are currently no students taking this concentration, which may be due to the already excessive number of units within the BS Chem program. The Committee did not hear of any Department plans or efforts to respond to the new ACS Guidelines for Undergraduate Chemistry programs, which include a number of important and substantive changes that allow for more flexibility and do not require a second semester of Organic, PChem, or Analytical. The Committee strongly recommends that the Department’s Curriculum Committee address these issues and work towards proposals for revising their undergrad programs, reducing the number of core classes, and allowing more elective options. Such changes will also affect the BA Chem and BS Biochem programs. Obviously, this requires some major efforts in re-designing curricula, it should be noted that these efforts will provide numerous benefits: fewer classes to offer each semester, fewer classes to teach, higher graduation rates, and shorter time to graduation. Obviously, more Department retreats and/or meetings are needed to address these issues, learning objectives for programs and specific areas, and related curricular issues.
3. Likewise, the Department’s graduate program has approximately 10 different core classes that must be offered on a biannual basis. This further impacts Department budgets and faculty workloads.
4. There seems to be insufficient grad student recruitment and limited tracking of the percentages of students completing the program. The Committee recommends the Department implement a simple survey through Google Docs or Survey Monkey. This will allow better assessment of student retention.
5. There is decreased enrollment in graduate programs and the Department should consider recruitment, retention, and alternative program options. For example, the Department could make contact with grad coordinators at nearby UC programs to identify whether they can meet the needs of their more marginal PhD applicants with respect to training and garnering research experience.
6. The Department is urged to follow up on its plans to implement a Professional Science Masters (PSM) program as a means for increasing grad student enrollment and improving its budget situation.
7. Graduate students have perennially complained about their workload, the need for larger stipends, and long time required to complete their degree. The Committee recognizes that

many of these issues are not entirely the direct responsibility of faculty but can offer a few suggestions. The Department might consider offering graduate program admission only in the fall to better allow students to complete graduate coursework in the proper sequence. Biochemistry courses need to be offered in the evening. An MA or PSM might be a faster and more attractive option for some students. The requirement that grad students with a concentration in biochemistry need to complete an ACS calculus-based PChem exam should be reconsidered, especially given that many undergrad Biochem majors do not have to take the more rigorous calculus-based PChem. Some grad students spend a large amount of time supervising undergrad students doing research in their lab. In some cases, these grad students are receiving no compensation for supervising undergrad REU students who are being compensated. While the undergrads certainly benefit from this mentorship, such supervisory activities represent additional time and effort on the part of the grad student.

8. There seems to be limited resources for students to obtain support through tutoring. Information on campus and department resources needs to be better disseminated to both faculty and students, and additional support structures should be explored.
9. Teaching Assistants (TAs) receive little support or orientation to their role. The Committee recommends that the College and/or Department implement a mandatory orientation program for TAs prior to the start of each semester (similar to ones currently used in biology and geosciences).

RESOURCES AND FACILITIES

Strengths

1. The Department responded admirably to the loss of three different office staff members, and is to be commended for bringing in several new staff members and one former staff member to handle the administrative duties and tasks so essential to the smooth operation of a Department of this size.
2. The Department's studio classroom and associated workstations and the Center for Molecular Structure (CMoLS) are excellent examples of the Department's commitment to computer-enhanced instruction and state of the art research facilities.

Concerns and Recommendations

1. The Department office staff appears to be spending an inordinate amount of time checking student prerequisites. The Committee urges consideration of whether or not such prerequisite checking can be done during the registration process as is currently done at SFSU for impacted chemistry courses.
2. Several grad students complained that they are being asked to serve as TAs in classes prior to getting a copy of their contract. Students should not be working as TAs until they are under contract and know the amount of their stipend, and every effort should be made to rectify this so as to avoid potential legal problems.
3. The Department's OE&E budget is woefully inadequate for a Department offering as many lab classes, mandatory undergrad research, etc. In light of the budget crisis and the small likelihood of increased an OE&E budget, the Department may need to consider increasing summer programs and CEL type programs to provide additional funds, adding or increasing student lab fees to cover the necessary costs for supplies, and/or counting PCs attached to instruments towards the consolidated fee return allocation.
4. CMoLS is an outstanding facility and the best of its type in the CSU system. The Department and College are urged to build institutional or outside support in light of continuing budget issues, finite grant durations, and significant costs to maintain this facility. Perhaps one

option would be to negotiate increased indirect cost returns from grants (7.5% seems low relative to other comparable Departments – perhaps a quick survey of other Department chairs is warranted).

5. The Department's concerns about limited lab space for research appear to be justified, especially with respect to the undergrad research requirement. For reference, faculty at SFSU's Department of Chemistry and Biochemistry have an average of 500 ft² in research space, with only a small percentage of their students doing undergrad research.
6. The Department website is sorely outdated, with limited recruitment and advisement resources available to potential and current students. The Committee recommends that the College or Department support the efforts of an IT person to modify this website as well as having undergrad and grad coordinators providing appropriate and updated content for this website.
7. The Department's undergrad advising materials and handouts are dated Fall 2005 and are likely in need of updating.

APPENDIX

Facilities Toured

McCarthy Hall – Dept. Conference Room, Dept. Office, Studio Classroom, CSUPERB Core Facility

Dan Black Hall undergraduate labs (120, organic), teaching labs, research labs

Documents Reviewed

2009 PPR Self-Study

2002 CNSM Comments on the Department of Chemistry and Biochemistry PPR Committee Report and the Department's Response to that Report

Dept. Website

Undergraduate Program Materials

- Chemistry and Biochemistry Undergraduate Handbook
- Bachelor's Degrees in Chemistry/Biochemistry View Sheet
- Advisement Sheets – Minor in Chemistry, BS Chemistry Degree Requirements and Advising Checklist, BS Biochemistry Degree Requirements and Advising Checklist, BA Chemistry Degree Requirements and Advising Checklist, Chemistry and Biochemistry Research – Active Faculty Research Interests

- Minor in Natural Science

Graduate Program Materials

- Master of Science in Chemistry View Sheet
- MA in Chemistry CSU Degree Program Proposal
- Masters in Chemistry Flyer
- Presentation on Master's Program in Chemistry
- Graduate Handbook for the Master of Science Degree in Chemistry

Interviews Scheduled

Dean, Associate Dean, Chair, Vice Chair, Full Professors, Associate Professors, Untenured Professors, Part-Time Faculty, Staff, Graduate Students, Undergraduate Students, Research Funding, Graduate Advisor (NOTE: No undergraduate students attended their interview)

Participants Interviewed

Steve Murray	Chris Hyland	David N. Sanchez (Comp Sci)
Mark Filowitz	Hang Do	Daval Doshi (Biochem)
Maria Linder	Chintan Amin	Peter De Lijser
Richard Deming	Shahanara Begum	Barbara L. Gonzalez
Madeline Rasche	Kiet Tran	Chandra Srinivasan
Katherine Kantadjieff	Larry Co	Beena Matthew,
Hal Rogers	Frank Lin	Instructional Support
Fuming Tao	Jasimene Alammar	Tech
Christopher Meyer	Sixi Wang	Ocean Corbin, ASC II
Scott Hewitt	Maura Corcoran	Lisa Guillory, ASA II
Christina Goode	Fan Zhang	Fatima Khan, Instructional
David Srulevitch	Payam Farahani	Support Tech
Qiang (James) Zhao	Daniel Delgado	
Paula Hudson	Daniel Delgado	
Karn Sorasaenee		