

Cal Poly Pomona BS & MS Chemistry Program Review

External Review Report

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Institution: CSU, Los Angeles
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The purpose of this external review of the BS and MS Chemistry programs is to provide an unbiased examination of the quality of education and service in the program, and to identify opportunities for improvement and growth. After carefully reviewing the program's Self Study, we took part in an on-campus visit on March 3 and 4, 2025. We met with Alison Baski (Dean of the College of Science); with Greg Barding, Chair of the Chemistry and Biochemistry Department; with students in the program; with tenured/tenure-track Chemistry faculty and adjunct faculty. This report is divided into sections on strengths, challenges, and recommendations.

Strengths

Culture

The department has a strong and inclusive culture that was demonstrated by the high morale of all groups interviewed, even in the face of institutional and budgetary uncertainty. The groups spoke highly of the inclusive and strong leadership of the department chair, Dr. Barding, and the overall positive culture within the department. Student organizations played a role in creating and sustaining community. Students were especially appreciative of the support they received from the faculty and staff. The lecturers and staff were equally satisfied with the departmental culture and leadership. There is strong support between the faculty and a willingness to share resources and work together to achieve greater things.

Department Instrumentation

The Department has a variety of instruments for both research and teaching use. The instrumentation is well-maintained and provides students with hands-on experience that is valuable for their future endeavors in graduate school and industry. The department is commended for designing laboratory courses that involve a large assortment of instrumentation for student use. In addition, the department encourages faculty sharing of equipment and instrumentation for research use. Faculty will persist in the re-submission to obtain a new NMR, which is critical to the program. There is interest in obtaining an LCMS, which would be a valuable addition to the analytical instrumentation in the department.

Undergraduate Program

Each of the options serves a distinct subset of student stakeholders, and the department also provides significant service to non-majors. The number of laboratory hours in the curriculum sets the program apart and prepares graduates for success in their disciplines. Student representatives were enthusiastic about the skills and knowledge they gained from the program, including a sense they were well-prepared to enter graduate school and the workforce. The implementation of a pilot cohort model (sections reserved for majors with the same instructor for a yearlong sequence) has been successful.

The faculty are committed to supporting students in the classroom and as research mentors. There is a large capacity for undergraduate engagement in meaningful research activities. As disciplinary and curriculum experts, they are very engaged in career and academic advising.

Graduate Program

The graduate program is small and serves students who are often working full-time. Courses are therefore offered in the late afternoon/early evening to serve those students. Students in the program are hired as TA's, and there is a strong TA training program supported by the College that prepares the students for this role. Student representatives felt very supported by faculty and were extremely satisfied with their experiences in the program – both in research and coursework - and felt their experiences prepared them for the next stages in their career path. The mean time to degree is exceptional for this student population.

Faculty

The tenure-stream and non-tenure stream faculty are highly accomplished and work well together as a cohesive group. The faculty has demonstrated significant research accomplishments, including strong extramural funding, and are highly engaged with students in the research mission. The department has a strong and shared sense of vision and purpose. There is a strong mentoring culture, particularly regarding the success of the junior faculty, as well as undergraduate and graduate students. The faculty are committed to professional development activities and continued professional growth. The junior faculty are off to a strong start and their commitment to the department and institution bodes well for the future.

Institutional Support

The Dean provides strong leadership and support for the department, while working with modest resources. The support for department chairs, vice chairs, teaching training and other departmental activities is significant. While the institution has reduced the faculty's annual professional development allocation, faculty also indicated their satisfaction with the support provided by Center for the Advancement of Faculty Excellence.

Weaknesses

Infrastructure

The department research infrastructure seems relatively strong, though investments are urgently needed in facilities to maintain the research enterprise moving into the future. More concerning are the supporting facilities for teaching. These can be broken down roughly into two categories: a) office and instructional space and b) laboratory space.

Office and instructional space: There is general lack of suitable office space for instructor-track faculty and graduate TAs. This accompanies a lack of suitable space for these critical instructional personnel to hold office hours for students. The result is that many students do not attend office hours, which can significantly hurt student success. Additionally, the lack of suitable office space inhibits graduate TAs from having a space to grade and perform other job-related tasks.

Laboratory space: The teaching laboratory space is limiting for many experiments due to the low number and capacity of fume hoods. Many experiments that should be performed in a hood are performed on a lab bench leading to potential safety and environmental concerns. Significant effort should be expended to address this issue.

An equally important problem is the lack of suitable vacuum equipment and recirculating chillers in the organic (and other laboratories). These labs rely on Cold-War era, inefficient, water-driven aspirators for vacuum and water-cooled open cycle condensers. Modern labs use vacuum pumps/house vacuum and recirculating chillers to address these common needs. Current practices lead to an unnecessary waste of water, and possibly water contamination, in a drought-stricken environment.

Additionally, facilities management seems unable or unwilling to deal with critical facilities issues in a timely manner. This includes repair of electrical outlets, lighting, unusable compressed air, fume hoods, etc. It was noted that several fume hoods had inoperable sashes or other operating defects.

Safety Issues

There is a concern with the lack of EH&S oversight and annual inspections of laboratories in the department. Both teaching and research laboratories should be inspected annually to identify and correct any safety issues. In addition, it was not clear on the frequency of safety shower and eyewash stations certification in the labs. Both the safety shower and eyewash stations must be tested on defined regular intervals by EH&S and should not be the responsibility of the department. The reduced airflow in some lab spaces further contributes to a lab environment that does not meet modern standards. There are also concerns with the speed of decommissioning laboratory spaces so that new faculty can fully use the lab space.

Curricular

Overall, the graduate and undergraduate curricula were considered to be strong and meaningful. However, key issues were identified for departmental investment.

Undergraduate: The undergraduate curriculum has not been updated significantly in many years. Additionally, the irregularity of class offerings, particularly for electives, and the overlapping scheduling of electives and core courses makes it difficult for many students to enroll in electives and/or core courses for their degree programming.

Graduate: The core graduate curriculum provides strong training for the graduate students, however the low frequency of elective course offerings prevents the graduate students from obtaining some coursework they specifically desire. The lack of elective offerings also leads to an increased reliance on 4000 level courses which may be problematic for students who completed the undergraduate degree at CPP. Additionally, the CHM 5500 class is repeated in the curriculum with no change in course content. This course should be differentiated between the two offerings. Finally, a more formal structure is needed to assist students with the choice of research director.

External learning experiences: One challenge for the department is providing opportunities for students to pursue internships. The number of industrial partnerships has declined over time, which makes it more difficult for students who are seeking experiences outside the academic laboratory.

Advising

The shift to centralized advising has caused significant problems for the students and the department. Undergraduate students indicated an increase in time to degree based on inaccurate advice from the central advisors, as well as a lack of ability to make long-term degree plans. Additionally, the case loads for advisors are ca. 2x the best practice of 300 students per advisor. The faculty are highly willing to advise students. A more streamlined workflow that improves communication between advisors, faculty and students is needed.

Faculty support

While the faculty generally expressed a strong degree of support, it is evident that the institutional support for pursuing external research funding is highly limited. The Office of Research and Sponsored Projects is understaffed, leading to additional faculty work preparing and submitting proposals. Additionally, there is little post-award support for funded projects, leading to budget uncertainty on funded projects.

Lack of operational budget

The department lacks an operational budget to support departmental activities. It is crucial that the department have some assigned resources to develop and implement innovative curricular changes and provide support for students, staff and faculty for professional development.

Recommendations (Opportunities)

Curricular

- Review and codify course offering frequency at graduate and undergraduate level to ensure coursework is available where needed
- Review undergraduate curriculum for opportunities to modernize and to enhance student success
- Update graduate level course work to remove redundancy (CHEM 5500)
- Increase external student learning activities, e.g. internships
- Introduce individual development plans for graduate students
- Develop a more formal structure for research director selection
- Addition of LC-MS capabilities would provide key enhancements for student learning
- Maintaining suitable NMR capabilities is a necessity

Academic and Student Support

- Provide suitable office/meeting space for faculty and graduate students to deliver office hour instruction.
- Better integrate faculty into college level advising structures
- Reduce advisor caseloads to ensure students receive proper attention and support.

Infrastructure and Safety

- Teaching and research laboratory infrastructure must be updated to modern standards
- Removal of water-driven aspirators and single pass condensers is critical.
- Alternative venting strategies such as snorkels or downdraft devices should be used on bench tops to reduce harmful vapor levels in the teaching laboratories
- Maintaining suitable NMR capabilities is a necessity
- Maintenance of fume hoods and other critical infrastructure should be increased
- Chemical and environmental safety inspections and oversight should be increased
- Safety infrastructure, e.g. eyewashes and showers, must be more regularly certified by EH&S
- The overall safety culture of the department should be emphasized more strongly

Advancement and Revenue Opportunities

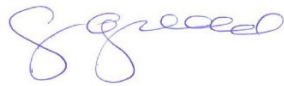
- Alumni engagement and development activities should be increased through external activities, including newsletters, mailings, or possibly the creation of an Advisory Board, etc.
- Development of curriculum offered through self-support

Sincerely,

Reviewer 1 Signature and Date: Alison McCurdy 3/17/25

Reviewer 2 Signature and Date: *Nicholas Salzameda.* 3/17/25

Reviewer 3 Signature and Date:



3/17/25