

Department of Chemistry and Biochemistry, UCCS

Strategic Plan

Vision: The Department of Chemistry and Biochemistry will provide students with academically rigorous and life-enriching experiences in the fields of chemistry and biochemistry. We will advance knowledge, integrate student learning with the spirit of discovery, and broaden the opportunities for our students to advance their academic and professional careers.

Mission: Our mission is to provide undergraduate and graduate (MSc.) students with the fundamental knowledge in the areas of chemistry and biochemistry with intellectual and practical tools for lifelong learning, and an educational foundation designed to qualify graduates for technical positions, graduate studies and professional success.

We achieve our mission by having our students be:

1. Knowledgeable in the concepts of chemistry and biochemistry;
2. Lifelong learners who approach scientific problems using a liberal arts education informed by the contributions of the arts, social sciences, and humanities;
3. Skilled experimentalists in the laboratory;
4. Aware of the importance of STEM service to society;
5. Learners who value collaboration with fellow students with faculty mentors to hone their scientific skillset; and
6. Cognizant of personal goals pursuant to their future careers as scientists and professionals.

Our Department supports and enables student success by:

1. **Teaching** students the fundamentals of chemistry and biochemistry while fostering problem-solving, critical thinking, communication, and teamwork skills.
2. Having **faculty who are student-focused and devoted to students** and their success and professional development. We specialize in undergraduate and Master's level graduate education and use the latest methods of instruction. We encourage student learning through modern teaching methods, including the use of technology. We maintain close working relationships with the Excel Science Center and the Student Success offices.
3. Having **faculty who are research scholars and research mentors**. Undergraduate and graduate students are partners in **original research** in chemistry and biochemistry who work closely with faculty mentors, resulting in co-authored presentations and peer-reviewed publications in the scientific literature. Students are encouraged to be involved in faculty-led research and may start early in their college careers.

4. Having faculty who are engaged with **advising and mentoring students**. Faculty are keenly aware of advising issues that arise owing to our many degree options, course pre-requisites, and course requirements. Student advising materials are available online at the Department website, in the Department main office, and at advising sessions organized by the faculty. Faculty also mentor students, assisting in placement in graduate or professional programs, internships, research experiences, and interview/resume-writing skills.

Core Values:

1. **Student Success:** Students have faculty mentors and champions who are dedicated to student success in classes and research laboratories. Undergraduate and graduate students gain the tools they need to become life-long learners and to be academically and professionally successful.
2. **The Pursuit of Knowledge:** Students majoring in chemistry and biochemistry learn the fundamental, applied, and developing nature of these disciplines in both the classroom and the laboratory.
3. **Research, Collaboration, and Innovation:** Students are involved in novel research programs that seek to answer interesting and innovative questions in fundamental and applied areas of chemistry and biochemistry. Students learn how to apply the scientific method in teaching and research laboratories and receive robust training in recording observations and data. Students are active researchers and become part of a team, where they are able to apply what they have learned from traditional lecture and teaching laboratories to research problems.
4. **Integrity and Professionalism:** Students are educated to act with integrity and professionalism in all aspects of scientific data collection and reporting from data management, citation of references, and understanding the societal cost of scientific fraud.
5. **Scientific Communication:** Students learn how to communicate scientific problems, challenges, results, and conclusions through various modes, including oral presentations, laboratory reports, and manuscripts for peer-review, or honors/graduate theses.
6. **Sustainability and Safety:** Students learn of how to perform chemical experiments safely and to lessen the environmental impact of laboratory experiments by applying the Twelve Principles of Green Chemistry.
7. **Diversity:** Our Department values diversity and inclusiveness. Our students, faculty, and staff strive to make this organization a mutually respectful environment for **all** persons where we celebrate and honor our differences and our similarities.

Strategic Plan

The UCCS Department of Chemistry and Biochemistry is committed to developing dynamic, innovative, and exceptional educational experiences that will prepare all of our students for future success. Simultaneously, we are committed to developing a Department that promotes faculty development to support our growth as teachers, researchers, scholars, and leaders of the highest caliber. We are a Department composed of devoted faculty members who work well together and

we aim to be excellent stewards of our programs. We nurture each other and our students but require of all: dedication to excellence, hard work, and rigorous scholarship.

To support the implementation of our strategic plan, we offer four foundational areas on which we will focus our efforts over the next five to seven year period.

1. **Demonstrated excellence in teaching** from the introductory to advanced/graduate courses with strong assessment and curriculum development plans in courses that are offered in traditional and online formats.
2. **Active and growing research programs** in the areas of chemistry and biochemistry with goals for improving funding rates, student support, and increase in laboratory productivity as indicated by published manuscripts, conference presentations or proceedings, or securing grants or contracts, among others.
3. **Impactful faculty service** in committees at the Department, College, Campus, or System levels. We would like to create formal mentoring plans of junior faculty and maintain a robust assessment program.
4. Developing **innovative programs to improve student recruitment, retention, persistence, and graduation rates.**

The goals and action items for each of the four foundational areas are provided in more detail below.

Foundation 1: Demonstrated excellence in teaching

The Department of Chemistry and Biochemistry will support faculty professional development as teachers and scholars so that our students experience excellent teaching across the curriculum, from introductory to graduate-level courses. Strong assessment and curriculum evaluation/development plans are included in this foundational area.

Goals:

1. Incorporate evidence-based teaching practices and technology, as appropriate for course content and instructor desire, to improve student outcomes in traditional and online courses.
2. Offer more experiential learning opportunities in the sub-disciplines of chemistry and biochemistry for our students through increased research activity (with student support), internship offerings, or courses that integrate research into the curriculum.
3. Refine our robust assessment plan across the Department curriculum to inform the development, evaluation, and rigor of our courses.

Action items:

1. Establish a Curriculum Committee that will examine:
 - a. How the policies relating to the General Chemistry sequence affect upper-division courses (a General Chemistry task force may opt to focus on these issues)

- b. Implications of using a placement exam for General Chemistry I and Pre-Chemistry courses
 - c. New proposed electives or substantial proposed changes to degree programs
 - d. Accelerated degree programs (BS/MSc) and the design of these programs
 - e. Proposed changes to the advising brochures so that faculty are well equipped to mentor students regarding program changes, new course offerings, etc.
 - f. Means of collecting student feedback (to include FCQs, mid-semester evaluations, etc.)
 - g. Review and discuss curricular issues
 - h. Discuss substantial changes to degree programs or assessment
 - i. Discuss changes in incorporating technology or new best practices
 - j. Maintain ACS accreditation in keeping with the guidelines of the Committee on Academic Program
2. Utilize a robust assessment plan to:
 - a. Inform curricular revision and improvement
 - b. Develop new courses, revise existing courses, or change degree programs
 - c. Support proposal development to granting agencies for curriculum improvement
 - d. Support Compass Curriculum assessment
 3. Offer more opportunities for faculty to hone their skills as teachers:
 - a. Peer feedback
 - b. Encourage faculty to attend teaching conferences/workshops hosted by UCCS, the CU system, external conferences, etc.
 - c. Encourage faculty to utilize the resources of the Faculty Resource Center

Foundation 2: Active and growing research programs

The faculty in the Department will continue to support active and growing research programs in the sub-disciplines of chemistry and biochemistry with goals for improving funding rates, student support, and increase in laboratory productivity as measured by peer-reviewed publications, conference presentations or proceedings, secured grants or contracts, submitted proposals, among others.

Goals:

1. Develop new collaborative and multi-disciplinary research projects with financial support from funded grants or collaborations with other universities, businesses, or governmental entities.
2. Increase financial support for students in Department research positions or Department supported internships.

3. Advocate for adequate research laboratory space, support staff, and a University fund to support timely acquisition and maintenance of high-budget scientific equipment.

Action items:

1. Seek assistance from the College to facilitate and fund experiential opportunities for students per the College Strategic Plan.
2. Develop a differential load plan so that faculty may alter their course load so that they have time to:
 - a. cultivate relationships with organizations outside the Department for successful proposal writing for multi-disciplinary projects
 - b. write grant proposals to federal agencies
3. Celebrate faculty and student research productivity by:
 - a. having special awards at the end-of-year award ceremony
 - b. highlighting successes on the Department webpage
 - c. including a 'Research' tab on the webpage with citations of papers or posters
 - d. Highlight research programs and successes in a newsletter to current students and alumni
4. Develop a faculty/student journal club to get editorial feedback on grant proposals or peer-reviewed literature drafts prior to submission.
5. Collaborate with other departments in the natural sciences (Biology, Physics) to advocate for a university fund that will support acquisition and maintenance of high-budget scientific equipment rather than the current *ad-hoc* approach.

Foundation 3: Impactful faculty service

Support faculty inclusion on committees at the Department, College, Campus, or System levels. We would like to create formal mentoring plans of junior faculty and develop a robust assessment program.

Goals:

1. Develop a Curriculum Committee, General Chemistry task force, and Assessment Committee (see **Foundation 1**) to support changes in curriculum.
2. Create a formal mentoring program of junior faculty, both tenure-track and non-tenure-track, to assist in their development as teachers and, in the case of tenure-track faculty, as research scholars.

Action items:

1. See **Foundation 1** for specific action items relating to the establishment of a Curriculum Committee, General Chemistry task force, and Assessment Committee.

2. Create a formal mentoring program of junior faculty:
 - a. For TTF and NTTF, have experienced faculty come to multiple lectures and provide documented peer-review and feedback to discuss what was done well and areas for improvement.
 - b. Encourage use of the Faculty Resource Center for implementation of technology and use of course management systems or other online tools/resources.
 - c. Support travel to one teaching-focused conference each year.
 - d. Use student feedback tools (such as FCQs or some other means) to help instructors develop their skills.
 - e. For faculty on the tenure-track:
 - i. Encourage participation in the faculty/student journal club so that they receive good feedback on grant proposals or manuscripts in preparation
 - ii. Have a formal documented meeting once or twice per year (at the junior faculty member's choice) with the assigned mentor and two other senior faculty to provide feedback on rate of progress towards tenure per the RPT guidelines
 - iii. Assist the tenure-track candidate in preparation of the dossier by reading the candidate's statements (executive, teaching, research, and service statements) and providing feedback
 - iv. Ask tenure-track faculty to provide feedback on mentoring program

Foundation 4: Developing innovative programs to improve student recruitment, retention, persistence, and graduation rates.

Goals:

1. Improve student recruitment strategies to increase the number of high quality students becoming chemistry or biochemistry majors.
2. Improve retention and persistence of our majors through high impact strategies.
3. Improve graduation rates of our chemistry and biochemistry majors with a focus on alumni tracking to understand where our graduates go, how they apply their degrees, and how we can improve our undergraduate and graduate programs to enable their success as professionals.

Action Items:

1. Connect with UCCS offices and resources, such as the Recruitment and Admissions Office, to highlight our programs in chemistry and biochemistry.
2. Improve outreach efforts with local high schools (teachers, guidance counselors) or STEM initiatives in the Pikes Peak region.
3. Celebrate local efforts by hosting awards such as "High School Chemistry Teacher of the Year."

4. Get more undergraduates involved in research or experiential learning, which are impactful ways of retaining and advancing students.
5. Partner with other departments (Biology, Physics) to create interdisciplinary graduate or certificate programs to attract students.
6. Offer more courses in Extended Studies or Weekend University.