Chemical and Systems Biology


The department emphasizes individualized training at the interface of physical science and biomedical science. The program encourages students to draw upon a variety of modern scientific techniques, ranging from recent advances in molecular biology and protein biochemistry to synthetic organic chemistry and single cell imaging. Graduate students in the department take courses in signal transduction networks, chemical biology, and other areas of importance to their research goals.

Master of Science in Chemical and Systems Biology

Students in the Ph.D. program may apply for an M.S. degree after having satisfactorily completed the course and laboratory requirements of the first two years. The degree also requires a written thesis based on literature or laboratory research. Postdoctoral research training is available to graduates having the Ph.D. or M.D. degree.

Doctor of Philosophy in Chemical and Systems Biology

University requirements for the Ph.D. are described in the "Graduate Degrees (http://exploredegrees.stanford.edu/schoolofmedicine/chemicalandsystemsbiology/%20/graduatedegrees)" section of this bulletin.

The Department of Chemical and Systems Biology offers interdisciplinary training to prepare students for independent careers in biomedical science. The main focus of the program is cell signaling, chemical biology, and systems biology.

The program leading to the Ph.D. degree includes formal and informal study in chemical biology, systems biology, drug discovery, biochemistry, and other areas of relevance to the interests of particular students. First-year students spend one quarter in each of three different laboratories, working closely with other graduate students, a professor, and postdoctoral fellows on various research projects. During the fourth quarter, the student chooses a faculty mentor with whom to undertake thesis research, based on available positions and the student’s interest. During or before the eighth quarter of study, students must pass a qualifying exam which consists of an oral exam on general knowledge and a defense of a research proposal. Course requirements are fulfilled during the first two years of study; the later years of the four- to six-year program are devoted to full-time dissertation research. Close tutorial contact between students and faculty is stressed throughout the program.

Research opportunities also exist for medical students and undergraduates. The limited size of the labs in the department allows for close tutorial contact between students, postdoctoral fellows, and faculty.

The department participates in the four quarter Health and Human Disease and Practice of Medicine sequence which provides medical students with a comprehensive, systems-based education in physiology, pathology, microbiology, and pharmacology.

Graduate Advising Expectations

The Department of Chemical and Systems Biology is committed to providing academic advising in support of graduate student scholarly and professional development. When most effective, this advising relationship entails collaborative and sustained engagement by both the adviser and the advisee. As a best practice, advising expectations should be periodically discussed and reviewed to ensure mutual understanding. Both the adviser and the advisee are expected to maintain professionalism and integrity.

Faculty advisers guide students in key areas such as selecting courses, designing and conducting research, developing of teaching pedagogy, navigating policies and degree requirements, and exploring academic opportunities and professional pathways.

Graduate students are active contributors to the advising relationship, proactively seeking academic and professional guidance and taking responsibility for informing themselves of policies and degree requirements for their graduate program.

For a statement of University policy on graduate advising, see the "Graduate Advising (http://exploredegrees.stanford.edu/graduatedegrees/#advisingandcredentialstext)" section of this bulletin.

What is the overall purpose of faculty advising in this program?

The Department of Chemical and Systems Biology is committed to providing advising to ensure graduate student personal, academic, and professional development. Both the advisor and advisee are key players in sustaining a collaborative relationship with integrity and professionalism.

How are advisors initially assigned to or selected by incoming graduate students?

Graduate students select a thesis advisor generally at the end of Spring Quarter of their first year. Before selecting an advisor, students rotate in one lab per quarter during Autumn through Spring quarters of their first academic year. Students may opt for a fourth lab rotation and select an advisor in the Summer Quarter before their second year. After each rotation, students meet with the CSB Advisory Committee (currently James Chen and James Ferrell) to discuss how the rotation went and whether the next rotation is a good match for the student’s educational and professional goals. With the guidance of the CSB Advisory Committee and assistance from the student services staff, if needed, the student and thesis advisor mutually agree to work together.

What is the process by which students can change advisors and when should this happen?

The student should approach the CSB student services office and the CSB Advisory Committee to discuss the reasoning and proposal to change advisors. The student should work with the student services office and CSB Advisory Committee to try to find a suitable advisor. This process should happen as soon as issues start to arise and/or as soon as the student would like to change advisors.

How frequently should students meet with their advisors and how are those meetings set up? How does meeting frequency change as the student progresses?

As mentioned above, at the end of each quarter, first-year students meet with the CSB Advisory Committee to discuss potential issues with the program, issues with host laboratories, classes, the qualifying exam, and career planning. The topics that are discussed include ideas
about student activities as well as additions or changes to the program. Students are also encouraged to meet with the CSB Advisory Committee members or the Department Chair individually if any issues come up throughout the year.

Committee meetings are normally held every six months starting after the qualifying exam and the meetings become more frequent if the thesis is not completed by five-and-a-half years. It is the student’s responsibility to initiate and schedule the meetings.

What topics might be discussed at advising or committee meetings?
Committee meetings are the best opportunity for the student to get feedback about the progress and to get second opinions about which types of experiments should be pursued to help answer the questions being addressed in the student’s thesis. The committee should include four faculty members counting the thesis advisor (faculty on the committee do not need to be tenure track). At least one of the four faculty members has to be a primary faculty in the CSB department, but the composition can be different from that in the qualifying exam and can also change during the student’s thesis work as they may need to pursue different directions. The structure and format of the meetings are listed below. The committee should provide advice on future directions, attendance of conferences, career plans and more personal laboratory issues. Each meeting should include a time plan to ensure that the thesis project can be completed within five-and-a-half years.

At the beginning of each meeting, the student exits the room to allow for a discussion between the advisor and the rest of the committee. A few minutes before the end of the meeting, the advisor is asked to leave the room to allow for the student and the rest of the committee to discuss issues about the lab, potential personal issues, training opportunities and to discuss possible differences in research goals or issues relating to authorship.

If a committee meeting is not completed by the end of Summer Quarter, an enrollment hold is placed on the student’s account and may delay graduate funding.

Are there any forms to complete or deliverables associated with any of those meetings?
Following the committee meeting, the student is required to summarize the discussion and formulate a revised plan for subsequent work. This summary should be discussed with the advisor and sent to the committee members within one week for comment. A final copy of the report must be submitted to the CSB Student Services Manager, Elizabeth Kay.

How and when does a student select and convene their dissertation reading or thesis committee? What is the purpose of the committee? And, how often should the committee meet?
Students select their reading committee when they go TGR, which is usually towards the end of their fourth year in Spring Quarter. The purpose of the committee is to further discuss the student’s thesis and provide feedback. The thesis committee should meet every six months and the meetings become more frequent after the five-and-a-half year mark.

How does the department or program, advisor, and student decide when a student is ready to graduate?
The decision to schedule an oral defense requires the support of each member on the committee including the thesis advisor. The department also expects that each student complete for the thesis at least one peer-reviewed, first-author paper that is accepted for publication by the time the oral thesis exam is being scheduled.

Who else might a student consult for help or guidance, e.g., department chair, DGS, student services staff?
At any time, students may consult with CSB student services staff, the Director of Graduate Studies (currently Dan Jarosz) and the Department Chair (currently James Chen). Students may reach out to any of these parties by email to set up a meeting and/or stop by the student services office.

Emeriti: (Professors) Robert H. Dreisbach, Stuart Kim, Richard A. Roth, James P. Whitlock
Chair: James K. Chen
Director of Graduate Studies: James E. Ferrell
Professors: James K. Chen, Karlene A. Cimprich, James E. Ferrell, Jr., Tobias Meyer, Daria Mochly-Rosen, Thomas J. Wandless, Joanna K. Wysocka
Professor (Teaching): Kevin Grimes
Assistant Professors: Daniel F. Jarosz, Lei Stanley Qi, Mary Teruel
Courtesy Professors: Philip Beachy, Carolyn Bertozzi, Matthew Bogyo, Beverly S. Mitchell, Paul A. Wender
Courtesy Associate Professors: Markus W. Covert, Justin Du Bois, Michael Z. Lin, Jan M. Skotheim, Aaron F. Straight, Marius Wernig