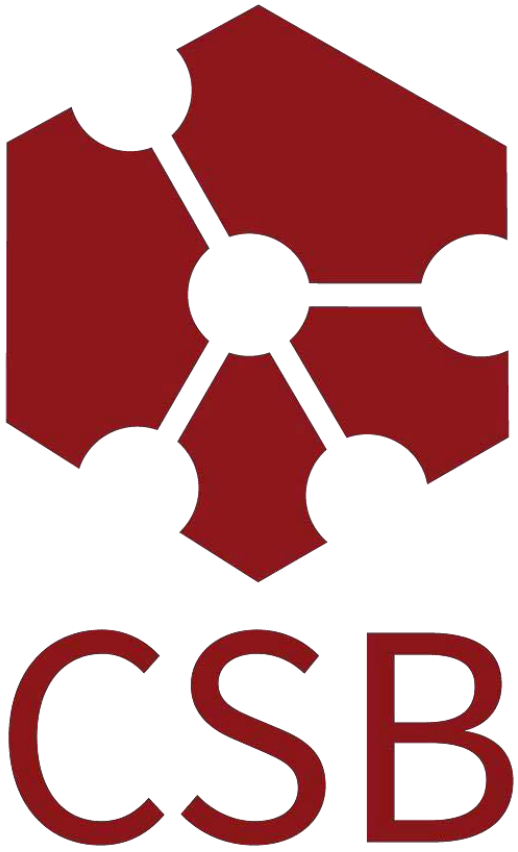

STUDENT GUIDE

Department of Chemical and Systems Biology
Stanford University School of Medicine

2025-2026

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Welcome to the Chemical and Systems Biology Ph.D. program. This guide lists the requirements for selecting rotations and coursework, passing the qualifying exam, and receiving a Ph.D. degree in Chemical and Systems Biology. Please do not hesitate to ask Dana Ramalho, the Student Services Officer, should you have any questions. We look forward to welcoming you to our department.

Rotations

All 1st year graduate students take 3 quarter-long research rotations of their choice. Our goal is to expose students to foundational chemical, systems, and cell biology concepts and to teach students how to plan and execute innovative biomedical research.

Two out of three rotations must be in the laboratories of the CSB faculty (Chen, Chistol, Cimprich, Ferrell, Gray, Jarosz, Martinez, Mochly-Rosen, Rogala, Wandless, or Wysocka) and the first rotation should be in one of the laboratories of the CSB primary faculty. The goal is to introduce students to the unique training and research environment that the CSB department offers.

Students are required to give an approximately 12-minute-long presentation about their rotation project at the end of each of the first three quarters in the Science Circle Forum series (aka Pizza Talks), which meets Tuesdays at noon.

You may discuss potential rotations with CSB faculty at any time, even before you come to Stanford, but we request that you finalize your choice of first rotation laboratory only after the Departmental Retreat, which is typically held shortly before classes start in the fall quarter. The Retreat will give you a chance to meet people from different laboratories and to learn more about potentially interesting rotation projects you may not be aware of. Short talks and poster sessions at the retreat offer excellent opportunities to see which types of research projects are currently active in the labs.

Before finalizing the second and third rotation laboratories later in the year, students meet individually with the CSB Advisory Committee (currently Director of Graduate Studies, Dan Jarosz, and Department Chair, James Chen) to discuss whether the rotation will be a good match for the student's educational goals.

Students rotating in labs within the department sign up for the corresponding faculty member's CSB 399 section. Sign up for whatever number of units brings your unit total for the quarter to 10. Students rotating outside the department sign up for Dan Jarosz's CSB 399 section and have their research advisor submit a grade via email to Dan Jarosz for submission in Axess.

We limit the number of rotating students in the same laboratory in any one quarter to two to ensure that students have a chance to closely interact with the faculty during the rotation. Incoming students are sometimes concerned that this might mean they will be unable to rotate in some laboratory they are interested in. We will help make sure that if you do not get your first-choice rotation in the fall, you will in the winter or spring.

Selection of Thesis Laboratory

Selection of a thesis laboratory should be initiated by the student by discussing projects with potential Ph. D. advisor, usually toward the end of spring quarter. Joining a lab is done by mutual consent. If you are unclear whether you have found the lab you want to join, it may be advisable to take a fourth (summer) rotation. Students must join a laboratory by the end of summer quarter. Here are some resources to help students during the mentor selection process:

https://vpge.stanford.edu/academic-guidance/advising-mentoring

At the end of each rotation, 1st year students meet with Professors Dan Jarosz and James Chen to discuss their experiences in the lab they rotated in as well as their coursework. The Student Services office will reach out to 1st year students toward the end of each quarter to coordinate these meetings.

Regardless of what laboratory you join, we expect that you actively participate in departmental Pizza Talks, the CSB annual retreat, departmental seminars and symposia, thesis defenses, and social events throughout your time at Stanford.

Procedure for Out of Department Laboratory

The majority of our students historically have chosen thesis labs within the CSB department. However, a student may choose any lab at Stanford for his or her Ph.D. research. We appreciate that interests change, and that a CSB lab may not be the best home for every student. If you are considering joining an outside CSB lab, please talk to Dana Ramalho about logistics early on. Students planning to join a lab outside the department and wishing to remain in the CSB program will be asked to write a brief one-page summary of the proposed thesis project and how it fits within the intellectual focus of the department. The CSB faculty will discuss whether the thesis project aligns with the department's mission and whether CSB faculty have the necessary expertise to serve as thesis committee members. If the faculty have concerns about either question, the student will be asked to meet with the Student Services Manager, CSB Chair, Director of Graduate Studies, and the prospective thesis advisor to discuss whether another PhD program may be a better fit. This information will be communicated to the CSB faculty. It is important to submit this proposal in a timely manner, within two weeks of joining the outside CSB lab. Submitting the proposal within this time frame will help ensure that you can complete the correct requirements for the degree program.

Quarterly Student Meetings During the First Year

At the end of each rotation quarter, 1st year students meet with the Student Advisory Committee to discuss the program, their rotation host laboratories, and coursework, along with qualifying exam and career planning. This is also a good time to discuss ideas about student activities and to provide feedback on your early graduate training experience. Students are also encouraged to meet with the Student Advisory Committee members or the Department Chair individually should any issues come up throughout the year.

Per a combination of the University policy on graduate advising and the CSB departmental goals, please see the advising guidelines below.

Areas of Advising

Your Ph.D. faculty advisers can have many roles in guiding your training, along with other members of your thesis committee:

- Serve as intellectual and professional mentors to their graduate students.
- Provide knowledgeable support concerning the academic and non-academic policies that pertain to graduate students.
- Help to prepare students to be competitive for employment.
- Maintain a high level of professionalism in the relationship. Establish and collaboratively maintain expectations of the adviser/advisee relationship, consistent with departmental standards.

Coursework

You will select courses in an individual quarterly meeting where you discuss with Dan Jarosz and James Chen your training goals and research interests. The goal of your coursework is for you to master foundational knowledge in the fields of systems biology, chemical biology, and cell regulation so that you will be able to understand research seminars and papers across the biosciences. In addition, we will make sure that your curriculum is filling any key training gaps that you may have and preparing you for your planned thesis research. Please ensure that your units add up to 10 in each quarter (use CSB 399 to reach 10 units). From the second year on, students focus on research and typically fill their coursework primarily with CSB 399 units. After approximately 3.5 years and if the appropriate qualifications are met, students transfer to a terminal graduate registration status (TGR), which reduces the tuition cost. TGR status has different course enrollment requirements than non-TGR status so please ask Dana Ramalho if you have questions regarding going TGR.

Coursework to be completed within the First Two Years

Important note: Normally, if a course has the option to be taken as a letter grade, the student must take the course as a letter grade and receive a B or better to have the course count towards the CSB Ph.D. requirements.

Please note that CSB counts all courses taken in academic year 2020-21 with a grade of. 'CR' (credit) or 'S' (satisfactory) towards satisfaction of graduate degree requirements that. otherwise require a letter grade provided that the instructor affirms that the work was done at a 'B' or better level.

Fall Quarter, Year 1

BIOS 200: Foundations in Experimental Biology
BIOS 204: Practical Tutorial on the Modeling of Signal Transduction Motifs
CSB 201: Bootcamp
CSB 270: Research Seminar
CSB 399: Graduate Research
(As needed for the required number of units to reach a full schedule of 10, note if already at 10 credits do not register for 399)

Subsequent Quarters

CSB 270: Research Seminar (Fall, Winter, and Spring)
CSB 399: Graduate Research (Fall, Winter, Spring, and Summer)
MED 255: The Responsible Conduct of Research (Fall, Winter, or Spring) or BIOS 258: Ethics, Science, and Society (course offering varies)
BIOS 263: Applied Grant-Writing Skills for Fellowships (Spring)

To be taken once, after selecting a thesis advisor. Students use their Qualifying Exam Proposal and/or skills obtained in this course to apply for fellowships and grants during their time in CSB (e.g., NIH F31, NSF, etc.) Choose another scientific writing course if you have already secured a fellowship.

Plus:

One Chemical Biology Course Chosen From

CSB 260: Concepts and Applications in Chemical Biology (Spring)
CHEM 281: Synthesis and Analysis at the Chemistry-Biology Interface (Winter)

***If CSB 260 and CHEM 281 are both offered within the same year, you must take CSB 260 for this requirement**

Two CSB Electives Chosen From

CSB 243: Biotechnology and Development of Therapeutics (Fall)
CSB 221: Methods and Logic in the Biosciences (Winter)
CSB 240A: A Practical Approach to Drug Discovery and Development (Winter)
CSB 240B: A Practical Approach to Drug Discovery and Development (Spring)
CSB 242: Drug Discovery and Development Seminar Series (Fall, Winter, Spring)
CSB 245: Economics of Biotechnology (Spring)
CSB 250: The Biology of Chromatin Templated Processes (Winter)

One Additional Elective

This may be an additional CSB course (listed above) or a substantial (i.e. 3-5 unit) course offered by another department. Some historical electives include:

BIOC 224/BIO 214/MCP 221: Advanced Cell Biology
BIOC 241/BIOE 241/BIOPHYS 241/SBIO 241: Biological Macromolecules
BIOS 221**:** Modern Statistics for Modern Biology
DBIO 210: Developmental Biology
GENE 205: Advanced Genetics

Other electives are possible with approval from the Student Advisory Committee.

In addition to this coursework, attending the quarterly faculty-led ethics discussion is mandatory during your first two years. CSB students are required to take it during their first year up through when they pass their qualifying exam.

Qualifying Exam

The CSB qualifying exam must be taken before the end of the second year (before the fall quarter that starts in September). Both the written thesis proposal and the oral part of the qualifying exam contribute to the qualifying exam committee's assessment of the student's

performance. Students should make sure that they have fulfilled all course requirements before scheduling the exam. In rare circumstances, an extension of the exam date can be requested. This must be approved by the CSB department chair. The purpose of the qualifying exam is to determine whether the student is ready to carry out their Ph.D. thesis project. This comes down to four fundamental questions:

1. **Has the student identified a good problem?**
   Is the question being addressed (or, in the case of more technological projects, the technology being developed) important, or is this incremental, "me-too "work?

2. **Does the student have the knowledge required to successfully carry out Ph.D. research?**
   Does the student have sufficient general background knowledge—the type of information one typically obtains from courses and review articles—for the research project? Does the student have sufficient expert-level knowledge—the more focused but deeper knowledge one typically obtains from critical reading of the primary literature—for the project?

3. **Is the research plan sound?**
   Is the approach direct, feasible, and likely to be definitive? How will the work be followed up if the expected results are obtained, and how will it be followed up if they are not? What are the most likely obstacles? Is there a Plan B (and C and…)?

4. **Is the student likely to make reasonable progress in a timely fashion?**
   A logical research plan is important for a successful Ph.D. thesis. So is the ability to get things done. Does the student have the preliminary results in hand to indicate that progress has been made, and will continue to be made?

The CSB qualifying exam lasts approximately 2 hours and is attended by the student and a committee of at least three eligible faculty that does not include their advisor. (These faculty must be tenure track and on the Academic Council). The exam committee is chosen by the student in consultation with the thesis advisor. The student must ask one of the CSB faculty members on the committee to be the qualifying exam chair in advance of the meeting. The thesis advisor must be present at the beginning of the exam and provide background about the student before leaving the room. In special cases, the thesis advisor may send instead a written report about the student to the three members of the exam committee.

Students present a research proposal orally and in writing. The written thesis proposal should be no longer than 5 pages (one-inch margin; single line, 11 or 12 pt.; Abstract, Specific Aims, Background, Research Plan, and timeline for completion of each aim; Figures are encouraged). **The written report must be received by the committee and Dana Ramalho no later than 7 days before the exam, or the exam will be canceled.** During the exam, the committee will discuss the thesis proposal with the student and ask the student questions about the proposed work, the background in the field, and other relevant scientific topics.

A qualifying exam form will be used to record the results of the committee's decision. The student will leave the room at the end of the exam and the three committee

members will decide by majority vote either (a) to pass, (b) to conditionally pass or (c) to fail the student. The student will be informed immediately after the vote whether he or she passed, conditionally passed, or failed. If a student passes or conditionally passes, the student will write a one-page report within one week summarizing the suggestions from the committee. This student report will first be sent to the committee members for additions and corrections. Once approved by the committee, the report must be sent to the thesis advisor and Dana Ramalho and the student is expected to discuss the points raised by the committee with the advisor. Only after a pass decision and the approval of the student report will the student become a Ph.D. Candidate.

A conditional pass can either include a requirement for a rewrite of the proposal or a requirement for an oral re-examination. After a conditional pass, the committee members can only be changed with the agreement of the CSB department chair. If an oral examination is required with the conditional pass, it must be completed within 6 months of the first examination. A final decision must be made at this oral re-examination. There is only one chance to pass an oral re-examination. If the student passes the re-examination, he or she writes again a report and has it approved by the committee as at the first one. A re-writing of the proposal involves the submission of a revised proposal and requires approval by the committee. In some cases, this may involve more than one round of changes. Also, when re-writing is required, the student must pass in 6 months or less from the initial examination date. In all cases, a final pass or fail decision for the CSB qualifying exam must be made before the end of winter quarter of the third year. Finally, in the case of a conditional pass, the final pass decision is only made after at least two of the three committee members have approved the revised proposal and the revised student report.

If the student fails, the committee chair will write a report to the student, the advisor and the department chair stating the reasons for the fail decision. The student has the right to appeal a “fail” to the department chair. Such an appeal must be made in writing within one month of the fail decision. In consultation with the CSB department faculty, the chair then has the option to either let the fail decision stand or to schedule a re- examination with the same or different faculty. If the faculty decide to let the fail decision stand, the student must leave the graduate program.

Post Qualifying Exam Requirements

Committee meetings are held once a year after the qualifying exam. When a student is in his or her fifth year, the committee meetings should be held twice a year. From the sixth year and on, the meetings should be held every quarter. **It is the student's responsibility to initiate and schedule the meetings.** It is strongly recommended to start scheduling at least 2-3 months in advance of the desired thesis committee date. From the 6th year at the discretion of the committee, two of these thesis meetings per year can be replaced with a manuscript draft submission for review by the committee members.

Committee meetings are one of the best opportunities for you to get feedback about your progress and to get second opinions about which types of experiments you should pursue to answer the questions you are trying to address in your thesis. To provide you with regular input, we mandate that you schedule committee meetings after the qualifying exam. Each of these meetings should be scheduled to be 60 minutes long and should

include 4 faculty members counting the thesis advisor (faculty on the committee do not need to be tenure track). It is important that you plan in advance to maximize the opportunity for the committee's feedback. At two of the four members must be CSB faculty, but the composition can be different from that in the qualifying exam and can also change during your thesis work as you may need to pursue different directions.

In rare occasions when scheduling is difficult, not all members have to be present, and you can meet with missing members separately. The committee is tasked to give you advice about your experiments and future research directions, help you establish and adhere to a paper publication timeline, recommend conferences or workshops relevant to your studies, and discuss your career plans and any personal concerns you might have. Each meeting should include a time plan to ensure that the thesis project can be completed within 5.5 years. At the beginning of each meeting, the student will exit 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. Meetings become more frequent in case the thesis is not completed by 5.5 years. **If the expected number of annual committee meetings are not completed by the end of Summer Quarter, an enrollment hold will be placed on the student's account, this may delay graduate funding.**

Before each committee meeting, students must complete the CSB Thesis Form and send it to their committee members at least one week before the meeting date, copying Student Services. **The committee members must approve this document before the meeting can be held**. If it is not provided on time, the committee meeting will be canceled. The topics covered on the CSB Thesis Form will be discussed during the committee meeting with the student. The student should bring a printed copy of the form for their committee members to sign.

Following the committee meeting, students summarize the discussion and formulate a revised plan for subsequent training, experiments, and publications within the CSB Thesis Form in the feedback sections. This form is then discussed with their advisor(s) and sent to the committee members within one week for their comments. A final copy of the form, approved by all committee members, is then submitted to the CSB Student Services Manager. These elements are considered part of the committee meeting requirement and must be fulfilled for continued enrollment.

Fellowship Applications

Part of being a good scientist is writing research grants. As part of their training, students in the CSB program are required to apply for possible funding from external fellowships. To have a good chance, you need to finish a first draft several weeks before the deadline. After the second year, we also request that all eligible students take a training class and apply for a fellowship regardless of their current funding. These fellowship applications are both an excellent learning experience and, if funded, are also a good addition to your CV. BIOS 263 is a required course that can teach you how to apply to grants and fellowships during your time at CSB.

Presentations

Starting in the 3rd year, students give a yearly 20-minute research progress update seminar to the department at the Tuesday Pizza talks. They also must attend the retreat and present a poster or give a talk. Furthermore, students must attend the departmental CSB Cutting Lectures and departmental symposia; speakers for these talks are leaders in their scientific disciplines who are selected by students, postdocs, and faculty with an emphasis on showcasing speakers who can explain their work to a broad audience. We strongly encourage students to meet with the speakers after the seminar for lunch (there is a signup email before each visit) or for breakfast. We ask students for input about selecting potential speakers and make sure that we have a few student-invited speakers every year. We also encourage students to attend department social events: a winter party in December, the annual alumni talks and summer barbeque, as well as happy hours in the summer.

External and Internal Speaking Engagements

Below are some options for students to present on and off campus.

While covering the cost of conferences is the responsibility of the thesis laboratory, students can obtain in their Ph.D. career support from the department, $1500 for research-related expenses. These expenses include attending a conference where they will give a talk or present a poster, laptops, etc. The funds can be used at different times.

Please make a request to Dana Ramalho before making a purchase. We encourage students to attend conferences at least once a year starting in the 3rd year of their thesis.

Students may also approach CSB faculty about the possibility of attending or presenting at group meetings outside of the student's home lab. There should be synergies between the student's work and lab's research.

CSB Conference Support

CSB Conference Support has been extended through the 2025-2026 academic year. This is a $500 subsidy to help you attend a scientific conference. Formal presentations of your work (e.g., posters or talks) are not required. If you would like to receive this support, please fill out the CSB Conference Support Form and email the form to CSB Student Services for approval. Please reach out to CSB Student Services if you need the form or have any questions.

Publications and Ph.D. Defense

Upon completion of your experimental and analysis work, you will be writing a thesis and will be orally defending your thesis to the department and University. The decision to schedule an oral defense requires the support of each member on the committee including the thesis advisor. You should aim to have your paper submitted during your fourth year.

Our expectation is that you should defend your thesis typically around the end of your 5th year to allow for a graduation quarter and/or a potential 3-month delay to the end of a quarter (when the degree is granted). We also expect that each graduating student will have consolidated their findings in research article(s). At least one first-author research article. By the time you are scheduling your thesis defense, this first-author research article should be accepted for publication.

It is not uncommon that there are different opinions about the order of authorship and the inclusion of authors on publications. We recommend that you discuss authorship early in a project—if at all possible, before a publication has been submitted. A good strategy is to periodically discuss authorship both with your co-workers and with the thesis advisor as a project advances since the authorship may change as contributions are changing. Contributions to a paper can include significant experimental or theoretical work as well as ideas or unpublished critical reagents or methods. If there is no satisfying solution after such discussions, you should discuss the issue with one or more members of your thesis committee. If there is still no resolution, you may contact the department chair. A final decision may in some cases involve the consultation of outside faculty to help clarify the relevance of different contributions.

The University mandates the format of the defense as described in the Stanford Graduate Academic Policies and Procedures (GAP).
Please see the following link for more information:
https://gap.stanford.edu/handbooks/gap-handbook/chapter-4/subchapter-7/page-4-7-1.
Per the GAP policy, the oral exam committee must consist of at least five Stanford faculty members: four examiners and a committee chair from another department. Please refer to the University Graduate Academic Policies and Procedures for more information on the policies for doctoral degrees, university oral examinations and committees:
https://gap.stanford.edu/handbooks/gap-handbook/chapter-4/subchapter-7/page-4-7-1

The Chemical and Systems Biology department requests that the oral examination committee includes at least 2 CSB faculty (all faculty must be tenured or tenure track, members of the Academic Council). Thus, if only one CSB faculty member was on your thesis committee, an additional CSB faculty member must be added. In addition, you will also need a committee chair. The thesis defense chair must be from a department other than CSB and the home department of your thesis advisor. Potential conflicts about scheduling the thesis defense should be resolved in discussions among the student, advisor, and committee, or, if requested, in consultation with the CSB department chair. If you are interested in having an adjunct professor participate on a committee, please reach out to the Student Services Manager for more information.

Per the University Policy, the student needs to submit a draft of his or her thesis to the oral thesis committee before he or she defends. This is essential for the examiners to critically evaluate the work. **The Department of Chemical and Systems Biology expects students to submit their written dissertation in Stanford Thesis format to their oral examination committee in at least two weeks before the actual defense.**

Please refer to the following link for more information on the dissertation and thesis submission:

https://studentservices.stanford.edu/my-academics/earn-my-degree/graduate-degree-progress/dissertations-and-theses.

Please refer to the University Graduate Academic Policies and Procedures for more information on the policies for doctoral degrees, dissertations, and dissertation reading committees:
https://gap.stanford.edu/handbooks/gap-handbook/chapter-4/subchapter-8/page-4-8-1

Service and Outreach

Service and outreach are not requirements of the program, but we encourage students to participate in activities that impact our broader community. There are several volunteer and outreach programs in the Bay Area, and our Student Services Team can provide you with information about specific opportunities such as, “CSB Gives Back.”

Internships

An internship can offer great experiences and learning opportunities. It can also impact your progress toward your PhD degree and therefore should be considered carefully in the context of your overall training. If the student is considering an outside internship, the details should be discussed with the thesis advisor and thesis committee at least 6 months in advance of the proposed internship start date.

There are many complex policies and rules regarding internships. Some may preclude your participation for some periods of your PhD training. Please contact the Student Services Administrator well in advance to discuss the policies and process. In addition to ensuring the student follows the rules regarding his or her funding source and university policies and processes, the trainee will need to complete a department internship proposal form which you can obtain from the Student Services Administrator and submit for approval. If you are an international student, please consult with Bechtel for internship policies as well. More information about internships from BioSci Careers is available here.

Graduate Student Resources

Please reach out to the Student Services Manager for more information on the resources below and for any questions or concerns.

- Graduate Life Office (GLO)
- Counseling & Psychological Services (CAPS)
- Mental Health Team (MHT)
- Office of Accessible Education (OAE)
- Leave of Absence
- Vaden Student Health Center
- Additional Wellness Resources
- BioPeers
- Bioscience Hardship Fund
- Learning and Writing Support/Connection and Community:
- Pregnancy or Parental Leaves