



Structural Biology, Biophysics and Biochemistry PhD Program

UNIVERSITY OF COLORADO
ANSCHUTZ MEDICAL CAMPUS

STUDENT HANDBOOK

Updated August 2026

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Program Guidelines Disclaimer

The Office of Research Education (ORE) PhD programs are affiliated with the University of Colorado Anschutz Medical Campus Graduate School. The Office of Research Education (ORE) resides within the Office of Medical Education (OME) within the School of Medicine (SOM). ORE serves as the administrative home for 1 umbrella-admitting program, Biomedical Sciences (BMSC), and 12 PhD granting programs. As affiliated-programs, ORE PhD programs must comply with the Policies and Procedures of the CU Anschutz Graduate School.

As a member of the Structural Biology, Biochemistry, & Biophysics (SBBB) PhD Program, you are expected to adhere to all established policies and procedures of the University, the Office of Research Education, the Graduate School and the SBBB Program.

CU Anschutz – University Policies
Office of Research Education
Graduate School

<https://catalog.ucdenver.edu/cu-anschutz/university-policies/>
<https://medschool.cuanschutz.edu/ore/forms-and-resources>
<https://graduateschool.cuanschutz.edu/forms-resources/resources>

This handbook does not constitute a contract with the University of Colorado School of Medicine Office of Research Education or the Structural Biology, Biochemistry & Biophysics Graduate Program, either expressed or implied. The Structural Biology, Biochemistry & Biophysics Graduate Program reserves the right at any time to change, delete, or add to any of the provisions at its sole discretion. Furthermore, the Structural Biology, Biochemistry & Biophysics Program designs the provisions of this document to serve as firm guidelines rather than absolute rules, and exceptions may be made based on extenuating circumstances.

Program Overview

Mission

The mission of the SBBB training program is to fill a growing need for professionals (at the institutional level and nationwide) that bridge the physical sciences and biology.

The SBBB program will provide didactic and hands-on scientific training for outstanding scientists in structural biology, biophysics, and biochemistry. The program will foster scientific excellence and innovation in the quantitative characterization of systems of biomedical import, development of new technologies, and discovery of targeted therapeutics and diagnostics.

The SBBB program will support the professional development of trainees through direct training and promotion of outside career development opportunities.

The SBBB program will provide a supportive and inclusive training environment that promotes the success of all trainees.

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- Point of contact for faculty, students, program, and organizational concerns and planning

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- Point of contact for ORE administrative concerns, organizational planning and ORE leadership availability

Program Leadership and Organization

The SBBB program is organized as follows:

Program Director, Associate Director, and Program Administrator

The Director, Associate Director, and Administrator of the Program are responsible for coordinating the day-to-day activities of the program and are points of contact for all program concerns. In collaboration with ORE leadership and the Graduate Training Committee members they will make overarching decisions about program structure and student and faculty support.

Graduate Training Committee

This committee includes the Chairs of each of the program committees. This Committee will meet yearly or more often as needed to oversee the direction of the Program and its operation.

Student Recruitment Committee (Chair: Dr. Chandra Tucker)

The Student Recruitment Committee is charged with devising strategies for "promoting the program," for informing prospective applicants of the advantages of our program, for actively pursuing qualified students who express an interest in structural biology, biochemistry, and biophysics, for collecting application materials, coordinating student interview visits, informing faculty and students of the purpose of these visits in order to maximize their recruiting utility, for making admissions decisions, and for conducting post-admissions surveys to allow our recruiting to improve in the future. The committee should coordinate efforts with the Student Advisory Committee so that special conditions, deficiencies, etc. can be recognized and rectified or accommodated. Membership to this committee is restricted to training faculty and student representatives.

Faculty Recruitment Chair (Dr. Francisco Asturias)

The Faculty Recruitment chair will recruit faculty interested in structural biology, biochemistry, and biophysics to the program. The chair serves as an initial contact regarding inquiries for membership, advises potential applicants of the program requirements and criteria for membership, and reviews their applications for suitability. The Chair is also charged review of all training faculty every 5 years. Membership to this committee is restricted to training faculty.

Student Advisor (Dr. Allie McClure)

The Student Advisor advises students on rotations, individual curricula, and program and graduate school regulations. The advisor will reach out to and meet with students regularly to discuss their progress, problems, questions, concerns and suggestions.

Seminar Committee (Chair: Dr. Ning Zhao)

The SBBB seminar series is intended to be student run, with a faculty chair for advisement purposes only. This committee is charged with organizing research in progress talks, selecting and inviting quality outside speakers, and suggesting additional topics of discussion they feel would benefit program students. Membership on this committee is open to all members of the program.

Curriculum Committee (Chair: Dr. Rui Zhao)

The Curriculum Committee is charged with making recommendations regarding course offerings for trainees. The committee should consist of at least two faculty and one student and meet annually to evaluate the quality of our current courses, make specific recommendations to course directors and instructors and evaluate proposals for new courses. The committee should solicit input from faculty, students and graduates in evaluating our didactic accomplishments and needs. The committee chair should help facilitate coordination of all SBBB courses with the help of the Program Administrator.

Student Involvement, Outreach, and Wellbeing. (Chair: McKayla Riney)

The Student Involvement, Outreach, and Wellbeing committee is open to all members of the program. However, it is generally a student led committee that works to empower all community members by organizing a variety of activities that foster student community and wellbeing.

Bi-annual Symposium Committee (Chair: Dr. Beat Vögeli)

Third- and fourth-year students will work with the Symposium Committee chair, Program Director/s, and Program Administrator to plan the symposium which occurs every other spring. They will be charged with fundraising, invitation of outside speakers, and program planning.

Curriculum Overview

All SBBB students follow a set curriculum as outlined below that includes both required and elective course work, research milestones, examinations, and supplemental activities.

Registration Process

Students must be registered for the appropriate number of credits as outline below in order to remain in the program. In addition to this course work students must

- Academic Calendars (see The Graduate School calendar)
- Register for Classes (see The Graduate School)
 - All basic science PhD students must register for a minimum of 5 credits (fall and spring semesters), and 1 credit of 8990 (summer semester). Anything above the minimum credit level will need approval from faculty mentor.
 - First year students, BSP and MSTP students should work with their Program Directors, Program Administrators, and thesis mentors as there will be additional credit requirements associated with their progress in the program.
 - The paying of tuition, fees and student health insurance occurs the week following the deadline for semester add/drop period, which can be found on the academic calendar . The Program Administrator will complete the process of submitting the appropriate form to the Bursar's Office. For those students receiving financial aid, please work with the Program Administrator to avoid any disruption in aid awarding.

TIMELINE AND MILESTONES

Year 1	Checklist	Activities	Milestones
Fall	☐ Orientation and on-boarding ☐ Register for classes ☐ Rotation 1 form ☐ Enroll in health insurance ☐ Begin establishing residency ☐ Rotation 2 form	• Weekly Seminar • Fundamentals and core course work • Rotation 1 • Rotation 2	• Rotation 1 talk
Spring	☐ Register for classes ☐ Rotation 3 form	• Weekly Seminar • Biophysics & Spectroscopy • Elective • Rotation 2 • Rotation 3	• Rotation 2 talk • Rotation 3 talk • Preliminary Exam
Summer	☐ Register for research ☐ File petition for residency	• Research • Form comps committee	• Join thesis lab
Year 2	Prepare	Activities	Milestones
Fall	☐ Register for classes ☐ Enroll in health insurance	• Research • Weekly Seminar • Molecular Structure Courses • Ethics Course	
Spring	☐ Register for classes	• Research • Weekly Seminar • Molecular Interactions • Elective Course • Form TAC	• Second Year Seminar
Summer	☐ Register for research ☐ Submit comprehensive exam forms	• Research	• Pre-comps meeting
Year 3	Prepare	Activities	Milestones
Fall	☐ Register for classes/research ☐ Enroll in health insurance	• Research • Weekly Seminar • Elective course (if needed)	• Comprehensive Exam
Spring	☐ Register for research	• Research • Weekly Seminar	• Update talk and committee meeting • Plan program symposium (odd years)
Summer	☐ Register for research	• Research • Weekly Seminar	
Years 4+	Prepare	Activities	Milestones
Fall	☐ Register for classes ☐ Enroll in health insurance	• Research • Weekly Seminar	• Year 4: Plan symposium

Spring	☐ Register for classes	• Research • Weekly Seminar	• Update talk and committee meeting • Plan program symposium (odd years)
Summer	☐ Register for research	• Research	

Year 1

COURSEWORK & LABORATORY ROTATIONS

Fall		
Course Title	Registration Information	Credits
Foundations in Biomedical Science	BMSC 7806	6
Discovering Protein Structure and Function (Core Topics A)	BMSC 7830	2
Core Topics in Biomedical Sciences B (Student choice)	BMSC 7831-38	2
Rotation 1	STBB 7650 (001)	1
Rotation 2	STBB 7650 (002)	1
SBBB Seminar	STBB 7660	1
Spring		
Course Title	Registration Information	Credits
Biophysics & Spectroscopy	STBB 7609	1.5
Biophysics & Spectroscopy Lab	STBB 7610	1.5
SBBB Seminar	STBB 7660	1
Rotation 3	STBB 7650 -003	1
Summer		
Course Title	Registration Information	Credits
Doctoral Thesis	STBB 8990	1

Rotations

Rotations serve several important purposes. First, they enable the student to explore and compare several areas of research and aid in the choice of a mentor and project for thesis work. Second, rotation seminars provide training in developing a scientific talk and public presentation, an essential aspect of future career success. Third, they allow program faculty to evaluate the motivation and intellectual preparedness of students to undertake independent research.

Students must perform 3 rotations before the start of their second year. Students should start their first rotation in the fall semester. Students must complete 3 rotations in 3 separate laboratories in order to advance to their second year. Register for the first 2 rotations (Sections 1 & 2) in the fall; register for the 3rd rotation (Section 3) in the spring. Medical Scientist Training Program (MSTP) students must complete two rotations (during the summers of the first and second year of Medical School. Under exceptional circumstances and at the discretion of the GTC and ORE, a student may be allowed to perform an additional rotation during the summer following the first academic year, for the express purpose of enhancing the mentor selection process. SBBB will make every effort to assist a student in finding a suitable faculty mentor.

Identifying Rotation Mentors

Students should work with the Student Advisor to identify suitable rotation mentors. All SBBB training faculty are eligible to serve as rotation mentors; however, opportunities in each lab may be limited by space and funding. Faculty complete an annual survey to indicate rotation availability in their labs, and the Program Administrator maintains a list of faculty who are taking rotation students. After a discussion with the student advisor, students should discuss their interests with several potential faculty mentors before the start of the rotation. *Only in exceptional circumstances will SBBB students be allowed to rotate with mentors who are not already training faculty in SBBB.* Such rotations must be approved by the Program Director.

Rotation Expectations

Students should discuss specific expectations with the potential rotation mentor. However, for scientific professionals in training it is very difficult to define exact hours of research work. This is largely dictated by the research itself. In this regard, students should, at times, expect to be in the lab outside “normal” working hours as needed to accomplish experimental goals. This commitment of time is especially important when long, complex experiments are being done. With this in mind, it is critical to have well-defined and reasonable research goals that include consideration of the time needed for course work. Strong self-motivation and management of time is an essential characteristic of an independent scientist, and we expect our students to begin to develop this quality from the very beginning of their training.

Rotation Seminar

At the end of each rotation the student will present a seminar. The purpose of the seminar is to provide training in the craft and art of public presentation, an essential aspect of future career

success. Each seminar should be approximately 15 minutes in length (12 minute talk + 3 minutes for questions). See Appendix 8 for tips on giving presentations. The student should practice the presentation with their rotation mentor and laboratory prior to the public presentation. The seminar is an essential component of the research rotation. Students are expected to present a well-organized, clear, and thoughtful seminar. Students should consider the following elements when designing their presentation (although the order need not be strictly followed):

Introduction - a short statement of the question or problem addressed by the rotation, and the hypothesis to be tested.

Background - describe the significance of the question in broad terms for a diverse audience. Describe previous work and its relationship to the project.

Specific experimental aims - what were the particular experimental goals proposed to test the hypothesis?

Methods and Design - explain briefly any unusual strategies or techniques employed.

Results – negative and positive results should be reported

Conclusions and future directions – what can you conclude from your results, and what would you pursue if you remained on the project?

ROTATION SCHEDULE FOR 2026-2027:

Fall 1st Rotation: August 31, 2026 - November 20, 2026

Fall 2nd Rotation: November 23, 2026 - February 26, 2027

Spring 3rd Rotation: March 01, 2027 – May 21, 2027

ORE Milestone Rotation This will be sent to you by email by the Program Administrator. Please work with your rotation mentor to complete this and return by the submission deadline. Three forms will be submitted throughout the academic year.

Identification of a Thesis Laboratory

An important aim of the rotations is to enable students to identify a thesis mentor and laboratory. The student should discuss the possibility of joining a mentor's laboratory directly with the mentor. Within one month of the completion of the three rotations, the student should come to a mutual agreement with a faculty member to act as their thesis mentor. If a student has not found a good mentoring fit during their rotations, they should discuss options with the Program Director. Once agreed upon between mentor and student the Program Director and mentor's home department must approve. Co-mentorship is possible but co-mentoring plans must be approved by the Program Director and follow ORE guidance. Official transfers to thesis labs take place on July 1st. Under exceptional circumstances and at the discretion of the Program Director and ORE, a student may be allowed to perform an additional rotation for enhancing their mentor selection process.

- In the unlikely event that a student is unable to select a thesis mentor prior to the beginning of the fall semester of the second year of graduate training, the program reserves the right to dismiss the student from the program.
- **Predoc Financial Support Agreement Form** for those faculty mentors who choose to take on a new predoctoral mentee.
 - **MSTP Specific:** Please work with MSTP Administration and PhD Program Administration to complete the required mentorship agreement for transitioning into a lab.

Residency

Per University policy, it is required that students begin the process of establishing their residency as soon as they accept their offer to join the PhD program. *This is critical!* This process must be started promptly to ensure you meet the necessary deadlines by the end of your first year. For more information, please visit the Registrar's website – **Residency**

Year 2

The fall and spring semesters must each total at least 5 credit hours. Students who are considering enrolling in more than 5 credit hours in either of these semesters should first discuss their enrollment with their thesis mentor, as the thesis mentor will be responsible for the additional expenses incurred. Once the student has approval from the thesis mentor to take more than 5 credits, forward the email approval to the Program Administrator.

Fall		
Course Title	Registration Information	Credits
Research (Pre-Comps)	STBB 7650-0V1	1-5
Responsible Conduct in Research	BMSC 7811	1
SBBB Seminar	STBB 7660	1
Electives	See Appendix 1	variable
Spring		
Course Title	Registration Information	Credits
Research (Pre-comps)	STBB 7650	1-5
SBBB Seminar	STBB 7660	1
Molecular Interactions	STBB 7608	3
Electives	See Appendix 1	variable
Summer		

Course Title	Registration Information	Credits
Doctoral Thesis	STBB 8990	1

Second Year Update Talk

- At the beginning of the second year, each student is required to give a 30 minute research in progress (RIP) talk to the program. The seminar committee organizes all RIP talks.

Year 3+

- Minimum registration requirement for full-time graduate students is 5 credits. Anything above 5 credits must be approved by faculty mentor.
- Students defending in the current semester must register for 5 credits of CSDV 8990. If a student is defending between semester dates as defined by the Academic Calendar, the student must register for 5 credits of CSDV 8990, in the proceeding semester of the scheduled defense date.
- Comprehensive exam **must** be taken by December of Year 03. Students must have 30 didactic credits to be eligible to schedule their Comprehensive exam. All graduate level courses (5000 level or above) count towards Comps eligibility except Pass/Fail courses (such as CSDV7000) and CSDV 8990. Note that courses taken in the exam semester do count towards Comps eligibility. If you are unsure whether to register for 7650 or 8990 credits, contact your Program Administrator.
- Students are required to take at least one elective or advance topics course each year during years 3-5. Options include CSDV7000, CSDV7100, CSDV7680, and courses listed in appendix 1. If a student would like to satisfy this requirement by taking another course, which is not listed on Appendix 1, they must receive approval from the Program Director and the Chair of the Curriculum Committee.

Fall		
Course Title	Registration Information	Credits
Doctoral Thesis	STBB 7650 (pre-comps) STBB 8990	1-5 (variable)
Electives (if applicable)		Variable
Spring		
Course Title	Registration Information	Credits

Doctoral Thesis	STBB 8990	1-5 (variable)
Electives (if applicable)		Variable
Summer		
Course Title	Registration Information	Credits
Doctoral Thesis	STBB 8990	1

Research Update Talks

- While students are not required to register for seminar after comps they are still required to attend all SBBB seminars.
- Post-comps students are required to give a 30-60 minute (student choice) RIP talk yearly as a part of the SBBB seminar series. The seminar committee organizes the RIP talks. Students are strongly encouraged to coordinate their yearly committee meeting with their RIP talk.

Thesis Committee meetings

Students are required to meet at least once each year with the thesis advisory committee (TAC) although more frequent meetings can be scheduled at the discretion of the student or thesis committee. It is the student's responsibility to arrange the time for the committee meeting which should be scheduled for 2 hours. The Program Administrator will help with scheduling a room. To schedule a committee meeting, you will need to work directly with your committee and are encouraged to use electronic polls to identify a suitable time. Keep in mind that organizing a committee meeting is an exercise in patience and persistence.

The candidate should provide the TAC a brief written summary of the progress made on the stated aims given to the committee at least one week prior to the meeting. A template for the progress report is provided in Appendix 2. It is the student's responsibility to initiate the [Meeting Assessment](#) via ORE Milestones. Following the meeting, the committee will complete this report..

Required and Elective Coursework

All SBBB students must take the following coursework

STBB 7660—SBBB Seminar (1st and 2nd year)
 STBB 7650—Research in SBBB (pre-comps)
 STBB 8990—Doctoral Thesis (summer, and post-comps)
 STBB 7608 – Molecular Interactions
 STBB 7609 – Biophysics & Spectroscopy
 STBB 7610 – Biophysics & Spectroscopy Lab

Two of the following courses:

STBB 7631 – Molecular Structure A (NMR spectroscopy)

STBB 7632 – Molecular Structure B (X-ray Crystallography)

STBB 7633 – Molecular Structure C (Mass Spectrometry)

STBB 7634 – Molecular Structure D (Cryo-EM)

* Note: additional Molecular Structure courses may be taken as electives

BMSC 7811 – Responsible Conduct of Research

*Though recommended other courses are available if this is not possible

Elective Courses

An extensive list of electives is available (see Appendix 1). Electives should be chosen to meet the research interests of the student and should be made in consultation with the student's thesis mentor and the STBB student advisor or program director. See

Examinations, Evaluations, and Additional Requirements

Fellowship Proposal

All students must write a fellowship proposal during their tenure. The student should discuss with the program director and/or thesis mentor to decide which fellowship to apply for.

Preliminary Exam

- Every first-year student takes the Preliminary Qualifying Exam at the end of the first year of graduate school. BSP students that plan to join SBBB can either take the BSP or SBBB preliminary exam.
- MSTP trainees transferring into SBBB during year 3 of their training will complete an MSTP specific preliminary exam prior to program transfer; this is accepted as an equivalent to the SBBB preliminary exam.

SBBB Preliminary Exam Guidelines

Continuation in the program is dependent on the outcome of the preliminary exam. All first-year students will take the exam in June of their first year, with the exact date to be scheduled by the Preliminary Exam Committee. This is an oral exam designed to test the general knowledge base of the student, with particular emphasis on areas deemed necessary to pursue studies in structural biology, biochemistry, and biophysics. The goal of the exam is to identify and form a plan to address any deficiencies.

About a month prior to the exam, students will be provided a study guide. In general, these topics will be gleaned from the learning objectives of the coursework the student completed during their first two semesters in the Program.

A committee consisting of 3-4 faculty members from the program will administer the exam to all students individually in a given year. The exam is 1 hour. During the exam, the student will be asked to answer questions and explain concepts based on the topics from their course work.

There are three possible outcomes of the Preliminary Exam

1. Pass (no conditions)
2. Conditional Pass (conditions must be detailed)*
3. Fail (the student must either retake and pass or leave the Program)**

*So long as the conditions of a conditional pass are met in the timeline requested by the committee, this will be converted to a pass. It is important to remember that a conditional pass is not a fail. Rather this provides the student an opportunity to enhance their knowledge base and/or skillset to best set them up for future success.

**The Preliminary Exam committee will determine if a student can retake the exam. If a student is allowed to retake, they should do so in the following 1-3 months. The examination committee may choose to reexamine only a single area of concern or may choose to reexamine the student more generally. The reasons for a failing grade and expectations for a successful retake will be clearly communicated to the student in written form.

Comprehensive Exam

During the summer after the second year of study the student should begin planning for the Comprehensive Exam which should take place in the fall of the third year. Under extenuating circumstances, and with the recommendation of the Program Director and concurrence of the Dean, the examination may be taken during spring of third year.

It is highly recommended that the student carefully read the Graduate School Policies & Procedures guide on Comprehensive Examination policies and deadlines and check the instructions and forms from the Graduate School website well ahead of the planned exam so all required paperwork can be completed on time. The completed Application for Candidacy and Exam Request Form must be submitted to the Program Administrator no later than one month prior to the examination date.

Note: A student cannot take the comprehensive examination with less than a 3.00 G.P.A. or before the Graduate School application is submitted and approved. A student must be registered at the time they take the Comprehensive Examination. The student must have completed a minimum of 30 didactic credit hours to be eligible to schedule the exam; Pass/Fail classes and STBB 8990 credits do not count toward the 30 hour minimum. Classes with less than a B- will not be accepted on the comprehensive application. Coursework taken in the semester in which the exam takes place do count towards the 30 hour minimum.

The Comprehensive Exam consists of two major components:

1. A written research proposal

2. An oral defense of the proposal

The written proposal is usually based on the student's thesis work but can include other areas of study as well. The overarching question, hypothesis, approach and innovation will then be very briefly presented (~15 mins) and defended orally. The student should demonstrate a workable knowledge of the field and related techniques of study to assure that independent work is imminent. The student's comprehensive exam committee judges the quality of the examination and makes recommendations for further academic advancement.

Steps for preparation of the Comprehensive Examination

The necessary steps to schedule and take the comprehensive exam are as follows:

1. Form a Comprehensive Exam Committee

The student should work with the thesis mentor to identify an exam committee and nominate one of these members as the chair. Students should then contact potential members individually and provide them a very brief overview of the topic, and justification of why they think their expertise would be appropriate for the committee, additionally requesting the potential chair to act in this capacity. The committee shall consist of five (5) Graduate Faculty members, the majority of which should be from the SBBB training faculty, the chair should be an SBBB member. The thesis mentor may not be a part of the examination committee. Research faculty may be on the committee but may not chair the committee. At least one of the members must be from outside the SBBB faculty. Please review the ORE Policy on Conflict of Interest and Undue Influence for Thesis Committees here: <https://medschool.cuanschutz.edu/ore/forms-and-resources>

2. Specific Aims Page and Pre-comps Meeting

The student should first put together a specific aims (SA) page and organize a pre-comps meeting of the full committee plus the thesis mentor. This meeting should be scheduled for 1 hour and the SA page should be disseminated to the committee at least 3 days prior. At the meeting the SA page will be discussed, and any changes suggested by the committee. The date for the exam should also be set at this meeting.

3. Complete the Graduate School Comprehensive Examination Forms

Immediate after the meeting the student should initiate paperwork in collaboration with the Program Administrator. The Graduate School requires three forms be submitted before taking the University Comprehensive Exam:

1. Application for admission to candidacy
2. Request for scheduling exam
3. Transfer of credit (if applicable)

The student should work with the Program Administrator to ensure all forms are submitted appropriately. All forms and information are located at <https://graduateschool.cuanschutz.edu/forms-resources/resources>

4. Submit a written research proposal

You must submit the written research proposal to the Exam Committee **at least two weeks prior to the scheduled examination date**. Late submission will lead to a postponement of the exam. The proposal should outline an original investigation leading to innovation in structural biology, biochemistry, and/or biophysics.

The proposal will generally follow an NIH R01 grant format:

1. Total of 7 pages including the SA page, all text, figures, and tables, excluding bibliography and title page.
2. 11-point Arial font (single spaced)
3. 10 point font is allowed for figure legends (single spaced)
4. Margins should be ½" all around
5. Sections should include:
 - Specific Aims (1 page maximum)
 - Background and Significance (suggested 1.5 pages)
 - Innovation (suggested 0.25 page)
 - Preliminary Results (suggested 1.25 pages)
 - Research Design (suggested 3 pages)
 - A short statement on rigor and reproducibility
 - Bibliography (no page limit)

Though the students can consult with anyone on the general nature and design of the research proposal and get general comments on the document, the written document produced must be solely the writing of the student.

5. *Oral Exam*

The student is generally given 10-15 minutes to give an overview of their proposal to the committee before the defense begins. During the oral defense portion of the exam, faculty members will test the student's knowledge not only regarding the proposal topic, but with respect to structural biology, biochemistry, and biophysics as a whole. The proposal provides a platform for the exam, but questions are not limited to what is in the written proposal. Rather, the committee will test the student's ability to plan and carry out hypothesis and/or discovery driven research, probe the depth of their knowledge, and test the student's ability to "think on their feet." The student must demonstrate sufficient basic knowledge of the system in question, the ability to form of a relevant research question, the ability to design aims to test this question, sufficient knowledge of the proposed approaches (including their strengths and limitations), and the ability to interpret results with respect to the proposed question. The student should be prepared for broad-ranging questions covering any related topic. Good performance on this section of the exam is critical to a successful outcome. At the conclusion of oral defense, the candidate will be excused, and the committee will deliberate to determine the result of the examination.

Potential Examination Results

Pass

The student must receive the affirmative votes of a majority of the members of the committee in order to pass.

Pass with Conditions

The committee may feel that, although the student has passed the examination, they should complete additional work to be fully prepared to carry out their doctoral studies. This may be in the form of a written document, additional coursework, etc. These conditions will be communicated in writing and must be satisfied within six months. The student will be considered to have "passed" when these conditions are satisfactorily met as determined by the committee chair. Failure to meet the conditions will result in failure of the examination. Note that receipt of a conditional pass is not a fail and should only be considered as an effort by the committee to best prepare the student for their doctoral work.

Fail

A fail will be issued if the majority of the members vote to fail. In the event that the student fails the examination, they are subject to immediate dismissal from the PhD Program. However, at the discretion of the Comprehensive Exam Committee and Program Director, they may be allowed to retake the examination once. The remedial exam will be in a form designated by the committee and must be completed within four months.

NOTE:	After passing the comprehensive exam, all PhD students are required to register for Doctoral Thesis STBB 8990 (instead of STBB 7650) each fall and each spring. Failure to do so can result in the student being required to retake the comprehensive exam. A student may register for up to 10 units of STBB 8990 in the semesters before and the semester in which the comprehensive exam is taken and passed.
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Post-comps Thesis Advisory Committee and Committee Meetings

After passing the Comprehensive Examination, the student enters Ph.D. candidacy. During the following years the students perform research towards a thesis defense. Students must give annual research in progress talks to the SBBB program and meet at least annually with their Thesis Advisory Committee (TAC). Generally, the Comprehensive Exam Committee will also serve as the Thesis Advisory Committee. However, an alternate TAC may be formed as the student sees fit. The Chair of the TAC serves as an advisor to the student and will monitor their progress. The Chair must be a member of the Program. *It cannot be emphasized enough, however, that this is merely an advisory role, each student is responsible for their own progress.*

Students are in charge of coordinating their committee meetings and are encouraged to coordinate this with their RIP talk when possible. Meetings are to be scheduled for 2 hours. After identifying a date and time they are to work with the Program Administrator book a room and send out a calendar invite. This is a requirement as it also alerts the program of the scheduled meeting. At least one week prior to the committee meeting the students should send an updated

research and training progress document to their committee (see Appendix 2). It is also the student's responsibility to initiate the [Milestones form](#). The TAC will then complete the form after the meeting. If concerns are identified they should be discussed immediately with the student, the thesis mentor and/or the student's Thesis Committee, and the Program Director.

Publication Requirement

SBBB students are required to have submitted for publication one primary (or first-author) major publication on their thesis work to a peer-reviewed journal. Review articles, methods papers, news & views, and very short communications of data are not sufficient to satisfy this requirement. An exception to this is a major methodological advance paper which goes beyond a simple protocol. Any exceptions to this must be approved by Program Director/s.

Completion of Thesis Work

A student is ready to graduate when they have:

1. Completed all required coursework
2. Passed their examinations
3. Amassed sufficient credits
4. Written and submitted a fellowship application
5. Submitted at least one first-author manuscript to a peer-reviewed journal
6. Come to an agreement with their thesis advisor and committee

At this point the student must meet with the Thesis Advisory Committee and receive formal approval to begin writing their thesis. Disagreements between mentor and student or any concerns about the timeline to graduation should be brought to the Program Director.

Thesis and Thesis Defense Examination

Upon completion of a body of original research that constitutes a significant contribution of new knowledge to the field of structural biology, biochemistry, and/or biophysics, students will write a Ph.D. thesis containing this information and defend this document at an oral examination scheduled by the Graduate School. Final defense of the thesis/dissertation must be completed in line with the Graduate School [deadlines](#).

Per Graduate School rules, the Program Director must approve the student's final Thesis Examination Committee membership and the examination schedule. The Request for the Exam and Biosketch must be submitted to the Program Administrator and Graduate School at least 4 weeks before the exam. These forms can be found on the graduate school website (<https://graduateschool.cuanschutz.edu/forms-resources/resources>) and consist of:

➤ **Biosketch Form**

- This is a graduate school form, not the NIH form

- **Exam Request**
- **Thesis Approval form**
- ProQuest **General Information for Submitting Dissertation & Thesis** page 13 on Graduate School website
- **Watch** how to prepare the correct forms and upload your dissertation.
- If defending after the semester ends you must register for 5 credits of 8990 in the proceeding semester. (Thesis defenses must be tied to the end of the semester deadlines dates please see the links below)

The Graduate School will send the final examination forms to the appropriate faculty members. The Program Administrator will post the notice of the examination, send out examination notices, and ensure examination rooms are reserved for the students.

Thesis Examination Committee

Generally, the TAC serves as the Thesis Examination Committee but can be different if appropriate and approved by the Program Director. Once approved to write the thesis the student should work with the committee to schedule their thesis defense.

Guidelines for writing a thesis

All doctoral students are required to submit a thesis (or dissertation) to the Graduate School as partial fulfillment of the requirements of the degree of Doctor of Philosophy. The form and scope of this thesis is determined by the student, the thesis mentor, and the Thesis Advisory Committee. Formatting is dictated by the Graduate School. [Watch the Graduate School's instructional video](#) on how to format your thesis.

The student should provide a thesis outline and discuss the format of the thesis with their Thesis Advisory Committee. The thesis should be based upon original investigation carried out by the student, put the work into the context of the field, demonstrate mature scholarship, critical judgment, and a high level of familiarity with tools and methods of research. It should contain an introductory chapter, research chapters, and a conclusions and future directions chapter. Appendices may be used as seen fit by the student and committee.

The student is strongly advised to work closely with the thesis mentor as they are writing their thesis to receive consistent feedback. However, at a minimum they must present a complete draft to the thesis mentor no later than 4 weeks prior to the defense date. The thesis must be approved by the thesis mentor before it is sent to the full committee no later than 2 weeks prior to the defense date.

Thesis Defense

For the defense, the student presents a 45-minute public seminar highlighting the contributions made to the understanding of a particular scientific problem by their dissertation work. Thereafter, the Committee will examine the student about the thesis work in a closed-door session. To pass the examination, the student must receive affirmative votes from the majority

of the members of the Thesis Examination Committee. Thesis Examination Committee members may impose conditions before conferring a passing evaluation or may require more extensive remedies before considering passing the student.

All members of the committee must be present for the examination. One member, but not the chairman nor the student, may participate by interactive video if absolutely necessary. The examination form is signed by each member of the Thesis Examination Committee and returned to the Program Administrator and Program Director. The student must receive votes from the majority of the Examination Committee for one of the following outcomes:

1. Pass
2. Pass with stated conditions
3. Fail

If a student passes the examination with conditions, those conditions must be satisfied within sixty days of the defense. The special conditions must be stated on the examination form and subsequently monitored by the committee chair in order to ensure that the conditions can be completed within the sixty days allotted. If a student fails the examination outright, they may be, at the discretion of the examination committee, dismissed from the program effective immediately.

Once the student is notified of a pass, they must circulate the thesis approval form to their committee for signatures, and then send it to the Program Administrator. The student must also submit their final thesis through ProQuest, work with the graduate school to make edits, and submit their final edits by the semester deadline. Failure to submit these documents will result in delayed graduation from the program.

You can find all forms for the comprehensive exam and thesis defense on the Graduate School website under the "Forms" section.

Thesis Defense Resources and Dissertation Guidelines

- **Thesis & Dissertation/ProQuest Format & Guidelines**
- **Graduate School Deadlines, Forms, Policies**

Thesis Defense Checklist
☐ First author paper submitted

☐ Credits completed before or during the defense term
☐ Exam Committee assembled and defense date scheduled
☐ Thesis submitted to mentor for approval 4 weeks prior to defense date
☐ Request for Exam and Biosketch to the Program Administrator and Graduate school 3 weeks prior to the defense date
☐ Thesis submitted to Exam Committee 2 weeks prior to defense date
☐ All conditions/revisions met within 60 days of the defense date

BSP & MSTP Requirements

Students transferring to SBBB from the Biomedical Sciences (BSP) or Medical Scientist Training (MSTP) programs may have different credit/course requirements (see appendix 1). Applications for transfer will be evaluated based on thesis lab availability, transcripts, and performance on the preliminary exam and in laboratory rotations. It is important to understand that transfer from either program into the SBBB PhD program depends on a SBBB faculty member agreeing to accept the student into her/his lab for their thesis work.

MSTP Students should enter a thesis lab with 27-33 graduate credits, including graduate core. They have also completed/will complete the MSTP Preliminary Course focused on grant writing in Spring term of their transfer year. This course covers F31 grants, but also F30 grants which are specific to dual-degree trainees. The MSTP administration will review student transcripts with the PhD Program Administrator at time of transfer and will confirm that all expected graduate credits have been posted for program review and evaluation.

MSTP students have already selected and been accepted into a thesis lab within the selected PhD program. They will enter the program under this lab's support immediately upon transfer and should not incur charges to the PhD program at any point in training absent the need for gap funding/support. As such please consider this transfer to be equivalent to a second year PhD student. Time to degree is a very important metric for the NIH and the program's T32 grant.

MSTPs are expected to complete their PhD training within four years of entering lab. Of course, mitigating circumstances can occur. The MSTP Administration should be alerted to any significant progress concerns which may impact a student's ability to graduate within the expected time frame. This can be accomplished by meeting, email, or committee meeting notes as appropriate.

- MSTP students should contact MSTP Administration to obtain the program specific lab mentor agreement to review lab mentor responsibilities, curriculum requirements and other expectations related to the research portion of training. **MSTP students must have thesis committee meetings every 6 months** regardless of their PhD program. Each MSTP student's thesis committee should have a faculty member representing MSTP. Students should discuss MSTP faculty representation with the Director or Associate Program Director to identify suitable candidates.
- Throughout the Thesis stage of training, MSTPs are required to register for the *Longitudinal Foundations of Doctoring* (FOD) course in 2 terms annually (Fall and Spring). They will enroll into the *Capstone Return-to-Clinics* course in their last year of thesis training, replacing FOD in the spring term. The MSTP mentor is responsible for covering the costs for these courses and agrees to this as part of the MSTP-specific mentor letter.

Policies

SBBB Policies, Obligations, & Record Keeping

A. Time and Attendance. Students should discuss specific time expectations with their thesis mentor. These will reasonably include certain hours during the work week where lab personnel should be in the lab and scheduled meetings (such as group meeting). However, for scientific professionals in training it is very difficult to define exact hours of research work. This is largely dictated by the research itself. In this regard, students should, at times, expect to be in the lab outside "normal" working hours as needed to accomplish experimental goals. This commitment of time is especially important when long, complex experiments are being done. With this in mind, it is critical to have well-defined and reasonable research goals. Strong self-motivation and time-management are essential characteristics of an independent scientist. Any unrealistic expectations should be brought to the Program Director's attention for discussion.

Students should always discuss time off and/or vacation days with their thesis mentor in advance. Any expectations with respect to taking time off should be made clear by the thesis mentor. Any unrealistic expectations should be brought to the Program Director's attention for discussion.

All graduate students are required to attend the SBBB seminars, post-rotational seminars, and thesis defense seminars given by SBBB program students. All graduate students are required to attend the bi-annual symposium.

B. Lab Records. All notebooks, original data and reagents from rotational and thesis work are the property of the thesis mentor and the University and must be left with the thesis mentor at the completion of the work.

C. Registration. It is the student's responsibility to register for courses in a timely manner – all late fees and finance charges will be the responsibility of the student.

D. Colorado Residency. First-year students who are domestic students must obtain a Colorado Driver's License at the time of arrival at the University of Colorado School of Medicine to begin the process of establishing Colorado residency. If residency has not been established by the beginning of the second year, the student is responsible for the non-resident portion of tuition that exceeds the resident assessment. The paperwork for establishing Colorado Residency must be filed with the Registrar prior to second year registration. Please check the Registrar's website for full details: <https://www.cuanschutz.edu/registrar>

E. Guidelines for the Use of AI and Machine Learning Tools. SBBB supports the responsible use of AI. When used appropriately, AI can be a very valuable tool. For example, it can provide language and grammar checks, help identify relevant research articles, or be used as a component of various computational tools (e.g. AlphaFold), or as a component of your own research program. However, AI and ML tools cannot and should not replace your own critical thinking and should not be used as a crutch to escape your own proper scientific and professional development. Using these tools in such a manner will only weaken your skill set.

Be honest and transparent about the use of AI tools in coursework and research. Citation of any use should be included in any relevant bibliography and include the name of the specific tool (and version) and how it was used. *Ex: ChatGPT, v4 was used to evaluate the grammar in this proposal. Suggestions from this evaluation were included in the final draft.*

The UCD AMC Graduate School has established [general guidelines](#) for generative AI use.

In addition to these guidelines, SBBB prohibits the following uses of AI:

1. Drafting outlines or paragraphs for class assignments. Writing assignments in SBBB must reflect students' own ideas, reasoning, and writing ability. Students may not use AI tools to generate new sentences, paragraphs, or outlines in their proposals. AI tools can be used to make suggestions to improve grammar and clarity of original writing, but not to generate new content.
2. Drafting peer review summaries. Students may not use AI tools to generate summaries or reviews of classmates' work. Peer review is an excellent opportunity to engage in critical thinking, fosters evaluation of alternative ideas, and offers practice in concise, original communication. Furthermore, another student's work to an AI tool may breach confidentiality, as the content may be stored, disseminated, or reused without consent. The NIH has recognized this threat and adopted a [policy](#) that prohibits the use of generative AI in the peer review process.
3. AI tools are generally not permitted for use in homework or exams, in drafting the comprehensive examination proposal document, or in writing the thesis document. The purpose of these is to assess a student's independent understanding and reasoning on the subject matter.

Therefore, students should not use AI tools to identify proposal topics, generate hypotheses, or to generate experimental plans for the proposals. Exceptions may be made if the instructor explicitly allows AI for specific questions, for example, to help students explore AI's strengths and limitations.

F. Student's Files. A file for each student will be kept by the Program Administrator. All relevant records should be given to the Program Administrator for the files, including published abstracts and papers, notifications of awards and honors, and copies of forms filed with the Office of Research Education. These files should reflect the total record of the student during their entire graduate career. Upon written request, the records may be examined by the student.

G. Exit Master's Degree. A student who needs to leave the Program before completing their PhD should discuss this with the Program Director. Under extenuating circumstances and with due consideration a Masters Degree may be obtained in Biomedical Basic Sciences (including a program transfer). If this occurs after passing the comprehensive examination the comps document will count as the thesis. If this occurs before the comprehensive examination a thesis must be completed and defended to a committee.

H. Maintaining Good Standing. The University of Colorado Anschutz Medical Campus has a Student Code of Conduct. The SBBB Program endorses and enforces this Code of Conduct. We strive to make our community a place of study and work where people are treated, and treat one another, with respect and civility. The SBBB Program views the student conduct process as a learning and growth experience that aims to repair harm and can result in personal understanding of one's responsibilities and privileges. As members of the Structural Biology & Biochemistry community, students are expected to uphold standards that assist in promoting a safe and welcoming community. The full Code of Conduct can be found at <https://www.cu.edu/ope/aps/2027>. A student who violates the Code of Conduct will be called before the Program Director and Student Advisor who may assign disciplinary action, up to and including dismissal from the program.

Each student is expected to maintain satisfactory academic progress. A student whose grade point average drops below a 3.0 is placed on academic probation. To be removed from academic probation, a student must achieve a GPA of 3.0 or above for the academic semester following the semester for which the student was placed on probation, and must achieve a cumulative GPA of 3.0 or above within two semesters of being placed on probation. A student who fails to be removed from academic probation within two semesters will be dismissed from the program.

Doctoral students are expected to complete all degree requirements within seven years of matriculation. Students who fail to complete the degree in this seven-year period are subject to termination from the Graduate School upon the recommendation of the Program Director and concurrence of the Dean. For a student to continue beyond the time limit, the Program Director must petition the Graduate School and include 1) reasons why the program faculty believe the student should be allowed to continue in the program and 2) an anticipated timeline for completion of the degree. Students who cannot complete requirements in the 7-year period will

be required to retake a second comprehensive examination. The Graduate School may approve extensions for up to one year.

The student requirements described in this handbook must be met by the deadlines stated. The Program Administrator & Director monitor the progress of each student. If they conclude that a student is not meeting the program's requirements in a timely manner, they may request a meeting with that student. After review, the Program Administrator & Director may take any actions deemed appropriate, including placing conditions on the student's continuance in the program or dismissing the student from the program. If a student is in jeopardy of missing a deadline or believes they are not achieving acceptable progress, the student should contact the Program Director immediately. Failure to notify the Program Director of problems in completing requirements can result in dismissal from the program.

Office of Research Education Policies

Policies can be found on the [Office of Research Education](#) website under Resources -> Policies.

- [Conflict of Interest](#)
- [Honor Code and Committee Procedures](#)
- [Anschutz Email address communication](#)
- **Student Badge Requirement:** Students must have their university badge visible, on their person, at all times while on campus.
- [Financial Aid for Graduate Students](#)
- Tuition, fees and stipend

All incoming Graduate Students are offered a financial aid package from the Graduate School that includes an annual stipend of **\$43,000** (approved for **Academic Year 2026-2027**), tuition costs, and payment of individual student health insurance and activity fees. The Stipend is evaluated on an annual basis for the cost of living. Please note that this support covers the period July 1, through June 30 for continuing PhD students, and August 15, through June 30 for first year PhD students. Payment of annual stipend, along with tuition costs, fees and individual health insurance is dependent upon satisfactory academic progress as defined in the Graduate School and Program policies.

A. Credits. The Graduate School requires at least 30 semester hours in course work (rotations and Research STBB 7650 count as course hours) and 30 semester hours of thesis research (STBB 8990) for the PhD. All work undertaken as a graduate student must be in compliance with the academic Code of Honor (see the Graduate School's website).

B. Maintenance of a 3.0 GPA. All students must maintain an average of "B" or better in their course work. Students are expected to earn a "B" or better in all required courses. Only in *exceptional* circumstances may a "B-" in a required course be acceptable, as determined by petition to the GTC. Required courses completed with a grade of below "B-" cannot be counted towards PhD requirements.

Students whose cumulative GPA falls below 3.0 will be placed on Academic Probation by the Graduate School. The student must earn a GPA of 3.0 in each of their next two semesters in order to be removed from Academic Probation. The Graduate School requires that after a student is put on academic probation, they must maintain a 3.0 in all subsequent semesters. Failing to meet either condition will lead to immediate dismissal from the Graduate School. A “B-” or below in any required course is considered unsatisfactory academic progress and more than one “B-” or below is grounds for immediate dismissal from the Program.

A graduate student who receives an unsatisfactory grade in a course (a B- or below) may repeat that course once or successfully complete an alternative assignment, upon written recommendation from the Program Director and approval by the Graduate School Dean (provided the course has not been previously applied toward a degree). The two grades received will be averaged in calculating the grade point average, and all grades received will appear on the student’s transcript. The course may be counted only once toward satisfying the unit requirement for the degree.

C. Change in Thesis Lab. Students experiencing difficulties in their thesis labs are encouraged to seek support from leadership within SBBB (thesis mentor, thesis committee, Program Administrator, Program Director (PD)) or within the university (e.g., ORE Associate Dean, Office of Student Affairs, Ombuds Office). When issues cannot be resolved, leaving the thesis lab may be the best course of action. The Office of Research Education has developed a policy with guidance for how students and/or mentors may decide that a student will leave the mentor’s lab (see [here](#))

F. Time Limit of PhD Studies. Students have seven years from the time they enter Graduate School to complete all requirements for the degree. Continuation after seven years requires the approval of the student’s Thesis Committee, the Program Director & the Graduate School.

G. Personal Leave of Absence. Students are eligible to take an unpaid personal leave of absence (LOA) for up to one year. Personal LOAs must be approved by the Program Director in consultation with the ORE Director of Business Services (Jodi Cropper). Please see more about the procedure for [requesting the LOA](#).

H. Medical Leave of Absence. Students are eligible to take an unpaid medical leave of absence (MLOA) for a semester up to one year. ORE encourages students considering an MLOA to first speak with their thesis mentor and Program Director or Administrator, and/or contact The [Office of Student Outreach and Support](#) (Morgan Phoebus) to discuss options. However, as the student’s health and confidentiality are priorities, students are not required to notify their Programs and may directly contact the Office of Student Outreach and Support. Please see the [Request for MLOA](#) form under Resources and Support.

I. Faculty member who leaves the institution. The Office of Research Education (ORE) and the School of Medicine (SOM) PhD programs work to ensure that all ORE PhD students have optimal PhD training conditions. Major challenges occur, however, when a student’s PhD

mentor leaves the institution, and the student has not completed the PhD requirements. Depending on the student's stage in her/his/their research and the program, the challenges will vary. See ORE's policy regarding students whose mentors leave the institution here: <https://medschool.cuanschutz.edu/ore/forms-and-resources>

J. External Employment for Graduate Students

Graduate students, in good academic standing, may, with appropriate approval, work a maximum of 10 hours per week. Such employment must be approved in advance in writing by the Student's Program Director for first year students and by Program Director and Thesis advisor for those students who have entered a laboratory or who transfer or are directly admitted to a laboratory.

The Office of Research Education and the Students advisory/ thesis committee must also be informed of any students approved for external employment. External employment must not conflict with any required elements of a student's PhD training. Examples include but are not limited to: classes, assessments, seminars, journal clubs, lab meetings, retreats and other required program or ORE activities. Students must remain in good academic standing in order to continue their external employment.

Approvals must be reviewed and reported by the student's Program and Advisory committee every 6 months. Students will attest that they have not exceeded approved hours. Students receiving extramural support for their PhD from training grants or other sources are subject to the requirements and policies of those funding entities and may not be eligible for external employment. Failure to disclose external employment, falsely reporting or willfully exceeding approved hours will be grounds for disciplinary action and possible dismissal from the PhD program.

Definitions

External employment- any paid (or compensated in kind) work or work product outside of a student's PhD training program and the Office of Research Education.

Good academic standing-maintaining a minimum of a B grade in all classes, rotations and thesis work. Passing Preliminary and comprehensive exams. Meeting other Program requirements, as described in Program Handbooks. Demonstrating satisfactory and timely progress toward the PhD, as determined by the Students Advisory/Thesis Committee.

Resolution of problems

Students may appeal denial or rescinding of approval for external employment on the basis that policies were not followed or applied fairly. Appeals will be reviewed by the Associate Dean for Research Education and their decision will be final.

J. Transfer Credits. Please see the Graduate School's "Policies & Procedures Guide" for information about transferring credits towards your degree with the Structural Biology, Biophysics & Biochemistry PhD program. That guide is available on the Graduate School website under the "Resources" tab: <https://graduateschool.cuanschutz.edu/forms-resources/resources>

Program Events and Activities

A. Annual SBBB Retreat

Each fall the SBBB faculty, students, associated post-docs, and alumni gather for a one-day retreat at the Chautauqua in Boulder.

B. SBBB Symposium

Every other year (even years) the students host a scientific symposium on campus. This event hosts outside speakers from academia and industry, student focused panels, and a poster session. The symposium is open to the whole campus as well as CU Boulder and CU Denver. Students are required to attend unless excused by the Program Director.

C. Participation in Recruitment Functions

During February/March each year, prospective student applicants visit our program for interviews. It is in the Program's best interest to attract and retain the best of these prospective students. To do this we need the help of current students and SBBB faculty who can convince these individuals that our Program is the place to be! When asked, please be willing to spend some time with prospective students during dinners or other functions. Our SBBB Program can and has flourished with your irreplaceable help.

Resources and Support

Student Financial Support

At present, students accepted in the Ph.D. program are provided full tuition, health insurance, and a stipend of \$43,000 per year for living expenses (for the academic year 2026-27). Continued support is contingent upon satisfactory academic and research performance by the student. When a student enters a thesis lab, the thesis mentor assumes complete responsibility for the student's stipend, tuition, fees, and associated research costs. In order to qualify for in-state tuition for the following year, all out-of-state students must establish Colorado residency by the end of summer of the first year. See the Registrar's website for complete details: <https://www.cuanschutz.edu/registrar>

Tutoring

Tutoring is available on an individual basis. Students should contact the chair of the Student Advisory Committee immediately if they feel they need assistance with any course work, English, or writing. Depending upon needs, some tutoring may be paid by the Graduate School or program to help ensure success.

Students can access a variety of campus services through the links provided below. The Office of Student Affairs is committed to supporting CU Anschutz students by offering guidance and

assistance in navigating campus resources. For detailed information about available services or to schedule an appointment, please visit the Office of Student Affairs webpages. For additional questions or support, you may contact the office via email at StudentAffairs@cuanschutz.edu.

- Office of Student Affairs
 - Campus Life
 - Student Support
 - Health & Wellness
 - Student Resources
 - Student Services
- Students Resource Directory
 - Includes all campus resources
- Academic Calendar
- Residency
- Badging Office
- Student Parking & Transportation
 - Eco Pass
 - Campus Circulator (Transportation service)
 - Medical Campus Rail Shuttle
- Office of Information Technology
- Student Health Insurance
- Office of Research Education – Concern Reporting Form (Maxient)
- CU Anschutz Student Outreach and Support Referral
- CU Anschutz Student Request for Medical Leave of Absence
- Graduation Deadlines Thesis, Anschutz
- Thesis & Dissertation/ProQuest Format & Guidelines

Appendices

Appendix 1: Course Descriptions

Required Courses

STBB 7608—Molecular Interactions (3 Credits)

This course is focused on critical reading of the literature and proposal writing strategies. Students will lead the discussion of 4-5 primary literature articles on key topics in STBB. Students will then write a mini-proposal on a follow up question from one of these papers. Instructors cover strategies for literature reading, management, and citation. They also cover strategies for writing a specific aims page and research proposal. This course should be taken in the spring of the second year before the comprehensive exam.

STBB 7609—Biophysics & Spectroscopy (1.5 Credits)

This course aims to provide the students with a deep understanding of the application of different biophysical techniques to study interactions of biomolecules with each other or with small molecules. The course will supply the students with the needed tools to be able to design their own biophysical experiments to tackle a particular question.

STBB 7610—Biophysics & Spectroscopy (1 Credit)

This course aims to provide the students hands-on training in the use of a variety of biophysical techniques for the quantification of biomolecular interactions. Must be taken with STBB 7609

STBB 7631—Molecular Structure A (NMR – 1.5 Credits)

Gain an in depth understanding of the underlying principles of an NMR experiment, so that student can turn NMR theory into NMR practice for their research.

STBB 7632—Molecular Structure B (X-ray Crystallography – 1.5 Credits)

Understand the theory and practice of structural determination using x-ray crystallography.

STBB 7633—Molecular Structure C (Mass Spectrometry – 1.5 Credits)

The purpose of this course is to provide students with a concise understanding of biological mass spectrometry and its application to study and characterize various classes of biomolecules in state of the art research.

STBB 7634—Molecular Structure D (Cryo-EM – 1.5 Credits)

The course will provide an introduction to conceptual and practical aspects of macromolecular cryo-electron microscopy (cryo-EM). A combination of lectures and hands-on experiences will give students a working understanding of cryo-EM and its application for structural analysis of biological macromolecules.

STBB 7650—Research in Structural Biology & Biochemistry 1-10 variable Credit Hours

Research work in Structural Biology and Biochemistry pre-comps (except summer).

STBB 7660—Structure Seminar 1 Credit Hour

This seminar series provides a forum for the presentation of research in structural biology and biochemistry by external and internal faculty, postdoctoral fellows, and graduate students.

STBB 8990—Doctoral Thesis 1-10 variable Credit Hours

Doctoral thesis work in Structural Biology and Biochemistry post-comps.

BMSC 7811 – Responsible Conduct of Research (1 Credit)

The course is designed to inform students about the NIH requirements for ethical and responsible research. Other ethics courses are available if this does not

Elective Courses

An extensive list of electives is available in other departments/programs in the University of Colorado Graduate School (<https://catalog.ucdenver.edu/cu-anschutz/courses-a-z/>).

Some recommended elective courses include:

BMSC 7820 - Statistics and Data Analyses for the Biomedical Sciences (3 credits)

This is a semester-long basic introductory level course (taught in Fall Semester) in applied biostatistics designed for students pursuing graduate degrees in biomedical research. We cover topics such as basic probability; t-, chi-square, and non-parametric tests; linear, logistic and Cox regression models; statistical power and multiple testing; cluster analyses; study design and scientific rigor; and scientific writing of methods and results. The course uses the statistical software package R and code is provided for analyses and plot/figure generation. The course is designed to meet minimum requirements for a biostatistics/statistics course. Students with previous coursework in calculus and linear algebra should consider taking a more rigorous course in applied statistics (e.g., BIOS 6011).

BIOS 6606 - Statistics for the Basic Sciences (3 Credits)

This course is designed for those wishing to obtain a basic understanding of statistics and its application in biological research. Students will develop statistical literacy and an ability to perform basic statistical analyses, basic graphical statistics, data summarizations, and estimation and inference using statistical software. Restrictions: Enrollment in UCD-AMC graduate program or permission of the instructor.

BIOS 6611 - Biostatistical Methods I (3 Credits)

This first course in applied statistics covers basic descriptive methods and probability; parametric and nonparametric inference for the one- and two-sample location problem; ANOVA, ANCOVA, and multiple linear regression. Matrix notation, R, and SAS are used. Prerequisite: differential calculus or permission of instructor

BSBT 6063 - Speaking & Presenting for Scientists & Educators (1 Credit)

Science Communication in the form of speeches and presentations is essential to the research endeavor. The course will increase your effectiveness to deliver scientific, medical, or educational presentations in an audience-centered and impactful way; to respond to audience questions; and to facilitate audience engagement & discussion.

BSBT 6064 - Scientific Writing (1 Credit)

Taught by a biomedical researcher and a professional writing instructor, this 15-hour (3-week) course focuses on developing a framework for successful scientific writing practices, including how to effectively structure arguments, how to write grant proposals and more.

BSBT 6067 - Statistics for Biomedical Sciences (2 Credits)

Learn how and when to apply statistical procedures to answer scientific questions relevant to biomedicine, and how to critically assess statistical data for validity.

MOLB 7900: Practical Computational Biology for Biologists — Python (2 Credits)

A computational biology class aimed at biology PhD students. Topics covered include basic practices for coding in Python, analysis of standard high-throughput genomic data to study the regulation of gene expression, integration of multiple datasets for genomic analysis, and introduction to scientific computing in Python.

MOLB 7910: Practical Computational Biology for Biologists — R/R Studio (2 Credits)

A computational biology class aimed at biology PhD students. Topics covered include basic practices for coding in R, analysis of standard high-throughput genomic data to study the regulation of gene expression, introduction to modeling gene expression, data visualization, and how to communicate computational analysis/results.

STBB 7670—Independent Study in Structural Biology (1-3 Credits)

This course is listed for the benefit of the advanced student who desires to pursue one or more topics in Structural Biology & Biochemistry in considerable depth. Supervision by a full-time faculty member is necessary.

Chemistry 5640 Artificial Intelligence in Chemistry and Biochemistry (3 Credits - Downtown Campus)

Artificial Intelligence (AI) changes every aspect of our lives. In this course, we explore AI and its applications from the perspective of a chemist/biochemist. The role of AI and the latest trends in modern chemistry and biochemistry will be taught. Students will learn how to connect modern AI techniques to their own research projects, using both experimental and computational data.

Appendix 2: Template for Thesis Committee Meeting Progress Report

Written progress reports can be useful tools for structuring your committee meetings. It is recommended that you send your committee members a brief progress report ~1 week before your committee meeting. The goals of the progress report are to update your committee on your progress and accomplishments, identify any needs or concerns, and identify goals for the future. Below is a suggested format for your progress report.

Student Name:

Year started graduate school:

Year of comps:

Meeting date:

Last meeting date:

Committee members:

Thesis mentor:

Title of project:

Summary of progress since last meeting:

Thesis project:

Supporting projects/collaborations/pending publications:

Manuscripts:

Meetings, abstracts and form of presentation (poster/talk):

Fellowships/ Grants:

Other experience, accomplishments:

Potential timeline for the upcoming year and graduation:

Goals for the Upcoming Year

In the upcoming year, what:

Publications do you plan to submit?

Meetings, conferences, and workshops do you plan to attend?

Fellowships or other funding applications do you plan to submit?

Collaborations do you plan to establish?

Other professional training or activities do you plan to participate in (e.g. teaching, university service, courses, internships, etc.)?

Career goals and professional development

Approximately when do you hope to finish your doctoral training?

If you plan to finish within 12-18 months, estimate when you will begin a job or postdoctoral search.

What is your “Next Step” career goal?

What is your long-term career goal?

What further training is required before you feel it is appropriate to start a career search?

How can your PI help you achieve your goals for the upcoming year?

What additional support do you need from your committee?

Appendix 3: Example Individual Development Plans

IDP example 1: Adapted from Duke University:

Building an Individual Development Plan

Individual Development Plans (IDPs) provide a way for you to plan how you will develop professionally and prepare for the next steps in your career. An IDP should be flexible enough to suit your interests and personal working style, and it should be rigid enough to ensure that you make active progress toward your goals.

IDP Steps

Step 1 Consider the skills, experiences, and qualities that are valued in your academic program(s) and in careers of interest

Step 2 Assess which of these skills, experiences, and qualities you want to improve long-term and short-term, and brainstorm specific experiences you can seek out

Step 3 Prioritize experiences to seek out and create SMART goals to ensure you make progress

Step 4 Discuss your IDP with mentors and others to gather feedback

Step 5 Implement your IDP and revisit it every 3-6 months

Step 1: How do you want to develop professionally?

Answer the following questions with lots of specific details. You can also include learning more about something as a quality you want to develop. For example, you can add “explore careers in science communication” to your career list.

What skills are required to be a successful student? What qualities are most valued?

What careers are you considering after PhD? What additional skills and qualities are valued in these careers?

Careers	Additional Skills & Qualities

Step 2: Setting Priorities and Gaining Experience

From the lists from Step 1, choose which skills, experiences, and qualities you want to develop in the short-term (the next 3-6 months) and which you want to build in the long-term (the next 1-2 years). Then, brainstorm different ways for you to gain experience in these areas.

Short-term Priorities

Skill/Quality	Potential Experiences

Long-term Priorities

Skill/Quality	Potential Experiences

Networking

Who Would Be A Helpful Contact?	Potential Ways to Meet

Career Exploration

What Careers Do You Want to Learn More About?	Potential Ways to Learn More

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Self-Care

Activity, creativity, community, and spirituality

Ways You Care for Yourself	Potential Ways to Learn More

Step 3: SMART Goals

*SMART goals are **S**pecific, **M**easurable, **A**ccountable, **R**ealistic, and **T**ime-bound. Use the table below to outline your SMART goals to help you develop as a professional.*

Specific Goal	How Will Your Success Be Measured?	When Will You Complete This Goal By?	Who Will Hold You Accountable? How Will You Update Them on Your Progress?

Step 4: Mentors' and Others' Feedback

Gathering input from mentors and others can help you gain insight and set more effective goals. Mentors can include your advisor, faculty members at Duke and other institutions, fellow students, university staff, alumni and other professionals in careers of interest. Seek out a variety of formal and informal mentors who can provide insight on the skills and qualities you want to develop.

Who could you recruit as a mentor for your short-term and long-term goals? When could you meet with them to ask for feedback?

Potential Mentors	When/How to Ask for Feedback

Overview

<u>Contributors</u>	<u>Academic</u>
<u>Contributors</u>	<u>Leadership / Campus Involvement / Volunteer</u>
<u>Contributors</u>	<u>Career & Professional Development</u>
<u>Contributors</u>	<u>Self-Care</u>
<u>Contributors</u>	<u>IDP Goal 1</u>
<u>Contributors</u>	<u>IDP Goal 2</u>

Contributors: who provides you with advice, feedback, support, mentorship for these activities? Who are you engaging with?

Step 5: Implement and Revise

Start using your IDP. Be sure to set a reminder to revise your IDP every 3-6 months and seek additional feedback from mentors and others. You will likely need to revise and adapt some goals to better suit your needs along the way, which is perfectly fine and is to be expected.

IDP Example 2: Adapted from CU AMC Immunology Program

Individual Development Plan (IDP)

Annual Progress Report

What were your main goals for the past year?

Which goals did you meet? If you did not meet a goal, why not?

List all major accomplishments this year in career development (e.g. presentations, publications, teaching, committees, course work, etc.). Include mentoring of graduate or undergraduate students in the laboratory.

Describe your level of satisfaction with your career development in the past year using a scale of 1-5 with 1 being highly satisfied. Provide a rationale for your choice.

- 1 – Highly satisfied
- 2 – Somewhat satisfied
- 3 – Neither satisfied nor dissatisfied
- 4 – Somewhat dissatisfied
- 5 – Highly dissatisfied

Self-assessment Tool

Core Competencies	No basis to evaluate	Needs development	Appropriate to career stage	Strength
Scientific Knowledge				
Broad based knowledge of science				
Deep knowledge of specific research area				
Critical evaluation of scientific literature				
Research Skills				
Technical skills related to research area				
Experimental design				
Statistical analysis				
Interpretation of data				
Creativity/innovative thinking				
Navigating the peer review process				
Communication				
Basic writing and editing				
Writing scientific publications				
Writing grant proposals				
Writing for nonscientists				
Speaking clearly and effectively				
Formulating and asking sound questions				
Presenting research to scientists				
Presenting to nonscientists				
Teaching in a classroom setting				
Training and mentoring individuals				
Seeking advice from advisors and mentors				
Negotiating difficult conversations				
Professionalism				
Demonstrating workplace etiquette				
Complying with rules and regulations				
Upholding commitments and meeting deadlines				
Maintaining positive relationships with colleagues				
Contributing to discipline (e.g. professional society member)				
Contributing to institution (e.g. committee participation)				
Management and Leadership Skills				
Providing instruction and guidance				
Providing constructive feedback				
Dealing with conflict				
Planning and organizing projects				
Time management				
Managing research resources responsibly				
Leading and motivating others				
Creating vision and goals				
Serving as a role model				
Responsible Conduct of Research				
Careful recordkeeping practices				
Understanding of data ownership/sharing issues				
Demonstrating responsible authorship/publication practices				
Demonstrating responsible conduct in human/animal research				
Able to identify and address research misconduct				
Able to identify and manage conflict of interest				
Career Advancement				
Creating and maintaining a professional network				
Identifying career options				

Adapted from ScienceCareers MyIDP, which is based on the National Postdoctoral Association's Core Competencies for Postdoctoral Scholars

Tracking professional development and accomplishments (e.g. writing and maintaining a CV or résumé)					
Interviewing					

Appendix 4: Travel Awards

A. Werner and Kitty HIRS Research Awards for Ph.D. Student Travel to National Meetings

A major gift to the Graduate School at the Anschutz Medical Campus has allowed the establishment of an endowed award for graduate students in the basic biomedical sciences at the Anschutz Medical Campus. The C. Werner and Kitty Hirs Graduate Student Enrichment Fund Awards may be used for any one of the following three specific purposes:

1. Travel awards to supplement support for Ph.D. students to attend national meetings,
2. Travel awards to facilitate Ph.D. students learning new techniques either through a visit to an out-of-state laboratory or by signing up for a hands-on technique course, such as the MBL course, and
3. Merit scholarships to aid in recruiting the “best and the brightest” Ph.D. students into the basic sciences at the HSC.

The travel awards can be made for up to \$500 each.

Eligibility:

1. The student must have successfully passed his/her comprehensive exam.
2. The student must be enrolled in a basic biomedical sciences Ph.D. program.
3. The student must have an abstract (first author) submitted and accepted for presentation at the meeting.
4. The student must submit an estimated budget to attend the conference.
5. The student’s laboratory mentor must commit to providing any additional support necessary for the student to attend the meeting.
6. For attendance and presentation at a conference the award will be up to a maximum dollar amount of \$500

Application Materials:

1. Application form
2. Student’s CV
3. Abstract of the work to be presented at the meeting
4. A letter of acceptance from the organization holding the meeting.

Submittal Deadlines:

Applications must be submitted one month before the meeting. Applications should be submitted to the Director of Finance at the Graduate School Katie Wennerstrom Kathryn.wennerstrom@cuanschutz.edu.

B. SBBB Travel Awards

Travel awards are available through the STBB program once for each student during their tenure:

1. Travel awards to supplement support for Ph.D. students to attend national meetings,
2. Travel awards to facilitate Ph.D. students learning new techniques either through a visit to an out-of-state laboratory or by signing up for a hands-on technique course, such as the MBL course, and
3. Travel to an Internship

The travel awards can be made for up to \$500 each. The travel awards for visiting another laboratory or attending a techniques course or an internship are to be applied only to travel expenses (e.g., travel and lodging).

Eligibility:

1. The student must have an abstract (first author) submitted and accepted for presentation at the meeting.
2. The student's laboratory mentor must commit to providing any additional support necessary for the student to attend the meeting.

Application Materials:

1. Student's CV or biosketch
2. Abstract of the work to be presented at the meeting
3. A letter of acceptance from the organization holding the meeting.

Please submit these materials to the PA and PD for consideration. There is no deadline and can be submitted at any time.

Appendix : Suggestions for Effective Presentations

1. Avoid reading or memorizing your presentation "word-for-word". Wooden, canned deliveries are dull and very hard for audiences to follow.
2. Prepare and use simple, effective visual aids. Remember that effective communication of data and ideas is your goal! Do not spend undue effort and expense on fancy multicolored slides (especially for text), if color is not required to simplify complex data or concepts. Colored visuals tend to require a darkened room and are often much harder to read than black on white line drawings or letters. Keep text very brief and do not read directly from the screen (audiences are much faster at reading silently!).
3. Use the marker board when appropriate. Diagramming or outlining while you are talking is a highly effective means of explaining concepts difficult to describe with the spoken word. Use of the marker board can also help answer spontaneous questions from the audience.
4. Consider audience questions carefully! Both faculty and students are encouraged to ask questions during and after rotation seminars. A few of these questions may be intended to probe your understanding of your research rather than illuminate an area of confusion. Part of your evaluation will concern your effectiveness in responding to questions. Thus, make sure that you understand the question before answering. Repeat the question or ask for a rephrasing if you need to. Second, relax and take a moment of silence if you must before answering to formulate a coherent answer. Third, if after contemplation you don't know the answer, don't be afraid to say so. We all get stumped from time to time!