Computational Bioscience Program
SCHOOL OF MEDICINE

UNIVERSITY OF COLORADO **ANSCHUTZ MEDICAL CAMPUS**

2024-2025
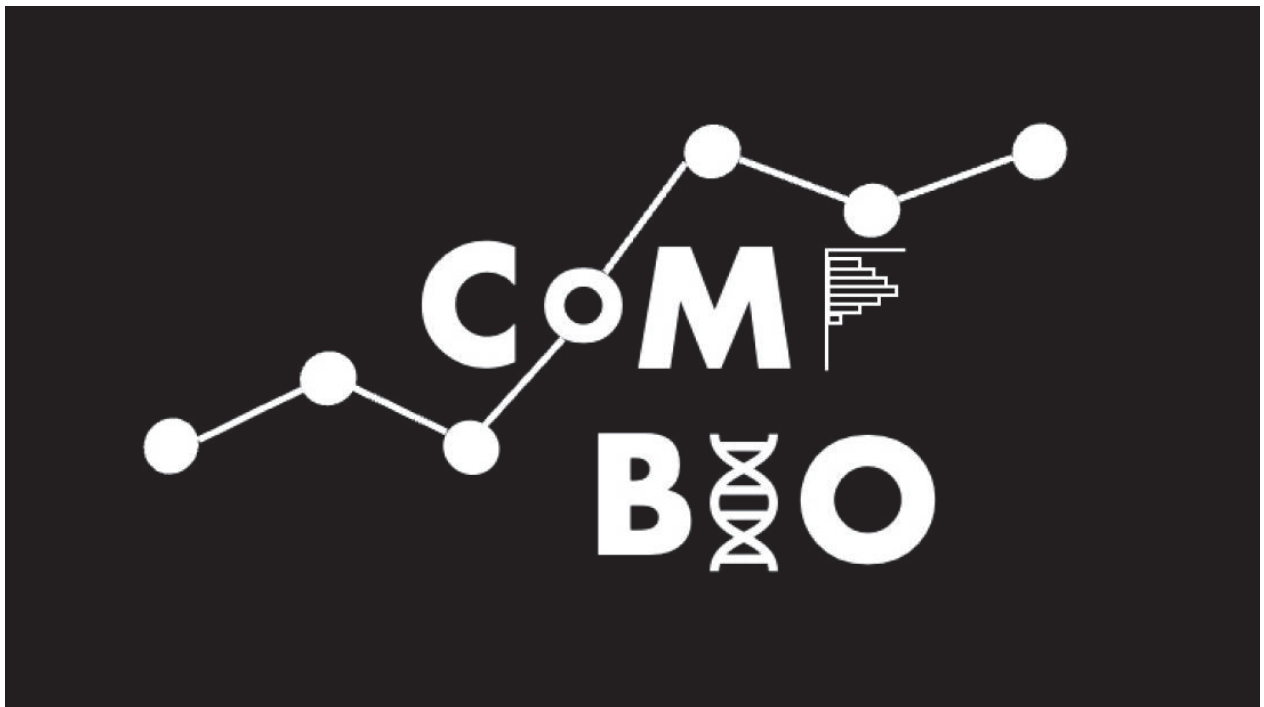# Student Handbook

Image created by Brook Santangelo

Computational Bioscience Program
https://www.cuanschutz.edu/graduate-programs/computational-bioscience/home

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General Information

Program Administrator
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Program Director
Katerina Kechris, Katerina.Kechris@cuanschutz.edu

The Graduate School

The Graduate School is the degree-granting institution on-campus for CPBS PhD students. As such, the Graduate School's Policies & Procedures Guide (https://graduateschool.cuanschutz.edu/forms-resources/resources) should be reviewed by CPBS students for full details about preliminary, comprehensive exams, thesis defense scheduling, and more.

Office of Research Education (ORE), School of Medicine

In July 2021, The Office of Research Education (ORE) took over the administration of the basic biomedical science PhD programs, including the Computational Bioscience PhD program. Previously, the Graduate School oversaw the administration of the basic biomedical science PhD programs. https://medschool.cuanschutz.edu/ore

Other Important Contacts

Student Services
Serves to support the students of CU Anschutz and navigate campus resources.
https://www.ucdenver.edu/anschutz/studentresources/student-assistance/Pages/default.aspx

Ombudsman's Office https://www1.ucdenver.edu/offices/ombudsoffice

Confidential, informal, neutral, and independent resource. This office can help with conflict management. Contact: (303) 724–2950 / Melissa.connel@cuanschutz.edu

Office of Disability, Access & Inclusion
Recognizes, welcomes, and celebrates disability as an integral part of a diverse health professions campus and workforce. To facilitate inclusion, we partner with students and programs to identify opportunities to create and promote meaningful access.
https://www.cuanschutz.edu/offices/office-of-disability-access-and-inclusion/students

Anschutz Health and Wellness Center

Students are eligible to join the Anschutz Health and Wellness Center. For more information, including pricing, see their website here: https://anschutzwellness.com/

Student Health Insurance

All students enrolled in one or more hours in a degree-seeking or financial aid-eligible certificate program are required to have health insurance. Therefore, all students taking one or more credit hours are automatically enrolled in and billed for the Student Health Insurance Plan. If you have comparable insurance, you may qualify to waive the Student Health Insurance Plan.

Please see the below website for up-to-date information about student health insurance plans, the waiver process and deadlines, and for contact information for any health insurance questions:

https://www.ucdenver.edu/life/services/student-health/insurance/Pages/default.aspx

Mental Health Resources

Start here with 'Find Help Now." https://help.cuanschutz.edu/

Student and Resident Mental Health (SRMH): Provides comprehensive and confidential mental health services for all students enrolled in the schools located at the Anschutz Medical Campus (Medical, Dental, Nursing, Pharmacy, Public Health, Physician Assistant, Physical Therapy, graduate school, etc.) as well as Graduate Medical Education residents and fellows (including Denver Health (DH) residents and fellows). Initial appointments are scheduled relatively quickly, often within the same week. Options for ongoing care include receiving treatment from the AMC Student and Resident Mental Health clinicians, the UCH Outpatient Psychiatry Clinic, group therapy, and a community network of providers, depending on insurance coverage.

Appointments can be made by calling the Student Mental Health Service at (303) 724-4716 or emailing smhservice@ucdenver.edu. Clinical service hours are 8 a.m. to 8 p.m. (Mon., Tues, & Wed.) and 8 a.m. to 5 p.m. (Thurs., Fri.) The Student and Resident Mental Health Service is located in the Fitzsimons Building, Level 2, east hallway."

For appointments, email: smhservice@ucdenver.edu
call: (303) 724-4716
Website: https://medschool.cuanschutz.edu/psychiatry/programs/student-resident-mental-health

CU AMC Mental Health Resources Guide for Students
Group Therapy
Available to all AMC students, residents and Fellows via SRMH.

Dialectic behavior therapy (DBT) Skills Group
This group introduces participants to a variety of skills, including mindfulness, distress tolerance, emotional regulation, and interpersonal effectiveness.
Meetings: The group meets once a week for 10 weeks on Thursday, 12-1pm.
Please email Danielle.Sukenik@cuanschutz.edu to register by setting up a phone consultation

Attention-deficit/hyperactivity disorder (ADHD) Skills Based Group
This group provides students and residents with strategies to minimize the impact of attention problems while they pursue their academic and career goals.
Meetings: Groups are held on Thursday 12-1pm, in person
E-mail Dr. Rosenthal at robert.rosenthal@cuanschutz.edu to schedule a screening for this group.

Therapy focused book club - The Narcissistic Family by Pressman & Pressman
The group will focus on families where the parental system was primarily involved in getting its own needs met (regardless of the reasons - job stress, alcoholism, drug abuse, mental illness, physical disability, lack of parenting skills, or personality disorders). The children in such narcissistic family systems try to earn love, attention and approval by satisfying their parents' needs, and tend to fail to recognize their own needs or create strategies for getting them met. Through reading and discussing the book we will focus on allowing the members to learn how to identify the impact of growing up in a family culture of narcissism and explore ways to recover from such an upbringing.
Led by Dr. Noa Heiman
Tuesdays 5-6:00pm, in person
Email Dr. Heiman at noa.heiman@cuanschutz.edu to register.

Last Updated 8.2024

Support Group for International Students or Children of Immigrants
This group is intended for international students or children of immigrants who find themselves in a clash of cultures. The group will offer a safe space to discuss themes of belonging, societal and familial expectations, and cultural conflicts. The group will provide support around understanding and bridging cultural disparities. The intent is for the group to provide a sense of camaraderie through shared and unique experiences of other group members.
Led by Dr. Noa Heiman
Tuesdays 5:15pm-6:15pm by zoom
Email Dr. Heiman at noa.heiman@cuanschutz.edu to register

List of Additional Resources:
Office of Student Affairs
Advocating for student needs – Resource connection – Care team management
(303) 724 – 2866 / StudentAffairs@cuanschutz.edu. / Refer a student:
https://www.cuanschutz.edu/student/support/care-team

Phoenix Center
Interpersonal Violence Support and Advocacy Resources
The Phoenix Center at Anschutz (PCA) is a resource for students, faculty, and staff who are affected by interpersonal violence (IPV) including relationship violence, sexual violence, and stalking. The Phoenix Center is proud to partner with The Blue Bench to provide free and confidential support and advocacy services. The Blue Bench is committed to offering support including navigating medical and legal logistics, counseling and case management options, and advocacy services.
(303) 724 – 7624 / Criag.Wimmer@cuanschutz.edu
TALK 24/7: (303) 322-7273

Central Office of Diversity, Equity, Inclusion and Community Engagement
Committed to transforming and advancing policies, programs and practices that address social injustices and health disparities alongside the communities we serve.
https://www.cuanschutz.edu/offices/diversity-equity-inclusion-community

Office of Student Health Promotion
https://www.cuanschutz.edu/student/health-wellness/health-promotion
Email Health.Promotion@cuanschutz.edu to get involved and submit ideas!

UC Health Integrated Transgender Program
Provides medical, surgical, and mental health support to transgendered individuals. Anschutz Outpatient Pavilion, 1635 Aurora Court, 6th Floor Aurora, CO 80045 720.848.2650 UCHITP@uchealth.org

Colorado Crisis Services
1-844-493-8255
Text "TALK" to 38255
http://coloradocrisisservices.org/

National Suicide Prevention Hotline
1-800-273-TALK (8255) https://suicidepreventionlifeline.org/chat

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Keeping In Touch

Email

You will be issued a campus email address, which you should check frequently and respond within 2 business days. If you are on vacation or sick leave, please use an out of office automatic response so colleagues know that you will respond at a later time.

The new password and your username provide access to:

- campus e-mail
- the student portal, http://www.ucdenver.edu/UCDAccess
- computers in the library, labs, etc.
- student printing & other UNIVERSITY domain resources.

Program Website

https://www.cuanschutz.edu/graduate-programs/computational-bioscience

Other Things You Should Know…

Weekly Events
Students are required to attend Wednesday Seminars and monthly Journal Club meetings. Seminars are held on Wednesday from 1:00pm-2:00pm Mountain Time. A list of events can be found on our website on the Events tab.

Virtual Private Network (VPN)
All CPBS students should establish access to the University's VPN and use the VPN when off-campus. Visit OIT's website to find more information about establishing access to the VPN here: https://www.ucdenver.edu/offices/office-of-information-technology/software/how-do-i-use/vpn-and-remote-access

Graduate School Vacation & Leave Policy
Please see the Graduate School's website for the policy on student vacation, sick leave, parental leave, unpaid leave etc.: https://graduateschool.cuanschutz.edu/forms-resources/resources

Advising

General academic questions can be directed to the Program Administrator. Be sure to meet with them before completion of program milestones (preliminary exam, comprehensive exam, etc.) to ensure you are adhering to the graduate school rules. Once students have passed their comprehensive exam, they are admitted to candidacy for their Ph.D. At this point, students are required to meet with their full thesis committee at least once per year, though twice per year meetings are advisable.

We encourage all students to develop a diverse mentoring team. Mentors include at least your primary faculty advisor but can be much richer. Look to develop relationships with other faculty both inside and outside of the program. Mentors can also include more senior graduate students, postdocs, staff and people from outside the institution. Mentors can provide support and advice about more than just research; consider finding mentors regarding career development, specialized skills (e.g., entrepreneurship), or just someone whose judgment you value in planning your graduate education. There are no rules about how a mentoring relationship is structured, but regularly scheduled meetings (whether one a week, once a semester, etc.) are generally beneficial.

Priorities in the first few weeks

Orientation

All new students must attend the Orientation run by the ORE Associate Dean Dr. Angie Ribera.

Payroll

It is important to establish a checking account as soon as possible. The University issues all paychecks, including student fellowship and stipends, as direct deposits. Students should be sure to have avoided check available when filling out payroll forms. Each student is required to produce a driver's license (or state ID) and a social security card for payroll purposes.

Taxes

You should contact a tax professional if you have questions about filing taxes. Appointees to the training grant should be aware that taxes are not withheld, so you should plan accordingly if you are a training grant appointee.

Establishing Residency

(The following pertains only to out-of-state students; International students are exempt from this)

Refer to the Registrar's website (link below) for the most complete and up-to-date information.

New non-resident students must immediately obtain documentation to support the Petition for State Residency. First-year students must make collecting this documentation a priority. Funding will be available, assuming satisfactory academic progress, only if the student qualifies as an in-state resident after the first year of study. To be awarded in-state tuition status at the beginning of your second year you must establish that you have resided in the state for a year and established several kinds of connections to the state. It is important that these "connections" be established as soon as you arrive in the state to show the one-year history required by the University. Some things that can support these connections are a signed lease, rent receipts, utility bills in your name, a Colorado driver's license and license plates, and voter registration.

Prior to the start of your second academic year, you must establish Colorado residency.

For complete directions on establishing Colorado in-state residency for tuition purposes please consult the Registrar's website at: https://www.cuanschutz.edu/registrar

Parking

Please see campus Facilities' parking webpage for details about obtaining a parking pass if you wish to purchase campus parking: https://www.cuanschutz.edu/offices/facilities-management/transportation-parking-maps/parking

Register for Classes & Maintain Personal Information

The UCDAccess online Student Self-Service Portal allows you to apply for financial aid, search for your classes on various criteria, view real-time numbers of seats available, enroll and pay for your classes, order transcripts, and more. To log into the UCDAccess portal you will need your official University username and password. http://www.ucdenver.edu/UCDAccess

Consult with your Program Administrator regarding your schedule of courses. The UCD Access log-in is also where you will be able to view your pay advice/check, update your address and emergency contact information, print your W-2, open the expense system and request travel reimbursement, view the holiday schedule and access a host of other vital announcements and resources.

Student Financial Support

As a Ph.D. student in the Computational Bioscience Program, you are provided full tuition, health and dental insurance, and a stipend of $38,110 for living expenses (for the academic year 2024-2025). All future funding is dependent on satisfactory academic progress in the program (**see research rotations**) and selection of thesis advisor and at the end of the first year. Once accepted into a thesis laboratory, your tuition, stipend, and benefits will be funded by your advisor. It is very important that you successfully complete the required research rotations during the first year, to maintain funding. Students who perform exceptionally well in the first year may be awarded funding from our National Institutes of Health,

NLM training grant. In addition to providing tuition, health and dental insurance, and a stipend, the training grant may cover the cost of travel to conferences and computer equipment for your research. The stipend is paid monthly via direct deposit, on the last working day of each month. As noted above appointees to the training grant should be aware that taxes are not withheld, so you should plan accordingly if you are a training grant appointee.

Each student is responsible for books, housing, and any other expenses not specifically mentioned above. The Program Administrator will obtain a copy of the students' bills following registration for the current semester. The Program Administrator will ensure that all appropriate charges on the student bills are paid. It is only necessary to deliver a copy of your bill to the Program Administrator if there is a problem or question. Each student is personally responsible for late fees and fines, so it is critical that all necessary registrations are completed on time.

Student expenses, including the stipend, will be paid until graduation as long as the following conditions are met:

1. Student maintains satisfactory academic progress (see above)
2. Students become eligible for in-state tuition after the first-year.
   a. Students who fail to qualify for in-state residency will be responsible for the difference between in-state and out-of-state tuition; only international students are exempted from this.
2. Students pass the Preliminary Examination at the end of the first year.
3. Students complete the Comprehensive Examination by the end of the third academic year.
4. Students schedules their Dissertation Defense within approximately five years of entering the Program.

Travel instructions
1. First you must obtain approval from your advisor (or the Program Director for first-year students) for any travel.

2. You can add the Program Administrator as a delegate for both your financial and travel in Concur

3. After your travel is approved by the Program Director and/or your faculty mentor, notify the Program Administrator of your detailed travel plans. Please specify name of conference or school you are visiting, purpose, dates of travel, destination, & the SpeedType (ST) to be used to pay for the travel expenses.

   - Booking flights and making hotel reservations is done in Concur via the CU Expense System. See directions below.

   - Making hotel reservations is your responsibility. You will book and pay for your hotel, then be reimbursed after the travel is complete. You must present a detailed receipt to be reimbursed. Or, if you cannot "front" the hotel expenses and wait for reimbursement, you should be able to book your hotel via Concur and the hotel should refrain from charging your card until your check-out, but you will need to monitor your credit card statements and contact the hotel directly if they accidentally charge you prior to your trip.

   - Upon completion of your trip, you may be reimbursed for additional costs, such as ground transportation and baggage. It is very important that you obtain an ITEMIZED receipt, as well as a receipt showing payment, for any expenses you wish to claim. If you would like help submitting your Reimbursement Report, please turn in all itemized receipts to the Program Administrator promptly. More information on travel is available at https://www.cu.edu/psc/payables/travel.htm

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Computational Bioscience Educational Mission Statement

The Computational Bioscience Program of the University of Colorado School of Medicine is dedicated to training computational biologists who aspire to achieve excellence in research, education and service, and who will apply the skills they learn toward improving human health and deepening our understanding of the living world.

The Computational Bioscience Program provides graduates with the foundation for a lifetime of continual learning. Our curriculum integrates training in computation and biomedical sciences with student research and teaching activities that grow increasingly independent through the course of the program. Our graduates are able to do independent computational research, collaborate effectively with other scientists, and to communicate their knowledge clearly to both students and the broader scientific community.

The Computational Bioscience Program is committed to continually reviewing and improving its curriculum as the science and practice of biomedical informatics evolves. The following four goals represent the foundation of the computational bioscience graduate education program at the University of Colorado.

Educational Goals and Objectives

Knowledge Goals

Graduates demonstrate their knowledge of core concepts and principles of computational bioscience, and the ability to apply computation to gain insight into significant biomedical problems. This knowledge includes mastery of the fundamentals of biomedicine, statistics and computer science, as well as proficiency in the integration of these fields. Graduates contribute to the discovery and dissemination of new knowledge.

Knowledge Objectives

1. Demonstrate knowledge of the scientific principles that underlie the current understanding of molecular biology, statistics and computer science.
2. Demonstrate an ability to productively integrate knowledge from disparate fields to solve problems in biomedicine using computational methods.
3. Demonstrate knowledge of the types and sources of data most commonly used in computational bioscience, including knowledge of all major public data repositories.
4. Demonstrate the knowledge of the classes of algorithms most often applied in computational bioscience, and their domains of applicability.
5. Demonstrate an understanding of the principles and practice of the scientific method as applied in computational bioscience, including experimental design, hypothesis testing, and evaluation of computational systems.

Communication Skills Goals

Graduates demonstrate interpersonal, oral and written skills that enable them to interact productively with scientists from both biomedical and computational domains, to clearly communicate the results of their work in appropriate formats, and to teach others computational bioscience skills. Graduates are able to bridge the gap between biomedical and computational cultures.

Communication Skills Objectives

1. Communicate effectively, both orally and in writing, in an appropriate range of scientific formats, including formal presentations, collaborative interactions, and the critique of others' work.
2. Demonstrate familiarity with both biomedical and computational modes of expression and be able to communicate clearly across disciplinary boundaries.
3. Demonstrate commitment and skill in teaching and learning from students, colleagues, and other members of the scientific community.

Professional Behavior Goals

Graduates demonstrate the highest standards of professional integrity and exemplary behavior, as reflected by a commitment to the ethical conduct of research, continuous professional development, and thoughtfulness regarding the broader implications of their work.

Professional Behavior Objectives

1. Act in an ethically responsible manner, displaying integrity, honesty, and appropriate conduct at all times.
2. Recognize the limits of one's knowledge, skills, and behavior through self-reflection and seek to overcome those limits.
3. Always consider the broad significance of one's professional actions, including their implications for society and the living world.

Self-Directed and Life Long Learning Skills

Graduates demonstrate habits and skills for self-directed and life-long learning and recognize that computational bioscience is a rapidly evolving discipline. Our focus is on the development of adaptive, flexible and curious scientists who comfortably assimilate new ideas and technologies during the course of their professional development.

Self-Directed and Life Long Learning Skills Objectives

1. Recognize the need to engage in lifelong learning to stay abreast of new technologies and scientific advances in multiple disciplines.
2. Locate, evaluate and assimilate relevant new knowledge and techniques from a wide variety of sources.

Degree Requirements and Coursework

Required Courses

The "required" credit hours in the Computational Bioscience Program includes a minimum of 30 semester credit hours of didactic courses and 30 semester hours of doctoral thesis research. The required Computational Bioscience courses in the program are described below. Relevant course work must be distributed equally among Human Biology, Math/Statistics and Computer Science. In order to meet the requisite credit hour requirements, the student must successfully pass (B or better) selected courses that fulfill the above conditions.

Transfer Courses

Pending approval from the Program Director, students may transfer up to 20 semester hours from prior work. Transfer course work must be relevant graduate-level course work that has been taken at AMC, other CU campuses, or other universities within the United States. Once approval to transfer credits has been obtained by the student from the Program Director, the student must notify the Program Administrator to complete the necessary paperwork to finalize the transfer of credits.

Biomedical Sciences "Core" Courses

This is a set of interdisciplinary courses required for first year graduate students enrolled in basic science Ph.D. programs at UCD|AMC. The objective of the courses is to provide the basic science information and introduction to the skills required for a successful research career in all disciplines of modern biomedical sciences. Topics cover the fundamentals of biochemistry, molecular biology, cell biology, developmental biology, molecular genetics, and biomolecular structure. Specialty topics required by individual programs are taken usually during the spring semester of the first year, and in some cases in the second year to round out the curriculum.

Biomedical Sciences Core Course	Course Information	Credits
Foundations in Biomedical Sciences BMSC 7806	Foundations in Biomedical Sciences	6
CPBS 7601 Core Topics A in Biomedical Sciences BMSC 7810 (then appropriate section)	Held for 3 weeks after BMSC 7806	2
CPBS 7602 Core Topics B in Biomedical Sciences BMSC 7810 (then appropriate section)	Held for 3 weeks after BMSC Core Topics A courses	2

Computational Bioscience Required Coursework:

Core I: Foundations in Biomedical Sciences

Credits: 6 semester hours

Status: Required

The course will focus on the fundamental principles of biomedical sciences. Lectures and recitations/discussions will primarily address the basics of molecular biology, biochemistry, genetics, cell biology and energetic principles. Course is typically limited to biomedical science PhD and BSBT MS students. Previously offered as IDPT 7806

CPBS 7601 Core Topics A: Computing Skills in the Biomedical Sciences (fall, 1st year)

Credits: 2 semester hours

Prerequisite: Undergraduate (or work) computing experience

Status: Required

To introduce the skills needed to perform reproducible and high-quality computational research. Topics include version control with Git, integrated development environments, software development fundamentals, Data management and Tidyverse, high performance computing and parallel computing,

workflows and orchestration, and code documentation and readability.

CPBS 7602 Core Topics B: Introduction to Big Data in the Biomedical Sciences (fall, 1st year)
Credits: 2 semester hours
Prerequisite: Undergraduate (or work) computing experience
Status: Required

To introduce standard methods in the analysis of high-dimensional biomedical data including supervised and unsupervised learning, dimension reduction, classification, clustering, and big data visualization. This course will prepare students to participate in rotations and take more advanced classes in these areas as electives.

CPBS 7712 Research Methods in Biomedical Informatics (spring, 1st Year)
Credits: 4 semester hours Prerequisite: Core Topics A & B (see above)
Status: Required

This course focuses on the application of algorithms to the analysis of different types of big data and provides training in how to plan, develop, execute, and report on research in computational biology. Topics include: 1) Bioinformatics, 2) Computational Neuroscience 3) Imaging Informatics and 4) Clinical Informatics. Students will also plan, execute, and write a research proposal, learn to critically read the literature through journal clubs and professional development skills. This course is a stage in the transition from well-educated students to independent researchers. This is a team-taught course. You will get a chance to meet and interact with some of the CPBS core faculty.

CPBS 7605 Ethics in Bioinformatics
(Taken Fall of 1st or 2nd Year as indicated by Program Administrator)
Credits: 1 semester hour
Status: Required

Discussion of professional conduct, social implications of research, and questions raised by biomedical research with an emphasis on topics relevant to computational biologists. Active student participation is required.

BMSC 7820 Statistics and Data Analyses for the Biomedical Sciences*
Credits: 3 semester hours
Prerequisite: In ORE graduate program, usually taken after 1st year
Status: Required

This is an introductory course designed for students seeking a basic understanding of statistical concepts and applications. Students will develop statistical literacy and will be taught how to perform basic data analyses, including data summarization, graphical skills, and simple statistical methods for estimation and hypothesis testing. Students will learn how to read and evaluate statistical writing and how to write basic statistical methods.

Prerequisites: Prospective students must be enrolled in an ORE graduate program or have explicit permission from the instructor

***NOTE:** Students may take an alternative statistics course if their background would benefit from a more upper- level statistics course. Acceptable substitutes are BIOS 6611, 6618 or BIOS 6631; The Program Director can advise you on what to take if you are not sure what would be best for you. If you are considering any other statistics course in lieu of one of these courses, please contact the program director for approval.

CPBS 7650 Research Rotations (3 Required)

Credits: 1 semester hour
Prerequisite: permission of instructor
Status: Required

This requirement is designed to give the student a better understanding of other sciences, promote collaboration between departments, and communicate effectively with biologists and scientists. The student must pick from Core Program Faculty (updated list is on the website) and ask permission to join their lab plus decide on a project, complete, and submit the pre-rotation laboratory agreement, and deliver a short seminar at the time of completion. Research rotations are considered a tool for selecting a dissertation subject.

*Students will continue to enroll in CPBS 7650 after they complete their research rotations, until they have accumulated 30 didactic credits that count towards their eligibility to schedule their Comprehensive Exam. Once they have 30 didactic hours of coursework, students will stop enrolling in CPBS 7650 and instead enroll in CPBS 8990 for their research hours.

CPBS 8990 Doctoral Thesis
Credits: 30 semester hours
Prerequisite: Successful completion of required Computational Bioscience courses.
Status: Required

Electives

Students are required to take a minimum of 30 semester hours of coursework before admission to candidacy. After these required courses and rotations, that leaves a minimum of nine remaining course credits (usually three courses) for electives during the second (or third) year. There are a wide variety of informatics and bioscience courses and programs at the University of Colorado campuses and our
students have been very creative at taking advantage of them to pursue specific biomedical and informatics interests.

Other Campuses

*Students who would like to take courses offered at another CU Campus, most commonly CU Boulder or CU Denver, must take the following steps, in this order:
> 1) Email the course instructor to ask for approval to enroll as a student on a different campus
> 2) Complete the Intercampus Enrollment Form, found on the CU Anschutz Registrar's Website.
> Email your completed Intercampus Enrollment Form to the PA, along with a copy of the email from the course instructor showing their approval for you to enroll in the course.

We have organized electives into tracks. Students are required to take 1 computational topic elective (typically 3 credits) and 2 domain electives (typically 3 credits each)

COMPUTATIONAL TOPIC ELECTIVE:
The purpose of this elective is to delve deeper into computational areas related to the student's research (e.g., machine learning, causal inference, network analysis) to learn the theory and implement advanced computational approaches. Example of courses are listed below and are offered at the Anschutz campus, Downtown Denver Campus (DDC) and CU Boulder (CUB):
- Machine Learning & Deep Learning: BIOE 5020/5021, BIOS 7747, BIOS 7748, DDC CSCI 5930 & 5931, CUB CSCI 5622 & 6622
- Longitudinal Data – BIOS 6629
- Causal Analysis – BIOS 6641
- Data Visualization – BIOS 7719
- NLP - CSCI 5832 (CUB)
- Multi-agent systems – CSCI 5423, 7000 (CUB)
- Machine Intelligence – CSCI 5822 (CUB)
- Network Analysis – CSCI 5352 (CUB)

This is not a comprehensive list and students can enroll in other suitable courses per the Program Director and Advisor's approval

DOMAIN ELECTIVES:
The purpose of the domain electives is specialized exploration of a domain area relevant to the student's

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research direction. They can be selected from 4 possible tracks 1) Bioinformatics 2) Computational Neuroscience 3) Imaging Informatics and 4) Clinical Informatics. Below are examples from each track.

1) Bioinformatics
Selected HMGP courses
Selected MOLB courses
BIOS 6655 Statistical Methods for Genetic Association Studies
BIOS 7659 Statistical Methods in Genomics

2) Computational Neuroscience
Selected NRSC course (e.g., NRSC 7501, 7612, 7657)
ELEC 5375: Eng. Neuro,
BIOE 5053: Optics and Microscopy;
Selected CUB courses (APPM 5370 Comp Neuro, ECEN 5811: Neural Signals, ECEN 5831: Brains, Minds and Computers)

3) Biomedical Imaging Informatics
BIOS 7718 Intro. Biomed Image
ELEC 5541 DL for Comp. Vision
CSCI 5722 Computer Vision (CUB)

4) Clinical Informatics
BIOS 6310: Practical Clinical Research Informatics
Selected NURS courses (6284, 6285, 6279, 6293)
Selected CLSC courses (6060, 6080, 6800, 6820
Selected CSCI courses (CUB) Human Comp. Interaction

This is not a comprehensive list and students can enroll in other suitable courses per the Program Director and Advisor's approval. Also, if a student is participating in research across or outside these domain areas, the student can create a custom elective track per the Program Director and Advisor's approval.

Academic Planning

1st Year Curriculum & Milestones				
Fall	**Course**	**Title**	**Credits**	**Total**
	BMSC 7806	BMSC 7806 Foundations in Biomedical Sciences	6	
	CPBS 7601	CPBS 7601 Core Topics A: Computing Skills in the Biomedical Sciences	2	
	CPBS 7602	CPBS 7602 Core Topics B: Introduction to Big Data in the Biomedical Sciences	2	
	CPBS 7650 -001	Research Rotation #1 (required ~Sep.-Dec)	1	
				11
Spring	**Course**	**Title**	**Credits**	**Total**
	CPBS 7712	Research Methods in Biomedical Informatics	4	
	CPBS 7650 section 0V3	Research Rotation #2 (required ~Jan.-March)	1	
	CPBS 7650 section 0V3	Research Rotation #3 (required ~March-May)	1	
				6
Preliminary Examination (June) Choose mentor (by mid-June)				
Summer	**Course**	**Title**	**Credits**	**Total**
	CPBS 8990/ CPBS 7650	Doctoral Thesis or Research Rotation #4 (if needed)	1	1
2nd Year Curriculum & Milestones: Enroll in at least 5 credit hours in fall & in spring				
Fall	**Course**	**Title**	**Credits**	**Total**
	BMSC 7820	Statistics and Data Analyses for the Biomedical Sciences	3	
	Dept Varies	Elective Course**	1-6	
	CPBS 7650 Section 001	Research	varies	
	CPBS 7605	Ethics (offered every other year)	1	
				5 min.
Spring	**Course**	**Title**	**Credits**	**Total**
	Dept Varies	Elective Course(s)**	1-9	
	CPBS 7650 Section 001	Research	varies	
				5 min.
Summer	**Course**	**Title**		
	CPBS 8990	Doctoral Thesis	1	1
Comprehensive Exam/Thesis Proposal				
Years 3-5 Curriculum & Milestones				
	CPBS 8990	Doctoral Thesis* (or additional elective credits)	5 credits/semester in fall & spring; 1 credit in summer	
Dissertation Committee meeting and Dissertation update talk –minimum of 1 per year; ideally 2 meetings per year each at ~ 6 month intervals				

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Dissertation Defense (You must complete 30 credits of CPBS 8990 before or in the semester you defend)

Total Credits = 60 (30 from coursework and 30 doctoral thesis)

*Do not take more than 10 credits of CPBS 8990 before taking the Comprehensive Exam.
**Number of elective credits needed depends upon educational background (Comp Sci, Bio, Math, etc) and number of credits transferred into the CPBS program from other graduate programs.

Tutoring

Tutoring is available on an individual basis. The Program Administrator and your faculty mentor should be contacted immediately if you need assistance with any course work, or communication skills.

Summary of Credit Requirements for Comprehensive Exam and Graduation

You need at least 30 <u>Didactic</u> credits to take the comprehensive exam.

Here is what counts (must be taken for a grade; and receive B or above) for Didactic credits:
- Core (6 credits)
- Core Topics A and B (4 credits)
- CPBS 7712 (4 credits)
- Rotations (CPBS 7650 – 1 credit per rotation; typically, 3 credits)
- Biostatistics requirement (3 credits)
- Ethics requirement (1 credit)
- Approved electives (5000 or above; typically, 9 credits)
- CPBS 7650 research credits taken until comps (variable credits)

Notes:
- You don't have to take all of the elective courses above, but they are approved for the 30 Didactic credits.
- For the semester you are taking Comps, you can be enrolled in some of these credits to get to the 30 Didactic credits.

What does not count for the 30 Didactic Credits for Comps
- CPBS 8990 dissertation credits
- Any class taken Pass/Fail
- Undergraduate class (below 5000)
- Grade of B- or below

In the transition between Comps and Post-Comps
- You need to start taking CPBS 8990 if you have finished your 30 Didactic Credits.
- Depending on the timing that would be Fall or Spring of the 3rd year.

To graduate
- You must have passed the Comps exam (see requirements above).
- You must meet CPBS program elective requirements (see below).
- You need at least 30 Credits of CPBS 8990.

Regarding Electives
- These are required by the program (3 courses, ~8-9 credits).
  - Less than 9 credits must be approved by the program director (e.g., one of the electives is a 2-credit course).
- They are typically taken in Year 2 or 3 of the program.
- They don't have to be part of the 30 Didactic credits to take Comps, but it is efficient that way and can be useful to prepare for Comps.

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- More than 9 elective credits may be taken (e.g., if there is a course that is useful for the student's research or career path). These credits do not count towards the 30 dissertation credits and if they are beyond 30 didactic credits, students need to get approval from the mentor (and T15 or other fellowship Director if student is on fellowship).

Minimum credits per semester
- Fall/Spring - Minimum of 5 credits for full-time enrollment
- Summer – Different than Fall/Spring, only 1 credit of CPBS 8990 is the requirement (pre or post-comps) and that 1 credit of 8990 confers full-time enrollment status
- International students should check with ISSS in case there are additional requirements

Research Rotations

In addition to didactic training, research rotations constitute an important component of the first-year of the program, providing students with intensive introductions to experimental design and quantitative data analysis, as well as introducing them to available research opportunities. Each student will conduct rotations in the laboratory of a Core CPBS training faculty member (see website for latest list), prior to choosing a primary thesis advisor (at the end of the first year). Students should approach research rotations with the primary goal of identifying their future thesis advisor. All students are required to complete at least two rotations. Under exceptional circumstances, this can be supplemented with a third rotation in the summer after prelims with the approval of the program director.

Because of the interdisciplinary nature of the CPBS Program and the students who enter the program, the laboratory rotations aim to provide students with the opportunity to broaden their scientific experience in Computational Bioscience and ultimately choose a laboratory for their thesis research. Students should complete and submit a pre-rotation laboratory agreement (available at the end of this handbook) at least one month prior to the start of the rotation (and send a copy to the program administrator) and deliver a post-rotation talk at the end of the rotation.

How to select a lab for rotation

After reviewing the work being conducted in the lab of your interest, make an appointment to speak with the PI and have an idea ready for the type of work you are interested in. It is the student's responsibility to take the initiative to contact a rotation advisor and arrive at an agreement with the advisor in a timely manner.

What happens during rotations?

Students are expected to devote non-classroom time to the rotation. This works out to approximately 25 hours per week for 10 weeks. You will be given space and are expected to join in discussions with the lab group. Your project should be discussed with the PI or a senior member of the lab at the beginning of the rotation. When formulating your project, you should focus on identifying a specific hypothesis or claim, explaining why the hypothesis is interesting to test, defining what method could be used to test it and defining the appropriate way to report results to be meaningful for your chosen research area. Although a fully completed project is desirable, the short rotation period may not allow this in which case you should end your rotation with an analysis of what has been learned to this point, and what steps would be necessary for this to be a fully completed project. The most important aspect of the rotation is familiarizing yourself with the work of the lab, participating in meetings, discussions, and seminars, and reporting on the project to the extent that it was completed.

2024-25 Rotation Schedule
September 9 – November 22 (10 weeks @25+ hr/wk)
January 2 – March 7 (10 weeks @ 25+hr/wk)
March 10 – May 23 (10 weeks @ 25+hr/wk)

Post-rotation talk

Post-rotation talks are scheduled at the end of each rotation project period and are similar to 'lightning talks' at a conference or symposium. You should prepare a 6-10 slide presentation and include title, introduction, hypothesis, results, methods, conclusions, and acknowledgements. You should be prepared to speak for 10-15 minutes, including time for audience questions. Your talk should focus on a specific hypothesis or claim, and explain why the hypothesis is interesting to test, what method you chose to test it, what the outcome of the test was, and why the outcome is meaningful and significant for your chosen research area. If you have worked on the same project outside the rotation period, you must clearly distinguish what you did during the rotation period from your other work. You should review the content of your presentation with your rotation advisor prior to giving the talk. Ideally, you will have been discussing your rotation with your advisor weekly, thus the contents of your talk will not be a surprise to anyone. Rotations are graded by the faculty at large, rather than by your rotation advisor, so your talk reflects on your advisor as much as it does on you.

Preliminary Examination

The preliminary examination is a broad-based written and computing examination given at the end of each student's first year. It covers the didactic material presented during Core Topics A, B and CPBS 7712, and incorporates a week-long programming problem. The exact format of the examination, time and number of questions, may change on an annual basis but typically, the layout is as follows:

Day One: Short Answer Essays—several questions are presented, and you must answer a certain number of them. These responses from you are due at the end of the day.

Day Two: Long Answer Essay—you are given one question that you must answer fully. This response from you is due at the end of the day.

Day Three: Programming—a programming question is given, and you will have approx. 1 week to develop your program and submit. Be sure to include information for the grader on how to run the program.

A passing grade is required for continuation in the program. In the case of a failing grade, it is entirely at the discretion of the preliminary exam committee whether to permit re-examination on all or part of the requirement, or to terminate the student's matriculation. Assuming successful completion of the preliminary examination requirement, a student may immediately begin work in a dissertation laboratory.

The statement below clarifies the Graduate School policy on students who do not pass the preliminary exam. Passing the exam requires that a student earn a passing grade on all parts of the exam if the exam is separated into multiple days; failure on either part results in failure of the entire exam. From the Graduate School Policy and Procedures Guide:

"Each Program is responsible for ensuring that students are qualified for doctoral studies by passing a comprehensive examination or a combined preliminary and comprehensive examination. If a program evaluates students' preparedness with a separate preliminary examination, it must be administered equitably to all students, with the limited exception of programs that require a student to have a master's degree before entering doctoral training; a master's degree may exempt the student from the preliminary examination but cannot exempt the student from the comprehensive examination."

In addition to the program having the discretion to allow a student to retake the preliminary examination, the program has full responsibility for designing the compensatory examination and for determining what constitutes a passing grade.

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Selecting A Thesis Advisor

The selection of a thesis advisor is one of the most important decisions a student will make during the course of their graduate career. Each student must select a thesis advisor from among the Core CPBS Training Faculty. The first year of the training program is designed to provide each student with an opportunity to interact with the faculty so that they feel familiar with the faculty members and their respective research interests. The student should know which faculty member whose lab they wish to join on or about the date of the Preliminary Examination; however, a thesis advisor may be selected at an earlier point during rotations. In the unlikely event that a student is unable to select a thesis advisor prior to July 1 following their first year in the program, the student must contact the Program Director as soon as possible to discuss funding for an additional rotation over the summer. If a student still does not have any thesis lab option at the completion of a third rotation, the Program reserves the right to dismiss the student from the program.

Comprehensive Exam & Thesis Defense Exam

Comprehensive Exam

The University-based Comprehensive Examination is an orally defended Doctoral thesis proposal typically taken by the end of the student's third year in the program. It is based on the student's doctoral thesis proposal but can include other areas of study as well. This exam typically takes the format of presenting the problem, defending its innovation, and demonstrating a workable knowledge of the field of study to assure that independent work is eminent.

The student's Comprehensive Exam committee judges the quality of the examination and makes recommendations for further academic advancement.

It is necessary that students complete all coursework or finish all coursework in the same semester as the exam, pass their preliminary examination, and have a doctoral thesis topic before they can schedule their Comprehensive Examination. After successfully completing this examination and meeting all other Graduate School requirements, students are recognized as formal Ph.D. candidates who can proceed with their independent research work that will ultimately culminate in their Ph.D. dissertation.

You must be registered for coursework during the semester in which the examination is taken.

The Comprehensive Exam contains three major components:

1. The written Doctoral thesis proposal
2. The Doctoral thesis proposal presentation
3. The oral examination and defense of the Doctoral thesis proposal

After completing or registering for all program-required non-doctoral thesis coursework, and concurrently with applying for admission to candidacy for the Ph.D., you must take a comprehensive examination in your field of concentration and related fields. This examination (written and oral) will test your mastery of a broad field of knowledge, not merely the formal coursework which you have completed. Students should plan to take this exam by the end of their third year of study. **If you would like to take the exam after the end of your third year, you must get approval from the Program Director, and communicate to the Program Administrator that an extension has been granted.** Under extenuating circumstances, and with the recommendation of the Program Director and concurrence of the Dean, the examination may be taken later than the conclusion of a student's third year of study. 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. The complete policy and procedure for taking the comprehensive exam is listed on the Graduate School website in the Policies & Procedures guide.

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

1. **Form a Comprehensive Exam Committee**

   Shortly after selecting a thesis advisor, you, in collaboration with your mentor, shall recommend a Comprehensive Exam Committee (CAC) subject to approval of your Program Director, and reported to the Program Administrator. You must have 5 committee members, and a majority of the committee must be members of the program. In rare exceptions, a larger committee would need to be approved by the PD. The CAC must always be an odd number of members. You must have at least one outside committee member; an outside member is someone who is not core program faculty. Your faculty advisor may or may not be a member of the committee, but they cannot be the chair of the committee. You should also disclose, in writing, if any of your committee members may have a (perceived) conflict of interest in serving on your committee. Examples of potential conflicts of interest may include: financial relationships (such as a committee member who is employed in the lab of your faculty advisor, or a current or former employer serving on your committee) and familial relationships. Although it is recommended that the Doctoral Thesis Advisory Committee be the same as the Comprehensive Examination Committee, the two committees need not be identical.

2. **Submit a Doctoral Thesis Proposal**
   Before taking the Comprehensive Examination, you must submit a doctoral thesis proposal to the Program Director and to the Doctoral Thesis Advisory Committee at least two weeks prior to the scheduled examination date and schedule the examination with the Graduate School by filing all the required Graduate School forms.

A doctoral thesis (written presentation of novel research) is based on original investigations and showing innovation in computational bioscience methodology. The doctoral thesis proposal should be in a format comparable to a National Institutes of Health (NIH) R03 grant submission and should be between 6 and 12 pages long. (http://grants.nih.gov/grants/funding/r03.htm). It is recommended to follow the NIH guidelines to include sections on Significance, Innovation, and Approach. Your Comps paper proposal should:

• Contain an argument regarding the significance of your work
• Address several aims of your work
• Explain your approaches to those aims
• Acknowledge likely pitfalls/fallbacks

3. **Complete the Graduate School Comprehensive Examination Forms**

The Graduate School requires 2-3 forms to be submitted in order to take the University Comprehensive Exam. All forms and information are located on their website at https://graduateschool.cuanschutz.edu/forms-resources/resources all documents need to be submitted via **DocuSign**, no PDF files will be accepted.

The following must be submitted to the program administrator <u>at least one month prior to your exam</u>:

1. *Application for Candidacy* form
2. *Exam Request* form
3. *Transfer of credit* form (if applicable)

DO NOT WAIT TO FILL OUT FORMS—the one-month deadline is hard and if something is amiss with your paperwork you may be required to reschedule your examination date.

START EARLY - Please start early to schedule exam dates, it can take several months' notice to find times that work for the entire committee. Furthermore, other committee members, especially members who have not been on a CPBS committee before, may need to fill out forms from the Graduate School that need to be approved before the exam.

Comprehensive Exam Format

In seminar format, students will present material from the Doctoral Thesis Proposal to their committee members and the general public. The presentation should last 30-45

minutes and allow time for general questions; then entire seminar plus questions should not exceed one hour. Shortly after the presentation is complete, the public audience members will be dismissed, and the oral comprehensive exam will begin. This oral examination will test your mastery of a broad field of knowledge, not merely information from your dissertation proposal or the formal coursework which you have completed.

Additional Program Expectations

Funding Proposals

Students who have passed their Comprehensive exam should submit a project proposal to seek funding for themselves at least once during their PhD studies. Please speak to your thesis advisor to determine which sponsor would be most appropriate for your project.

Publications

The program highly encourages students to have submitted articles based on their doctoral research before they exit the program with their doctoral degree.

Education Assistant Experience

All students are expected to have 1 teaching/mentoring experience as an education assistant for the Core Topics, 7712, summer program (when offered), or other opportunities per Program Director's approval. This is considered a training experience to help develop teaching, organizational, and leadership skills in addition to building a well-rounded CV and solidifying your knowledge. This experience is an important component of your training and also builds community by providing service to the program by mentoring more junior students.

Doctoral Thesis

Doctoral Thesis Update Seminars

After completion of the comprehensive exam students are required to give a thesis update seminar on an annual basis; thesis advisory committee (TAC) meetings are required annually as well. Update seminars provide a good opportunity for the student's TAC to review the student's progress and to invite input from the faculty as a whole, as well as afford the student opportunities to polish presentation skills. A student in consultation with their advisor, and with the approval of the Program Director, should select an outside committee member (see below) by the date of the first thesis update (i.e., on or around one year in the thesis laboratory). Following each committee meeting, regardless of whether the student gives a public presentation, the student and TAC chair will complete an assessment that summarizes what the committee discussed in the meeting. Annual meetings with the TAC are mandatory but meetings every six months are strongly encouraged.

Thesis Advisory Committee

The thesis advisory committee (TAC) meets with and advises you until your thesis defense. The TAC is often the same as the comprehensive exam committee (CAC), but there may be a need to change the make-up of the committee. The TAC will serve as an advisory function to you and your mentor and shall also monitor your progress in generating and/or collecting data to be used in the writing of the doctoral thesis. Your thesis advisor will give you formal permission to write the thesis once sufficient data have been collected and analyzed. The Doctoral TAC shall meet at least once each year, usually during the student's thesis update talk. Records of the meetings and of your progress are maintained; notify the program administrator in writing of your meetings. Your TAC must have 5 committee members, and a majority of the committee must be members of the program. In rare exceptions, a larger committee would need to be approved by the PD. The TAC must always be an odd number of members. You must have at least one outside committee member; an outside member is someone who is not core program faculty. Your thesis chair must be a regular faculty member of the program and cannot be your thesis advisor. Your faculty advisor may or may not be a member of the committee, but they cannot be the chair of the committee. You should also disclose, in writing, if any of your committee members may have (perceived) conflict of interest in serving on your committee.

committee member who is employed in the lab of your faculty advisor, or a current or former employer serving on your committee) and familial relationships. Although it is recommended that the Doctoral Thesis Advisory Committee be the same as the Comprehensive Examination Committee, the two committees need not be identical.

Examples of potential conflicts of interest may include financial relationships (such as a committee member who is employed in the lab of your faculty advisor, or a current or former employer serving on your committee) and familial relationships. Although it is recommended that the Doctoral Thesis Advisory Committee be the same as the Comprehensive Examination Committee, the two committees need not be identical.

You are required to meet with your TAC at least once per year (although more frequent meetings are encouraged) to monitor the progress of the project and to provide additional input and suggestions. The student must take the initiative in scheduling TAC meetings. After each committee meeting, the student will complete the Thesis Advisory Committee Meeting Summary with their TAC chairperson. This web form must be completed no later than the two weeks following the TAC meeting. If the TAC meeting is accompanied by an annual presentation, then both the presentation and the meeting forms must be completed at http://predocprogress.ucdenver.edu.

Thesis Defense

The student's doctoral thesis advisory committee conducts the "Defense of Dissertation" after completion of the independent research. Arrangements for the final examination must be made with the Graduate School, via the program administrator, at least one month in advance. Required paperwork are the "*Biosketch*" and "*Exam Request*" forms found on the Graduate School's website (https://graduateschool.cuanschutz.edu/forms-resources/resources) please use the link to be sure you are accessing and completing the most up-to-date version of those forms. Please check with the Program Administrator at least one month in advance of your scheduled defense date to ensure all committee members have faculty appointments with the Graduate School.

This doctoral thesis document must be written, approved by an examining committee authorized by the program, and in a final format approved by the Graduate School. A near final draft of the work is submitted to the examination committee at least two weeks prior to the final oral examination (Defense of Dissertation). The examination committee must formally approve the dissertation before the candidate submits a final and appropriately formatted version of the dissertation to the Graduate School. All Graduate School guidelines and specifications must be followed. Students must register for and complete 30 semester hours of doctoral thesis credit (CPBS 8990) to be eligible for the Ph.D. degree; additionally, students must be registered for 5 credits of CPBS 8990 in the semester in which they defend their thesis (which counts towards the required 30 credits of CPBS 8990).

Upon successfully defending the innovation of the problem and student's independent research efforts, the Ph.D. candidate must complete all the contingencies and formal recommendations of the doctoral thesis advisory committee and the Program Director. A final grade for the 30 semester hours of thesis research is assigned only after the student submits the final, approved manuscript, documenting the completed, innovative and independent research work to the Dean of the Graduate School. If approved by the Graduate School, the Dean of the Graduate School makes a recommendation to the Chancellor, on behalf of the entire graduate school faculty, who then awards the Ph.D. degree to the candidate.

Graduate School Policies for Thesis Examination Results

Pass

You 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 you have passed the examination, you should complete additional work. This may be in the form of rewriting submitted work, additional coursework, etc. The Graduate School requires that these conditions be satisfied within sixty days; however, the student's committee may require the conditions in a shorter time frame. Under extenuating circumstances, the graduate Program Director may petition the Graduate School for additional time. You will be considered to have "passed" when these conditions are met. Failure to meet the conditions will result in failure of the examination.

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Fail

In the event that you fail the examination, the student may not continue in the program unless a time extension is supported by the program in writing for a retake of the defense. You will be required to meet registration requirements for the new examination.

Disciplinary Actions

The University of Colorado Anschutz Medical Campus, consistent with most other educational institutions, has a student honor code (https://graduateschool.cuanschutz.edu/forms-resources/resources). The Computational Bioscience Ph.D. Training Program endorses and enforces this honor code. A student who violates the honor code will be called before the Program Director 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.

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.

Disclaimer

This handbook, which includes parts of the Graduate School Policies, does not constitute a contract with the University of Colorado Denver Graduate School, Office of Research Education, nor with the Computational Bioscience Program, either expressed or implied. The Graduate School, Office of Research Education and the Computational Bioscience Ph.D. Training Program reserve the right at any time to change, delete, or add to any of the provisions or contents at their sole discretion. Furthermore, the provisions of this document are designed to serve as firm guidelines rather than absolute rules and exceptions may be made on the basis of extenuating circumstances.

University of Colorado Denver, School of Medicine
Computational Bioscience Program
Pre-Rotation Laboratory Proposal
This form, signed off by student and rotation advisor, is due
to the Program Administrator at least one month prior to the
start of the rotation.

Student Name: _____

Student Signature: _____

Rotation Advisor: _____

Faculty Rotation Advisor Signature: _____

Date: _____

Project Title: _____

Program Director Signature: _____

1. Hypothesis & Specific aims

2. Background & Significance

3. Technical approach

4. Evaluation approach

ORE Policy on External employment for Graduate Students

Background

Graduate students admitted to ORE Programs receive an annual stipend of $38,110, health insurance coverage and full tuition. They are considered full time students and, per NIH policy, expected to devote a minimum of 40 hours to their PhD training. Students may wish to take on additional paid employment for financial reasons or to gain experience in teaching, industry or explore other career opportunities. This may be complementary and beneficial to their training and professional development in University of Colorado graduate programs. In the past students have taken on additional external employment, in some cases becoming self-funded and essentially full-time employees of another company or institution, while simultaneously attempting to complete their PhD training at the University of Colorado. This has been detrimental to academic progress and the student-mentor relationship. There are currently no guidelines or policies regarding Graduate students engaging in external employment.

Policy

Graduate students, in good academic standing, may, with appropriate approval, work a maximum of 10 hours per week in external employment. Such employment must be approved in advance, in writing by the Students 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: laboratory research, 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 external employment 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 Ph.D., 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.

ORE Leave of Absence Policies

Students who need to leave a graduate program for a period of time (up to one (1) year) should consult their program directors for guidance on a Leave of Absence (LOA). Personal LOAs are reviewed and approved entirely through the program and ORE. Medical LOAs are managed through the CU Anschutz Student Outreach and Support Office in collaboration with the program and the ORE. An approved LOA pauses the student's academic record and automatically extends the time limit for completing a degree by the equivalent

amount of time that the student spends on leave. Requests for LOA that exceed one (1) year may be approved with sufficient justification to the Dean of the Graduate School. Students who do not return from their approved LOA will be considered to have withdrawn from their program and will either be required to formally re-apply for admission, or, at the discretion of the program, may be re- admitted through an expedited process.

Office of Research Policies Medical Leave of Absence: ore-process-for-requesting-a-medical-leave-of-absence-12-2023.pdf (cuanschutz.edu)

If you have any questions please make sure to contact the Program Administrator and the Program Director for Computational Bioscience PhD Program.