University of Colorado
Denver | Anschutz Medical Campus

CLINICAL SCIENCE GRADUATE PROGRAM

PHD STUDENT HANDBOOK

303-724-1214 (p)
https://cctsi.cuanschutz.edu/training/clsc#phd

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Welcome!

The overall goal of the University of Colorado Denver | Anschutz Medical Campus Graduate Program in Clinical Science (CLSC) is to train nationally competitive clinician/clinical translational scientists by providing a formal, structured, and rigorous educational program in the clinical and translational sciences. The Clinical Science Graduate Program was designed in response to the demand for well-qualified clinical researchers in academia and industry. The critical need for individuals capable of conducting rigorous, credible and relevant patient-based research within stringent ethical and regulatory guidelines, and translating the evidence for community application, is expected to continue to grow.

For doctoral students, there is a selected emphasis of study in one of the following three tracks: Clinical Investigation (CI), Health Information Technology (HIT), or Health Services Research (HSR). These three specialized tracks of clinical science are important areas of study for translational research activities in the evolving health care environment. In our program, training occurs across many disciplines to achieve proficiency in the areas of clinical science, clinical investigation and translation, and includes biostatistics, clinical epidemiology, clinical studies design, ethics, and grant writing. An important compliment to the rigorous training in the CLSC program is the formal mentoring with interdisciplinary faculty working in the clinical sciences. Graduates of our program are highly qualified and well-trained clinician/clinical scientists who will be nationally competitive for grant funding and career advancement in the health sciences.

Your feedback and perspectives of the CLSC program are important. We strive to provide the best academically rigorous program while simultaneously meeting the individual needs of students and seizing opportunities to enrich the educational experience. Please feel free to contact any of the Core CLSC Faculty or CLSC Program Administrator at any time. Our contact information is below. We have an open door policy and want to hear your thoughts both good and bad. Please feel free to contact Dr. Lisa Cicutto, CLSC Director, at any time by email (Lisa.Cicutto@cuanschutz.edu) or by phone at 303-398-1538.

Purpose of Handbook

The intent of the PhD Handbook is to provide key information to help you succeed in and benefit the most from the Clinical Science Graduate Program. This Handbook should be used in conjunction with the University of Colorado Denver | Anschutz Medical Campus Graduate School Policies and Procedures, the Course book, and other official documents prepared and distributed by the Clinical Science Program. (This would include documents developed for candidacy application, thesis preparation and graduation). It is expected that students will be familiar with and knowledgeable of these documents. To access the Graduate School Policies and Procedures, please go to https://graduateschool.cuanschutz.edu/forms-resources/resources.

As a general rule, the policies in effect at the time of admission govern a student's progression.
The curriculum, course schedules, and offerings are subject to change. Courses are offered pending required minimum enrollment numbers. If curriculum changes are made, courses in the current curriculum will be offered for a specified period of time; students who decelerate or otherwise change their program plans may be asked to substitute another course for required courses being discontinued or with insufficient enrollment. All program plan changes will be discussed and approved by the student's Academic Advisor.

Mission

The mission of the Clinical Science Program is to prepare and train nationally competitive clinician/clinical translational scientists.

Vision

To provide a comprehensive knowledge base of translational research methods, theories, and techniques in clinical science in order to train and further prepare Clinician Scientists.

Core Competencies

To prepare students to perform state of the art translational research, graduates of the Clinical Science Graduate program will:

- Adhere to legal, ethical and regulatory issues related to clinical research
- Critically appraise existing literature and sources of information
- Apply **evidence-based practice principals**
- Accurately select, use and interpret commonly used statistics
- Apply and use appropriate study designs and methods to address research questions/hypotheses
- Identify and measure clinically relevant and meaningful outcomes
- Design and conduct clinical and patient-oriented research studies
- Publish research manuscripts in peer-reviewed journals
- Prepare and submit grant proposals
- Provide constructive reviews and feedback to colleagues
- Demonstrate effective communication and leadership skills
- Participate in interdisciplinary collaborative research

Clinical Science Graduate Program Core Faculty and Staff

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Clinical Science Program
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Campus Box B141
Aurora, CO 80045
Phone: 303-724-1214

Clinical Science PhD Degree Program

The overall goal of CLSC doctoral training program is to prepare nationally competitive clinician/clinical scientists that are able to translate across the discovery-community continuum. Students in our program are highly motivated and bright individuals that seek additional rigorous training to become leaders in their field and make significant contributions to improving the health of citizens. The program allows specialization in one of three tracks or areas of focus: Clinical Investigation, Health Information Technology, or Health Services Research.

The PhD program consists of successful completion of: didactic coursework, a Preliminary Examination, a Comprehensive Examination, and completion and defense of a thesis dissertation.

Tracks within the CLSC Program

Clinical Investigation (CI)

Clinical investigation is the discipline by which physicians, clinicians and other health related disciplines translate knowledge gained in the basic sciences or the laboratory setting to develop prevention and disease management interventions and strategies to improve health outcomes. It can also involve translating knowledge gained about the efficacy of successful strategies and interventions conducted in the academic clinical setting to the community setting to improve health related outcomes. The mission of the Clinical Investigation Track is to train the next generation of clinician scientists who will pursue successful careers in clinical translational research. Clinical investigation is clearly a primary mission of academic medical and health centers, and properly trained clinicians and scientists are uniquely qualified to engage in investigative and translational studies.

Competencies Specific to CI

Specific to the CI Track, graduates of the program will:

- Apply relevant study design methods commonly used in clinical and translational studies
- Develop a well-designed, successful research thesis project relevant to the clinical and translation sciences and fields

Health Information Technology (HIT)

The Health Information Technology Track provides a background in clinical informatics: the study of how medical data and knowledge can be stored, analyzed, and delivered to facilitate research and to improve the quality, safety, and efficiency of care. Students will develop a fundamental understanding of the technical and organizational challenges particular to the field of health information technology and will train in evaluation and research methods. Graduates of the Health Information Technology Track will be prepared for leadership roles in developing, implementing, and evaluating clinical informatics applications in academia, industry and clinical practice. Within the HIT Track, formal training occurs in the following cross disciplines:

- Electronic health records
- Decision support
- Telehealth
- Public health informatics

- Research informatics
- Standards and data integrity
- Privacy and security

Competencies Specific to HIT

Specific to the HIT Track, graduates of the program will:

- Demonstrate understanding of relevant standards and terminologies for communication and representation of health data
- Demonstrate understanding of major types of clinical and administrative information systems and how they are integrated
- Demonstrate understanding of computerized provider order entry (CPOE) and clinical decision support systems (CDSS), including
    - Success factors for implementation
    - Methods of encoding rules/logic
- Ability to assess and develop methods to protect privacy (e.g. HIPAA issues) and security (confidentiality, integrity, and availability) of health information
- Design appropriate research and evaluation studies in HIT, with understanding of both experimental and quasi-experimental research designs
- Ability to apply systems life cycle approach to HIT planning, analysis, design, implementation and evaluation, including translation of user needs into functional requirement
- Apply database concepts to the design and implementation of databases for clinical, research, and public health applications

Health Services Research (HSR), Collaborative Program with Colorado School of Public Health

The Health Services Research (HSR) PhD Program is a collaborative program between the Clinical Science Graduate Program and the Health Systems Management and Policy Department within the Colorado School of Public Health (CSPH). Please refer to the following website for additional information:

https://coloradosph.cuanschutz.edu/education/degrees-and-programs/doctor-of-philosophy/phd-in-health-services-research

Clinical Science Program Curricula

The curriculum for the Clinical Investigation and Health Information Technology tracks of the Clinical Science Program are shown on the following pages.

Clinical Investigation Curriculum
(students admitted during or after Fall 2024)

Note that course schedules may vary from term to term. To verify schedules and prerequisites for specific courses, please visit the CLSC courses and registration web page at: https://cctsi.cuanschutz.edu/training/clsc#resource

Course Number	*Course Title*	*Credits*
BIOS 6601*	Applied Biostatistics I	3
BIOS 6602*	Applied Biostatistics II	3
BIOS 6648 or EPID 6626 or BIOS 6623	Design and Conduct of Clinical Trials or Research Methods in Epidemiology (BIOS 6602 is a pre-requisite) or Advanced Data Analysis	3
CLSC 6210†	Research Seminars in Clinical Science	1
CLSC 6270	Critical Appraisal Seminars in Clinical Science	1
CLSC 7101	Grant Writing I	1
CLSC 7150* or CLSC 7152*	Ethics and Responsible Conduct of Research or Ethics and Responsible Conduct of Research in the Digital Age	1
CLSC 7202	Clinical Outcomes and Applications	2
CLSC 7300	Scientific Grant Review Process: CCTSI Proposals - Doctoral	1
EPID 6630*	Epidemiology	3
EPID 6631	Analytical Epidemiology	3
	Required Clinical Investigation Course Credits	**22**
	Elective Course Credits	**8**
	Minimum Number of Required Course Credit (Core + Electives)	**30**
*CLSC 8990	Doctoral Thesis	**≥ 30**

* Courses required before Preliminary Exam (biostatistics, ethics, epidemiology). In addition, a second methods class is required (EPID 6626 or EPID 6631 or BIOS 6648 or BIOS 6623 or CLSC 6270 or CLSC 7202).

† CLSC 6210 is taken over 1 year typically during the second or third year of your PhD (after passing the Preliminary Examination but before completing the Comprehensive Examination).

* Must take the following prerequisite classes and pass the preliminary exam prior to registering for CLSC 8990: BIOS 6601, BIOS 6602, BIOS 6648 or EPID 6626 or BIOS 6623 or EPID 6631, CLSC 7150 or CLSC 7152, EPID 6630

Health Information Technology Curriculum
(students admitted during or after Fall 2024)

Note that course schedules may vary from term to term. To verify schedules and prerequisites for specific courses, please visit the CLSC courses and registration web page at: https://cctsi.cuanschutz.edu/training/clsc#resource

Course Number	*Course Title*	*Credits*
BIOS 6601*	Applied Biostatistics I	3
BIOS 6602*	Applied Biostatistics II	3
BIOS 6648 or EPID 6626 or BIOS 6623 or EPID 6631	Design and Conduct of Clinical Trials or Research Methods in Epidemiology (BIOS 6602 is a pre-requisite) or Advanced Data Analysis or Analytical Epidemiology	3
CLSC 6210†	Research Seminars in Clinical Science	1
CLSC 6270	Critical Appraisal Seminars in Clinical Science	1
HLTH 6071 or NURS 6286	Intro to Health Information Technology *or* Foundations of Healthcare Informatics	3
NURS 6290	Information Systems Life Cycle	4
CLSC 7101	Grant Writing I	1
CLSC 7150* or CLSC 7152*	Ethics and Responsible Conduct of Research or Ethics and Responsible Conduct of Research in the Digital Age	1
CLSC 7202	Clinical Outcomes and Applications	2
EPID 6630*	Epidemiology	3
NURS 6293 or ISMG 6080	Database Management Systems (Informatics focus) Database Management Systems (Information Systems focus)	3
	Required Health Information Technology Course Credits	**28**
	Elective Course Credits	**2**
	Minimum Number of Required Course Credit (Core + Electives)	**30**
*CLSC 8990	Doctoral Thesis	**≥ 30**

* Courses required before Preliminary Exam (biostatistics, ethics, epidemiology). In addition, a second methods class is required (EPID 6626 or EPID 6631 or BIOS 6648 or BIOS 6623 or CLSC 6270 or CLSC 7202).

† CLSC 6210 is taken over 1 year typically during the second or third year of your PhD (after passing the Preliminary Examination but before completing the Comprehensive Examination).

* Must take the following prerequisite classes and pass the preliminary exam prior to registering for CLSC 8990: BIOS 6601, BIOS 6602, BIOS 6648 or EPID 6626 or BIOS 6623 or EPID 6631, CLSC 7150 or CLSC 7152, EPID 6630

Academic Advisement

Student Responsibilities & Program Plans

The student's responsibilities include:

- Becoming familiar with, and adhering to, the rules, policies, and procedures in place in the Clinical Science program, the Graduate School, and the University as outlined in available resources such as the respective handbooks, web sites and calendars.
- Completing and updating annually the CLSC Academic Plan
- Preparing a research plan and timetable in consultation with the Research Mentor including coursework and any proposed fieldwork.
- Meeting with the Research Mentor (at a minimum twice a month) and providing regular updates on progress and results of research project.
- Establishing a Comprehensive Exam and Thesis Committee, with the assistance of the Research Mentor. This must be completed after passing the Preliminary Examination.
- Maintaining good records of each stage of the research.
- Planning to complete the PhD degree requirements in 4-6 years (the Graduate School's maximum duration for PhD degree completion is 8 years)

Meeting with your Academic Advisor once a year to plan and discuss your progress through the program is crucial to a successful experience for you and is thus **mandatory**. Your Academic Advisor assists you with identifying and scheduling required coursework, identifying areas of research and collaborations, and selecting committee members for your thesis and comprehensive examination. They may even help save you money by progressing through the program in the most expeditious manner.

At the time of your admission to the program, an Academic Advisor will be assigned to you.

1. **The Academic Advisor** will assist you in selecting and sequencing courses and planning other activities to progress through the program. The projected courses for meeting the degree requirements, plans for additional course requirements, and a projected date for completion of the Preliminary and Comprehensive Examinations and the Thesis Defense will be recorded on the **Program Plan Form** (See next pages). Students should visit with their Academic Advisor regularly (at least once per year) for discussions of research ideas, grant and course opportunities, and other advisement.

   New students should familiarize themselves with the curriculum requirements prior to meeting with their Academic Advisor. In conjunction with their Academic Advisor, all new students should develop a proposed plan of study. Copies of the track-specific planning forms are provided (See below). These plans are maintained electronically and accessed via a secure link provided by the program administrator.

2. It is expected that every Clinical Science Graduate Program student, for every year that s/he is in the program, will have a program plan form completed or updated, approved by the Academic Advisor, and submitted electronically the **first week of September.** You may receive notices from your Academic Advisor of specific requirements and timelines for this process. This information is key for planning future course offerings and insuring completion of the program in a reasonable period of time. **Updated program plans are the responsibility of the student.**

3. Program Plans for the PhD degrees are shown on the following pages. Visit the PhD Resources section of the CLSC website at https://cctsi.cuanschutz.edu/training/clsc#phd

CLSC PhD Student – Clinical Investigation Track Program Plan (students admitted *during or after Fall 2024*)

Note that course schedules may vary from term to term. To verify schedules and prerequisites for specific courses, please visit the CLSC courses and registration web page at: https://cctsi.cuanschutz.edu/training/clsc#resource

STUDENT NAME: _____ **DATE OF LAST REVISION:** _____

Matriculation: _____ **Research Mentor:** _____ **Advisor:** _____

Courses			Semesters (Term -- Year)									
Number	Credits	Description	--	--	--	--	--	--	--	--	--	Credits Earned
TOTAL REQUIRED COURSE HOURS FOR DEGREE = 30												
	22	Required Courses										
BIOS 6601*	3	Applied Biostatistics I	☐	☐	☐	☐	☐	☐	☐	☐	☐	
BIOS 6602*	3	Applied Biostatistics II	☐	☐	☐	☐	☐	☐	☐	☐	☐	
BIOS 6648 **or** EPID 6626 **or** BIOS 6623	3	Design and Conduct of Clinical Trials **or** Research Methods in Epidemiology (BIOS 6602 is a pre-requisite) **or** Advanced Data Analysis	☐	☐	☐	☐	☐	☐	☐	☐	☐	
CLSC 6210†	1	Research Seminars in Clinical Science	☐	☐	☐	☐	☐	☐	☐	☐	☐	
CLSC 6270	1	Critical Appraisal Seminars in Clinical Science	☐	☐	☐	☐	☐	☐	☐	☐	☐	
CLSC 7101	1	Grant Writing I	☐	☐	☐	☐	☐	☐	☐	☐	☐	
CLSC 7150* or CLSC 7152*	1	Ethics and Responsible Conduct of Research or Ethics and Responsible Conduct of Research in the Digital Age	☐	☐	☐	☐	☐	☐	☐	☐	☐	
CLSC 7202	2	Clinical Outcomes and Applications	☐	☐	☐	☐	☐	☐	☐	☐	☐	
CLSC 7300	1	Scientific Grant Review Process: CCTSI Proposals-Doctoral	☐	☐	☐	☐	☐	☐	☐	☐	☐	
EPID 6630*	3	Epidemiology	☐	☐	☐	☐	☐	☐	☐	☐	☐	
EPID 6631	3	Analytical Epidemiology	☐	☐	☐	☐	☐	☐	☐	☐	☐	
	8	Elective Courses										
			☐	☐	☐	☐	☐	☐	☐	☐	☐	
			☐	☐	☐	☐	☐	☐	☐	☐	☐	
			☐	☐	☐	☐	☐	☐	☐	☐	☐	

* Courses required before Preliminary Exam (biostatistics, ethics, epidemiology). In addition, a second methods class is required (EPID 6626 or EPID 6631 or BIOS 6648 or BIOS 6623 or CLSC 6270 or CLSC 7202).

†CLSC 6210 is taken over 1 year typically during the second or third year of your PhD (after passing the Preliminary Examination but before completing the Comprehensive Examination).

Clinical Science PhD Program: Clinical Investigation
Student Name: _____

Thesis Credit Hours	**Indicate # of Thesis Credit Hours taken per Semester: Fa/Sp/Su-Year**												**Total Credits ≥ 30**
*CLSC 8990 Doctoral Thesis (after completing prerequisite classes)													
Comp/Thesis Committee Meetings	**Indicate the Semester in which Committee Meetings are held: Fa/Sp/Su-Year**												**Total Meetings**
Committee Meetings Held													

Exams	**Semester: Fa/Sp/Su-Year**
Prelim Exam	
Comp Exam	
Thesis Defense	

NOTES

Courses to Transfer – if applicable – must be approved by Program and the Graduate School				
Number	**Credits**	**Description**	**Substitutes For**	**Credits Granted**

Pending successful completion of all planned courses (B or better in all courses), ≥ 30 thesis credit hours completed, approval and validation of courses proposed for transfer, AND passing the required program examinations (Preliminary Examination, Comprehensive Examination and the Final Thesis Defense), this schedule would fulfill the requirements of the Clinical Science PhD Program (Clinical Investigation Track).

Student's Approval Date: _____ Track Director's Approval Date: _____

CLSC PhD Student – Health Information Technology Track Program Plan (students admitted *during or after Fall 2024*)

Note that course schedules may vary from term to term. To verify schedules and prerequisites for specific courses, please visit the CLSC courses and registration web page at: https://cctsi.cuanschutz.edu/training/clsc#resource

STUDENT NAME: _____ **DATE OF LAST REVISION:** _____ **Matriculation:** _____ **Research Mentor:** _____ **Advisor:** _____

Courses			**Semesters (Term -- Year)**									
Number	**Credits**	**Description**	--	--	--	--	--	--	--	--	--	**Credits Earned**
TOTAL REQUIRED COURSE HOURS FOR DEGREE = 30												
	28	**Required Courses**										
BIOS 6601*	3	Applied Biostatistics I	☐	☐	☐	☐	☐	☐	☐	☐	☐	
BIOS 6602*	3	Applied Biostatistics II	☐	☐	☐	☐	☐	☐	☐	☐	☐	
BIOS 6648‡ **or** EPID 6626 **or** BIOS 6623 **or** EPID 6631	3	Design and Conduct of Clinical Trials **or** Research Methods in Epidemiology (BIOS 6602 is a pre-requisite) **or** Advanced Data Analysis **or** Analytical Epidemiology	☐	☐	☐	☐	☐	☐	☐	☐	☐	
CLSC 6210†	1	Research Seminars in Clinical Science	☐	☐	☐	☐	☐	☐	☐	☐	☐	
CLSC 6270	1	Critical Appraisal Seminars in Clinical Science	☐	☐	☐	☐	☐	☐	☐	☐	☐	
HLTH 6071 **or** NURS 6286	3	Introduction to Health Information Technology **or** Foundations of Healthcare Informatics	☐	☐	☐	☐	☐	☐	☐	☐	☐	
NURS 6290	4	Information Systems Life Cycle	☐	☐	☐	☐	☐	☐	☐	☐	☐	
CLSC 7101	1	Grant Writing I	☐	☐	☐	☐	☐	☐	☐	☐	☐	
CLSC 7150* or CLSC 7152*	1	Ethics and Responsible Conduct of Research or Ethics and Responsible Conduct of Research in the Digital Age	☐	☐	☐	☐	☐	☐	☐	☐	☐	
CLSC 7202	2	Clinical Outcomes and Applications	☐	☐	☐	☐	☐	☐	☐	☐	☐	
EPID 6630*	3	Epidemiology	☐	☐	☐	☐	☐	☐	☐	☐	☐	
NURS 6293 **or** ISMG 6080	3	Database Management Systems (Informatics focus) **or** Database Management Systems (Information Systems focus)	☐	☐	☐	☐	☐	☐	☐	☐	☐	
	2	**Elective Courses**										
			☐	☐	☐	☐	☐	☐	☐	☐	☐	
			☐	☐	☐	☐	☐	☐	☐	☐	☐	

			☐	☐	☐	☐	☐	☐	☐	☐	☐			

* Courses required before Preliminary Exam (biostatistics, ethics, epidemiology). In addition, a second methods class is required (EPID 6626 or EPID 6631 or BIOS 6648 or BIOS 6623 or CLSC 6270 or CLSC 7202).
†CLSC 6210 is taken over 1 year typically during the second or third year of your PhD (after passing the Preliminary Examination but before completing the Comprehensive Examination).

Clinical Science PhD Program: Health Information Technology
Student Name: _____

Thesis Credit Hours	**Indicate # of Thesis Credit Hours taken per Semester: Fa/Sp/Su-Year**												**Total Credits ≥ 30**
*CLSC 8990 Doctoral Thesis (after completing prerequisite classes)													
Comp/Thesis Committee Meetings	**Indicate the Semester in which Committee Meetings are held: Fa/Sp/Su-Year**												**Total Meetings**
Committee Meetings Held													

Exams	**Semester: Fa/Sp/Su-Year**
Prelim Exam	
Comp Exam	
Thesis Defense	

NOTES

Courses to Transfer – if applicable – must be approved by Program and the Graduate School				
Number	**Credits**	**Description**	**Substitutes For**	**Credits Granted**

Pending successful completion of all planned courses (B or better in all courses), ≥ 30 thesis credit hours completed, approval and validation of courses proposed for transfer, AND passing the required program examinations (Preliminary Examination, Comprehensive Examination and the Final Thesis Defense), this schedule would fulfill the requirements of the Clinical Science PhD Program (Health Information Technology Track).

Student's Approval Date: _____ Track Director's Approval Date: _____

Transfer of Credits

Pending CLSC Program and Graduate School approval, transfer of up to 30 semester credits for the PhD may be coordinated. Transfer credit is defined as any credit earned at another accredited institution. The maximum amount of transfer work that may be applied toward a graduate degree at CU | Anschutz Medical Campus is 30 semester hours for Ph.D. degree programs. The Graduate School accepts transfer credits only after approval of those transfer credits by the student's Program Director and the Dean of the Graduate School.

All courses accepted for transfer must:

a. Be graduate level (M.S. / M.A. or Ph.D.);
b. Have a grade of "B" or higher;
c. Not have been applied toward an undergraduate degree or another graduate degree on the same level (e.g., Ph.D. to Ph.D.);
d. Be validated if not taken within seven (7) years of the PhD comprehensive exam; and
e. Be transferred prior to the term in which the Comprehensive Examination is taken.

Credit cannot be transferred until the student has established a satisfactory record of at least one term of enrollment at the CU | Anschutz Medical Campus (CU|AMC) and earned a minimum 3.00 GPA. Transferred courses do not reduce the residency requirement but may reduce the amount of work required for the degree.

Transfer of Credits for Core CLSC Courses: Students must contact the current course instructor for each course that they are substituting (or attempting to transfer in) to determine that the course is comparable. This will involve submitting the course syllabus to the course instructor for review to assist with determining comparability. Students must copy/forward emails from the current course instructors identifying whether or not the course being transferred is comparable to the core CLSC course to Ms. Galit Mankin (galit.mankin@cuanschutz.edu).

Transfer of credits for elective courses into the CLSC program: Students will submit a copy of the course syllabus to their Academic Advisor for each course that they are seeking to transfer into the program and apply towards the degree. The Academic Advisor will review the materials in light of the focus of the student's program of research and level of academic rigor. Ms. Galit Mankin (galit.mankin@cuanschutz.edu) needs to be copied on or forwarded emails detailing the decision to recommend or not the transfer of credit hours.

Students wishing to transfer credits for courses taken over 7 years prior to completing the comprehensive exam need to be validated. The validation process is similar to the transfer of core credit hours. Students need to contact the course instructor for each of the courses taken more than 7 years ago to determine whether or not the course content has changed substantially since the student completed the course. Emails of the instructor's assessment must be forwarded or copied to Ms. Galit Mankin (galit.mankin@cuanschutz.edu).

The onus for contacting instructors, collecting course syllabus/syllabi for review, and the coordination of the review and communication process, as well as paperwork is on the student.

Finally, a Graduate School form detailing the recommended courses for transfer is required to be signed by the program and submitted to the Graduate School. The Transfer of Credit form is not required for non-degree

credit transfers as these courses appear on the University of Colorado transcripts. Approval of the courses by the program and the Graduate School on the Application for Candidacy will constitute approval of the transfer of courses toward the degree.

It is not always a good idea to transfer in credit hours for CLSC core courses, especially if they were completed several years ago. It is often wiser to repeat similar coursework so that you are well prepared for your preliminary and comprehensive examinations.

Course Offerings

Course Information

Course titles, credits and semester of offering are listed on the Course Offering Schedule available on the CLSC website:

https://cctsi.cuanschutz.edu/training/clsc#resource

Consultation of the Anschutz Medical Campus Graduate School Course Book is also recommended:

https://catalog.cuanschutz.edu

The semesters listed are the semester that each course is usually offered and is subject to change. Some courses require pre-requisites. Courses have a minimum enrollment of 5 students; a course with less than the minimum enrollment on the first day of the semester is subject to cancellation. The program reserves the right to provide a substitute course or modify the program plan for students who have decelerated or take less than 6 credit hours/semester.

Registration

Registration opens three to four weeks before the beginning of summer and fall semesters, and even earlier for spring semester. The student registration portal is found at https://portal.cusys.edu/UCDAccessFedAuthLogin.html. The Academic Calendar is posted on the CU | Anschutz Medical Campus Graduate School's website at https://graduateschool.cuanschutz.edu/forms-resources/resources

The drop/add period ends one (summer) to two weeks (fall and spring) after the semester begins. Students remain responsible for full tuition and fees for any classes dropped after this period, and a late fee is charged for any class added after this period. Payment is due within 30 days of the beginning of the semester, regardless of your registration date. Note that new students are not allowed to register until after being cleared by the Graduate School. It is, therefore, essential that all the required forms, information and payments have been submitted to and approved by the Graduate School.

CLSC 7650 Guided Research Tutorial

A Guided Research Tutorial, also known as an independent study course, may be taken for 1-3 credit hours given that the requirements for doing so are fulfilled. Independent study courses (CLSC 7650 Guided Research Tutorial) cannot exceed 8 credit hours for the doctoral degree.

No required courses may be taken for credit as independent study.

Planning for the Guided Research Tutorial should begin 3-4 weeks prior to the term of planned enrollment. There are several steps that need to occur prior to enrollment.

1. First, discuss your intent and plan for the Guided Research Tutorial with your Academic Advisor to get preliminary approval.
2. Discuss with the proposed course instructor his/her availability to supervise your course of study and to review and agree on the course plan. Specifically, a course plan should be mutually developed and agreed upon and include:
    - proposed number of credit hours,
    - course objectives
    - course content covered, activities and the timeframe (outline),
    - assignments or outcomes/products of the course and due dates to the course instructor.
3. Determine the appropriate number of credit hours
    - Regular meetings need to occur with the course instructor
    - For instructional activities conducted by the faculty that require student participation, experimentation, observation or practice, the minimum number of weekly student-faculty contact hours is 2 hours for a 1 credit course, 4 hours for a 2 credit course and 6 hours for a 3 credit course throughout the semester.
    - For a private instruction–based course, there needs to be formal presentations in a one-to-one relationship between the student and the instructor weekly. Over the course of 15 weeks, there needs to be at least 7.5 hours with the instructor for a 1 credit hour course; 15 hours with the instructor for a 2 credit hour course; and 22.5 hours with the instructor for a 3 credit hour course.
4. Submit the course plan that has the approval emails of the course instructor to Dr. Lisa Cicutto, Program Director for approval.

Steps 1-4 need to be completed prior to registering for CLSC 7650 Guided Research Tutorial. This is a closed registration course meaning that registration without a permission number is not allowed. The CLSC program must provide the students with the permission number in order to register.

Sample Course Plan for CLSC 7650

Clinical Science (CLSC) 7650 Guided Research Tutorial
Fall 2008

Student: Jane Kanduit
Primary Instructor: Onlywith Myhlp, MD
Credits: 3 hours
Course Focus: Manuscript Preparation, Writing and Submission of Pilot Study on Surviving a PhD and Avoiding Bankruptcy

Course Objectives:

At the end of this course, I will be able to:

1. Perform literature searches related to surviving a PhD and avoiding bankruptcy
2. Synthesize and integrate the literature related surviving a PhD and avoiding bankruptcy by writing a literature review
3. Write a structured abstract related to pilot study re: surviving a PhD and avoiding bankruptcy
4. Describe and write the statistical analyses section of the manuscript
5. Prepare tables and figures that support the text in the manuscript for publication
6. List and discuss the pros and cons of possible journals to submit to and publish in
7. Submit a manuscript for peer-review publication on surviving a PhD and avoiding bankruptcy

Weekly Course Content Outline:

1-2	Review literature for guidance on publishing in scientific journals.
2-4	Perform literature search and review literature on surviving a PhD and avoiding bankruptcy .
3	Interview mentors and colleagues about strategies for publishing in the area
2-5	Identify appropriate journals for manuscript
5	Write Background/Introduction section
6	Meet with psychologist, stress physiologist, life coach and financial planner to seek advice in the write-up of methodology used in pilot study
7	Write Methods section
8	Meet with statistician about writing statistical analysis section and presentation of results
9-10	Write Results section (2 weeks)
10-11	Write Discussion and abstract
11-12	Solicit feedback on entire manuscript and draft cover letter to editor
13-14	Revise and incorporate comments
14-15	Submit to chosen journal

Meeting Plans with Instructor:

1. Meet with Dr. Onlywith Myhlp, every week on Mondays at the VA hospital from 2:00- to 4:00 (2x15=30 hours).
2. Meet with psychologist, stress physiologist, life coach and financial planner (all co-authors) each for 1-2 hrs while writing the manuscript and perhaps again after completing first draft.

Assignments:

1. Outline of manuscript: Due week 3, 5% of final grade
2. Introduction section: Due week 6, worth 15%
3. Methods section: Due week 9, worth 15% of final grade

4. Results section: Due week 11, 2% of final grade
5. Discussion and abstract: Due week 12, 20% of final grade
6. Cover letter and revised paper submitted: 20% of final grade

Grading within the CLSC Program

Standards for assigning grades are as follows:

Letter Grade	GPA	% Grade
A	4.00	93-100
A-	3.70	90-92
B+	3.30	87-89
B	3.00	83-86
B-	2.70	80-82
C+	2.30	77-79
C	2.00	73-76
C-	1.70	70-72
D+	1.30	68-69
D	1.00	63-67
D-	0.70	60-62
F	0.00	<60

Any course grade below a B will not be accepted for credit hours applied to the PhD in Clinical Science degree.

The following activities will be considered academic dishonesty:

- Copying the work of current or past students or using solutions given to students in past semesters for any class assignments
- Paying external parties to complete part or all of assignments or exams
- Using material from other sources (such as websites, books, articles and AI) without crediting the source

If a student is caught engaging in one of these activities, the program will enforce the standard penalty for academic dishonesty. The standard penalty for a first violation is an F on the assignment resulting in at least a one letter grade penalty for the course. The penalty for subsequent academic penalties can involve removal from the program.

Incomplete Grades

After the Add/Drop deadline, courses may not be dropped unless there are special circumstances. The student must ask the instructor for an "I" (Incomplete) grade if his/her circumstances warrant it. If this is the case, the student and the instructor must develop a written plan for the work that needs to be completed and the time frame for its completion (up to a year). If the outlined work is completed according to the agreed upon time frame, the Instructor of Record must submit the final grade to the CLSC administrative office for processing. If the agreed upon work is not completed by the agreed upon time frame, the course grade will be changed to an "F" (Fail).

Canvas

Canvas is used in almost all courses available through the CLSC Program. Course syllabi, notes, lectures, articles, discussion groups, and assignments can be found here. Online quizzes, exams, and assignments are also conducted on or submitted via Canvas. Canvas allows faculty, instructors, and trainers to easily upload course content; manage course communication; test students online; post multimedia materials; manage student grades online, and many other course-related functions. Using a common web browser, students can access the materials from home or work at their convenience. Canvas is primarily used for web-enhanced courses (traditional courses with Internet enhancement), and hybrid courses (courses that blend the traditional format with online).

Canvas can be accessed at http://canvas.cuonline.edu and accessed with your CU|AMC email log-in. Upon enrollment, your registered courses will be attached to Canvas and content made available at the beginning of the semester.

For access assistance, please contact the CU|AMC Online Help Desk at 303.315.3700 (Monday through Friday, 7:00 am – 7:00 pm), or email cuonlinehelp@cuanschutz.edu. The help desk provides email assistance 24 hours a day, 7 days a week. They guarantee a 24-hour response time to inquiries, but generally respond in much shorter time.

Course Evaluations

Ongoing student assessment is critical and is a required component of any Graduate School program to maintain accreditation. At the end of the semester students will complete an overall evaluation of the course and instructor. Students are asked to evaluate components of the course on a 1-5 scale (1-poor, 2-fair, 3-good, 4-very good, 5-excellent) and have the opportunity to add free text.

The Preliminary Examination

At the end of the first year of didactic course work, students will take a written Preliminary Exam to assess their comprehension of the educational concepts covered in the coursework. A Preliminary Examination ensures that students are qualified for doctoral study conduct. The Preliminary Examination covers the core content areas of:

- Biostatistics
- Ethics
- Research Methods

The Preliminary Examination is held every year over a three-day period between the end of the spring and beginning of the summer terms (typically late May or early June). You will be asked to indicate your intent to take the examination about 3 months prior to the date of the Preliminary Examination. Students typically take the Preliminary Examination after completing the first year of required core courses.

Course Requirements for Taking the Preliminary Exam

CLSC Students:

The following courses must be completed prior to taking the Preliminary Examination:

- Biostatistics: BIOS 6601 and BIOS 6602
- Ethics: CLSC 7150 or CLSC 7152
- Methods: EPID 6630 plus one of the following
    - CLSC 6270
    - CLSC 7202
    - EPID 6626
    - BIOS 6648
    - EPID 6631
    - EPID 6623

Exam Format

The Preliminary Examination is **OPEN BOOK and completed off campus**. Students should feel free to use textbooks, reference materials, class notes, peer-reviewed publications, and credible websites.

On the morning of the exam, students will be required to attend a Zoom orientation to review the instructions for the exam and receive the exam questions. Honor codes must be signed prior to attending the orientation.

CLSC Program Honor Code and Grading Policy

All doctoral students taking the CLSC preliminary exam will be requested to sign the following statement for their work:

> "As noted in the exam instructions, I have abided by the CU Denver | Anschutz Medical Campus Graduate School honor system whereby I have not used any reference material, computer files, or worked with any person in a manner that would unfairly advantage my performance on this Ph.D. Program in Clinical Science Preliminary Examination. Moreover, I will not share a copy of this

Preliminary Exam (either the questions or my responses) with anyone without written pre-authorization from the Ph.D. Program in Clinical Science administration."

Faculty members will be using a grading rubric for scoring each exam section. The pass/fail designation you receive will reflect faculty scores submitted for: 1) Research Methods, 2) Ethics, and 3) Biostatistics. **In order to pass the Preliminary Exam, you will need to receive a passing designation in ALL three sections. If you fail any one of the sections, you will need to talk with the Program Director and your Academic Advisor to identify the next steps. If you fail any two or all three sections, you will be administratively withdrawn from the Clinical Science graduate program.** Possible next steps include re-taking the failed section of the exam within a designated time period, completing additional courses before retaking the examination, or withdrawal from the program.

The scoring is as follows:

100 to 80 score = Pass
Less than 80 = Fail

Historically, the most **common error** made is **not reading the instructions carefully** and/or **not answering ALL components** of each question. This exam process is the equivalent to writing academic papers. Ensure your thoughts are well thought out, articulated, and supported by references.

Skipping a question or a section of a question is not a wise choice. It is better to provide your best answer possible than no answer at all. You should respond in full sentences – not outline format. The use of tables and figures to illustrate points is encouraged. Overall writing style and correct use of spelling and grammar are taken into consideration during scoring. Organizing responses according to the sections of the examination questions and sub-questions (with headers) is a useful approach (and makes your exam easier to grade).

Criteria Used for Grading

ANALYSIS

- Identify and organize elements in ways that demonstrates a logical coherent response
- Explain the central issues, problems and "puzzles" with respect to the topic under discussion
- Identify and explain unstated assumptions, logical fallacies, and extraneous aspects of an issue, problem or position
- Project the implications of an issue, problem, or position
- Explain and compare alternative views

SYNTHESIS

- Present succinct summaries of ideas that reflect comprehension of the whole while building a deliberate message concerning the topic under discussion
- Convey abstract relationships that form conceptual wholes
- Integrate a variety of sources to form a foundation for the student's unique ideas

CRITICAL SCHOLARLY ABILITIES

- Demonstrate critical self-awareness and reflective thinking
- Provide succinct, complete and direct responses to the issues

- Demonstrate a breadth of knowledge of the topic under discussion that is consistent with the breadth covered in the entry doctoral level courses
- Interpret existing literature without misrepresentation
- Demonstrate the ability to defend a logical position without prejudice

Preparation Tips and Study Guide

At a minimum, it is suggested that you dedicate at least 40 hours of study time for the Preliminary Exam.

You should review the course reading materials, textbooks, and class notes, as well as spend time reviewing the literature.

Biostatistics Section

The objectives for the biostatistics section are three-fold:

1) To demonstrate your familiarity with fundamental concepts and elements of probability, descriptive statistics and hypothesis testing;
2) To demonstrate that you can define and carry out a basic design and analytic plan for a study; and
3) To demonstrate that you can use appropriate computer packages for design and analysis.

Students should be comfortable with the following concepts:

- Dichotomous and continuous variables
- Power of a statistical test
- Sample size calculation
- Power calculation
- Normal distribution
- Inference from two-way tables

Be sure that you are comfortable programming in SAS and PASS (or some statistical software that can be used for sample size/power calculations).

Research Methods Section

From your epidemiology and research methods course material, you should review study designs that are commonly used in the field of clinical science research. The primary objectives for the research methods section of the exam are to ensure that students have the ability to:

1) Describe in detail each type of research design studied (providing definitions of key terms and appropriate examples);
2) Compare and contrast the strengths and weaknesses of various study designs, as well as in comparison to the randomized, controlled clinical trial;
3) Design and compare alternative design approaches to the randomized, controlled clinical trial; and
4) Select the best design to answer a clinical question or hypothesis and provide the rationale for the selection.

The questions in this section of the CLSC Preliminary exam will expect you to identify the "optimal" study design for a specific clinical question or hypothesis. Thus, you should examine each study design's

applicability to different types of clinical science research questions. Be sure to highlight and discuss literature-based examples of how different study designs have been used successfully.

Ethics Section

The primary objectives for the ethics section of the exam are to ensure that students have the ability to:

1) Describe the COMIRB requirements for paperwork and approvals (based on COMIRB web site). Additionally, it is important that student can explain the common pitfalls to avoid (based on COMIRB reviewer criteria) in preparing an informed consent document for approval;
2) Explain the historical foundations of the current requirements for ethical review of human subjects research. Please review the seminal works (e.g., Declaration of Helsinki, the Nuremberg Code, and the Belmont Report) carefully to identify the basic ethical principles that should guide the conduct of human subjects research; and
3) Apply their knowledge of ethical principles and regulatory issues to be addressed in a human subjects research to a selected case study situation.

Acknowledgment of NIH Funding on CCTSI Publications and Projects

The Clinical Science graduate program is a CCTSI (Colorado Clinical & Translational Sciences Institute) - sponsored Training and Education Resource. Any publications, patents, projects, or other tangible outcomes (including MSCS thesis/Publishable paper and PhD thesis) that benefit from any CCTSI resources **must credit the CTSA Grant**.

The following language should be used when citing the grant:
"This project/publication is supported in part by NIH/NCATS Colorado CTSI Grant Number UL1 TR004399. Contents are the authors' sole responsibility and do not necessarily represent official NIH views."

In addition, publications should be registered with PubMed Central.

More information is available on the CCTSI website at https://cctsi.cuanschutz.edu/resources/grant-language

Comprehensive Examination, Thesis Process and Thesis Defense

Comprehensive Examination and Expectations of Thesis Committee

The PhD Thesis Examination will examine the student for both the Comprehensive Examination, to qualify for PhD candidacy, and the PhD Thesis Defense Examination to complete the requirements of the PhD degree. Students select at least five members to serve on their PhD Thesis Committee. The PhD Thesis Committee is to be formed and meet once within 12 months of successful completion of the Preliminary Examination. It is expected that once the student passed the Comprehensive Examination that the PhD Thesis Committee will meet twice a year and at minimum once per year. Students should meet with individual committee members more regularly to take advantage of the individual member's expertise for successful project completion. Following the Comprehensive Examination and each Thesis Committee meeting, documentation of the student's progress and areas discussed is to be completed and forwarded to the CLSC Administrator (galit.mankin@cuanschutz.edu) using the Thesis Committee Report Form. The Chair is responsible for completing and submitting the form.

Prior to forming the PhD Thesis Committee, we encourage students to talk with a number of faculty members about possible topics during their first year of study. Following successful completion of the Preliminary Examination and within one year of this milestone, the PhD Thesis Committee must be formed and meet at least once. Academic Advisors are a wonderful resource for networking and identifying potential Research Mentors and committee members. When meeting with various faculty, you are not making any commitment to work with that person nor they with you. Do not assume that you need to find a topic on your own, but also do not assume that you will be handed a topic to work on. It will be helpful if you have some interests or specific things to suggest as you are meeting with faculty.

Once you have selected your Research Mentor, also known as the thesis supervisor, (which is the person you will work most closely with for your PhD research project and thesis) and are fairly confident you have identified a topic or specific aims for your research, begin forming the committee. You and your Research Mentor should identify other faculty to serve as PhD Thesis Committee members with whom you would like to work and would add expertise needed for your project. When you have agreed on a list of possible members, meet with each of those people to describe your proposed work and request committee membership. You and your committee should meet as a group every six months and a minimum once every year. You will also need to identify the Chair of your committee. The Research Mentor and Chair must be different. The Chair is responsible for adhering to the Graduate School and the CLSC program requirements and processes and reporting their outcome to the Clinical Science Graduate Program and the Graduate School. Specifically, they will complete and submit the CLSC Thesis Committee Report form (in the following pages) following each committee meeting, chair both the Comprehensive Examination and the PhD Thesis Defense Examination and will complete and submit necessary forms/documentation.

Expectations of the Student

Good supervisory practice entails responsibilities not only of the Research Mentor but also of the student. When a student enters a PhD program, that student commits time and energy necessary for research leading to a dissertation that makes a substantial and original contribution to knowledge and the field. This contribution is comparable to three published manuscripts. It is the responsibility of the student to conform to University and Clinical Science program requirements and procedures. Although it is the duty of the Research

Mentor to be reasonably available for consultation, the primary responsibility for keeping in touch and **setting up thesis committee meetings and examinations rests with the student**. It is the student's responsibility to ensure continued progress of their academic program and thesis research. The student's responsibilities include the following:

- Becoming familiar with, and adhering to, the rules, policies, and procedures in place in Clinical Science (CLSC) Program, and the University as outlined in available resources such as CLSC student handbooks/web site and University policies and thesis requirements.
- Developing an Individualized Career Plan (ICDP) that includes the CLSC Academic Plan and reviewing it regularly with your Academic Advisor, Thesis Research Mentor, and Thesis Committee members.
- Selecting and planning an original research topic that can be successfully completed within the expected time frame for the degree, in consultation with the Research Mentor and Chair.
- Learning and adhering to responsible conduct of research standards for their field, as well as the Principles of Responsible Conduct for Research at the University.
- Meeting with the Research Mentor regularly and when requested, reporting on progress and results, including informing the Mentor of any significant changes that may affect the progress of the research.
- Establishing a PhD Thesis Committee, with the assistance of the Mentor, early in the PhD program.
- Once a student passes the Comprehensive Examination, arrange two thesis committee meetings per year. At a minimum, an annual PhD thesis committee must be held. **If an annual PhD Thesis Committee meeting is not held, the student is at risk of being placed on academic probation.**
- Organizing thesis committee meetings including identification of meeting dates and time, agenda formation, creating and sharing a progress report with the Chair and Research Mentor one week in advance of the meeting. During the meeting, progress and accomplishments should be shared as well as challenges and areas for assistance and guidance.
- Maintaining good records of each stage of the research.
- When appropriate, planning to seek additional funding as needed well in advance.
- Regularly seek input of PhD Thesis Research Mentor and Committee members on drafts of student's research proposal and thesis (this may also include manuscripts in preparation) and allow sufficient time (2-4 weeks) for review and provision of feedback.

Expectations of the Research Mentor

The Thesis Research Mentor has the overall responsibility for guiding the student through the process of successful completion of a thesis that fulfills the expectations of scholarly work at the appropriate level as well as meets the requirements of the Clinical Science Program. It is highly recommended that Research Mentors be trained and prepared through participation in an official mentoring program, such as Mentoring3: Mentors, Mentees, Peers, CO-Mentor or CIMER. In addition to the expectations of serving as a PhD Thesis Committee member (described below), the Thesis Research Mentor will:

- Be able and willing to assume principal responsibility for advising the student related to the research project (design, conduct, analysis) and write up adhering to rigor and reproducibility principles/standards and ethical and regulatory principles.
- Have and provide adequate time to commit to the student for successful completion of the research/thesis and be accessible to the student.

- Provide adequate and timely feedback to both the student and the PhD Committee regarding student progress toward degree completion.
- Guide and provide continuing feedback on the student's development of a research project by providing input on the intellectual appropriateness of the proposed activities, the reasonableness of project scope, acquisition of necessary resources and expertise, necessary facilities (lab, etc.).
- Establish key academic milestones and communicate these to the student and appropriately evaluate the student on meeting these milestones.
- Review the student's career and research milestones identified on their Individualized Career Development Plan on a regular basis (at least quarterly).
- Assist the student in selecting and forming the PhD Thesis Committee.

Expectations of Members

In order to provide good supervisory practice, PhD Thesis Committee Members will:

- Have and commit adequate time to meet with students to advise and provide expertise and mentorship.
- Be accessible to the student for meetings (at a minimum this implies availability for Committee meetings, meeting individually with the student, the student's Comprehensive Examination and PhD Thesis Defense.
- Attend and participate in PhD Thesis Committee meetings twice a year and at a minimum once a year. Failure to do so jeopardizes the student's standing in the program.
- Ensure the student's work conforms to the highest standards of scholarly performance within the discipline and within the expertise provided by the Committee member.
- Provide advice to both the student and the student's Research Mentor(s) on the quality, suitability and timeliness of the work being undertaken.
- Approve the student's degree plan (e.g., courses of study, compliance with program's qualifying process, thesis proposal, etc.), assuring that the plan not only meets the intellectual needs of the student, but also all institutional and program requirements.
- Review dissertation drafts as provided by the student and provide feedback in a timely fashion to the student and the Research Mentor, as appropriate.
- Provide input in the selection and planning of an original research topic that can be successfully completed within the expected time frame (3-4 years for full-time study and 5-6 years for part time students).
- Ensure that students understand the relevant theories, methods, technical skills necessary for the research.
- Advise on and contribute to career development and professional development, examples include preparation of the CV, providing letters of reference, reviewing applications, and strategies for launching an academic career.
- Participate in evaluating the student's performance throughout the program and be honest with the student when academic performance is not meeting expectations.

Expectations of the Chair

PhD student committees are chaired by core CLSC faculty. The Chair of the PhD Thesis committee plays the primary role in ensuring that the committee meets all of its responsibilities and that Graduate School and Clinical Science Program's requirements, policies and practices are followed. They are also an advocate for the student and will assist with managing conflict, if it should arise.

- Responsible for completion and submission of the appropriate CLSC and Graduate School documentation and forms, which are submitted to Galit Mankin (galit.mankin@cuanschutz.edu), Program Administrator.
- Responsible for chairing PhD Thesis Committee meetings, the Comprehensive Examination and PhD Thesis Defense.
- Reviewing student progress reports, plans and ICDP prior to the PhD Thesis Committee meetings (provided by student one week prior to meeting).
- Serve as a key advocate for student success, being available to discuss any issues of importance, including thesis project, career planning, etc.
- Ensures that the committee meets twice yearly and at minimum, once yearly and completes and submits the Thesis Committee Report form to document the student's progress, accomplishments and areas of concern or disagreement.
- If conflicts arise between the student and the Research Mentor or PhD Thesis Committee members, the Chair will take the lead for resolution and management of conflicts and will notify the CLSC Program Director.

Graduate School Faculty Appointment

All members of the committee must have or be eligible for a Graduate School faculty appointment. A Graduate School faculty appointment listing is posted on-line at https://gs.ucdenver.edu/tbl_gradfac_curr.php

For a committee member who does not have a Graduate School appointment, students may request that the CLSC Program submit an appointment nomination to the Graduate School. To begin this process, the student must submit to Galit Mankin (galit.mankin@cuanschutz.edu) a CV of the nominee, which includes the teaching portfolio, and a written explanation of the contribution brought to the committee. Nomination requests must be submitted to the CLSC Program no less than two months before the planned Comprehensive and the PhD Thesis Defense examination date, if membership of the committee changes.

CLSC Committee Composition

- The committee must contain at least 5 members.
- The majority of committee members must be CLSC faculty.
- At least 1 member must NOT be from the CLSC faculty.
- Your Research Mentor (the person you will work most closely with to develop and conduct your research project) is a member and MUST attend the Comprehensive Examination and the Thesis Defense Examination but is NOT allowed to chair the committee nor the exams.

- The Chair of the committee must be a CLSC core faculty member (This includes the Track Directors, Educational Director, Program Director and Program Director Emeritus). This individual will chair the Comprehensive Examination, your committee meetings, and the Thesis Defense Examination.

Comprehensive Examination Planning Process

Admission to Candidacy

Graduate School Policies & Procedures apply to Comprehensive Exams of all CLSC PhD students. The purpose of the Comprehensive Examination is to provide the candidate with the opportunity to demonstrate mastery of a broad range of knowledge in clinical science. While specific courses completed by the candidate are important, their content has been tested as a portion of the grading process for the course AND THE Preliminary Examination. The Comprehensive Examination is not, therefore, a re-examination of course content but rather the integration and application of knowledge and skills. A form of evidence of this ability is the student's thesis proposal. The candidate should demonstrate synthesis of knowledge in the areas of:

- theory construction, analysis, and evaluation;
- research and analytic methods required to answer significant clinical science questions;
- existing and emerging knowledge in clinical science, the identified clinical science track and other contributing fields.

Before admission to candidacy for the PhD in Clinical Science, each student must pass a Comprehensive Examination in the selected track or field of concentration. This examination will include: 1) a written exam component, 2) a presentation of the thesis proposal that is open to the public, and 3) a closed oral exam on the proposal, related clinical science topics and synthesis of completed coursework. The format of the written exam requirement is the first three chapters of your doctoral thesis dissertation, which includes the introduction and problem statement, review, critique and synthesis of the literature, specific aims, research questions/hypotheses and the methods used to address research questions/hypotheses.

Requirements Prior to Scheduling the Comprehensive Examination

- Preferably completed by the end of the student's third year or early in the fourth year.
- Successful completion of the Preliminary Examination.
- Completion of or current registration for all program-required, non-thesis coursework.
- Validation of any course work to count toward the degree that was taken more than 7 years before the Comprehensive Exam.
- A cumulative G.P.A. of 3.00 or higher for completed CLSC program coursework.
- Registration for a minimum of one credit during the semester of the Comprehensive Examination.
- Attendance at the public presentation portion of at least one CLSC peer's Comprehensive Examination.
- A CLSC program-approved list of committee members, including the Research Mentor and Thesis Committee Chair.
- The student must prepare a written research proposal that consists of the first three chapters of the thesis dissertation, which was reviewed by your entire PhD Thesis Committee with feedback provided to the student and Research Mentor.

- The student must initiate the "Approval of Thesis Proposal Form" (signed/email chain documenting approval by Chair & Mentor) and submit the thesis proposal to the PhD Committee members and Galit Mankin at least **8 weeks** before the exam.
- The Final Draft of the thesis proposal must be distributed to the PhD Committee members at least 4 weeks in advance of the Comprehensive Examination.

All required paperwork must be completed and submitted to Galit Mankin **NO LESS THAN 30 DAYS** before the exam is held.

- University-wide Instructions and Forms for the Comprehensive Examination are available in the Student Services section of the Graduate School website: https://graduateschool.cuanschutz.edu/forms-resources/resources

  Please read all instructions carefully. An "Application for Admission to Candidacy" form must be submitted along with the "Request for Scheduling Exam" form.
- The paperwork requires the CLSC Program Director to review, approve and sign the form before the Graduate School will accept it.
- Any student who does not meet the Graduate School deadlines will be required to re-schedule his/her Comprehensive Examination. Therefore, we strongly recommend students begin the paperwork process **NO LESS THAN 8 WEEKS** before the planned exam date.

Extremely Important: Students must be registered at the time they take the Comprehensive Examination. Students who schedule their examinations after the last day of a given term must register in the subsequent term.

- In addition to the maximum 10 thesis hours that may be completed *prior* to the Comprehensive Exam (and *after* passing the preliminary exam), up to 10 additional thesis hours may be completed *during* the semester in which the Comprehensive Exam is taken.

Scheduling

- Due to limited faculty availability during the Summer semester, Comprehensive Exams will normally be held during Fall and Spring semesters. The Comprehensive Exam can be held in a room on the AMC campus or an AMC-affiliated campus. If there are extraordinary circumstances that do not allow one or more committee members to attend the exam in person, the Committee chair might choose to hold the exam by Zoom or as a hybrid.
- The Graduate School requires that students and committee members set aside 3 hours for the Comprehensive Exam.
- Contact CU Denver | Anschutz Medical Campus Educational Support Services to reserve a room and any necessary audio-visual equipment (e.g., projector): https://www1.ucdenver.edu/offices/office-of-information-technology/services/academic-technology-and-classroom-support

Comprehensive Examination Process/Content

All members of the committee must be present for the examination. Any costs incurred to bring an outside member to campus or to connect the member by interactive video/telephone are the responsibility of the student. The examination form, indicating the pass, conditional pass, or fail status of the exam, will be initiated by the Graduate School in DocuSign and will be routed for signatures to all committee members.

The thesis proposal should describe the proposed topic, background and relevant literature, theoretical foundations, specific aims, research questions and hypotheses, and methods. The student and the Research Mentor (and perhaps other committee members) should work together to get the proposal in good shape, and then circulate it to the committee for comments. This process is meant to help assess the level of agreement between the student and the committee, describing expectations and scope of work. The PhD research project and thesis should show originality on the part of the student and be of peer-reviewed publishable quality for three scholarly papers.

Thesis Proposal

1) Cover letter/memo: Provide a list of the names of the Comprehensive Examination Committee, provide the date, time, location (including room number) and title of the proposal and oral presentation.
2) Chapter 1- Introduction: Provide a brief overview, conceptual framework, purpose, and problem statement of the proposal.
3) Chapter 2- Background/Review of the Literature: Perform a review of the literature that identifies, reviews, and critically appraises existing knowledge in the identified fields and topics. Gaps in evidence, knowledge and/or practice should be identified that the proposed project addresses.
4) Chapter 3- Study Hypotheses, Methods and Analysis Plan: Briefly present the proposed study's hypotheses/research questions, the methods proposed to address the hypotheses/questions and the accompanying analysis plan.

Evaluation Criteria for the Paper/Written Element

- Focuses on a substantive topic in clinical science that synthesizes theory, research and practice.
- Reflects breadth of knowledge in the field.
- Reflects understanding of the issues and problems related to the topic.
- Presents original ideas and sound rationale; the significance for clinical science is convincing.
- Discusses and suggests methods and approaches to the inquiry.
- Is concise, logical and readable.
- The content is well founded and accurate.
- Citation and documentation of sources used are accurate and comprehensive.

Comprehensive Exam Structure

The Comprehensive Examination has two components: 1) a formal, public presentation of the student's thesis (dissertation) proposal, and 2) a closed discussion with the exam committee during which the student is required to demonstrate in-depth knowledge of the methodological, clinical and social issues pertinent to the student's project and selected track.

The public presentation should last approximately 40 minutes, followed by an open question-answer session. Following the public presentation is a closed meeting with committee members. During this exam component, content from courses and the student thesis proposal will be covered (related fields of study, methodology, statistics). Listed below are some examples of core content areas according to track.

- Clinical Investigation: Students will be expected to demonstrate their knowledge and understanding of the challenges and potential solution/approaches used in clinical investigations, research methods, and principles of clinical translation.
- Health Information Technology: Students will be able to present and discuss the goals and objectives for HIT in clinical, financial and administrative realms; describe the role of HIT in improving patient safety, quality, and operational efficiencies; and explain the major barriers to implementing HIT.

Prior to their own Comprehensive Exam, CLSC students must attend at least one of their CLSC peer's public presentation component of the Comprehensive Examination. Students are encouraged to attend more than one to become familiar with the process and to participate in the scholarly dialogue.

Examination Grading

There are three possible outcomes for the Comprehensive Exam:

1) Pass – The student must receive affirmative (passing) votes from the majority of the committee members to pass.
2) Pass with conditions – The committee may decide that although the student has passed the examination the student should complete additional work on the thesis proposal or coursework. Areas of additional work or other conditions will be specified on the examination form and must be completed to the satisfaction of the examination committee within 4 months of the examination. The committee chair is responsible for monitoring the conditions and reporting the outcome to the Graduate School and to the Clinical Science Program office. Failure to satisfy these conditions will result in failure of the examination.
3) Fail – If the student fails the examination, per Graduate School Policies & Procedures, the student may be subject to immediate dismissal from the program. At the program's discretion, the student may be allowed to re-take the examination once. The re-examination will be in the form designated by the committee and must be completed within twelve (12) months. The original examination form noting the failure is signed by the committee and returned to the Clinical Science Program office. New examination forms will be generated when the examination is rescheduled. The student will be required to meet registration requirements and be registered during the term in which the repeat exam is taken.

Upon completion of the Comprehensive Examination, the Chair ensures completion of the proper forms. Please refer to the PhD Comprehensive Examination Checklist to ensure completion of all required Graduate School and CLSC forms. *These forms should never be in the student's possession*. Copies will be kept in the student's file.

Post Comprehensive Exam Requirements

- After passing the Comprehensive Examination, students must register for at least 5 dissertation/thesis credits every semester (excluding the summer semester).
- The student must register for a minimum of 5 thesis credits during the semester in which he/she defends the PhD dissertation (summer is NOT excluded in this instance).

- A maximum of 10 thesis credits can be taken in any semester. Only 10 thesis credits taken prior to the Comprehensive Examination (and *after* passing the preliminary exam) to be counted towards the minimum 30 credit hours required.
- In addition to the maximum 10 thesis hours that may be completed *prior* to the Comprehensive Exam (and *after* passing the preliminary exam), up to 10 additional thesis hours may be completed *during* the semester in which the Comprehensive Exam is taken.

Important Note: There is some strategy required in taking thesis credits. Because of the continuous registration requirement, taking too many credits early may result in additional expense; however, if a student takes too few, it may limit how quickly the student can graduate.

Committee Meetings

Once the student passes the Comprehensive Examination, the PhD Thesis Committee should meet twice a year and at minimum once per year (failure to do so can place the student on academic probation). The student should also meet with individual committee members more regularly to take advantage of the individual members' expertise for successful project completion. The Chair should complete and return the CLSC Thesis Committee Report Form to the CLSC Program Administrator immediately following each Committee meeting.

CLSC Dissertation/Thesis Proposal- Comprehensive Exam

The format of your written element of your Comprehensive Examination is the first chapters of your thesis dissertation up to the Results Chapter. Therefore, it includes the introduction and problem statement, review, critique and synthesis of the literature review, hypothesis(es), Research Questions, Specific Aims, the conceptual framework/theory and the proposed methods.

Criteria for Assessment of Dissertation Proposals During the Comprehensive Examination

1. Introduction and Statement of the Problem
    - Does the introduction provide a general overview of the issues surrounding the study proposed (part of the study rationale)
    - Is the problem under investigation clearly stated?
    - Is there evidence to demonstrate the significance of the study?
    - Are important terms and concepts defined?
    - Are assumptions clearly stated?
    - Are major assumptions that lay the groundwork for the study articulated?
2. Literature Review
    - Is the study grounded in a larger body of work/research?
    - Is the review/literature current and representative of the related work in the area?
    - Are the related studies critically appraised and the gaps clearly articulated?
    - Does the review provide a clear rationale for the study and the gaps that are addressed by the study?
    - Is the literature review well-structured/organized through the use of sub-headings and graphics/images, when appropriate?
3. Hypothesis/Hypotheses, Research Questions, Specific Aims
    - Do the specific aims, hypothesis(es) and/or research questions support/aligned with the problem statement, background and literature review?
    - Do hypothesis(es) and/or research questions contain essential details such as PICOTS (population, intervention, comparison, intervention, time and setting)?
    - Are they written that imply responses more complex than “Yes/No”
4. Conceptual Framework/Theory
    - Does the proposal provide a conceptual framework that unites the proposal and provides support for the approach and variables? (This can be a separate chapter or part of the Methods Chapter)
5. Methods
    - Is the study design explicitly identified and described and is it appropriate to address the hypothesis(es) and/or research questions posed?
    - Are the sample and participants fully described?
    - Is the sampling and recruitment plans clearly described?

- Is there a good discussion of sample size and if appropriate sample size estimation with power calculation?
- Are data collection procedures fully explicated and appropriate hypothesis(es) and/or research questions posed?
- Are analytical procedures (stats, handling of missing data, etc) fully explicated and appropriate to address hypothesis(es) and/or research questions posed?
- Are the merits (validity, reliability, responsiveness) of instruments/ procedures/protocols described clearly?
- Are anticipated problems and possible solutions discussed?
- Are the appropriate ethical and regulatory approvals included?
-

6. General
    - Does the proposal demonstrate a high quality of written expression?
    - Is the proposal cohesive and coherent?

UNIVERSITY OF COLORADO DENVER

CLINICAL SCIENCE GRADUATE PROGRAM

Approval of Thesis Proposal

The following members of the Thesis Committee have approved the dissertation proposal submitted by _____
Doctoral Candidate

Chairperson _____
Print name

_____
Signature Date

Research Mentor _____
Print name

_____
Signature Date

This form is to be submitted to the Clinical Science Graduate Program's Administrative Office:
Galit.mankin@cuanschutz.edu

Clinical Science PhD Program
Comprehensive Examination Checklist
(Expectations of the Chair)

2-4 days prior to the Comprehensive Examination, ensure that you have received the necessary paperwork from Galit Mankin:

- Graduate School Information/Instruction sheet ☐
- Graduate School Confirmation Sheet ☐
- Graduate School Comprehensive Examination Report form ☐
- CLSC Comprehensive Examination Attendance form ☐
- Student's completed coursework and grades record ☐
- CLSC Comprehensive Examination Report form ☐

- Copy of Student's Thesis proposal - should be provided by the student directly to the committee members

If you have not received these documents, please contact Galit Mankin at galit.mankin@cuanschutz.edu

Day of the Comprehensive Examination

1. Have attendees sign-in using the CLSC Comprehensive Exam Attendance form
2. Introduce the student and the title of his/her thesis proposal
3. Explain the structure of the Comprehensive Examination
   - Open forum session will include PhD student's presentation (approx. 40-45 mins) followed by questioning (approx. 20-30 mins)
   - Closed session follows the open forum (only committee members and student)
4. Following the presentation and questioning, thank and dismiss attendees and begin the closed session (ONLY committee members and student)
5. Ask student to step outside room (10mins), while the examination committee discusses the following points:
   i. Ensure all members have read the proposal
   ii. Determine order and format of questioning
   iii. Review student's coursework and grades
   iv. Determine if there are major concerns of the candidate
6. Call student back into the examination room to begin closed session questioning
7. Once questioning is completed, ask student to step outside the room (10-15 mins) while committee deliberates.
8. Chair the committee member executive session
   a. Determine examination grade: pass, pass with conditions, or fail
   - If pass with conditions, the conditions need to be clearly documented and a date by which the conditions must be met identified on paper (conditions must be satisfy within 4 months). This paper should be provided to the CLSC Program Administrator, Galit Mankin.

b. Have committee members sign Graduate School Comprehensive Examination Report form
c. Complete the CLSC Comp Exam Form with committee member input

9. Call the candidate back into the room to join the committee and share the results of the examination. If there are conditions, explain the steps that the student must complete and the timeframe for completion.

10. Remind the student that the CTSA grant must be cited in the finalized version of the student's Thesis. The following language should be used when citing the grant:
"This project/publication is supported in part by NIH/NCATS Colorado CTSI Grant Number UL1 TR004399. Contents are the authors' sole responsibility and do not necessarily represent official NIH views."

In addition, publications should be registered with PubMed Central.

11. Completed Graduate School forms will be submitted via DocuSign. CLSC forms should be emailed to: Galit.mankin@cuanschutz.edu

AT NO TIME IS THE STUDENT TO HAVE POSSESSION OF ANY OF THE GRADUATE SCHOOL FORMS

CLSC Comprehensive Examination Report

Student:_____Date of Exam:_____

Chair:_____ Research Mentor: _____

Members in Attendance: _____

_____

The student's performance during the Comprehensive Examination and review of the written thesis proposal and coursework grades suggest that the student is progressing as follows towards CLSC core competencies:

1. Understands legal, ethical and regulatory issues related to clinical research and principles for Responsible Conduct of Research.
   ☐ Exceeds expectations ☐ Meets expectations ☐ Below expectations

2. Critically appraise existing literature and sources of information.
   ☐ Exceeds expectations ☐ Meets expectations ☐ Below expectations

3. Accurately select, use and interpret commonly used statistics.
   ☐ Exceeds expectations ☐ Meets expectations ☐ Below expectations

4. Apply and use appropriate study designs and methods to address research questions/hypotheses.
   ☐ Exceeds expectations ☐ Meets expectations ☐ Below expectations

5. Identify and measure clinically relevant and meaningful outcomes.
   ☐ Exceeds expectations ☐ Meets expectations ☐ Below expectations

6. Design and conduct clinically and patient oriented research studies.
   ☐ Exceeds expectations ☐ Meets expectations ☐ Below expectations

7. Demonstrate effective communication and leadership skills.
   ☐ Exceeds expectations ☐ Meets expectations ☐ Below expectations

8. Participate in interdisciplinary collaboration.
   ☐ Exceeds expectations ☐ Meets expectations ☐ Below expectations

Comments:

Please submit completed form to: Galit.mankin@cuanschutz.edu

CLSC Comprehensive Examination Attendance Form

SPEAKER: _____

DATE: ____ / _____ / _____

ATTENDEES (please PRINT name clearly):

1.	26.
2.	27.
3.	28.
4.	29.
5.	30.
6.	31.
7.	32.
8.	33.
9.	34.
10.	35.
11.	36.
12.	37.
13.	38.
14.	39.
15.	40.
16.	41.
17.	42.
18.	43.
19.	44.
20.	45.
21.	46.
22.	47.
23.	48.
24.	49.
25.	50.

CLINICAL SCIENCE GRADUATE PROGRAM

Thesis Committee Report

Student:_____ Date of Meeting:_____

Research Mentor:_____ Dissertation Chair:_____

Committee Members in Attendance:

_____

_____

1. Has the student made satisfactory progress? YES NO
   If yes, attach student's progress summary.
   If no, explain the reasons.

2. Please list publications submitted, In Press, published and/or grants submitted, or awarded since the last committee meeting.

3. Is there evidence that the student is sufficiently committed to the research? YES NO

4. Does the student have sufficient knowledge of the current literature?
   ☐ Exceeds expectations ☐ Meets expectations ☐ Below expectations ☐ Unable to assess/Too early

5. Is the student able to critically appraise evidence and various sources of information?
   ☐ Exceeds expectations ☐ Meets expectations ☐ Below expectations ☐ Unable to assess/Too early

6. Does the student have sufficient knowledge to apply legal, ethical, and regulatory issues related to clinical research and principles for the Responsible Conduct of Research?
   ☐ Exceeds expectations ☐ Meets expectations ☐ Below expectations ☐ Unable to assess/Too early

7. Did the student display the ability to select, use and interpret commonly used statistics and forms of analyses?
   ☐ Exceeds expectations ☐ Meets expectations ☐ Below expectations ☐ Unable to assess/Too early

8. Did the student demonstrate the ability to use appropriate research design to address the research questions or hypotheses?
☐ Exceeds expectations ☐ Meets expectations ☐ Below expectations ☐ Unable to assess/Too early

9. Does the student have ability to identify and measure clinically relevant and meaningful outcomes?
☐ Exceeds expectations ☐ Meets expectations ☐ Below expectations ☐ Unable to assess/Too early

10. Through the final research project, is the student participating in interdisciplinary research?
YES NO

11. Has the student communicated effectively (written and oral) in committee meetings?
☐ Exceeds expectations ☐ Meets expectations ☐ Below expectations ☐ Unable to assess/Too early

12. What are the specific concerns of the committee related to the project/student?

13. The committee recommends the following activities, experiments and/or goals to be accomplished by the next meeting.

14. Has the student been made aware of concerns, expectations or recommendations of the committee?
YES NO
If yes, explain.

15. Are there any disagreements within the committee or between committee members and the student?
YES NO

16. Date by which next meeting should be held?_____

This form is to be submitted to the Clinical Science Graduate Program's Administrative Office: Galit.mankin@cuanschutz.edu

Thesis Process

1. Form the committee: See above Comprehensive Examination and Thesis Committee Membership.
2. Draft a proposal: See above Comprehensive Examination Process/Content.
3. Conduct the research: The student will work with the Research Mentor and committee members to carry out the proposal. As things develop there will likely be some variation from the proposal, which is okay. Research involves collaboration. Some committees or individual members meet regularly (e.g., weekly) while others meet upon request. However, the student should not spend long periods of time working alone without talking with the Research Mentor – this is a recipe for delay, expenses, and/or failure. PhD Thesis Committees should meet twice a year and MUST meet at least once a year. Failure to meet once a year jeopardizes the status of the student in the program. Thesis Committee Report is to be submitted to the CLSC Administrative Office following the meetings by the Thesis Committee Chair. Students must register for at least five thesis hours each fall and spring semester extending through the semester of the PhD Thesis Defense Examination. The final grade for the thesis (thesis course credit hours) will be withheld until the thesis is completed and approved by the Graduate School; the student will receive a grade of "In Progress" (IP) until that time.
4. Write the thesis: The thesis must meet the formatting criteria outlined in CU Denver | Anschutz Medical Campus Graduate School Thesis Specifications. The student will draft and circulate thesis elements as progress is made. The Research Mentor should review and work with the student before drafts are provided to Thesis Committee members. The goal is for the student to initiate and receive feedback often and to incorporate all required changes/revisions.

Thesis Chapter Content Requirements

There is some variation in chapters across theses, but all theses must contain the information listed below and adhere to the Graduate School requirements.

Chapter 1- Introduction: Provide a brief overview, conceptual framework, purpose, and problem statement of the project.

Chapter 2- Background/Review of the Literature: Perform a review of the literature that identifies reviews and critically appraises existing knowledge in the identified fields and topics. Gaps in evidence, knowledge and/or practice should be identified that the project addresses.

Chapter 3- Study Hypothesis/es or Research Questions, Methods, and Analysis Plan: Provide the study's overall purpose, research question(s) hypothesis/es, specific aims, and a detailed description of the research methodology and analytical approach used. Where appropriate, detailed lab protocols should be specified (but may be included in an appendix). A power calculation/sample size calculation would normally be included. If qualitative or exploratory work was involved to complement the primary hypothesis-driven study approach, these study aims and methods should be described also. Appendices are helpful to provide copies of instruments, calibration assessments, key diagnostic tests, clinical performance metrics, study data forms, study data definitions, survey instruments, or any other source documents related to the study. The student's thesis COMIRB application and (at a minimum) COMIRB approval documentation (including HIPAA documentation if appropriate) should be included as a separate appendix.

Chapter 4- Study Results: Tables, graphs, and a detailed summary of the study findings should be presented.

Chapter 5- Conclusion/Discussion: The project's conclusions are presented and a discussion of the implications (as related to the field of clinical science) provided. The impact on patient care should be discussed. Strengths and limitations of the work are also described. Future research directions and/or research projects planned may be discussed in this chapter or an additional chapter.

Thesis Defense

The PhD Thesis Defense is the official Graduate School final exam for the PhD degree. Graduate School Policies & Procedures apply to PhD Thesis Examinations of all CLSC PhD students.

Due to limited faculty availability during the Summer semester, PhD Defense Examinations will normally be held during Fall and Spring semesters. The PhD Defense Examination can be held in a room on the AMC campus or an AMC-affiliated campus. If there are extraordinary circumstances that do not allow one or more committee members to attend the exam in person, the Committee chair might choose to hold the exam by Zoom or as a hybrid. All members of the committee must be present for the examination. Any costs incurred to bring an outside member to campus or to connect the member by interactive video/telephone are the responsibility of the student. The examination form, indicating the pass, conditional pass, or fail status of the exam, will be initiated by the Graduate School in DocuSign and will be routed for signatures to all committee members.

- The Graduate School requires that students and committee members set aside 3 hours for the PhD Defense Examination.
- CU Denver-Anschutz Medical Campus Educational Support Services (https://www1.ucdenver.edu/offices/office-of-information-technology/services/academic-technology-and-classroom-support) is available for reserving a room and providing equipment (e.g., projector).

Please note that the following forms need to be completed and submitted to CLSC Administrative Office. Allow a minimum of **4 weeks for the CLSC and the Graduate School to process the required forms*:***

1) *Request for Scheduling Exam form (a Graduate School form SUBMITTED VIA DOCUSIGN)*
2) *Biosketch (a Graduate School form SUBMITTED VIA DOCUSIGN)*
3) ***Permission to Proceed to Defense form*** *(a CLSC program form)*

- Students are strongly advised to begin the paperwork process **NO LESS THAN 8 WEEKS** before the planned exam date. The student must initiate the "Permission to Proceed to Defense" form (signed/email chain documenting approval by each Committee Member) and circulate the thesis dissertation to the thesis Committee and Galit Mankin at least **8 weeks** before the exam.
- Final draft of the thesis dissertation must be distributed to PhD Thesis Committee members at least 4 weeks in advance of the PhD Defense Examination.
- Students who have passed the Defense Examination and whose final copy of their thesis/dissertation has been examined and found to meet scholarly and presentation standards of work in their program must submit the **Thesis Approval Form** through DocuSign by the required Graduate School deadline.

Graduate School deadlines for graduation are listed in the Deadlines and Forms section of the Graduate School website. ***It is crucial to check the Graduate School deadlines to ensure a smooth process.*** Graduation packets containing all necessary instructions and paperwork are available from the Graduate School office or website.

Students must be enrolled for at least 5 thesis credits (CLSC 8990) during the semester in which the PhD Thesis Defense is held.

Similar to the Comprehensive Examination, the thesis defense consists of an open-to-the-public oral presentation and question period followed by a closed session with the members of the examination committee. All CLSC Program faculty and students will be invited to attend the oral presentation. The public presentation should last approximately 50 minutes with 20-30 minutes available for open public discussion.

At the thesis defense, a majority vote of the Comprehensive and Thesis Committee members is required. This committee will evaluate both the oral defense and written thesis. Following deliberations, the committee will vote to pass, conditionally pass (with modifications required to the written thesis draft) or fail a student for his/her thesis defense. If changes are required, final review and approval by the committee chair (who will determine that the committee's stipulated modifications have been completed successfully) will be obtained. If a student passes the examination with conditions, those conditions must be satisfied within 60 days for the PhD degree.

A current Format Guide for Theses and Dissertations is available on the Graduate School website. The student's final thesis dissertation **must be uploaded by the published deadline** in order to graduate in that semester. In addition, an electronic copy MUST be submitted to the program within 60 days of the thesis defense date.

Clinical Science Program
Guidelines for Doctoral Dissertations

Please review and follow the Graduate School Formatting Guidelines
http://www.ucdenver.edu/academics/colleges/Graduate-School/Documents/GSOCTFORMS/Format-Guide.pdf

PhD dissertation research is the vehicle through which students learn to independently conduct, complete, and communicate research. The doctoral dissertation should reveal the student's ability to discover, analyze, interpret, synthesize, and disseminate information through the process of:

1. Generating research questions/hypotheses of interest and import to the student's chosen field;
2. Placing the research questions/hypotheses in the context of research literature relating to the project with a particular emphasis on prior scholarship on which the dissertation is built;
3. Describing and executing appropriate methodology;
4. Presenting results in a logical manner; and
5. Fully and coherently discussing the meaning of the results and placing it within the body of existing literature.

The dissertation should be:

1. Original (i.e., it builds on or extends what is currently known).
2. Substantial and researchable (i.e., it addresses a significant problem that:
    - Poses a puzzle to the field at a theoretical, methodological, or policy level;
    - Requires an analytical discussion, beyond simple cataloging or describing; and
    - Employs a reasonable research methodology).
    - Results in the equivalent of about 3 publications
3. Manageable (i.e., the scope of the project is appropriate given limited time and resources).

.
Length: Most range between 150-200 pages

General Outline for Doctoral Dissertation

Title
The title must be pertinent to your project.

Abstract
The abstract is a brief summary of your work. It should include the research questions/hypothesis(es), the methodology and the key results. The abstract is typically written last. Abstract uses a structured format Background/ Rationale, Objective/Purpose, Methods, Results, Conclusion and is within the 350 words limit.

Chapter 1 Elements

Introduction

This is a *general* introduction to what the thesis is all about and its structure-- it is *not* just a description of the contents of each section. Briefly *summarize* the question (you will be stating the question in detail later), some of the reasons why it is a worthwhile question, and perhaps give an overview of your main results. This is a birds-eye view of the answers to the main questions answered and how this thesis adds value to the known literature.

What is the topic and why is it important? State the problem(s) as simply as you can. Try to step back mentally and take a broader view of the problem. How does it fit into the broader world of your area/discipline?

In the introduction, do not overestimate the reader's familiarity with your topic. You are writing for researchers in the general area, but not all of them need be specialists in your particular topic. The introduction should be interesting. For the first paragraph or two, tradition permits prose that is less dry than the scientific norm. Try to make the reader want to read the heavy bundle that has arrived uninvited on his/her desk. Go to the library and read several thesis introductions. Did any make you want to read on? Which ones were boring?

This section might go through several drafts to make it read well and logically, while keeping it short. For this section, it is a good idea to ask someone who is not a specialist to read it and to comment. Is it an adequate introduction? Is it easy to follow? Your introduction should tell where the thesis is going, and this may become clearer during the writing. This section will need revision following completion of the study.

Literature Review

The focus/topic of the dissertation must be well grounded in the relevant theoretical and/or empirical literature related to the topic. This means that an extensive literature review needs to be conducted as the basis for the proposal and the dissertation, in defense of the chosen topic. The extent and type of literature search strategy should be discussed with your mentor/committee. You should have a description, table or algorithm that describes your search strategy and results and approach to finding and reviewing the relevant research. This literature review must also widely and firmly support the research questions, the research design, and any hypotheses that may be tested.

Here you review the state of the literature relevant to your thesis. The idea is to *present* the major ideas right up to, but not including, your own personal brilliant ideas.

This section is organized *by idea*, and not by author or by publication.

Where did the problem come from? What is already known about this problem? What other methods have been tried to solve it?
Ideally, you will already have much of the hard work done, if you have been keeping up with the literature. If you have summarized those papers, then you have some good starting points for the review.

> For example, when you start reading about a topic, you should open a spread sheet file, or at least a word processor file, for your literature review. Of course, you want the reference but you also write a summary (anything from a couple of sentences to a couple of pages, depending on the relevance). In other columns of the spread sheet, you can add key words (your own and theirs) and comments about its importance, relevance to you and its quality.

How many papers? How relevant do they have to be before you include them? Well, that is a matter of judgment. You are the world expert on the topic of your thesis: you must demonstrate this.

Problem Statement, Research Questions, Hypotheses

You need to describe the overall or general "problem" to be solved and the specific research questions and/or hypotheses to be answered. In either case, this section has four main parts:

1. a concise statement of the problem
2. importance of the problem, i.e., why it is worth researching, why it matters to the field.
3. justification, by *direct* reference to the Literature Review chapter, that your question is previously unanswered- what gaps are addressed
4. specific aims, research questions/hypotheses that your thesis tackles

Items 2&3 above are where you *analyze/critically appraise* the information you presented in the Literature Review. For example, maybe your problem is to "develop an algorithm capable of handling very large scale problems in reasonable time" (you would further describe what you mean by "large scale" and "reasonable time" in the problem statement). Now in your *analysis* of the state of the art you would show how each of the current approaches fails (i.e. can handle only small problems, takes too much time, requires very expensive software). In the last part of this section you would explain why having a large-scale fast algorithm is useful; e.g., by describing applications where it can be used.

You must make it clear in this section how what you want to do differs from what has been done before and how it builds upon the past work. You should also be able to show that the question you want to answer will further the state of knowledge in your field. Finally, the statement of problem should culminate in the identification of one or more testable hypotheses/research questions that you think will address the statement of problem.

Chapter 2 Elements

Theoretical OR Conceptual Model

1. Chapter 2 provides a conceptual model or theoretical foundation(s) supporting the problem/issue and a description of the methods used to address the research questions and hypotheses posed. The dissertation must have a theoretical framework that is steeped in and builds upon the relevant knowledge base. Theoretical frameworks must contribute to conceptual or theoretical models that can

be tested by theoretical or empirical means. The theoretical or conceptual framework should be used to motivate the hypotheses and the empirical specifications that are used to test hypotheses. This can be a stand alone chapter or integrated into the Methods Chapter.

S**tudy Design, Methods and Statistical Approach**

The topic of the dissertation and the nature of the research question(s) or hypothesis(es) must lead the research design. Some questions/hypotheses may require different research designs. For example, some topics and research questions in the field are best suited to some form of qualitative research while others may be best suited to some form of quantitative research. Some topics may be best suited for a combination of qualitative and quantitative research. It is the nature of research questions that determines the appropriate research design.

Methods of data collection and techniques of analysis must be consistent with the research design. For example, if the research questions call for survey research, then they must conform to the best standards of survey research and subsequent statistical analysis. If the research questions call for an econometric model, then the methods of data collection and analysis must conform to the best standards of econometric modeling. If the research questions call for some form of qualitative research design, then the methods of data collection and analysis must conform to the best standards of a particular form of qualitative research. Data collection and analysis, whether quantitative or qualitative must build a strong bridge between conceptualization (conceptual model/framework or theory) and operationalization. Standard Operating Procedures should be mentioned and provided in Appendices. Data collection instruments are also provided in the Appendices.

IRB and IACUC

Include COMIRB and other IRB submitted to and approved along with the protocol number(s) for all research involving human subjects/participants. For live animals, animal tissue or observational animal work, include your IACUC protocol number. Include your IRB and or IACUC submissions in Appendices.

Chapter 3 Elements

Results

Results of the research are presented clearly and address the research questions/ hypotheses. Styles for presenting results in your dissertation may vary. In general, there are 3 options:

2. Results are described through tables, figures, graphs, images and text.
3. Results are written as full manuscripts that are in submission-ready form as they would be submitted for publications (3 papers).
4. Published, In Press or submitted peer-reviewed manuscripts (3 papers) of your research results are presented in the results section or contained in the dissertation as separate chapters following chapter 2 (theoretical/conceptual framework and methods).

*For students that choose option 3- dissertations that use the style of presenting/inserting three Published, In Press or submitted peer-reviewed manuscript*s may choose to have each published paper serve as a separate chapter of the dissertation. The published papers must be re-formatted to follow the Graduate School Format Guide for Theses and Dissertations. (See above at the top of the document). In addition, for multi-authored papers, a description must be included that provides the full reference citation (could be included as a footnote or note at the top of the section/chapter) and describes the student's role and

contributions, such as

> "This chapter is adapted from [Title] published in [Journal] and has been reproduced with the permission of the publisher and my co-authors [List co-authors]" and include the full citation required by the publisher. Students who use this approach may have shorter final conclusions and discussion chapters.

Students should discuss the best thesis structure option for their thesis early in the process (before the Comprehensive Examination). In addition, it is important to consult with your thesis committee regarding expectations for the methods and final conclusions and discussion chapters.

Last Chapter: Conclusions and Discussion
Generally, three things are covered in the Conclusions and Discussion Chapter, and each of these usually merits a separate subsection:

1. Conclusions
2. Summary of Contributions and Implications
3. Limitations of Research
4. Future Research

Conclusions are *not* a rambling summary of the thesis: they are *short*, *concise* statements of the inferences that you have made because of your work. It helps to organize these as short numbered paragraphs, ordered from most to least important. All conclusions should be directly related to the research question stated in the Problem Statement, Research Questions, Hypotheses chapter.

The Summary of Contributions and Implications will be sought and carefully read by the examiners. Here you list the contributions of *new* knowledge that your thesis makes and how it builds on existing literature as well as how your work contradicts the previous work of others. Of course, the thesis itself must substantiate any claims made here. There is often some overlap with the Conclusions, but that's okay. You also want to highlight/discuss the implications of your work. This summary should be organized around your contributions to and implications for research/methods, theories/models/framework, and clinical practice.

The Future Research subsection is included so that researchers picking up this work in future have the benefit of the ideas that you generated while you were working on the project. Future work should relate to the clinical area, methods, and theory.

5. *Dissertations that use the style of presenting three Published, In Press or submitted manuscripts approach* has the last chapter present and discuss linkages (i.e., similarities and differences) between the separate manuscripts that are included in the dissertation, striving as much as possible to present the document as representative of a coherent body of work. The conclusion chapter 'ties' everything together and helps the reader see how the various manuscripts, taken together, make a contribution to the knowledge base regarding the problem. The conclusion chapter should present/discuss research imperatives, or knowledge gaps, not visible when each manuscript is considered individually and should articulate an agenda for future research on the issues addressed in the dissertation. It should be clear the contributions to the literature made by the student's body of work in terms of research, theory, and practice as well as next steps to be taken or considered to move the state of the evidence forward.
6.

References

The list of references is closely tied to the Literature Review. Most examiners scan your list of references looking for the important works in the field, so make sure they are listed and referred to in the Literature Review. All references given *must* be referred to in the main body of the thesis. Note the difference from a Bibliography, which may include works that are not directly referenced in the thesis.

Appendices

What goes in the appendices? Any material which impedes the smooth development of your presentation, but which is important to your dissertation. Generally, it is material that is of too nitty-gritty a level of detail for inclusion in the main body of the thesis, but which should be available for perusal by the examiners to convince them sufficiently. Examples include data collection instruments, informed consent, immense tables of data, lengthy statistical formulae or outputs or derivations, etc.

Doctoral Dissertation Checklist

1. The title is clear and concise.
2. Abstract uses a structured format Background/Rationale, Objective/Purpose, Methods, Results, Conclusion and is within word limit.
3. Include COMIRB/IRB protocol number(s) in your Acknowledgements and Methods Chapter/Section. For live animals, animal tissue or observational animal work, include your IACUC protocol number in your Acknowledgements and Methods Chapter/Section.
4. Problem is significant and clearly stated.
5. Review of the literature is efficiently summarized.
6. Limitations of the literature are highlighted and well defined.
7. Important terms are well defined.
8. Hypotheses or research questions are clearly stated and are testable, discoverable, or answerable.
9. Problem statement, hypotheses, or research questions derive from the review of the literature. Rationale for work is clearly articulated.
10. Research design is clearly and comprehensively described, and demonstrated to be related to the research questions, and/or hypotheses.
11. Theoretical or conceptual model/framework used to guide work is well described.
12. Methods of data collection are clearly presented and demonstrated to be related to the research questions/hypotheses.
13. Plans for analysis whether quantitative or qualitative are clearly stated and justified within the context of the research design.
14. Tables and figures are used effectively. Textual explanation of the tables/figures is provided along with the tables and figures.
15. Results of the research are presented clearly and address the research questions/hypotheses.
16. Major findings are discussed clearly and related to previous research.
17. Importance of the findings is explained.
18. The relationship between the research and the findings is demonstrated with tight, logical reasoning.
19. Conclusions are clearly stated.
20. Conclusions are based on the results.
21. Generalizations are confirmed.
22. Limitations and weakness of the study/body of work are discussed.

23. Implications of findings to clinical care, research, methods and theory are discussed.
24. Relationship of the study to previous research is clear.
25. Suggestions for future research are offered regarding clinical care, research, methods and theory.
26. References are included (usually > 75).
27. Data collection instruments are included in Appendices.
28. IRB submission in Appendices
29. Sentence structure, grammar, spelling, and punctuation are correct.
30. Thesis is clearly written.
31. Tone is unbiased and impartial.

*Grossly borrowed with some adaptations from J. E. Mauch and J. W. Birch (1998), *Guide to the Successful Thesis and Dissertation*, Marcel Dekker.

Doctoral Dissertation Checklist

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PhD PROGRAM, CLINICAL SCIENCE GRADUATE PROGRAM

Permission to Proceed to Defense

The following members of the Dissertation Committee have approved the thesis submitted

By _____ for the Thesis Defense Examination.
Doctoral Candidate

Dissertation Chairperson _____
Print name

_____
Signature Date

Research Mentor _____
Print name

_____
Signature Date

Committee Member _____
Print name

_____
Signature Date

Committee Member _____
Print name

_____
Signature Date

Committee Member _____
Print name

_____
Signature Date

Please submit completed form to: Galit.mankin@cuanschutz.edu

CLSC PhD Dissertation\Thesis Defense Report

Student:_____ Date of Exam:_____

Chair:_____ Research Mentor:_____

Members in Attendance:_____

Rate the student's ability regarding the CLSC core competencies taking into account the written thesis/dissertation, the oral presentation and response to questioning:

1. Applies legal, ethical and regulatory issues related to clinical research and principles for Responsible Conduct of Research.
   ☐ Exceeds expectations ☐ Meets expectations ☐ Below expectations

2. Critically appraises existing literature and sources of information.
   ☐ Exceeds expectations ☐ Meets expectations ☐ Below expectations

3. Accurately select, use and interpret commonly used statistics.
   ☐ Exceeds expectations ☐ Meets expectations ☐ Below expectations

4. Apply and use appropriate study designs and methods to address research questions/hypotheses.
   ☐ Exceeds expectations ☐ Meets expectations ☐ Below expectations

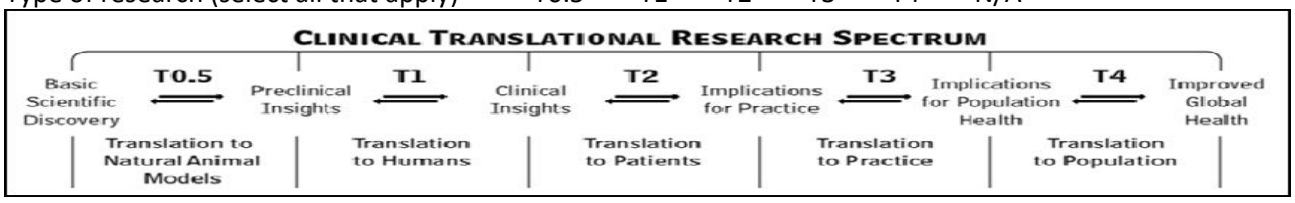
5. Identify and measure clinically relevant and meaningful outcomes.
   ☐ Exceeds expectations ☐ Meets expectations ☐ Below expectations

6. Design and conduct clinically and patient oriented research studies.
   ☐ Exceeds expectations ☐ Meets expectations ☐ Below expectations

7. Demonstrate effective communication and leadership skills.
   ☐ Exceeds expectations ☐ Meets expectations ☐ Below expectations

8. Participate in interdisciplinary collaboration.
   ☐ Exceeds expectations ☐ Meets expectations ☐ Below expectations

Type of research (select all that apply) ☐ T0.5 ☐ T1 ☐ T2 ☐ T3 ☐ T4 ☐ N/A



Comments:

This form is to be submitted to the Clinical Science Graduate Program's Administrative Office: Galit.Mankin@cuanschutz.edu

CLSC PhD Program Checklist for Thesis Defense:

Expectations of the Chair

2-4 days prior to the Thesis Defense, ensure that you have received the necessary paperwork from Galit Mankin:

- Graduate School Defense Information/Instruction sheet ☐
- Graduate School Thesis Defense Confirmation Sheet ☐
- Graduate School Thesis Defense Results Report form ☐
- CLSC Thesis Defense form ☐
- Student's completed coursework and grades record ☐

- Copy of Student's Thesis - should be provided by the student directly to the committee members

- Thesis/Dissertation Approval form – Student is instructed to complete the form on-line (from the GS website). The handling of this form is the responsibility of the student.

If you have not received these documents, please contact Galit Mankin at galit.mankin@cuanschutz.edu

Day of the Thesis Defense

1. Introduce the candidate student and the title of his/her thesis.

3. Explain the structure of the Defense:
   - Open forum session will include PhD candidate's presentation (approx. 50-55 mins) followed by questioning (approx. 30 mins)
   - Closed session follows (only committee members and candidate)

4. Following the presentation and questioning, thank and dismiss attendees and begin the closed session (ONLY committee members and the candidate student).

5. Ask the candidate to step outside the room (5-10mins), while the examination committee discusses the following points:

   - Ensure all members have read the Thesis
   - Determine order and format of questioning
   - Determine if there are major concerns of the candidate

6. Call candidate back into the examination room to begin closed session questioning.

7. Once questioning is completed, ask student to step outside the room (10-15 mins) until asked to return.

8. Chair the Committee member executive session
   a. Determine examination grade: pass, pass with conditions, or fail
      - If pass with conditions, the conditions need to be clearly documented and a date by which the conditions must be met identified on paper (conditions must be satisfied within 60 days), which is submitted to the CLSC Program Administrator, Galit Mankin.
   b. Committee members sign Graduate School Thesis Defense Report form
   c. Complete the CLSC Thesis Form with committee member input

9. Call the candidate back into the room to join the committee and share the results of the examination. If there are conditions, explain the steps that the student must complete and the timeframe for completion

10. Remind the student that the CTSA grant must be cited in the finalized version of the student's Thesis. The following language should be used when citing the grant:
    "This project/publication is supported in part by NIH/NCATS Colorado CTSI Grant Number UL1 TR004399. Contents are the authors' sole responsibility and do not necessarily represent official NIH views."

    In addition, publications should be registered with PubMed Central.

11. Completed Graduate School forms will be submitted via DocuSign. CLSC forms should be emailed to: Galit.mankin@cuanschutz.edu

AT NO TIME IS THE STUDENT TO HAVE POSSESSION OF ANY OF THE GRADUATE SCHOOL FORMS

General Graduate School Related Information

I.D. Badge and Parking Information

New students will be contacted by email to receive a badge. The signing authority for the Graduate School will let you know when to contact the Badge Office at the Anschutz Medical Campus (AMC). A driver's license, state ID, or passport is necessary to have your photo taken and to receive your badge. The Badge Office is located in Building 500, Room N1207 behind the café and on the same floor as the bookstore. The Badge Office can be reached at 303-724-0399 and at IDAccessBadges@cuanschutz.edu.

Pay parking is available at the Anschutz Medical Campus. For maps, permits and rates, go to https://www.cuanschutz.edu/offices/facilities-management/parking-transportation-maps/parking

Guidelines for Studying

A good rule of thumb to remember is that for each credit hour of a course, you will spend about double to triple that number of hours each week doing work for the class. Thus, you will spend about 6-12 hours each week, out of class, on average, for a 3-credit-hour class. Students with less experience in the subject matter of a particular unit or course should anticipate a greater time commitment.

The Strauss Health Sciences Library at Anschutz Medical Campus

As a student in the CLSC Program, you have access to the outstanding state-of-the-art Anschutz Medical Campus' Health Sciences Library, which houses more than 2000 online journals, many information databases, computer workstations, group study rooms, and online text references. This is a valuable resource that is available to you for your professional use throughout your enrollment in the CLSC Program. We encourage you to read the materials from the Health Science Library and to explore the assistance available on the home page at: (https://library.cuanschutz.edu/). The "Online Information Rack" from the library also provides helpful information about the library and its online services. If you have questions about using the library, the librarians can be reached at 303-724-2152.

Scholarship Information and Financial Aid

No scholarship opportunities specifically designed to support students of the CLSC Program exist at this time. Financial aid information is available from the campus financial aid office: https://www.cuanschutz.edu/student-finances/financial-aid

Honor Code

Students are expected to review and follow the Graduate School Honor Code Guidelines and Academic Integrity Expectations: https://graduateschool.cuanschutz.edu/forms-resources/resources

Clinical Science Program Frequently Asked Questions

Where is the Graduate School located?
The Graduate School is located on the Anschutz Medical Campus in Aurora, CO at 13001 E. 17th Place in Building 500, Room C5000.

Where is the Clinical Science Program Administrative Office located?
The Clinical Science Program Administrative office is located on the Anschutz Medical Campus in Aurora, CO at 1890 N Revere Ct. in the Anschutz Health Sciences Building, Room 6149.

I am interested in the Clinical Science Program and would like to know more about the admissions requirements. Who do I contact?
Please contact Galit Mankin at galit.mankin@cuanschutz.edu for more information.

What forms do I need to complete for exams/graduation?
Forms, deadlines and instructions for exams/thesis defense are located on the Graduate School website. See the Master's Resources page if you are a master's student. PhD students should refer to the PhD Resources page.

How can I verify that members of my committee have current Graduate Faculty appointments?
See the Graduate Faculty Directory for a list of faculty with current or expired appointments. New appointment paperwork is received on a regular basis from the programs. If a faculty member's appointment is showing as expired or they are not currently listed on the website, contact Galit Mankin, CLSC Program Administrator, to see if appointment paperwork has already been forwarded to the Graduate School or to request new appointment paperwork be completed.

What is the maximum number of credits I can transfer?
Master's degree students can transfer in 12 semester hours. Transfer credit is defined as any credit earned at another accredited institution. PhD degree students can transfer in 30 semester hours. Credits must meet the transfer credit requirements and be approved for transfer by the program and the assistant dean.

What opportunities are there for loan repayment for clinical researchers?
The NIH Loan Repayment Program (LRP) for Clinical Research is designed to recruit and retain highly qualified health professionals as clinical investigators, repaying lenders directly for the existing principal, interest, and related expenses of qualified government and commercial education loans obtained for undergraduate, graduate, and health professional school expenses. For more information, visit the LRP website.

Is financial support available for international students?
No student financial support [for either educational costs (e.g., tuition) and/or stipend support] is available through the Clinical Science Program. As part of the application materials required, all international applicants must document that adequate financial support will be available for the entire period of study. For additional information, please review the International Student Requirements for Graduate School admissions.

Who might I contact for a CLSC course billing-related question?
For billing questions, contact the UCD Anschutz Medical Campus Bursar's Office:
https://www.cuanschutz.edu/student-finances/billing-payments