

The **PhD Program in Genetics, Genomics & Cancer Biology (GGCB)** is an interdepartmental program that focuses on training in the rapidly expanding field of molecular genetics, functional genomics and cancer biology. The program of study leading to a PhD degree is designed to provide graduate students with comprehensive training and research experience to pursue careers as independent scientific investigators in academic, government, or industrial settings.

Program Director:

Lucia Languino, PhD phone: 3-3442 Lucia.Languino@jefferson.edu

GGCB Executive Committee:

Teresa Alnemri, PhD; Paolo Fortina, MD, PhD; D. Craig Hooper, PhD; James Jaynes, PhD; Lucia Languino, PhD (chair); Alex Mazo, PhD; Adam Snook, PhD; and Andrew South, PhD

Training Programs Office:

Danielle Park M-46 JAH Danielle.Park@jefferson.edu

General PhD Requirements: The PhD degree earned through the GGCB PhD Program requires the student to complete all degree requirements of both the Program and the Jefferson College of Life Sciences (JCLS). JCLS requirements are described at <https://www.jefferson.edu/academics/colleges-schools-institutes/life-sciences/student-resources/policies-guidelines.html>.

Credit Requirements: A minimum of 180 credits during the entire PhD program beyond the bachelor's degree is required. At least 30 percent of the credits (a minimum of 54) must be obtained from formal course work, of which one third (a minimum of 18) must be in disciplines other than that of major concentration. The remaining credits are dissertation research credits. Full time enrollment in the Fall Semester is 20 credits, Winter Semester is 10 credits, Spring Semester is 30 credits, and Summer Semester is 10 credits.

GGCB PhD Program					
	Fall Semester	Winter Semester	Spring Semester		Summer Semester
Full-Time Enrollment	20 Credits Total	10 Credits Total	30 Credits Total		10 Credits Total
Year 1	GC 550 – Foundations in Biomedical Sciences (10 credits)	GC 550D – Rudiments of Computational Biology	GE 637 – Human Genetics (2 credits)	GE 612 – Adv. Topics in Molecular Genetics (2 credits)	GC 750 - PhD Laboratory Rotation (3 credits)
	GC 760 – PhD Laboratory Rotation (3 credits)	GE 940 – Research (variable credits)	Elective (2 – 3 credits)	GC 640 – Research Ethics (1 Credit)	GE 735 - Seminar (1 credit)
	GE 715 – Seminar (1 credit)	GC 770- PhD Laboratory Rotation (3 credits)		GC 780 - PhD Laboratory Rotation (3 credits)	GE 930 – Research (variable credits)
	GE 910 – Research (variable credits)		GE 720 – Current Literature II (1 Credit)		
			GE 725 Seminar II (1 Credit)		
			NS 740 – Applied Statistics (2 Credits)		
			GE 920 – Research (variable credits)		

GGCB PhD Program				
	Fall Semester	Winter Semester	Spring Semester	Summer Semester
Full-Time Enrollment	GE 636 – Tumor Cell Signaling & Cell Cycle (3 credits)	GE 940 – Research (10 credits)	Elective(s) (2 – 3 credits)	GE 735 – Seminar (1 credit)
Year 2	GE 710 – Current Literature (1 credit)		GC 730 Planning & Writing a Research Grant (1 credit)	GE 930 – Research (variable credits)
	GE 715 – Seminar (1 credit)		GE 720 – Current Literature (1 credit)	
	GE 910 – Research (variable credits)		GE 725 – Seminar (1 credit)	
		GE 920 – Research (variable credits)		

GGCB PhD Program				
	Fall Semester	Winter Semester	Spring Semester	Summer Semester
Full-Time Enrollment	GE 710 – Current Literature (1 credit)	GE 940 – Research (10 credits)	GE 720 – Current Literature (1 credit)	GE 735 – Seminar (1 credit)
Year 3	GE 715 – Seminar (1 credit)		GE 725 – Seminar (1 credit)	GE 930 – Research (variable credits)
	GE 910 – Research (variable credits)		GE 920 – Research (variable credits)	
	Preliminary Exam			

Transfer of Credits: A student may be able to receive transfer credits up to a maximum of 18 credits for graduate level courses taken at another institution per the policy described at <https://www.jefferson.edu/academics/colleges-schools-institutes/life-sciences/student-resources/policies-guidelines.html>.

Check with your Program Director or the Training Programs Office for more details regarding credit transfers.

Guidelines for Good Standing:

1. Maintain B average in coursework
2. Performance in core courses – GC 550, GE 612, GE 636 and GE 637
 - a. Lower than a B- in any core course triggers a meeting with the GGCB Executive Committee to discuss corrective measures
3. Lower than a B- in two of the three core courses may result in dismissal from the Program

Presentation of Scientific Information

Current Topics in GGCB: Graduate students present at least twice per year on topics unrelated to their dissertation thesis research during required courses – **GE 710** and **720**. Students in 6th year and beyond or students who have received permission to write are not required to register for this course sequence but are encouraged to attend without credit.

Joint Seminar Series in Biochemistry and Cancer Biology: GGCB students must register for **GE 715**, **725**, **735** each semester and will receive 1 credit each semester for participation. Starting in their third year, each student will present their progress once a year in the "Research in Progress" component of the Joint Seminar Series in Biochemistry and Cancer Biology and in which pre- and postdoctoral trainees need to participate. Students in 6th year and beyond or students who have received permission to write are not required to register for this course sequence but are encouraged to attend without credit.

Laboratory Research Rotations: During the first year of study graduate students are required to rotate through at least three different laboratories, each rotation lasting one semester. The purpose of laboratory rotations is threefold: 1) to expose the student to various experimental approaches to laboratory research problems dealing with different aspects of biomedical research, 2) to help the student

select a dissertation research advisor, and 3) to assist the faculty in evaluating the student's strengths and areas needing further attention. The student arranges their research rotations in consultation with the Program Director on the basis of the student's own interests and the willingness of a faculty member to serve as rotation mentor. The student is expected to spend all available working hours when not attending classes engaged in research-related activities during each of these rotations. At the end of each rotation, the student is required to submit a written report summarizing the rationale of the experiments, the methodologies, results, and a brief discussion. The faculty member in whose laboratory the rotation has occurred then makes a written evaluation of the student's performance for each rotation. With approval of the Program's GGCB Executive Committee, students with a Master's degree, may be allowed to take fewer than the three required rotations, depending upon the individual circumstances.

Evaluation at End of First Year: The GGCB Executive Committee will evaluate the performance of students in the Program at the end of the spring semester. The criteria for evaluation will be the student's course grades, lab rotation evaluations, and participation and presentations in Journal Club. Students deficient in any of these areas will be brought before the committee to discuss the problem and possible ways to remedy the situation. Students with overall poor performance and judged unable to rectify the situation will be asked to leave the Program at this time.

Thesis Advisor and Research Advisory Committee: The Program Director will be the student's advisor during the first year and will meet with the student to establish the student's academic program and ascertain the nature of the student's research interests. Subsequent meetings will occur at the end of the first and second semesters to review academic progress and the development of research interests.

Permanent thesis advisor, selected on the basis of the student's academic accomplishments and research interests in consultation with the Program Director after the completion of three laboratory rotations. The final decision of mentor must be approved by the GGCB PhD Program Director.

Research Committee, formed in consultation with the thesis advisor, shall consist of a minimum of four members: the permanent thesis advisor, a member of the GGCB Executive Committee, a member of the GGCB Faculty, and at least one other graduate faculty member, in order to provide objectivity in evaluation of the student's progress. Adding individuals to the committee that bring specific expertise as the research evolves is encouraged. One of the GGCB faculty members other than the thesis advisor will serve as the committee chairperson. It is expected that members of the Thesis Research Committee will be available to help and counsel the student concerning the thesis research throughout its duration. The student is responsible for sending the membership of the Thesis Advisory Committee to the Training Programs Office as soon as it is formed or if its membership changes. The Research Advisory or Thesis Committee should be formed after successful completion of the basic knowledge and concepts section of your comprehensive examination (CE Part 1, see below) and the first meeting held before October 31 of the third year of study. The Program Director is an ex-officio member of all student Advisory Committees and as such, should be notified in advance of the date and time of every meeting. Each student must have at least two Committee meetings per academic year. It is the responsibility of the student to arrange committee meetings and procure forms for recording minutes. Meeting forms are available at <https://www.jefferson.edu/academics/colleges-schools-institutes/life-sciences/student-resources/policies-guidelines.html> or from the Training Programs Office; there are two forms 1. The chair summary form that gets completed by the chairperson and 2. The evaluation form which each member of the committee completes (including the chairperson and the thesis advisor). All forms should be returned to the Training Programs Office via e-mail Danielle.Park@jefferson.edu for inclusion in the student's file and distribution to the JCLS Dean. Either the student or thesis advisor may call committee meetings at any time.

If a student desires to change a permanent thesis advisor, or a thesis advisor desires to be relieved of responsibility to a student, the matter shall be brought to the Program Director and subsequently, before the GGCB Executive Committee for consideration.

Individual Development Plans (IDPs)

The GGCB Program and Jefferson College of Life Sciences (JCLS) require an annual IDP for all predoctoral students. These IDPs should be reviewed and discussed with your program director, your

thesis advisor, and your committee on an annual basis, or more frequently as warranted. This will ensure open bi-directional communication between trainees and faculty mentors to mutually assess short-term and long-term professional goals and achievements. The purpose is to ensure that periodic review and assessment of a student's current stage of professional development, and future plans, address both the general competencies and proficiencies established by the College and the GGCB program, as well as each trainee's individual professional development needs and goals. The IDP for first year students involves two sections, including Part A: Self-assessment of Skills, Motivations and Part B: Establishment of Plans and Goals for the Coming Year. The IDP for students in thesis labs involves three sections, including Part A: Self-assessment of Skills, Motivation and Career Planning; Part B: Assessment of Achievements and Goals; and Part C: Skills to Improve

Guidelines for the GGCB PhD Comprehensive Examination

After completion of all course work at the end of the second year (June, July or August), each graduate student is required to pass a Comprehensive Examination (CE). The CE has two parts:

1. Part 1. An oral test of basic knowledge and concepts in the fields of General, Mouse, Human, Cancer Genetics and Cancer Biology derived from coursework in GC550, GE612, GE636, and GE637, which will last approximately two hours. This Comprehensive Exam Part 1 will be tailored to each student based on the elective courses taken by each student and
2. Part 2. An oral and written exam, based on the preparation and defense of a research proposal in Genetics, Genomics and Cancer Biology, in an area of investigation of the student's dissertation and/or advisor's research program. Special attention should be paid to incorporating materials from NS740.

Defense of the research proposal should be completed before November 15 of the third year of study. The examining committee will be composed of three members of the GGCB PhD Program faculty who will be assigned each year plus the thesis advisor. It is the student's responsibility to arrange the date and time for the defense of the proposal with the members of the examining committee. Once a date is selected the student must notify the Training Office in sufficient time to reserve a room and AV and notify JCLS. This notification produces the official record of the CE which must be completed at the examination/defense and returned to the Training Program office. Please note that the CE is not officially completed and recorded in JCLS until this step is completed.

The written Research Proposal has a 6-page limit; one Specific Aims page should also be included; it must strictly abide by the rules for submission of an NIH NRSA F30/31. For more information, please visit: <https://grants.nih.gov/grants/guide/pa-files/PA-21-052.html>

In order for the examination committee to evaluate the student's writing ability, the student **must** prepare a grant proposal with minimal input from faculty and other research staff. The thesis advisor is permitted to help with the development of specific aims. At the time of submission, the examinee will be asked to provide a list of who contributed to the thesis proposal and in what capacity.

Students who have submitted a F31 to the NIH may use that grant as their written proposal.

The completed proposal must be submitted to all CE Members at least two weeks prior to the examination date.

Readiness to Write the Thesis: Before the student begins writing, the research advisor, research advisory committee, and candidate must reach a consensus on the content of the thesis and the format – either traditional or manuscript. JCLS is notified by use of Chairperson's report (see above). At this time the student and committee will also designate the format of the thesis.

Thesis Defense: All PhD candidates must successfully present a public seminar and defend the Thesis prior to graduation. The JCLS Dean may attend the defense. In the oral defense, the candidate must demonstrate competence in his or her specific area of research as well as successfully defend the thesis research. By the time of the thesis defense, the research work performed by the student should generally have reached a stage of completion such that at least one paper, representing work to which the student has been a primary contributor (though not necessarily sole first author), has been published or accepted for publication in a peer-reviewed journal. If the candidate wishes to graduate in the upcoming Spring

Commencement, the thesis defense must be passed and the final approved copy of the thesis must be turned into the Dean's office no later than April 1 of that year.

Final Examination (Defense) Committee: is composed of members of the Research Advisory Committee and the Program Director (or their designate) who attends as the JCLS Dean's delegate. An external member is optional.

The student MUST give the penultimate version of the thesis to their committee members at least 6 WEEKS prior to the defense date. At this point, the committee will read and revise the thesis within 2 weeks. After review by the committee, the thesis will be given back to the student; the student will revise the thesis within 2 weeks. After this revision, it is presented to the Defense Committee and the Dean's Office.

Scheduling the Seminar and Defense: At least two months before the planned date, the student is responsible for scheduling the date and time of the defense. Contact the Training Programs Office to reserve a room and AV equipment for the public seminar.

Letter from the Program Director: At least one month before the planned Defense, contact the Training Programs Office to generate letter from the Program Director to the JCLS Dean. The following information is necessary for this letter:

1. date, time, location of Public Seminar and Thesis Defense
2. thesis title
3. your name as it should appear on the diploma
4. members of the Final Examination Committee; addresses for any outside the University
5. the date on which the student stipend payment will stop (this information is for JCLS Financial Office use only; it will not appear on other defense documents)

The [PhD Thesis Manual](#) contains the JCLS requirements for the successful completion of the PhD degree from the time you matriculate until you complete your degree. These are minimal requirements that are supplemented and expanded by GGCB Program specific requirements and instructions.

[PhD Degree Completion Checklist](#)