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:
Linda Siracusa, PhD    phone: 3-4536    Linda.Siracusa@jefferson.edu

GGCB Graduate Studies Committee:
Andrew Aplin, PhD, Sophie Astrof, PhD, Bruno Calabretta, MD, PhD, Jim Jaynes, PhD, Alex Mazo, PhD, My Mahoney, PhD, Marja Nevalainen, MD, PhD, Glenn Radice, PhD, and Linda Siracusa, PhD (chair).

Training Programs Office: 910 BLSB    fax: 215-503-0622
Joanne Balitzky    phone: 3-6687    Joanne.Balitzky@jefferson.edu
Kathleen Kieser    phone: 3-4636    Kathleen.Kieser@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 Graduate School of Biomedical Sciences (JGSBS). JGSBS requirements are described in the JGSBS catalog and, in greater detail, in the “Guide to the PhD Degree and Thesis Manual”.

Credit Requirements: A minimum of 180 credits beyond the bachelor’s degree is required. 54 of these credits must be from a combination of required and elective coursework, including seminar/journal club. At least 18 of these credits must be from outside the major Program (not GE). The remaining credits are dissertation research credits. Full time enrollment in the Fall Semester is 20 credits, Spring I and II combined is 30 credits, and Summer Semester is 10 credits.

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<td>20 credit total</td>
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<td>Full-time Enrollment</td>
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<td>Year 1</td>
<td>GC 550 10 credits</td>
<td>Genetics of Model Organisms GE 612 3 credits</td>
<td>Advanced Human Genetics GE 637 3 credits</td>
<td>Research GE 930</td>
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<td>Journal Club GE 710 1 credit</td>
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<td>Lab Rotation 1 GE 511 3 credits</td>
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<td>Ethics GC 640 1 credit</td>
<td>Applied Statistics in Neuroscience NS 740 2 credits</td>
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### 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 in the JGSBS Catalog. 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 and GE 637
   a. Lower than a B- in any core course triggers a meeting with the Genetics Graduate Studies 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
Graduate students present seminars at least twice per year on topics unrelated to their dissertation thesis research during required seminar courses – GE 710, 720, 730. Students are required to take seminar until receiving permission to write.

Starting in their third year, each student will present his/her progress once a year in the "Research in Progress" Seminar series that occurs on a weekly basis and in which pre- and postdoctoral trainees participate.

### 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 his/her 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 Graduate Studies Committee, students with substantial research
experience and/or a Masters degree, may be allowed to take fewer than the three required rotations,
depending upon the individual circumstances.

**Evaluation at End of First Year:** The Graduate Studies 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 Committee.

Research Committee, selected by the student and permanent thesis advisor, in consultation with the
Graduate Studies Committee. The Research Advisory Committee shall consist of the permanent thesis
advisor, at least two other members of the GGCB Program (one of whom must be a member of the
Graduate Studies Committee), and at least one Graduate faculty member from outside of the Program, in
order to provide objectivity in evaluation of the student's progress. 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 [http://www.jefferson.edu/jcgs/policies/](http://www.jefferson.edu/jcgs/policies/) there is
one form for the committee chairperson and a form for each individual member. All forms should be
returned to the Training Programs Office for inclusion in the student's file and distribution to the JGSBS
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 Graduate Studies Committee for consideration.

**Guidelines for the GGCB PhD Comprehensive Preliminary 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 Preliminary Examination (CPE). The CPE has two parts:
1) an oral test of basic knowledge and concepts in the fields of General, Mouse, Human and Cancer
Genetics derived from coursework in GC550, GE612, GE637, GE636, GE651 and GE652, which will last
approximately two hours, and
2) an oral and written exam, based on the preparation and defense of a research proposal in Genetics,
Genomics and Cancer Biology, preferably in, but not limited to, 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 and GC645.

The written proposal should be constructed in the following format:
- **Margins of 1 inch on all sides of every page**
- **Single-spaced with a blank line between paragraphs**
- **Title Page** – title, your name, date, time and place of CPE and names of CPE members (state at
  the bottom: Submitted in partial fulfillment of the requirements for a PhD in GGCB at the JGSBS)
- **Specific Aims** – one page with brief introductory paragraph, list the aims
• **Background** – 3-5 pages, inclusion of figures and tables recommended
• **Significance** – one paragraph (no longer than one page)
• **Preliminary data** – 0-3 pages, inclusion of figures and/or tables recommended
• **Experimental plan** – average of 5 pages, should define each specific aim, provide a clear rationale for each aim, and fully describe the experimental strategy and general methods that will be used to accomplish each aim. Anticipated outcomes/potential pitfalls and alternative interpretations should be included (inclusion of figures and/or tables suggested)
• **References in text, tables and figure legends** – citation format should be as (Pizza 2002) for single author papers, as (Smith & Wesson 2007) for only two authors, or as (Barilla et al. 2008) for 3+ authors. Cite review articles as (reviewed by Ronzoni et al. 2001)
• **Summary** – one paragraph (no longer than one page)
• **References list** – should be in alphabetical order by the last name of the first author, with indents as shown in the example below.
• **Figure and tables** – each should be numbered and contain appropriate titles and legends, the text within figures and tables should be legible, each one should be of publication quality (use format of any journal)
• **Timeline** – see example below

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This format approximates that used in preparing the scientific portion of NRSA and NSF grants, and therefore provides students with valuable experience in writing grants.

Students who have submitted an F31 to the NIH may use that grant as their written proposal. **The completed proposal must be submitted to all CPE Members at least two weeks prior to your 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. JGSBS 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 JGSBS Dean attends 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 chaired by the Program Director (or his/her designate) and is composed of members of the Research Advisory Committee. An external member is optional but recommended. The JGSBS Dean or his designate is an ex-officio member of all Defense Committees.

The student MUST give the penultimate version of the thesis to his/her 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; he/she 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 with the JGSBS Dean's Office (contact Lisa DiCampli, 3-8982). Contact the Training Programs Office to reserve a room and AV equipment for the public seminar.

**Letter from the Program Director:** At least one months before the planned Defense, contact the Training Programs Office to generate letter from the Program Director to the JGSBS 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 JGSBS Financial Office use only; it will not appear on other defense documents)
The PhD Thesis Manual contains the JGSBS 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.

**Highlights from the PhD Thesis Manual which are important to your progress:**

- **page 6: Formation of the Research Committee**
  - JGSBS minimum - research advisor and 2 graduate faculty; formed in consultation with advisor and Program Director
  - chairman of committee – a member other than thesis advisor
    - **GGCB** – permanent thesis advisor, at least two other members of the GGCB Program (one of whom must be a member of the Graduate Studies Committee), and at least one Graduate faculty member from outside of the Program, in order to provide objectivity in evaluation of the student's progress. The Program Director is an ex-officio member of all student Research Committees and as such, should be notified in advance of the date and time of each meeting.

- **page 6-7: Monitoring Progress**
  - 2 committee meetings per year, each year of research activity
  - Use forms for reporting results: report from each committee member plus chairperson’s report – both available at [http://www.jefferson.edu/Biomedical_Sciences/policies/documents/phd_res_comm_ind_fac_rept.pdf](http://www.jefferson.edu/Biomedical_Sciences/policies/documents/phd_res_comm_ind_fac_rept.pdf)
    - **GGCB** – return all forms to Training Programs Office, 910 BLSB for required distribution
  - Semi-Annual Report to JGSBS from student

- **page 7: Thesis Proposal**
  - may be part of Comprehensive Exam

- **page 8: Comprehensive Examination**
  - **GGCB** – requires at least one meeting of Research Committee prior to the Comprehensive Exam; see GGCB Handbook for details

- **page 9: Readiness to Write**
  - Determined by Research Committee; JGSBS notified by use of Chairperson’s report (see above)
  - Designate format of thesis: Traditional or Manuscript

- **page 10-12: Final Examination Committee and Defense of Thesis**
  - Candidate must present an open seminar of thesis work followed by a private defense before his/her Examining Committee
  - “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.”
  - Committee Membership: Research Committee; Program Director; JGSBS Dean
    - **GGCB** - an external member, from outside the University, is optional but recommended. Under certain circumstance, a second faculty member from another department may serve in place of the external member or the external review of the thesis can be handled without the actual presence of the reviewer.
    - Arrange defense date with Dean’s Office at least one month prior to planned defense by contacting Lisa DiCampli at 3-8982 or Lisa.DiCampli@jefferson.edu
      - **GGCB** – notify Training Program Office of date and time in order to arrange room and AV equipment for open seminar
    - One month prior to defense request letter from Program Director to JGSBS denoting readiness to defend
      - **GGCB** – contact Training Programs Office to request this letter; 3-6687 or Joanne.Balitzky@jefferson.edu

- **page 13: Format of Thesis – Model 1, Traditional**

- **page 22: Format of Thesis – Model 2, Manuscript**

**Application for Degree/Certificate:** Is available on Blackboard to all registered students. Candidates for degree must complete this form and return to University Office of the Registrar. Deadline is usually December 31 of year prior to desired commencement.

PhD Degree Completion Checklist:
[http://www.jefferson.edu/Biomedical_Sciences/policies/documents/phd_degree_completion_checklist.pdf](http://www.jefferson.edu/Biomedical_Sciences/policies/documents/phd_degree_completion_checklist.pdf)