



# Rensselaer

DEPARTMENT OF BIOLOGICAL SCIENCES

2014-2015

## GRADUATE STUDENT HANDBOOK

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# Department of Biological Sciences

## Graduate Education in Biology at Rensselaer: Overview

The Graduate Program in Biological Sciences at Rensselaer is designed to help you to become an active participant in modern biological research and to provide you with unique opportunities to develop as a scientist.

The Biology Program will help you obtain the tools necessary for a successful biology research career. These include:

- A background in a variety of sub-disciplines within the broader field of biology.
- Critical thinking skills.
- The ability to plan, execute and interpret experiments, and experience in the necessary research techniques.
- Skills in analyzing the scientific literature.
- Oral communication skills.
- Experience in scientific writing, including manuscript and grant proposal preparation.

Your graduate education will include:

- A core course covering the broad field of modern biology. Depending on the needs and interests of individual students, other advanced courses are available as electives. RPI biology graduate students are also able to enroll in courses at nearby institutions, including SUNY-Albany and Albany Medical College.
- Working closely with a research advisor who will serve as your scientific mentor.
- Practice in oral presentations through participation in departmental seminars. This is essential for learning to present your work at research conferences and seminars, and will help you to become an effective communicator for research and education.
- Teaching experience. Many scientists choose careers that involve teaching, and our program provides this valuable experience.
- Opportunities to mentor undergraduates and/or junior graduate students.
- Opportunities for interdisciplinary collaborations.

**We hope this will be a rewarding experience!**

**The Graduate Curriculum in Biological Sciences:** The PhD is a scholarly degree requiring an original research contribution to a field of knowledge. Thus, the time to degree completion is determined by the research itself, and may be influenced by internal factors (e.g. student motivation and work ethic), and by external factors (e.g. standards in the research sub-discipline, luck with experiments). Although **a student may reasonably expect to spend approximately five years completing the requirements for a PhD**, there are many cases of both shorter and longer periods of study both at Rensselaer and across the discipline of Biology. A student wishing to register beyond the end of the fifth year must file a petition each semester with the Graduate Program Committee; this petition is normally granted. The Institute sets a **maximum time of seven years to degree completion for a PhD for students entering with a bachelor's degree**. For students entering with a master's degree, the maximum time to degree completion for a PhD is five years.

## Requirements

### **First year students:**

- Take the two-semester Biology Core Course and maintain a 3.0 GPA.
- Be a teaching assistant for an undergraduate section of a Biology course each semester.
- Attend the weekly Biology Seminar Series.
- Rotate in three research laboratories. Following completion of the third rotation in the spring, students join a lab for their PhD research.
- *Note: Students who receive Rensselaer Graduate Fellowships will not TA during their first year, but instead take an additional elective in both the Fall and Spring semesters.*

### **Second year students:**

- Continue dissertation research.
- Attend the weekly Biology Seminar Series and give their first seminar presentations to the department.
- May serve as a teaching assistant (at the discretion of their advisors).
- May take additional elective classes.
- Prepare for and pass their Candidacy examinations (by the end of the 2<sup>nd</sup> year).
- Form Doctoral Thesis Committee

### **Third year students and beyond:**

- Continue performing dissertation research.
- Present department seminars (approximately once a year).
- Hold annual Thesis Committee meetings, preferably immediately after the department seminar
- Attend the weekly Biology Seminar Series.

## Key Points: (Year 1)

### ➤ **Biology Core Course:**

In order to ensure that students gain a broad foundation in the diverse areas of modern biological inquiry, students are required to take the two-semester Biology Core Course in their first year. The course is team-taught by faculty with expertise in each area. Each semester of the Core Course is divided into modules. The module grades are combined for the semester grade. The Core Course serves as the Qualifying Exam for Biology. **Students must earn at least a B each semester to continue to the second year.** If a student receives lower than a B for one module, but still receives a B for the semester, he/she may be required to repeat that module the following year (at the discretion of the GPC).

### ➤ **Seminar Attendance:**

An important aspect of graduate education is learning about a wide range of scientific topics, and learning to think critically about research in fields outside your own. To that end, all PhD students are required to attend the weekly Biology seminar series, which includes presentations from outside speakers, RPI speakers and senior graduate students.

### ➤ **Teaching requirements:**

An essential part of each student's professional training is experience as a teaching assistant. Biology PhD students are required to TA at least two semesters, typically in the first year, although most will TA for four semesters (first two years). Note: as a teaching assistant, the graduate student is serving as an instructor for undergraduate students, and as such is expected to behave in a professional manner. All forms of harassment are prohibited.

### ➤ **Rotations and choosing an advisor:**

Because the dissertation advisor will serve as the primary mentor for a student, the selection of the advisor is one of the most important decisions that a graduate student will make. With the guidance of the advisor, the student will develop critical thinking, independence and laboratory skills, and set goals for completion of the dissertation project. To enable students to choose the laboratory best suited for their individual needs, students are required to rotate in three different laboratories during their first year, and may not join a lab for their dissertation research until all three rotations have been completed. The rotation system also allows prospective advisors to judge if the student is a good fit for their laboratories. If three rotations are not sufficient to select an advisor, the student, in consultation with GPC, may be allowed a fourth rotation laboratory. Requests for exemptions to the "three rotations" rule will be considered by the GPC on a case-by-case basis. Each rotation will last for approximately eight weeks. At the end of each rotation, students will present a short talk on their rotation research to the department. **The student must join a lab by the end of the first year in order to progress to the second year.**

## (Year 2 and beyond)

### ➤ **Graduate Student Seminar:**

Beginning in the second year, each student is required to give an annual presentation in the departmental seminar series. From the third year on, it is advisable that these seminars are coordinated with the annual meeting of the Doctoral Thesis Committee (see below). It is preferable, although not always possible, to schedule the Committee meeting immediately after the seminar.

### ➤ **Other Courses and Credits:**

The Institute requires a total of seventy-two credits for the PhD. After the first year, most of these credits will come from Dissertation Research; courses are generally only taken during the first two years while students are beginning their research. This allows students to focus on their dissertation research in subsequent years. Students whose needs are not met by more conventional departmental offerings can enroll in directed reading courses with their thesis advisors or other faculty members. Students entering the program with an MS degree may receive credit for earlier work (although work outside RPI cannot be counted toward the Core Course requirement) – this will be evaluated by the GPC on a case-by-case basis.

### ➤ **Doctoral Thesis Committee:**

The Doctoral Thesis Committee will consist of four members: the advisor (who chairs the committee), two members of the department and one external member (from outside of the department and/or the Institute). If the external member is outside RPI, a CV and letter of justification must be submitted to the GPC (and then subsequently to the Office of Graduate Education) and the appointment to the committee must be approved. The graduate student selects the thesis committee in consultation with the faculty advisor during the spring of the second year. The thesis committee is responsible for supervising the student's academic studies and monitoring the student's progress towards the degree. The thesis committee also oversees the student's candidacy examination (although for the candidacy, a committee member other than the advisor must serve as the chair). Once the thesis committee is selected, the GPC must approve any changes in its composition. **Note: the Doctoral Committee must be approved by the Office of Graduate Education BEFORE the Candidacy Exam.**

Students must convene at least one thesis committee meeting per year – generally in coordination with the student's presentation in the seminar series. A week before each committee meeting, the student should provide the committee members with a written progress report, consisting of background (brief), specific aims, results since the last committee meeting, and future plans. A report of the outcome of the meeting signed by the majority of the members of the Doctoral Thesis Committee and by the Graduate Program Director must be filed with Graduate Program Administrator.

➤ **Candidacy Examination:**

The candidacy exam is designed to evaluate the student's ability to perform independent scientific research, and to present and analyze data at an appropriate level for a doctoral student. **The exam must take place by the end of the second year (i.e. May 31st), and passing this exam is mandatory for continuation in the Ph.D. program.**

The candidacy exam is a thesis proposal, and therefore should be based on the student's research. The exam consists of three parts – a written document, an oral presentation, and an oral defense. The written document should be in the style of a fellowship proposal (i.e. NIH). Several examples of styles are available in the Biology office. The proposal should be a maximum of ten pages (not including references), single spaced, 1 inch margins on all sides, font size 12 point. The oral presentation should be 30-40 minutes, followed directly by the defense of the research plan to the candidacy examination committee. ***The proposal and presentation must be prepared by the student without any help or editing by his/her advisor.***

The doctoral thesis committee serves as the candidacy examination committee, but a member of the committee other than the thesis advisor serves as the committee chair. The student's advisor is present during the examination but the student must answer the questions alone.

The student must give the written candidacy proposal to the members of his/her committee at least 2 weeks prior to the exam. If the student fails, the committee will decide whether the student should be allowed to retake the exam by a specified date or be asked to leave the program. A thorough evaluation of the student by the advisor is essential for this decision.

**Evaluation of Graduate Students:**

Graduate students are evaluated at several stages, and successful evaluations are necessary for advancement in the program. In the first year, students are evaluated on the Core Course (by module grades and final grades), on Rotations (by Rotation evaluations and Rotation talk evaluations), and on the Teaching Assistantship (by TA evaluations). In the second year, the students are evaluated in the Candidacy Exam. In the third year and beyond, the students are evaluated by the advisor and Dissertation Committee during the annual committee meeting. All graduate students are evaluated by the entire department graduate faculty once a year and will receive a written evaluation of his/her progress.

**To receive a PhD, a student must:**

- Write a doctoral dissertation and prepare it with appropriate formatting and references (for guidance on this topic, see the Office of Graduate Education website).
- Present the dissertation research in a public seminar.
- Defend the dissertation in an oral examination.
- Publications – an essential aspect of research is publication of peer-reviewed research articles, and students are expected and encouraged to publish peer-reviewed journal articles. It is expected that students will have at least one paper published or accepted for publication at the time of graduation.

**Additional Information:**

**Deviations from the typical course of study must be approved (in advance) by the Graduate Program Committee. Failure to receive prior approval may result in the loss of financial aid.**

**Graduate School is a full-time job. Working an additional job (or moonlighting) is not permitted. Infractions of this policy may result in the termination of all financial aid.**

## **Important Information from the Office of Graduate Education:**

**Current Requirements for Graduation can be found on the Office of Graduate Education website (<http://gradoffice.rpi.edu/>).**

**The items listed below should be completed by the beginning of the semester you intend to graduate:**

- Registration for the semester in which the degree will be conferred is required.
- A Degree Application Form must be on file with the Registrar's Office-refer to the academic calendar for due dates applicable to the semester you intend to graduate.

**Part I: Prior to submission of the dissertation, the items below must already be on file in the Office of Graduate Education.**

- An approved [Plan of Study](#) must be on file with the Registrar's Office and a copy on file with the Office of Graduate Education (courses listed on the Plan of Study must agree with courses shown on your transcript).
- An approved [Doctoral Committee Nomination Form](#) must be on file with the Office of Graduate Education.
- A record of successful completion of the Candidacy Examination must be on file with the Office of Graduate Education.

**Part II: The items listed below must be submitted to the Office of Graduate Education before a formal review of the dissertation will be conducted. In order to complete the review process and notify the Registrar's Office that your dissertation requirement has been met, it is highly recommended that your submission is completed before the dissertation submission deadline (but no later than the published deadline).**

- A [Record of Dissertation Exam Form](#) with the original signatures of your Examining Committee must be provided to the Office of Graduate Education. Once your dissertation has been reviewed and officially approved, this form is signed by the Dean of Graduate Education and sent to the Registrar's Office.
- A completed [Survey of Earned Doctorates](#) form must be submitted with the dissertation.
- A completed [Graduate Student Exit Survey](#) form when you submit your dissertation.
- We ask that you please take a moment to complete the [First Destination Survey](#). We have many employers who request compensation guidelines for PhD graduates, this data can help strengthen salary offers for our students.

## Typical Course of Study for Biology Graduate Students

Academic load: To be considered full time you must carry 12 credit hours per semester. (exception: If you are a TA, you may carry 9 credits hours for full-time status)

### **1<sup>st</sup> semester:**

|                     |           |
|---------------------|-----------|
| Research Rotation I | 4 credits |
| Core course         | 4 credits |
| Seminar             | 1 credit  |
| Total               | 9 credits |

### **2<sup>nd</sup> semester:**

|                       |           |
|-----------------------|-----------|
| Research Rotation II  | 2 credits |
| Research Rotation III | 2 credits |
| Core course           | 4 credits |
| Seminar               | 1 credit  |
| Total                 | 9 credits |

### **3<sup>rd</sup> semester:**

|              |           |
|--------------|-----------|
| Elective     | 4 credits |
| Dissertation | 5 credits |
| Seminar      | 1 credit  |
| Total        | 9 credits |

### **4<sup>th</sup> semester:**

|                 |           |
|-----------------|-----------|
| Readings Course | 4 credits |
| Dissertation    | 5 credits |
| Seminar         | 1 credit  |
| Total           | 9 credits |

### **5<sup>th</sup> semester:**

|              |            |
|--------------|------------|
| Dissertation | 11 credits |
| Seminar      | 1 credit   |
| Total        | 12 credits |

### **6<sup>th</sup> semester:**

|              |            |
|--------------|------------|
| Dissertation | 11 credits |
| Seminar      | 1 credit   |
| Total        | 12 credits |

### **7<sup>th</sup> semester:**

|              |            |
|--------------|------------|
| Dissertation | 11 credits |
| Seminar      | 1 credit   |
| Total        | 12 credits |

### **8<sup>th</sup> semester:**

|              |            |
|--------------|------------|
| Dissertation | 11 credits |
| Seminar      | 1 credit   |
| Total        | 12 credits |

*Alternate First Year Plan for students with Rensselaer Graduate Fellowships:*

### **1<sup>st</sup> semester:**

|                     |            |
|---------------------|------------|
| Research Rotation I | 4 credits  |
| Core course         | 4 credits  |
| Elective Course     | 4 credits  |
| Seminar             | 1 credit   |
| Total               | 13 credits |

### **2<sup>nd</sup> semester:**

|                       |            |
|-----------------------|------------|
| Research Rotation II  | 2 credits  |
| Research Rotation III | 2 credits  |
| Core course           | 4 credits  |
| Elective Course       | 4 credits  |
| Seminar               | 1 credit   |
| Total                 | 13 credits |