

Princeton University

# Quantitative and Computational Biology

Graduate Student Handbook

2020-2021 Edition

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**QCB Graduate Student Handbook**  
**2020-2021 Edition**

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## QCB Program 5 Year Timeline

Year 1			Year 2		Year 3		Year 4		Year 5	
Fall	Spring		Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
2 courses			1 course				Teach both terms		Dissertation Defense (“Final Public Oral” or “FPO”)  <i>(FPO happens around end of yr. 5, give or take)</i>	
Lab Rot. #1	Lab Rot. #2	Lab Rot. #3	-Start work in thesis lab -General Exam (January)			Annual Committee Meetings (October)				

## Ph.D. Requirements

### Core Courses:

- [QCB 515](#): Method and Logic in Quantitative Biology
- [COS/QCB 551](#): Introduction to Genomics and Computational Molecular Biology
- [QCB 501](#): Topics in Ethics in Science
- Three additional courses from the lists below, including at least one each from the Quantitative and Biological course lists (substitutions possible with permission from the DGS)

### [QCB Graduate Colloquium](#)

Regular attendance of QCB seminar series

[Research rotations](#) during your first year (three required)

[General Examination](#) (January of second year)

[Teaching](#) (two semesters are required, usually in fourth year)

[Thesis Committee Meetings](#)

[Dissertation defense](#)

**Program length is five years.** Please see [QCB Program Timeline](#) for program summary.

## Course Requirements

Completion of course requirements is necessary to attain the Ph.D. degree. The course of study for each student must be approved by the Director of Graduate Studies (DGS). A minimum of a B average in program courses is necessary for successful completion of the course requirement. Courses must be graduate level (500+) and **not** taken as P/D/F in order to satisfy the course requirement. **Course substitutions are possible with permission from the DGS.**

Note: if you take an approved course that is **half-term**, by itself, it will only count for half of one of your required courses. To complete the requirement, you would have to take another approved half course, or something equivalent with the approval of the DGS (i.e. maybe an additional project as part of the course, with the instructor and DGS approval).

## Core Courses

- [QCB 515](#) Method and Logic in Quantitative Biology
- [COS/QCB 551](#) Introduction to Genomics and Computational Molecular Biology
- [QCB 501](#) Topics in Ethics in Science (Responsible Conduct of Research, or RCR, course); please note that you may take an RCR course offered by another department with approval from home and affiliated departments.

### **Quantitative Courses (must take at least one)**

- [APC 524 /MAE506/AST506](#) Software Engineering for Scientific Computing
- [CBE 517](#) Soft Matter Mechanics: Fundamentals & Applications
- [CHM 503/CBE 524/MSE 514](#) Introduction to Statistical Mechanics
- [CHM 515](#) Biophysical Chemistry I
- [CHM 516](#) Biophysical Chemistry II
- [COS 511](#) Theoretical Machine Learning
- [COS 524/COS 424](#) Fundamentals of Machine Learning
- [COS 557](#) Analysis and Visualization of Large-Scale Genomic Data Sets
- [COS 597F](#) Advanced Topics in Computer Sci: Computational Biology of Single Cells
- [ELE 535](#) Machine Learning and Pattern Recognition
- [MAE 567/CBE 568](#) Crowd Control: Understanding and Manipulating Collective Behaviors and Swarm Dynamics
- [MAT 586/APC 511/MOL 511/QCB 513](#) Computational Methods in Cryo-Electron Microscopy
- [MAE 560 / MSE 570](#) - Lessons from Biology to Engineer Tiny Devices
- [MOL 518](#) Quantitative Methods in Cell and Molecular Biology
- [MSE 504/CHM 560/PHY 512/CBE 520](#) Monte Carlo and Molecular Dynamics Simulation in Statistical Physics & Materials Science
- [NEU 437/537](#) Computational Neuroscience
- [NEU 501](#) Cellular and Circuits Neuroscience
- [NEU 560](#) Statistical Modeling and Analysis of Neural Data
- [PHY 561/2](#) Biophysics
- [QCB 505/PHY555](#) Topics in Biophysics and Quantitative Biology
- [QCB 508](#) Foundations of Statistical Genomics

### **Biological Courses (must take at least one)**

- [CHM 403](#) Advanced Organic Chemistry
- [CHM/QCB 541](#) Chemical Biology II
- [EEB 504](#) Fundamental Concepts in Ecology, Evolution, and Behavior II
- [EEB 507](#) Recent Research in Population Biology
- [MAE 566](#) Biomechanics and Biomaterials: From Cells to Organisms
- [MOL 504](#) Cellular Biochemistry
- [MOL 506](#) Cell Biology and Development
- [MOL 518](#) Quantitative Methods in Cell and Molecular Biology
- [MOL 521](#) - Systems Microbiology and Immunology
- [MOL 523](#) Molecular Basis of Cancer
- [MOL 559](#) Viruses: Strategy & Tactics
- [QCB 490](#) Molecular Mechanisms of Longevity

## **Selected undergraduate courses of interest**

**(Note: these do not count toward course requirements)**

- [APC 350](#) Introduction in Differential Equations
- [CBE 448](#) Introduction to Nonlinear Dynamics
- [COS 226](#) Algorithms and Data Structures
- [EEB 324](#) Theoretical Ecology
- [MOL/QCB 485](#) Mathematical Models in Biology
- [ORF/MAT 309/380](#) Probability and Stochastic Systems
- [ORF 406](#) Statistical Design of Experiments
- [QCB 302](#) Research Topics in QCB

Please visit the Registrar Course Offerings page at <http://registrar.princeton.edu/course-offerings> for links to see what is be offered this academic year and for detailed course information.

## **Responsible Conduct of Research (RCR)**

Students are required to take [QCB501 Topics in Ethics in Science](#), the QCB course in responsible conduct of research (RCR). This course is offered every other year and students will be notified when an enrollment year is upcoming. Students are also permitted to enroll in an RCR course hosted by an affiliated department, provided both home and host departments give approval. The QCB Executive Committee is also available to field and answer questions about issues in the arena of “Responsible Conduct of Research.”

As QCB501 is only offered every other year, we require all incoming students to complete the **CITI Training Module**, an online RCR course, by November of their first year. Instructions are sent directly to new students.

Students must complete all RCR training by their **third year of study, preferably earlier** (this is a requirement set by the Graduate School).

## **QCB Graduate Colloquium**

QCB students are required to attend our **QCB Graduate Colloquium** during the academic year. First, third, and fourth year students will present their research to their peers over the fall and spring semesters. Schedules will be made during the summer for the upcoming academic year.

## **Lab Rotations & Choosing a Thesis Advisor**

**QCB students are required to complete three lab rotations.** Rotations, approximately 10 weeks in length, will take place during the Fall, Winter, and Spring of the first year. Students can choose rotations at their discretion, although it is suggested that students do at least one rotation outside of their area to gain research breadth. **All lab rotations must be discussed with and approved by the Director of Graduate Studies in advance.**

**Lab rotation expectations:** Students are required to meet with the faculty member they are rotating with at the beginning of the rotation to form a working plan. Students are expected to show up routinely in lab to work on their project and to attend all lab meetings, and it is recommended that the student meet with the faculty member periodically. Satisfactory rotation performance is one condition of [reenrollment](#). Students will be expected to present the work done during their lab rotations to their QCB peers during the spring term of the [QCB Graduate Colloquium](#).

*Students should have a thesis advisor by the end of their third rotation. If a student foresees any problem with this, they should meet with the DGS as soon as possible to discuss a course of action.*

### **Suggested rotation schedule for 2020-2021 academic year\***

<b>ROTATION</b>	<b>BEGINS</b>	<b>ENDS</b>
<b>FIRST</b>	<b>September 8, 2020</b>	<b>November 20, 2020</b>
<b>SECOND</b>	<b>November 30, 2020</b>	<b>February 19, 2021</b>
<b>THIRD</b>	<b>February 22, 2021</b>	<b>May 7, 2021</b>

- Fall break is October 10 – 13, 2020
- Spring Break is March 13 – 16, 2021
- Summer months are June and July. If you anticipate that you will not have a thesis advisor by June 1, please reach out to DGS as soon as possible.

\*We understand your rotation dates might not follow this schedule exactly for a variety of reasons, and that is OK. There is enough leeway to still ensure you can do three 10-week rotations. We have tried to account for semester breaks and holidays when estimating rotation start and end dates. Work in thesis lab should begin no later than June 1.

## **QCB General Exam Requirements (taken in January of your second year)**

**The general exam consists of a 7 page written thesis proposal, in the format and style of an NIH predoctoral NRSA application, and a two-hour oral exam.**

**The overall goal** of the general exam is to be sure that you have developed a novel and feasible research plan of appropriate scope for a thesis project, and that you have the knowledge and the skills required to carry it out. Students are highly encouraged to develop successfully defended thesis proposals into F31 applications, if eligible.

1. **Forming your committee:** student is responsible for forming the exam committee, coordinating a date and time, and reserving a room for the exam. The committee must consist of three faculty, and the student's advisor may not serve on the examining committee and is not present at the exam. At least 2 of the 3 committee members must be QCB faculty.
2. **When it happens:** General Exams are held in January of your second year; any exceptions must first be approved by the Director of Graduate Studies and then by the Graduate School, if it falls outside of their pre-determined exam windows (see the registrar's [Academic Calendar](#)).
3. **How to prepare:** The **written portion** of the general exam is a report describing the thesis proposal and is written by the student in consultation with their thesis advisor. Proposals should be in the style of an NIH fellowship, as follows:
  - a. **Your proposal must have a title**
  - b. **Specific Aims (1 page)\***
  - c. **Research Strategy, which is broken down into: (a) Significance and (b) Approach (6 pages)\*\***
  - d. **References (mandatory) and figures (if applicable) – no page limit**

It is recommended that the thesis advisor review the student's thesis proposal and offer feedback to the student before the general exam, but advisors are asked not to rewrite any part of the proposal.

4. **Submit your final thesis proposal** to your committee members and the graduate administrator (Jennifer Giraldi) at least one week in advance of your exam.
5. **The second part of the generals is a two-hour oral presentation**, which should cover the content in the written proposal.
  - a. **The format: Chalk talk. If you'd like to add anything, such as a video, you must consult with your exam committee for approval beforehand.** During the presentation, anticipate being interrupted early and often with comments and questions throughout your presentation. They will ask questions to get a sense of



your breadth and depth of knowledge in your area of focus, as well as general molecular and biological and quantitative knowledge. It is normal and acceptable for you to not know the answers to all of their questions, so do not panic if you have to say “I don’t know”. It is a good idea to make sure your room is equipped with supplies you need before you begin (chalk, water, etc.).

- b. Have a minimum of two practice exams with your lab**, one of which should include your thesis advisor. It is often helpful to ask more senior students from the labs of your committee members to come to your practice exams and try to ask the kinds of questions their advisors might.

- 6. The general exam results:** your committee will confer immediately after your exam and will let you know the results. They will then complete a report form and submit it to the department. The student will then receive an official document from the department and the graduate school, stating the pass or fail.

Students who pass the general exam will receive an email from the graduate school inviting them to apply for their incidental Master of Arts degree, which is done through TigerHub.

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**\* SPECIFIC AIMS (1 PAGE)**

State concisely the goals of the proposed research and summarize the expected outcome(s), including the impact that the results of the proposed research will have on the research field(s) involved.

List succinctly the specific objectives of the research proposed (e.g., to test a stated hypothesis, create a novel design, solve a specific problem, challenge an existing paradigm or clinical practice, address a critical barrier to progress in the field, or develop a new technology).

**\*\*RESEARCH STRATEGY (6 PAGES)**

Start each section of the Research Strategy with an appropriate section heading – **Significance** and **Approach**. Cite published experimental details in the Research Strategy section and provide the full reference in a References Cited section at the end. While there is no page limitation for bibliography, it is important to be concise and to select only those literature references pertinent to the proposed research.

**(a) Significance**

- Explain the importance of the problem or critical barrier to progress in the field that the proposed project addresses.

- Explain how the proposed project will improve scientific knowledge, technical capability, and/or clinical practice in one or more broad fields.
- Describe how the concepts, methods, technologies, treatments, services, or preventative interventions that drive this field will be changed if the proposed aims are achieved.

**(b) Approach**

- Describe the overall strategy, methodology, and analyses to be used to accomplish the specific aims of the project.
- Discuss potential problems, alternative strategies, and benchmarks for success anticipated to achieve the aims.

Above guidelines taken from NIH website:

<https://researchtraining.nih.gov/programs/fellowships/F31>

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In summary, your proposal should present a research project that you intend to carry out over the duration of your time in the QCB program. The proposal should include a cited background in literature, how your project fits into this background, the significance of your proposal, the approach you will use and what the rationale is behind your approach. You should also discuss potential problems and what alternative strategies may be used to lead to possible solutions. And please keep in mind that this is a proposal, and it is understood that it is in the preliminary stages of research.

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## **Teaching**

<http://gradschool.princeton.edu/costs-funding/sources-funding/assistantships/assistantships-instruction>

Two semesters of teaching are required for the Ph.D. degree. Students can teach after successful completion of their general exam, typically in their fourth year of study. Students may teach additional terms with permission from their advisor, although students who need to complete the program requirement are considered first for available teaching slots.

Department courses include ISC231-234, ISC326, QCB302, QCB408, QCB505, QCB515, and COS551/QCB455. The graduate administrator and Director of Graduate Studies will make all teaching assignments each summer. If a student would like to teach one of these courses in particular, or a course from another department, they should inform the graduate administrator as soon as possible, so the request can be taken into consideration. Students have also taught in courses for CBE, COS, EEB, ENV, MAT, MOL, SML. These are usually secured with assistance from the student's advisor. If you do plan to teach in a course outside of QCB, you must notify us immediately with your teaching plan, as we handle your funding.

First-time Assistants-in-Instruction (AI's) are required by the Graduate School to attend a training & orientation course given by the McGraw Center for Teaching and Learning. Trainings are offered twice a year, once in early September for Fall Term AI's and once in late January for Spring Term AI's. The graduate administrator must register all students so they are given credit for completing the training.

If you are on a fellowship, you can usually still teach, but it must be a 3 hour (50%) assignment or less. This is graduate school policy. You would also need to check with your fellowship officer on if they have any specific rules regarding teaching while on fellowship.

## **Thesis Advisory Committee and Thesis Committee Meetings**

After the student has chosen a thesis advisor and passed the general exam, they must form a thesis committee, which consists of the thesis advisor and two additional faculty members. (Note: you need two non-advisor committee members, so if you are co-advised by multiple faculty, you still need to add two additional non-advisor committee members). At least two members of your committee must be QCB faculty. If you need assistance in forming your committee, please work with your advisor and/or DGS. **The thesis committee must ultimately be approved by the DGS.**

**Thesis committee meetings are mandatory and held once a year; the suggested time is October.** The student or any of the committee members may hold additional committee meetings as needed. It is recommended that at least two meetings are held each year, but it is not required.

To prepare for the thesis committee meeting, the student should write 1-2 pages about their research progress and goals and then present this and any future plans to the thesis

committee for feedback. Meetings typically last one hour. Graduate students are responsible for organizing the meeting logistics.

Please keep the graduate administrator informed of any upcoming meetings, as a progress form is sent to the committees ahead of time.

## **Dissertation**

<http://gradschool.princeton.edu/academics/degree-requirements/phd-requirements/dissertation-and-fpo>

After the student has chosen a thesis advisor, completed all coursework and passed the general exam, the remainder of the program is devoted to independent research leading to the writing of a dissertation.

The dissertation must show that the candidate has technical mastery of the field and is capable of doing independent research. This study must enlarge or modify current knowledge in a field or present a significant new interpretation of the known materials.

The dissertation is reviewed and approved by at least two principal readers before being submitted for acceptance to the Graduate School. The Graduate School requires that all reader's reports and other documentation be received in their office, via the advanced degree application in TigerHub, **at least two weeks** before your defense (FPO) examination date.

Thesis format and procedures for its deposition with the University archives can be found on the Mudd Library website: <https://rbcs.princeton.edu/policies/masters-theses-and-phd-dissertations-submission-guidelines>.

## **Final Public Oral Examination (your dissertation defense)**

The final public oral (FPO) examination is a final exam in the student's field of study and a defense of the dissertation, and is the last formal requirement for the Ph.D. The advisory committee serves as the final thesis committee and conducts the FPO. Additional faculty may need to be included as at least two of your FPO committee members may not also be principal readers of your dissertation.

The FPO consists of a public lecture on the thesis research, usually of about one hour in length. During this presentation, the public and the thesis committee may question the student about the research.

Students who successfully defend by early May are invited to participate in the June Commencement. Degree deadline dates can be found on the Graduate School website: <http://gradschool.princeton.edu/academics/degree-requirements/phd-requirements/dissertation-and-fpo/advanced-degree-application>.

If the student does not pass the final public oral examination, he or she may request to retake the examination within one year. If unsuccessful a second time, the candidate is not permitted another opportunity to retake the examination, and Ph.D. candidacy is terminated.

Students may wish to consult [Benefits and Status after the FPO](#) for information about benefits you may receive between FPO and degree conferral.

## **Timeline to your FPO (Final Public Oral)**

Below are the guidelines when we were able to conduct FPO's in person. Please refer to my below information **as well as** the graduate school website for modified guidelines while we are under pandemic related restrictions:

<https://gradschool.princeton.edu/academics/degree-requirements/phd-advising-and-requirements/dissertation-and-fpo/advanced-degree>

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To start: Click [here](#) for degree deadlines

### **More than TWO MONTHS before your FPO:**

- Review the Mudd Library dissertation format requirements and submission procedure at <https://rbsc.princeton.edu/policies/masters-theses-and-phd-dissertations-submission-guidelines>.

*Note: (thesis binding can be done through Smith-Shattuck Bookbinding; 609-497-1445; [shattuckbook@att.net](mailto:shattuckbook@att.net), <http://www.thesisbookbinding.com>)*

- Submit final chapters of your thesis to your advisor(s) for review
- Confirm your **principal readers** and **exam committee**
  - a. *Dissertation readers:* You must have two faculty dissertation readers. One should be your advisor.
  - b. *FPO exam committee:* A minimum of 3 faculty members are required, and one is your advisor. The other two faculty on your committee must **not** have read your dissertation.
  - c. Coordinate your FPO date and time with your exam committee. Contact Graduate Administrator (Jennifer Girdali) to reserve a room.
  - d. For details: <http://gradschool.princeton.edu/academics/degree-requirements/phd-requirements/dissertation-and-fpo>

**Approximately FOUR to SIX WEEKS before your FPO:**

- Submit a draft of your thesis to your readers. Incorporate suggested edits into thesis, if applicable.

**At least TWO WEEKS before your FPO:**

- Apply for your Advanced Degree by visiting [TigerHub](#) and filling in appropriate information. They will ask you for copies of your title page and abstract (350 words or less), and [Ph.D. Dissertation Embargo Request and Approval](#) form if applicable.
- The following forms must be submitted to the department **Graduate Administrator**
  - [Prior Presentation and Publication](#) form, completed by advisor
  - [Reader's Report](#) forms, completed by principal readers of dissertation
  - **An electronic copy of your thesis** (this is only for department records)

**THREE DAYS before your FPO:**

After the graduate school approves your FPO, the department will post announcement.

**Day of FPO**

<https://gradschool.princeton.edu/academics/degree-requirements/phd-advising-and-requirements/dissertation-and-fpo>

- Defend! Please make sure that all of your examiners are present before you begin. Public portion of defense (your talk) is expected to last about 50 minutes, followed by 10 minutes for questions from the public.
- The following items are due in Seeley G. Mudd Manuscript Library **normally immediately after the successful completion of the FPO exam**, but no later than two weeks after defense:
  - [Final Public Oral Examination Report](#) signed by FPO chair/DGS (1 original plus 1 copy)
  - One bound copy of the dissertation
  - Print-out of confirmation email from submission of dissertation to [ProQuest/UMD ETD](#)
  - \$15.00 dissertation maintenance fee (MasterCard, Visa, or check payable to Princeton University Library accepted)
  - If you are seeking an embargo you must provide the email confirmation of embargo approval from the Graduate School
  - All info found here: <https://rbsc.princeton.edu/services/theses-dissertations>

- The three documents below must be submitted in hard copy to the Office of Academic Affairs, 111 Clio Hall, **normally immediately after the successful completion of FPO exam**, but no later than two weeks after the successful defense:
  - [Final Public Oral Examination Report](#) in hard copy; signed by FPO chair or DGS and Mudd librarian
  - [Survey of Earned Doctorates](#) (hard copy of the “Certificate of Completion” page of the SED)
  - [Exit Questionnaire](#) (hard copy of “Confirmation of Completion” page must be submitted)
  - If currently enrolled, a completed [Checkout for Students Departing the University](#) form

Students may wish to consult [Benefits and Status after the FPO](#) for information about benefits you may receive between FPO and degree conferral.

## **Reenrollment (happens every April)**

<http://gradschool.princeton.edu/academics/degree-requirements/standard-requirements/reenrollment>

Students are evaluated on an on-going basis by their research advisor, thesis committee and the Director of Graduate Studies. Readmission to a subsequent academic year is conditional on the progress and conduct during the previous year.

Students will be notified by the Graduate School via email, with instructions, when it is time to submit the reenrollment application. This is an annual process. Reenrollment applications typically open to students in mid-March, with a deadline in April. On the reenrollment application, students describe their academic progress of the current year and their goals for summer and the next academic year. **Students are expected to be as detailed as possible in the applications**, or their reenrollment application may get an initial rejection by their advisor, which causes a delay in process. (e.g. do not only write “work in lab” as your summer goals).

Once the student submits the application, the advisor then provides feedback (if there is an advisor at this point). In turn, the department receives the application, provides feedback, and submits the application to the Graduate School for approval. The student will then receive a renewal contract from the Graduate School for the upcoming academic year.

## **Student Status**

<http://gradschool.princeton.edu/academics/enrollment-statuses>

Please visit the Graduate School website for information regarding the following student statuses: In Absentia, Leave of Absence, Withdrawal, Degree Completion Enrollment (DCE), Enrollment Terminated, Degree Candidacy Continued (ETDCC) and Termination.

## **Funding Information**

Students in the QCB Graduate Program are provided funding for a five year enrollment period. For the first year of study, the Graduate School provides fellowship and tuition payment; in subsequent years, students are funded via department funds, training grants, teaching positions, research grants, internal or external fellowships, or a combination thereof.

Graduate students are paid once a month. Direct deposit can be set up through TigerHub.\* If direct deposit is not set up, paychecks are held onto by the Institute’s HR Assistant, and students are emailed when they are ready for pick up.

Paycheck amounts will vary year-to-year depending on funding source. If a student is paid via **fellowship**, no taxes are directly deducted from paychecks, and students are expected to report those taxes. First year of pay from the graduate school is considered a fellowship. Other potential fellowships include the LSI’s NIH training grant, and external



awards such as the NSF, NJCCR, etc. If a student is **not on a fellowship (i.e. research or teaching)**, then taxes are taken out of paychecks like any other salaried position. The graduate school does not offer tax assistance, but a guideline summary can be found on their website.\*\*

\*Direct deposit instructions:

<https://finance.princeton.edu/how-to/payroll/payroll-basics/view-or-change-you/sign-up-for-direct-deposit-step-by-step/>

\*\*Tax information: <https://gradschool.princeton.edu/costs-funding/tax-information>

## **Outside Funding**

<http://gradschool.princeton.edu/costs-funding/sources-funding/external-funding/external-fellowships>

At the beginning of the fall term, one of our QCB faculty will give a general fellowship presentation to first and second years.

Students are encouraged to apply for outside sources of funding. Please visit Princeton's Pivot site at [https://pivot.proquest.com/funding\\_main](https://pivot.proquest.com/funding_main) to search for other external fellowship funding opportunities. If you need assistance with choosing an appropriate fellowship, please discuss with your advisor and/or our DGS.

Students who do obtain external awards must fill out the Graduate School's **External Fellowship Form**, so the graduate school and the department have all of the necessary award information. <https://gsapps.princeton.edu/externalfellowship/>

## **Safety Training**

All students must complete **laboratory safety** and **biosafety training** offered by Princeton's office of Environmental and Health Services (EHS). Students who do not take this course will not be permitted to work in a lab. Students will typically complete training during September orientation, before the start of their first lab rotation.

Students should visit the EHS website, <http://www.princeton.edu/ehs>, for further information on safety issues, hazardous material and more.

## **Student Vacation Policy** <http://gradschool.princeton.edu/policies/student-vacation-time>

Graduate study is understood to be a full-time commitment. The specific periods taken as vacation must not conflict with the student's academic responsibilities, coursework, research or teaching.

Students must discuss vacation time with his or her advisor and teaching supervisor(s), if student is an assistant in instruction (AI), for approval. AI's will typically not be allowed to take vacation when class is in session or during reading periods and exam times.

## **International Travel** <http://www.princeton.edu/travel/graduate-students>

The Graduate School requires that all graduate students on University sponsored travel register their trips in the University's Travel Registration database, Concur. This is travel that is funded, entirely or in part, by Princeton funds or funds processed through University accounts.

## **Affiliated Seminar Series**

Please note that attendance is mandatory for the QCB Seminar Series only. All other seminars are optional and listed here for informational purposes only. Seminars are held during the academic year. ***Please check all websites for updates due to the pandemic. All seminar series will be held remotely.***

### **QCB Seminar Series (Lewis-Sigler Institute)**

Mondays at 4:15pm in Icahn 101

<http://lsi.princeton.edu/archives/seminars>

### **CUNY-Princeton Biophysics Seminar Series**

Mondays at 12:00pm in Joseph Henry Room (Jadwin Hall)

<http://lsi.princeton.edu/archives/seminars>

### **Chemical and Biological Engineering**

<http://www.princeton.edu/cbe/events>

### **Chemistry**

<http://chemistry.princeton.edu/seminars-events/type/seminar>

### **Computer Science**

<http://www.cs.princeton.edu/general/newsevents/events>

### **Ecology & Evolutionary Biology Seminar Series**

<http://www.princeton.edu/eeb/events>

### **Molecular Biology Seminar Series**

<http://molbio.princeton.edu/events/all>

### **Neuroscience Seminar Series**

<http://www.princeton.edu/neuroscience/events/index.xml?category=Neuroscience%20Seminar%20Series>

### **PACM Seminar Series (Program in Applied and Computational Mathematics)**

<https://www.math.princeton.edu/events>

### **PICASso (Program in Integrative Information, Computer and Application Sciences)**

<http://www.cs.princeton.edu/picasso/?events.html>

### **PICSciE Seminar Series (Princeton Institute for Computational Science and Engineering)**

<https://researchcomputing.princeton.edu/news-and-events>

## **Information Links and Contacts**

**QCB Faculty** <http://lsi.princeton.edu/qcbgraduate/faculty-research>

**QCB Staff** <http://lsi.princeton.edu/people/staff>

**QCB Graduate Program** <http://lsi.princeton.edu/qcbgraduate>

### **TigerHub Login Page**

(where students register for courses, reenroll and manage payroll information, including setting up direct deposit and W-2 information): <https://registrar.princeton.edu/tigerhub/>

### **Graduate School**

Location: Clio Hall; Phone: 609-258-3034; <http://gradschool.princeton.edu>

### **Pivot: Princeton's external fellowship funding opportunity search engine**

[https://pivot.proquest.com/funding\\_main](https://pivot.proquest.com/funding_main)

### **CPS (Counseling and Psychological Services)**

Location: McCosh Health Center (Third Floor); Phone: 609-258-3285  
<http://www.princeton.edu/uhs/student-services/counseling-psychological>

### **University Health Services**

Location: McCosh Health Center; Phone: 609-258-3129  
<http://www.princeton.edu/uhs>

### **Payroll questions**

Location: 701 Carnegie Center, Suite 154  
Phone: 609-258-3082; Email: [payroll@princeton.edu](mailto:payroll@princeton.edu)  
<http://finance.princeton.edu/how-to/payroll/payroll-basics>

### **Tax questions**

<http://gradschool.princeton.edu/costs-funding/tax-information>  
For additional help, domestic students must visit the IRS website or consult a professional tax preparer for assistance; international students can visit the Davis International Center for assistance:  
<https://davisic.princeton.edu/taxes-social-security>

### **Housing Office**

Location: Macmillan Building  
Phone: 609-258-3460; Email: [gradhsg@Princeton.EDU](mailto:gradhsg@Princeton.EDU)

**Weather Hotline:** 609-258-SNOW

**Public Safety:** 609-258-1000

## **Core Course Descriptions**

### **QCB 515 Method and Logic in Quantitative Biology**

**[Offered in Fall Term]**

Close reading of published papers illustrating the principles, achievements, and difficulties that lie at the interface of theory and experiment in biology. Two important papers, read in advance by all students, will be considered each week; the emphasis will be on discussion with students as opposed to formal lectures. Topics include: cooperativity, robust adaptation, kinetic proofreading, sequence analysis, clustering, phylogenetics, analysis of fluctuations, and maximum likelihood methods. A general tutorial on Matlab and specific tutorials for the four homework assignments will be available.

### **COS/QCB 551 Introduction to Genomics and Computational Molecular Biology**

**[Offered in Fall Term]**

Introduction to basic computational methods used for problems arising in molecular biology, genomics, and proteomics. We also discuss the basic biology of the genome and experimental methods used to probe its function. Topics include computational approaches to: sequence similarity and alignment, phylogenetic inference, gene recognition, gene expression analysis, structure prediction, population and comparative genomics.

### **QCB 501 Topics in Ethics in Science**

**[Offered every other year]**

Discussion and evaluation of the role professional researchers play in dealing with the reporting of research, responsible authorship, human and animal studies, misconduct and fraud in science, intellectual property, and professional conduct in scientific relationships. Participants are expected to read the materials and cases prior to each meeting. Successful completion is based on regular attendance and active participation in discussion. This half-term course is designed to satisfy federal funding agencies' requirements for training in the ethical practice of scientists. Required for graduate students and post-docs.

## QCB Graduate Student Checklist

If needed, this checklist is intended to help you keep track of your graduate career milestones.

### Course Requirements

- QCB515** (Method and Logic in Quantitative Biology)
- COS/QCB551** (Introduction to Genomics and Computational Molecular Biology)
- QCB501** (our RCR or Responsible Conduct of Research course) - offered approximately every other summer
- Elective #1** \_\_\_\_\_
- Elective #2** \_\_\_\_\_
- Elective #3** \_\_\_\_\_

NOTE: At least one elective must be from our *Quantitative* course list, and one must be from our *Biological* course list (see <http://lsi.princeton.edu/qcbgraduate/education/phd-program-requirements>). All course substitutions must be approved by the DGS. Courses cannot be taken P/D/F.

### Research Rotations

Students must complete three lab rotations. All rotations are usually completed by end of the first year, and the student's thesis lab should be decided upon at the conclusion of the rotations. If student foresees any issues with this timetable, they should meet with the DGS to discuss a course of action.

- Rotation 1: Lab and Project

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- Rotation 2: Lab and Project

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- Rotation 3: Lab and Project

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### **General Exam (held in January of your second year):**

- By the fall of your second year, form an exam committee consisting of three faculty. The exam committee cannot include your thesis advisor. Committees must have at least two QCB faculty. Email DGS for approval on committee.
- Book date/time/room with your committee as soon as possible.
- Prepare your written submission and practice giving your talk.
- Submit proposal to your committee at least a week in advance of the exam.

Exam committee member #1 \_\_\_\_\_

Exam committee member #2 \_\_\_\_\_

Exam committee member #3 \_\_\_\_\_

### **Thesis Committee Meetings (held annually in October)\***

- Form thesis committee by the fall term following your general exam (one member will be your advisor). At least two members must be QCB faculty. All committees must be approved by DGS.
- Completed meeting in October of third year.
- Completed meeting in October of fourth year.
- Completed meeting in October of fifth year.

Thesis committee member #1 \_\_\_\_\_

Thesis committee member #2 \_\_\_\_\_

Thesis committee member #3 \_\_\_\_\_

\*To prepare for a meeting, write up 1-2 page summary of your research progress and goals. Present this and your future plans to the thesis committee for feedback.

**Dissertation and FPO (Final Public Oral):** You can find information and a complete checklist for Princeton's FPO process here:

<https://gradschool.princeton.edu/academics/degree-requirements/phd-advising-and-requirements/dissertation-and-fpo/advanced-degree>.