

Cornell University

# Field of Biophysics

Graduate Student Handbook

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## Cornell Graduate School & Graduate Field Structure:

As a Cornell graduate student, your College Registrar is the Graduate School. The central administration of graduate programs at Cornell allows graduate study to be cross-disciplinary and integrative, independent of traditional departments, colleges or campuses. (See [Understanding Field Structure](#) for more information). For the student, this allows for freedom with responsibility for creating a program that is unique to each.

The broad structure and guidelines for all Graduate Fields at the University is governed by the Graduate School, particularly with regard to registration, student status, and benchmarks leading to graduation. The [Code of Legislation of the Graduate Faculty](#) contains all of the regulations related to graduate education at Cornell. The most relevant ones are included in this book.

Within these guidelines, each Field sets the standards and requirements specific to students in the particular program. On the individual level, the student's Special Committee is the final arbiter of the student's program.

You should be sure to follow all administrative requirements of the University, [the Graduate School](#) and the Field. If you have questions about any of these requirements, please contact the appropriate office or ask the GFAs for information or a referral to the appropriate office. Note that Graduate School Forms are found on-line at <https://gradschool.cornell.edu/forms/>.

### Orientation and "Basic" Training

The University and Graduate School require certain training and compliance tasks of all graduate students. Much of this is included in the [New Student Checklist](#) which becomes available in late April/early May. The rest is taken care of in Orientation process at the beginning of your first year.

Incoming students are required to attend Biophysics Orientation, which generally takes place the week before classes start. During this time, students will complete required training and paperwork necessary for their program. It is our goal to have administrative requirements completed before the start of classes in order to allow students to concentrate on the academic part of their program.

Included in the mix with administrative requirements and training are activities designed to welcome you into the Department of Molecular Biology & Genetics (MBG), which is the administrative home to the Graduate Fields of Biochemistry, Molecular & Cell Biology and Genetics, Genomics & Development, and specifically to the Field of Biophysics. The MBG Welcome & Awards Ceremony is held at the beginning of the fall semester and is a good way to meet the students, staff, and faculty in an informal, non-lab setting.

### Registration

**Registration:** Registration takes place three times a year – fall, spring and summer and establishes your status as a Cornell graduate student. Registration is typically an automatic process; however, if there is a hold on your account, your registration may be blocked. Additionally, if you do not enroll in Dissertation Research for the summer, you will not be considered a registered student.

**Student Essentials** (<https://studentessentials.cornell.edu/>) is your information hub. You should go here at the beginning of each semester to ensure that you do not have any holds on your account (i.e. that you are registered). If there is a hold, clear it up as soon as possible even if it is not preventing you from being a registered student. Unresolved holds not only result in late fees but will prevent future registration.

You should keep your contact information updated in Student Essentials. It is not only a site that asks for information, but it also provides links to campus resources and information as well as contact information for important campus offices, such as the Bursar, the Registrar (OUR), Financial Aid and the Graduate School.

Your Student Essentials will also have information about your financial assistance (i.e. stipend, tuition and health insurances) and whether or not it has been processed. If there is a problem with your funding, contact the GFAs as soon as possible to get this resolved.

**Changes in Student Status:** Unless you fail to clear up registration holds by the deadline or do not register for summer, your student status should continue unless you change it. A voluntary change in student status requires completion of the appropriate form, all of which can be found on the [Graduate School Forms web site](#).

**In Absentia:** If you are going to be doing research or working on your thesis at least 100 miles away from Cornell, you may apply for In Absentia Status. IA will maintain your status as a student and allow you to have access to libraries and receive an assistantship.

**Leave of Absence:** A [Leave of Absence](#) means that you are giving up your status as a student. There are a number of different types of leaves which are detailed on the Graduate School web site. If you have questions, consult the GFAs or the Graduate School Student Services Team.

## Course Enrollment

**Grad School/University Course Information:** The Graduate School does not set [course requirements](#); these are set by the Field of Biophysics and your Special Committee. You should consult with the Director of Graduate Studies (DGS) and/or your Special Committee about the courses that you should take.

Dates for course enrollment, including pre-enrollment for the next semester, are set by the University Registrar (<https://registrar.cornell.edu/>). Make sure that you register in accordance with the published dates. NOTE: The Graduate School will only consider Course Enrollment Petitions in extremely extenuating circumstances. Check your course enrollment prior to the published add/drop dates.

Federal regulations require that all students enroll in at least 12 credit hours/semester. You should not feel obligated to enroll in 12 credit hours of actual coursework unless your DGS/Special Committee consider(s) it necessary. Enroll only in the courses that you need/want to take. In the fall and spring semesters, the Graduate School will enroll students in their Graduate Dissertation Research course in order to ensure that your record reflects 12 credit hours.

**Summer Enrollment/Registration:** All graduate students who plan to use university facilities such as libraries, computer centers, and the Gannett Health Center and/or receive a summer stipend are required to enroll in the Graduate Dissertation Research (via Student Center) for the summer. The deadline for this is the end of May. (Please note: If you register after the published deadline, FICA taxes will be withdrawn from your paycheck).

**Biophysics Coursework:** Course requirements are set by the Field of Biophysics and your Special Committee (see Course Enrollment). You should talk to the Director of Graduate Studies (DGS) and/or your Special Committee about the courses that you should take. Course requirements are centered around the Field's learning outcomes/core competencies. These are listed below with course suggestions for each area. These must be completed prior to the A-Exam.

**Grade Expectations:** Courses should be taken for letter grade with a minimum grade of “B-“. The option of S/U for one course is allowed. Audits are not acceptable. For courses with a letter grade, students are expected to receive a “B” (3.0) or better in order to remain in good standing in the program. If a student receives a C+ or lower grade in any core Biophysics course, no credit is given for that course; the course must be retaken if it is a required course.

## **Biophysics Learning Objectives: (to be satisfied prior to the A-exam)**

### **1. Advanced Mathematics:**

- CHEM 7870 (Mathematical Methods of Physical Chemistry)
- AEP 3200 (Introductory Mathematical Physics) – graduate level course number pending
- AEP 4200 (Intermediate Mathematical Physics) – graduate level course number pending

### **2. Quantum Mechanics:**

- CHEM 7930 (Quantum Mechanics I)
- PHYS 6572 (Quantum Mechanics I) Recommended for students w/ physics/math background
- CHEM 6890 (Honors Physical Chemistry I)

### **3. Statistical Mechanics:**

- PHYS 6562 (Statistical Physics I)
- PHYS 7653 (Statistical Physics II)
- CHEM 7960 (Statistical Mechanics) Recommended for students w/ physics background
- CHEM 6900 (Honors Physical Chemistry II)

### **4. Biochemistry:**

- BIOMG 6300 (Principles of Biochemistry, Individualized Instruction)
- BIOMG 6310 (Principles of Biochemistry: Proteins, Structure & Function)
- BIOMG 3350 (Principles of Biochemistry: Proteins & Metabolism) – graduate level course number pending

### **5. Molecular Cell Biology**

- BIOMG 6400 (Laboratory in Biochemistry & Molecular Biology)
- BIOMG 6310 (Protein Structure & Function)
- BIOMG 6360 (Functional Organization of Eukaryotic Cels)
- BIOMG 4320 (Survey of Cell Bio) – graduate level course number pending
- BIOMG 3320 (Principles of Biochemistry: Molecular Biology) – graduate level course number pending

### **6. Advanced Studies of Molecular Biophysics & Associated Areas of Biological & Physical Science**

- BME 5700 (Biophysical Methods)
- CHEM 7880 (Structural Methods in Biochemistry)
- Other Graduate-level class in BMCB/PHYS/CHEM

### **7. Computer Literacy, Laboratory Electronics and Instrumentation:**

- PHYS 6510 (Advanced Lab)
- Machine Shop Course
- Other significant research experience worthy of consideration

### **8. Ethics:** A course in scientific ethics **BIOMG 7510** is required of all students. **Computer Literacy, Laboratory Electronics and Instrumentation:**

In addition, a course in scientific ethics (BIOMG 7510) is required of all students.

Students must also enroll in Frontiers in Biophysics (BIOMG 6312) every semester.

### **Requirements for a Minor in Biophysics**

For Ph.D. candidates with a minor in Biophysics, the suggested requirements are at least six credits of advanced lecture courses. Appropriate courses in BMCB include: BIOMG 6310, 6330, 6360, and 6390. 6000- and 7000-level courses in other departments, i.e., Chemistry & Chemical Biology, Plant Biology, Vet Molecular Medicine, and Vet Microbiology & Immunology, may also be suitable, as determined by the Special Committee. If a student who wants to minor in BMCB has not been exposed to appropriate lab work in the general area of BMCB, then he/she should also take the lab course BIOMG 4400.

For MS candidates with a minor in BMCB, the suggested requirements are at least four (4) credits of advanced lecture courses and a lab if appropriate. Some suggestions for appropriate courses are indicated in the paragraph above.

Note that requirements are determined by Special Committees, and that the recommendations above are guidelines offered by the Field.

### **Program Timeline & Benchmarks**

#### **Biophysics First-year Program & Assessment**

**Rotations:** All graduate students in Biophysics are required to complete three rotations during their first year in the program. Rotations provide an opportunity to explore areas for possible Ph.D. thesis research. In addition, both students and faculty are able to test possible working relationships. During this time, the Director of Graduate Studies (DGS) serves as your temporary advisor.

At the beginning of the Fall semester, Biophysics graduate students attend Rotation Talks in which Biophysics faculty who are actively seeking graduate students discuss their research. All first-year students are expected to attend all of these talks.

To arrange for laboratory rotations, students should discuss the possibility of a rotation with individual faculty and arrange to rotate in the interested lab at a mutually agreed-upon time. At the end of the rotation talk period, students should have decided on their first rotation. Each rotation should be ~8 weeks in length and all should be carried out in the lab of a Biophysics faculty member. The exact timing is flexible and can be worked out between the faculty and student.

Please note that graduate students do not follow the undergraduate academic calendar. Because you are paid a twelve-month stipend, you are expected to be active in academics and/or research unless the university itself is closed. During your first year, any time away should be discussed with the DGS and your rotation supervisor(s). Consult [Current Student Funding](#) for details about funding and time away.

#### **Recommended Timing for Rotation Periods**

- First Rotation Period: September-December
- Second Rotation Period: December/January – March
- Third Rotation Period: March – May/June

### ***What is expected of a graduate student on rotation?***

While no one objects to a graduate student completing a project and writing a paper for publication during a rotation, no one expects it either! What is expected is self-motivated earnest effort, independent thinking, and the fullest participation possible in the intellectual life of the laboratory, culminating in a written description of the project and record of the progress made. You should have a frank discussion of lab expectations at the beginning of each rotation. At the end of each rotation, you should meet with the faculty; they should provide you with a written evaluation (Rotation Evaluation form) and constructive feedback on the rotation. Regular communication with your faculty supervisor(s), and, in subsequent years, your Special Committee, is a vital component of your success.

Usually, by the end of the third rotation, you will have had a conversation with faculty whose lab you are interested in joining for your thesis research. Please note, faculty should not commit to accepting a student into their lab until the last day of classes in Spring semester (usually early May). This is designed to ensure all students have the fair chance of completing their third rotation before faculty make their final decisions. However, students are encouraged to have a clear and honest discussion with interested faculty about the possibility of joining their labs ahead of time, in order to gauge the likelihood of joining a particular lab, and whether a summer rotation will be necessary. Students who want to initiate the fourth rotation in the summer months should consult with the DGS.

All first-year students are expected to have been accepted into a lab by August 15, i.e. by one year after they have enrolled. Rotations cannot be extended beyond that time.

### ***First Year Assessment***

The evaluation of first-year students is based on grades received from courses taken and rotation evaluations. Students should consult with the DGS regarding the details of courses to be taken in the first year.

**Rotation Evaluations:** Supervising faculty in each rotation are required to meet with the student to discuss rotation performance at the end of each rotation. Constructive feedback is important for students and will help them not only in subsequent rotations but also in their graduate program. A Rotation Evaluation Form must be filled out by the faculty and the signed copy given to the GRA.

These evaluations are vital to the evaluation of the first-year class. The Field of Biophysics meets at the end of each year to evaluate the first year class. Anyone who is judged not to have made satisfactory progress is asked to leave the program.

In the absence of persuasive mitigating circumstances, students with the following performance in their first two semesters will be asked to leave the Biophysics program:

- Two or more 'failed' rotations
- *OR* Two C grades in core courses
- *OR* One C grade in core courses *AND* one failed rotation
- *OR* Cumulative GPA < 3.0 in core courses *AND* one failed rotation

**Special Committee:** One of the most important decisions you will make as a graduate student is the selection of your Special Committee. This is because your Special Committee guides and supervises your program and your progress in it.

For your first year of study, until you choose a thesis lab, the Director of Graduate Studies (DGS) acts as your temporary Chair. Within two weeks of registration, you should go to your [Student Center](#) and add them as your temporary Chair by choosing the DGS role.

By the end of the first academic year (or August 1 at the latest), you should have chosen your Special Committee Chair. At that time, you should remove the DGS as your temporary Chair and replace them with your mentor.

The Special Committee consists of the thesis research supervisor (Committee Chairperson and your major professor or PI), a faculty member representing a minor subject and another faculty member from the Field of Biophysics. (Occasionally, students include an extra faculty member on their Special Committee for additional expertise).

You should work with your chair to determine the rest of the membership of your committee as soon as possible in order to complete all the requirements (in terms of courses) as soon as possible. **The Graduate School requires that you have a full committee by the end of your third semester of registration (i.e. the end of the fall semester of your second year).** Once you have determined the other members of your Committee, update the information in your Student Center.

The Special Committee system offers great flexibility to the Ph.D. program since it permits tailoring of the program to your specific interests. We encourage you to talk to other graduate students and faculty and to seek as much information as possible before selecting your committee members. Make an appointment to meet with each of your potential committee members and bring relevant materials to the meeting (e.g., curriculum vitae, course records, and summary of research plans if possible). Be prepared to discuss why he or she would be an appropriate committee member. It is important that you both understand each other's expectations: what courses will they require, what assistance they can provide for certain experiments, etc.

As your research develops, don't panic if you realize that another faculty person might be more appropriate. Until your A-exam, you can request Committee formation and change on-line in your Student Center ([studentcenter.cornell.edu](http://studentcenter.cornell.edu)). After that, if you want to change your Committee, you must submit [petition to the Graduate School](#) requesting permission from the Graduate School Dean to do so. All of your new Committee members must sign and avow, in writing, that they accept the results of your A-Exam.

### **Choosing a Minor**

You are required to designate at least one minor. When you submit your full Special Committee request in your Student Center, you will be asked to identify the major and minor that each member of your committee represents. These will appear on your transcript as part of your program plan.

A minor provides you with an opportunity to delve with greater breadth and depth into a specific area that may help you with your individual research project and goals. The Graduate School publishes a list of major and minor subjects and concentrations for all graduate fields at Cornell <https://www.gradschool.cornell.edu/academics/fields-of-study/fields>). You can pick any areas of study listed as your minor.

Minors may require a couple of additional courses, which students are strongly encouraged to finish by the end of the second year. Fields often have guidelines, rather than strict requirements, for the number of courses



needed to satisfy a minor. It is up to the faculty member who represents the minor to decide, in consultation with the student, how many courses and which courses are to be taken. You should discuss with potential committee members which courses they would want you to take, given your background and interests.

### Presentation of Research

Students in their second year and beyond are required to present their research in the Biophysics Seminar Series. These take place in the Fall and Spring semesters and are coordinated through the Physics Department and are announced to the Field and other interested parties via the following list serve ([BIOPHYSICS-L@list.cornell.edu](mailto:BIOPHYSICS-L@list.cornell.edu)). The date of your seminar should be coordinated with your Chair and the rest of your Special Committee as part of the Student Progress Review process (see below).

### Annual Committee Meetings and Student Progress Review (SPR)

**As a graduate student in your second year and beyond, you are required to meet with your entire committee at least once a year to discuss progress and plans for your research project and completion of your program.** You should arrange this meeting to take place immediately following your Field seminar (or as soon after as possible thereafter). It is the student's responsibility to arrange this meeting and to provide faculty with the Student Progress Review (SPR). The Student Progress Review (SPR) report is **due shortly after your Biophysics seminar or May 31 at the latest.** (see suggested process below).

The [Student Progress Review](#) (SPR) form is a requirement of the Field of Biophysics and of the Graduate School/University. As a guideline for communication, the SPR supports communication between the student and their Special Committee and helps to gauge the progress being made toward graduation. It also serves such administrative purposes as award nominations and collection of assessment and reporting data for the Graduate School. **Submission of this document is required of every student who is enrolled in any part of a given academic year. Even if you are graduating, if you were registered, you must complete the SPR.** The Progress Report is found on-line (see links below which can also be found on the [Biophysics Current Student Forms page](#)).

Regular meetings with the full committee (a minimum of once a year) will help keep your program on track. You are also encouraged to meet with individual members of your committee along the way in order to get information and feedback on your program and research. Use your committee for guidance and feedback. That is why they are there.

### Process for completion of annual Biophysics Student Progress Review:

1. Schedule a meeting with your Special Committee that coincides with your Field seminar. The purpose of this meeting is to discuss your seminar as well as your portion of the Student Progress Review.
2. Complete the Student Section of the online Student Progress Review, save and download a draft to distribute to your entire Special Committee **at least seven (7) days prior** to your seminar.
3. After your seminar, meet with Special Committee to discuss your progress and planning. Ideally, this meeting should take place immediately after your seminar, while your presentation is fresh in everyone's mind. This meeting should take place **within two weeks of your seminar, if not immediately thereafter.**
4. After your meeting, finalize the Student Section of the SPR and submit it. Once you click submit, your SPR will be routed to your Chair so they can complete the Advisor section and submit it to the Graduate School. The rest of your committee can also view the form; however, only your Chair electronically signs and submits it. (Note: Once you submit the SPR, you will be unable to edit it).
5. Your Committee Chair should submit their portion of the online form **by July 31. If it is not submitted by then, a hold may be placed on your account for the Fall semester.**

**The Field of Biophysics takes annual meetings and submission of progress reports very seriously and requires 100% compliance. The Student Progress Review is also a University/Grad School requirement and must be submitted by both the student and the PI by May 31.**

Links to the On-line Student Progress Report are provided on the [Biophysics Current Student Forms page](#)

Beyond the fourth year, all students must include a “Thesis Outline” in their annual progress reports. The Thesis Outline should be distributed to the Special Committee one week prior to the committee meeting, so it can be thoroughly discussed at the committee meeting.

The Biophysics Steering Committee will discuss situations in which students appear to be making slow progress toward their degree or having other problems and these circumstances will be addressed confidentially at the Biophysics Field Meeting. Results of the evaluation are communicated to the student(s) and their advisor(s).

### **Student Funding & Appointments**

Biophysics graduate students are admitted with full funding, which is contingent upon satisfactory progress. Students making satisfactory progress receive financial support, including stipend, tuition, and health insurance. The first year of funding is supported through fellowships and training grant appointments. In the second year, and for the duration of the program, support comes from the thesis advisor, teaching assistantships and individual awards that the student may receive. Generally, senior students are supported on a research grant

**Stipends:** The stipend rate is set by the Graduate School and generally set in January or February for the following academic year.

Graduate student stipends are considered taxable by the U.S. Internal Revenue Service and the State of New York. GRA and TA stipends are administered through Payroll and typically have taxes taken out of each check. Fellowships are typically paid in lump sums throughout the year and do not have taxes withheld. Students should consult their tax advisor to determine how best to handle payment of taxes to suit their particular circumstances. Cornell faculty and staff cannot offer tax advice. General information is available on the [Graduate School website](#) as well as in the [University Division of Financial Affairs](#).

**Tuition Payments:** Tuition payments are made through the university financial system and credited to your Bursar bill. Fall tuition is credited by August and Spring tuition is credited by January. The tuition payment should be taken care of automatically for most students. If you have questions regarding your Bursar bill, please see the GFA in 107 Biotech.

**Health Insurance:** All registered grad students receive an individual Student Health Insurance Plan (SHIP), an accident/illness policy that meets the health insurance standards developed by the American College Health Association. The yearly premium is paid by your source of financial support and should be taken care of automatically. Please contact the GFA if there remains a charge on your Bursar bill. Additional family coverage and/or optional dental and vision insurance is available at a cost to the student. More information can be found on the Office of Student Health Benefits web site, <http://studenthealthbenefits.cornell.edu/>

## Methods of Payment to Graduate Students

Graduate student appointments are governed by [University Policy 1.3](#).

**Graduate Research Assistant (GRA) or Teaching Assistant (TA):** While acting as a Graduate Research Assistant or a Teaching Assistant, a student's stipend is processed through the payroll system. A student must be registered to receive a stipend check. Also, in accordance with federal regulations, in order to be paid as a GRA or TA, a graduate students must fill out an I-9 form. This form is necessary for a student to receive a stipend.

A GRA/TA is paid semi-monthly a fixed amount based on the annual stipend rate. Timecards are not required or collected. Taxes are withheld from the student check; the amount will vary depending on how the student fills out the W-4 (withholding) form. The W-4 form can be changed anytime during the year through the Workday system. The student will receive a W-2 (Wage and Tax Statement) from the university at the address listed on your paycheck or on-line, depending on your preference. You are strongly encouraged to use direct deposit; forms can be obtained from <http://www.dfa.cornell.edu/payrollservices/services/directdeposit.cfm>. Physical checks are mailed to student's local address of record. The first check should be available in mid- or late August.

**Fellowship:** A student on a fellowship (either university fellowship or supported by a departmental fellowship) is paid once per semester through the Bursar system in lump sums. (Training grant support is processed like a fellowship). Payment is issued at the beginning of each semester of study (August; January; June). Most stipend checks should be available at the Bursar's Office in Day Hall after registration and are released to registered Cornell students presenting a valid Cornell ID. Taxes **are not** withheld from fellowship checks and you are responsible for paying estimated taxes on your taxable income. You are strongly encouraged to sign up for direct deposit. Forms can be obtained at <https://www.dfa.cornell.edu/tools-library/forms/student-refund-direct-deposit-form-nelnet>.

**Time Away:** Graduate students appointed on any combination of full assistantships or fellowships for spring, summer, and fall terms are entitled to two weeks (ten weekdays) of annual vacation each 12-month period (August 21 through August 20) in addition to Cornell University holidays (when the university is officially closed); vacation time will be prorated for students appointed for shorter periods of time (e.g., 4 days for a student appointed on an assistantship or fellowship for only one semester during the calendar period August 21-August 20). University holidays generally include the following days: Martin Luther King Jr. Day, Memorial Day, Juneteenth, Independence Day, Labor Day, Thanksgiving and the following day, and winter break (generally six working days from December 25 through January 1). Days on which classes are not in session but the university is open (e.g., institutionally-scheduled academic breaks in Fall Semester, January intersession, Spring Semester) are not automatic vacation time nor holidays for graduate students appointed on assistantships, but graduate students appointed on assistantships may request in advance to take vacation during such periods.

**External Fellowships:** Students are encouraged to apply for outside funding. Should a student be awarded funding from an external source, this will replace the previous funding source until such time as the external funding ends. External funding may not be combined with other internal sources of funding.

**Questions about Funding/Stipend:** If you have questions about your funding or Bursar bill, contact the GFAs and/or the person responsible for graduate student appointments in your mentor's department.

## Teaching Requirement & Professional Development Opportunities

While serving as a Teaching Assistant is not required in the Biophysics program, students who are interested in teaching as part of their career goals are encouraged to seek opportunities to do so.

## Required Exams

Exams are a benchmark of progress toward your degree. The Graduate School requires two exams in your progress toward the PhD. Both exams must be scheduled with the Graduate School at least seven days prior using the Scheduling forms that are found on the [Grad School Forms page](#). The results form must be submitted with all approvals within three days of the exam.

Exams must be announced. The A exam is announced to Field faculty; according to the Code of Legislation, faculty in the Field must be invited to attend, in practice, it rarely happens. The B Exam is usually preceded by a dissertation seminar; the seminar is open to the Cornell community, the exam is not.

### **Biophysics Exam Guidelines: A Exam -Admission to Candidacy**

To qualify as a PhD candidate, each graduate student must pass the Admission to Candidacy, or “A Exam”. The A exam should be taken by the end of the second year if possible, but no later than the beginning of your seventh semester of registration. Not having obtained sufficient data is not an acceptable reason for delaying the A exam. You should consult with your committee about an acceptable date/time and reserve a room. The completed [Schedule of Exam form](#) for the A-exam must be filed with the Graduate School at least seven (7) days prior to the date of the exam. This on-line form is available on the Graduate School web site at <https://gradschool.cornell.edu/forms/>. It must be signed by all of the members of the Special Committee, the Director of Graduate Studies, and one of the GFAs. You should give a copy of the written proposal for your exam to each member of the examination committee at least **one week before** the oral exam.

Course requirements for the major (including BioMG 7510 “Ethical Issues”), and all or most for the minor, should be finished by the time of the A exam. Occasionally, the student and the Special Committee may feel an additional course is useful or important after the A exam and this may be recommended or required by the Special Committee.

Your examiners for the A exam are your Special Committee and one other member of the Cornell University faculty that you choose. (This person is usually, but not necessarily, from the Field of Biophysics). This fourth member should add breadth to the committee and have expertise closely aligned with the topic of your proposal. They will read your proposal and participate in your A-exam, however, they should not sign the Schedule or Results of Exam forms as they are not a permanent member of your committee.

**The Results of Exam form is also on-line and must be signed by your Committee, as well as the DGS and GFA and filed within three (3) business days of the date of the exam.**

Note: In accordance with the Code of Legislation of the Graduate Faculty, your A-exam is announced to Field faculty. Please do not be concerned; Field faculty outside your Special Committee, although free to attend by Graduate School rules, rarely, if ever do.

### ***The Written Proposal for the A Exam***

In preparation of the A Exam, prepare a Thesis Proposal describing the background and motivation for the proposed thesis research, work accomplished so far, and an outline of the proposed research plan. The scope of the proposal should be arranged with the thesis adviser. The proposal should be given to each member of the Committee and the Field appointed member at least one week prior to the exam.

Your proposal will describe the research you intend to accomplish as a graduate student. The proposal should be well-formulated and in sufficient detail that it can be evaluated for its scientific merit. Include sufficient information to permit an effective review without readers having to refer to the literature. Brevity and clarity in the presentation will be considered indicative of an applicant's approach and ability to conduct a superior project. The proposal must be written following the format specified below:

1. Abstract. This is a summary of the proposed work, with enough of an introduction to allow someone not expert in the field to understand what is planned and to appreciate its importance. This should be on a separate page and not exceed three vertical inches (single spaced).

\*\* Sections (2) through (4) are **not to exceed 10 pages (single spaced)**, including all tables and figures.

2. Specific Aims. State the specific purposes of the research proposal and the hypotheses to be tested. (Typically no more than one page)
3. Significance and Innovation. Sketch briefly the background to the proposal. State concisely the importance of the research described in this application by relating the specific aims to field as a whole. Use this section to provide an account of any preliminary studies that might demonstrate the utility of the proposed project. (Typically about 2 pages)
4. Research Design and Methods. (Typically about 7 pages) Provide an outline of:
  - o (a) research design and the procedures to be used to accomplish the specific aims;
  - o (b) tentative sequence for the investigation;
  - o (c) statistical procedures by which the data will be analyzed;
  - o (d) potential experimental difficulties and alternative approaches that could achieve the desired aims.
5. Literature Cited. List all literature references. Each reference must include the title, names of all authors, book or journal, volume number, page numbers, and year of publication. The reference should be limited to relevant and current literature. While there is not a page limitation, it is important to be concise and to select only those literature references pertinent to the proposed research.

**Formatting.** The proposal must conform to the following NIH requirements:

1. Helvetica or Arial 11-12 point is the suggested font.
2. Type density, including characters and spaces, must be no more than 15 characters per inch (cpi).

For proportional spacing, the average for any representative section of text must not exceed 15 cpi;

3. No more than 6 lines of type within a vertical inch;
4. Margins, in all directions, must be at least 1/2 inch.

Applicants should check the type size using a standard device for measuring type size rather than relying on the font selected for a particular word processing/printer combination. Figures, charts, tables, figure legends, and footnotes may be smaller in size but must be readily legible. In preparing the application, use English and avoid jargon. If terms are not universally known, spell out the term the first time it is used, with the appropriate abbreviation in parentheses. The abbreviation may be used thereafter.

NOTE: Use the single-spacing formatting above to make sure that your final proposal with figures meets the requirements. Send an electronic copy in this format to all your committee members.

The exam will consist of an oral presentation elaborating the thesis proposal, followed (or interrupted!) by oral examination covering, but not limited to, the student's understanding of material related to the research topic, the student's general background in the Areas of Required Competence (Table A), and the student's research proposal. The Committee will review the student's academic record and examine any potential weak areas to determine if additional course-work is required. The minor advisor may specify additional exam components as required for the minor. Students should feel free to chat with the DGS in advance about any aspect of the A-exam.

**The Oral Exam:** The oral component is a defense of this proposal and you can expect that the majority of questions will be directly or indirectly related to your proposal and to areas that are considered off-shoots of it. The committee will likely ask you to explain, in more detail than the written format permits, background material and experimental protocols.

The committee will also ask broadly-based questions on basic concepts, to ensure you have strong command of foundational knowledge in Biophysics and your minor area(s). The committee member(s) representing the minor subject area(s) is particularly responsible to ascertain that you have achieved competency in that subject area.

In addition to the evaluation of your proposal, the A exam is the time when committee members will discuss and evaluate your course work as well as your performance in the laboratory. Please bring a summary of the courses you have taken and grades earned to be distributed to the committee at the time of the A-exam. Satisfaction of requirements for the minor will be assessed by the minor field member at the A-exam.

Note that the Field recommendation is that during the exam, the mentor (thesis advisor) should not ask questions or make comments except when asked by other committee members or when clarification is needed. The intended goal is to dissuade the mentor, who may have a vested interest in the outcome of the exam, from stepping in to justify the research or the particular experimental approach being used. The student is expected to fully defend the proposal by themselves. However, the mentor should participate fully in the discussion of the student's performance, after the student is asked to leave the room. In making this recommendation, the Field is aware that the Special Committee may run the exam in whatever way it deems appropriate.

**The Field of Biophysics also uses the oral part of the exam for Field assessment. The student should be prepared to discuss which aspects of the Field they find constructive and useful for their education, and which aspects would benefit from change.**

### ***Possible Outcomes of the A-Exam***

The **final outcome is determined by the Special Committee**. Examples below are not exhaustive and are provided to assist the student in their exam preparation. Some factors that may be judged in evaluation of the A-exam are:

- importance of the problem chosen
- demonstration of a command of knowledge/research in the field.
- evidence of creativity in formulating experimental approaches
- feasibility of the proposed experiments
- whether a range of different approaches are brought to bear on the problem
- whether the scope of the proposed experiments is feasible for a 3-4 year project
- adequacy of control experiments
- clarity of the proposal
- ability to deal with questions
- communication / presentation skills/breadth of knowledge

**Unqualified pass.** The Chair will indicate that the student has passed the exam but should not check the box referring to a Master's with continuation to a PhD. The Field of Biophysics does not award an MS degree except as an exit degree (see below).

**Conditional Pass.** This option will be exercised when the committee decides that some aspect of the proposal / defense needs to be improved. In this case, the committee will specify the condition(s) required for the student to receive a pass and the timeline for fulfilling these conditions. This must be done in writing and the Graduate School must be informed of the details. This can be done in the form of an email from the Special Committee Chair to the Graduate School Student Services team (gradstudserv@cornell.edu).

Some examples of Conditional Pass:(a) The committee may specify that the proposal or that parts of it need to be revised within a certain time frame (i.e. improvement of writing; re-working of aspect of scientific research; addition of another section. (b) The committee may specify that the student carry out additional literature review, e.g. weekly written report of a paper, participation in existing journal clubs. This might be particularly helpful when the student appears to have weak command of the literature surrounding a particular area. (c) The committee may specify that the student complete a piece of research / a particular sub-aim within a certain time-frame. This is relevant when the committee has some concerns about the ability and/or motivation of the student to complete the PhD program.

**Fail.** inadequate. In this case, the committee will usually recommend one of two actions.

- If the committee has confidence in the overall ability of the student to complete the Ph.D. program, then they may recommend that the student retake the A exam. In this case, they will specify whether an entirely new proposal on a different topic is to be written or whether they expect a major rewriting of the original proposal. Note that the rules of the Graduate School specify that a second A exam needs to be scheduled no later than 3 months after the first.
- If the committee has serious concern about the motivation or ability of the student to complete the Ph.D. program, it could recommend that the student complete a piece of research, write a Masters-level thesis based on that work, and then defend that thesis.

**Master's Degree:** The Field of Biophysics does not have a formal Master's degree program. In cases in which a student decides that the Biophysics Ph.D. program does not meet his or her needs, or in which a student is judged to be unqualified for the Ph.D. program, the Special Committee typically recommends that the student write and defend the research work done and receive a Master's degree. The requirements for a Master's degree include the coursework normally taken by first-year students, at least two rotations, one semester of

teaching, and a research-based thesis (including a thesis defense). At a minimum, the Special Committee of a Master's degree candidate is composed of a chairperson and a faculty member representing a minor subject. The student may invite a third faculty member to be on the committee if he or she chooses. To take the Master's degree path, the student must submit a Change of Program form to the Graduate School, requesting transfer from the PhD program to a Master's program. This form will then be sent to the DGS for approval.

### **Biophysics Exam Guidelines Thesis Defense -- B Exam:**

You should be proactive about your B-exam/thesis defense. The Graduate School offers a [planning timeline](#) for students who are planning the completion of their degree. The B-Exam is the thesis defense which follows a public seminar on the dissertation topic. The completed dissertation should be submitted to the committee at least 1 week before the examination. The exam will begin with a public seminar describing the thesis research. This will be followed by a closed oral examination covering the dissertation.

To schedule the oral defense of the Ph.D. thesis (B exam): at least seven days before the exam you must distribute your thesis to the Special Committee; the thesis must be complete in all respects and editorially acceptable for final approval. The [Schedule of B exam form](#) must be filled out, approvals obtained and submission to the Graduate School must be completed **at least seven (7) days prior to the exam**. You are also required to provide the title and abstract for your dissertation and the list of your publications to the GFAs for the announcement of your exam. The completed Results of Exam form must be submitted within three (3) days of your exam.

**Thesis Format:** A section of the Graduate School website (<http://gradschool.cornell.edu/thesis-dissertation>) is dedicated to information about the dissertation process, including the Thesis and Dissertation Guide. You are highly encouraged to follow the process it lays out in planning submission of your thesis and graduation. The Graduate School Office of Academic & Student Affairs (<http://gradschool.cornell.edu/academics/office-academic-and-student-affairs>) also coordinates a number of workshops to assist you with thesis writing.

Your thesis may be organized either as a single work (traditional thesis) or as a series of relatively independent chapters (independent chapter thesis). In the latter case, there may be a unified introduction and bibliography or separate introductions and bibliographies. There may be a unified summary, or the two-page abstract (required of all theses) can serve as a summary statement for all chapters. Examples of thesis formats are shown below.

#### **Traditional Thesis**

- Literature Review
- Materials & Methods
- Results
- Discussion
- Conclusions
- Literature Cited
- Appendices

#### **Independent Chapter Thesis**

- **Chapter 1:** General Introduction & Literature Review
- **Chapter 2:** Introduction; Materials and Methods; Results; Discussion; Literature Cited
- **Chapter 3:** (as above)
- **Final Chapter** including General Discussion; Speculations & Conclusions; Appendices



The independent chapter option allows you to prepare your thesis as a series of papers in a format ready for publication, and chapters can be published before the thesis defense. The work in your thesis must be primarily, if not entirely, your own. If your published work includes co-author(s), you may cite the work of your co-author(s) in your thesis with appropriate acknowledgment, but you should not include the data of your co-author(s) in your thesis. An exception could be if data from a co-author are needed for clarity. In that case, the legend to the figure should explain this. You should acknowledge in the publication that the research is part of a thesis, and the Graduate School requires written permission from the publisher to include it in your thesis.

Full collections of dissertations are maintained in Mann Library. There is also a collection of theses of graduates in the Fields of Genetics, Genomics and Development and Biochemistry, Molecular and Cell Biology in the Keller Reading Room, Biotechnology Building, Room G09. You can view these by asking someone in the MBG Department Office (107 Biotech) to let you into this room. NOTE: Materials are NEVER to be removed from this room.

**Thesis Seminar:** The final thesis seminar usually is given immediately before or on the same day as the thesis defense, i.e. the “B” exam. However, in very rare cases, students may want to present the thesis seminar up to six months before the B exam, for example, to allow input from the special committee about final experiments. In this case, the GFAs must be informed so that they can announce the seminar to the Field.

**Conferral of Degree:** Degrees are conferred by the Graduate School/University three times per year (see the [Grad School Thesis & Dissertation website](#)). Your status as a student does not change until conferral unless you take a Leave of Absence or Leave Upon Completion. You should consult with the GFAs to understand the implications of a leave related to funding and tuition.

Once you submit your dissertation and it receives all necessary approvals, a letter certifying your completion of all requirements for the degree is generated by the Graduate School. Some employers require this letter in anticipation of a later conferral for hiring purposes.

## Graduate Student Life & Support

The Field of Biophysics very carefully chooses students admitted to our program and the graduate community is committed to each student successfully completing their graduate program and moving toward their career goals. There are many sources of support for students within the Field, the department, college and university.

As with life, communication is key in graduate student life. You should have frequent conversations with your mentor regarding expectations and progress. However, if there is an issue or conflict with your mentor, you should feel free to reach out to other members of your Special Committee and/or the DGS or GFAs. They can provide suggestions and resources for resolution. Likewise, your student colleagues can offer suggestions related to their own experience.

**Biophysics Graduate Student Association (GSA)** (<https://cornell.campusgroups.com/biophysicsgsa/home/>) is a community-building association of Biophysics graduate students dedicated to connecting Biophysics graduate students with each other and with other members of the Cornell graduate student community.

The Department of Molecular Biology & Genetics has a [Peer Support Network](#), which is comprised of faculty, students and staff who are committed to be confidential listeners and resources for the community.

[MBG Diversity Council](#) is made up of graduate students in the three Fields administered in the Department of Molecular Biology & Genetics (Biochemistry, Molecular & Cell Biology (BMCB); Genetics, Genomics &

Development (GGD) and Biophysics). Their goal is to increase the inclusivity of the department and create a healthy, welcoming community.

[MBG Diversity Equity & Inclusion Committee](#) advises and supports the faculty Leader for Diversity and Inclusion in the Department of Molecular Biology & Genetics. It is made up of graduate students, faculty, post-docs and staff.

The Office of Academic & Student Affairs has a guide for research students that covers, among other topics, suggested [strategies and avenues to resolve conflict](#) with your mentor. The [Office of Graduate Student Life](#) offers programming and resources to support and enhance the well-being of Cornell graduate students.

On the University level, there are a number of offices dedicated to the health and well-being of Cornell students and creating a [caring community](#).

The [University Ombudsman](#) is a place where any member of the Cornell community can have a confidential conversation about problems or issues within the Cornell community.

More information about the Biophysics program, including a comprehensive list of faculty members, can be found on the web site for the Field. <https://biophysics.cornell.edu/>