

Department of Biochemistry Graduate Student Handbook Updated: January 2023

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1. Introduction and contact information

This handbook is intended to provide incoming graduate students in the Department of Biochemistry with the information necessary for completion of the Ph.D. and M.S. degrees. Contact Jeff Goldberg in the Biochemistry Office of Academic Affairs (jmgoldbe@illinois.edu, room 417 Roger Adams Lab; 244-3149) if you have questions of an academic or administrative nature. If you have questions of a scientific or professional nature, you should talk to your faculty advisor.

Department of Biochemistry contacts are:

Jeff Goldberg, Senior Coordinator of Student Academic Affairs, Room 417 Roger Adams Lab; 217-244-3149, Biochemistry Student Academic Affairs Office (SAAO), jmgoldbe@illinois.edu

Dr. Satish Nair, Head of Biochemistry, Room 417 Roger Adams Lab; 333- 2013, snair@illinois.edu

Dr. Kai Zhang, Director of Graduate Studies, 300-0584 kaizkaiz@illinois.edu

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General Information

Mail - Biochemistry graduate students pick up their mail from the boxes located inside room 420 RAL. The mail for students is filed alphabetically according to their last name.

Parking - Metered parking is available on most streets throughout the campus and in municipal parking lots. Metered parking is also available on the lower level of the Krannert Center (vehicle registration required). These may be obtained from Campus Parking Division, 1201 W. University, Urbana. Information concerning reserved parking spaces may be obtained from the Campus Parking Division. Be sure to register your car if you have one – you cannot park anywhere on campus without it.

Keys - All keys must be returned to the office that dispensed them (either 29A RAL or 417 RAL) when a student terminates his/her affiliation with the University.

School of Molecular and Cellular Biology

The School of Molecular and Cellular Biology (MCB) consists of the Departments of Biochemistry, Cell & Developmental Biology, Microbiology, and Molecular & Integrative Physiology, the Center in Biophysics & Computational Biology and Neuroscience Program. The Departments have affiliated themselves into a single school in order to provide their graduate students with a broad range of training and research opportunities. Over 100 active research laboratories are included in the School. One purpose of the School is to provide graduate students with a broad spectrum of excellent laboratories in which to conduct their research.

Although the application process provides the opportunity to express preference for a particular department, all students are admitted into an umbrella program for the first semester and can select faculty research advisors from the entire faculty of the School. Students choose their thesis research lab at the end of the first semester. If a student chooses to do his or her thesis research in a lab outside the department to which he or she was originally admitted, the student will normally join the department to which their thesis lab belongs. This arrangement emphasizes the connections among all areas of contemporary biological research and recognizes that beginning graduate students often have broad interests that may extend beyond a single department. During their first semester all beginning students in the school participate in research rotations, selecting laboratories from throughout the school.

2. Selection of Research Advisor and Financial Support

Selection of a Research Advisor

In order to acquaint new students with the research opportunities in Biochemistry and MCB, all new Ph.D. students register in MCB 581/582/583, which consists of Faculty Research Presentations and the Laboratory Rotation Program. All students will receive a grade of either “Satisfactory” or “Unsatisfactory” for MCB 581/582/583. Faculty Research Presentations is a series of talks held during the week before the start of the Fall semester in which most of the faculty who have lab openings describe their ongoing research projects.

New students then participate in a Laboratory Rotation Program involving three 5-week rotations in laboratories of Biochemistry and other MCB faculty. Students use the information presented in the Faculty Research Presentations as well as informal interactions with the faculty to identify labs in which to rotate. A prioritized list of faculty for rotations is submitted by each student to an MCB Committee, which assigns each rotation.

The laboratory rotations are intended to provide students with a genuine lab experience where they will learn and perform laboratory procedures. However, the time is short and a minimum expectation of a rotation is to allow new students to interact closely with the faculty, advanced graduate students and post-doctoral associates, including attendance of regularly scheduled group meetings, to gain a good understanding of the ongoing research projects in these laboratories. The laboratory rotations provide an essential function by helping new students become more rapidly integrated into the department and by helping them learn more about the operations of the laboratories they may wish to join.

Some students may be interested in more faculty research programs than can be accommodated by the rotation program or may not obtain a requested rotation. All students are therefore strongly encouraged to interact with additional faculty members and laboratory personnel to gain more information about further research opportunities throughout the Fall semester. It is also recommended that new students engage in individual discussions with all faculty in whom they are interested so that both the student and faculty can come to a clear understanding of the level of mutual interest. However, neither the faculty nor the student may make any commitment regarding final laboratory affiliation until the official commitment date, which is in early December. Upon the official commitment date, students should directly arrange their permanent

lab assignments with their desired faculty mentor. This will be a mutual agreement between the faculty mentor and graduate student. No faculty member may accept more than two first year MCB students in his or her laboratory. Any unassigned students will consult with Dr. James Imlay, Associate Director MCB Graduate Program, for further assistance in laboratory affiliation.

There is a Department of Biochemistry Orientation each January before classes start for first year students. It last about 75 minutes.

Financial Support for Graduate Study

Financial support for graduate students includes appointments as teaching assistants (TA), research assistants (RA), Federal traineeships, and fellowships. The most common forms of financial aid available for graduate students in Biochemistry are the teaching and research assistantships. One-half (50%) time graduate assistant (RA/TA) stipends for the academic year are totaling \$28,700 for first year students (see Jeff Goldberg, Senior Coordinator of Student Academic Affairs, for updated stipend information, and for subsequent years). All teaching and research assistantships as well as fellowships are taxable, according to current Internal Revenue Service rules. There are tax treaty rules for international students.

NOTE: Although students are strongly encouraged to complete their degree in 5 or 6 years, Ph.D. students who are making satisfactory progress toward the doctoral degree are guaranteed continued financial support through the end of their 7th year.

3. Obligations of TAs and RAs

Teaching Assistantships

The Department considers teaching experience essential training for a student's development as a scholar and all Biochemistry graduate students are required to teach during their graduate training. A minimum of one semester at 50%-time (or 2 semesters at 25% time) of teaching is required for all Ph.D. students. Students are also expected to have received a grade of "B" or better in any course for which they serve as a teaching assistant. The performance of all TA's is evaluated each semester by the course instructor and students. This evaluation becomes part of the TA's permanent record. The obligations of the teaching assistant can fall into one of several categories. A one-half time teaching assistant in an undergraduate laboratory course is expected to spend approximately eight contact hours per week in the laboratory plus an additional twelve hours per week in preparation time. An equivalent amount of time of 20 hours is expected for a TA who is assigned to lecture course discussion sections. Other fractional time appointments, i.e., a 25% TA, would be expected to spend a proportional number of hours in the course. All new students are required to participate in the Teaching Assistant Orientation Program in August of their 2nd year. Students are encouraged to complete their TA requirement by the end of their 2nd or 3rd year. Students may not TA after their 7th year.

International Student Test of Spoken English (TSE/SPEAK/ TOEFL IBT) Test

Illinois state law requires that all instructors at the University of Illinois be orally proficient in English to be eligible to teach. Graduate students for whom English is not their native language must achieve a score of 50 or higher on the TSE exam (or SPEAK exam taken at UIUC) or 24 on the Speaking component of the TOEFL IBT exam. Students may take the EPI test a maximum of three (3) times at UIUC. In addition, campus policy requires those who pass the test to attend the next available Teaching Assistant Orientation; this includes a session specifically for International Students. It is the Department's policy that students must pass the EPI exam before they are allowed to take their Preliminary Examination.

It is the student's responsibility to take the TOEFL IBT or TSE exam prior to enrollment or during the first semester in the Biochemistry Program. The student must register for any subsequently required ESL courses [e.g. 504/506] and pass the TOEFL IBT/TSE/EPI exam no later than the spring semester of the second year in the program (before preliminary exam). Failure to pass the TOEFL IBT/TSE/EPI test by this time may result in the student's dismissal from the Program.

4. Overview of Ph.D. and M.S. Degrees in Biochemistry

Admission Requirements

Admission to the Biochemistry Ph.D. graduate program is limited to graduates with bachelor's degrees equivalent to those of the University of Illinois. Generally, admission is limited to undergraduates who have completed a degree program with a major in biochemistry, chemistry or biology. Biology majors should have a strong chemistry minor. Thus, accepted applications are expected to have a basic background in organic and physical chemistry, in biology, and in mathematics through calculus. Students lacking such background will be required to make up these deficiencies during the course of their graduate study. Current admissions generally require students to have undergraduate grade point averages of 3.2 or greater (on a 4.0 scale). Admissions are limited to students possessing at least a 3.0 average over the student's last 60 hours of undergraduate work, or last 60 hours of undergraduate work and total accumulated graduate work, whichever is appropriate. Currently, there is no first-year entry into our M.S. program.

Goals of the Ph.D. Program

The faculty of the Department of Biochemistry have endorsed the statement on "Standards for the Ph.D. Degree" issued by the International Union of Biochemistry (found in the Appendix). This is a statement of general philosophic ideals toward which we believe all students should strive and which faculty support. Students should keep these goals in mind as they pursue their Ph.D. degree and consider ways of achieving the kinds of competency that are listed. The Biochemistry faculty also accepts the responsibility of working toward these goals. Clearly, both formal course work and a variety of informal mechanisms can be used to develop the strengths described in the statement. Students should consider especially whether their use of the informal mechanisms available is adequate. The faculty is open to suggestions as to new mechanisms that need to be developed.

Academic Advising

Once students have been assigned to a laboratory to start their thesis research, the thesis supervisor acts as the research advisor. However, the Director of Graduate Studies in Biochemistry and the Senior Coordinator of Student Academic Affairs continue to be available for advice on any issues pertinent to the graduate program.

Research Ethics and Responsibilities

Ethical conduct is an essential part of the scientific enterprise. To that end graduate students in the Department of Biochemistry are expected to follow the ethical standards and principles set out in the University of Illinois document on Policy and Procedures on Academic Integrity in Research and Publication (see the section on Academic Integrity in the Graduate College Handbook for Students, Faculty and Staff - <http://www.research.illinois.edu/ai/index.asp>).

In all areas of scholarship, in coursework, in teaching and in research, plagiarism is a major ethical transgression, which the University takes very seriously. It will always lead to disciplinary action and may result in dismissal from the University. Students should therefore take pains to understand fully what constitutes plagiarism.

In their capacity as teaching assistants in Biochemistry, graduate students should work with the course instructors to provide the best possible instruction to their students, should avoid any kind of discrimination in their dealings with students, and should provide a fair evaluation of their students' work. Because they hold power over their students, they should always behave so as to avoid even the appearance of exploitive or improper actions, or conflict of interest.

As researchers in Biochemistry, graduate students should keep accurate, up to date records of their research data in a form that can be stored and easily retrieved by their advisors and other authorized scientists. Digital records are allowed. During the course of laboratory research, graduate students should follow all appropriate regulations and procedures for the handling of human materials, animals, and hazardous materials. When reporting or publishing research results, graduate students should assess and present data honestly, acknowledge the work and contributions of others, and provide accurate and complete literature citations. With the knowledge and approval of their advisors, graduate students should share data with collaborators, and should provide reagents to and share their knowledge with scientists within the University of Illinois and outside of it.

5. Stages of the Doctoral Program

The University of Illinois Graduate College Handbook for Students & Advisers specifies three stages for the doctoral program, each of approximately 32 credit hours (<http://www.grad.illinois.edu/gradhandbook/2/chapter6/doctoral-stages>)

- Stage I is completed when the student has received a minimum of 32 hours of credit distributed as specified by the requirements of the degree program, commonly equivalent to a Master's degree. The Department of Biochemistry certifies fulfillment of Stage I after

completion of the required courses (MCB501/502/580/581/582/583/540/BIOC555/PCHEM I/446/590JC) and approved elective courses (see BIOC SAAO for list of courses), usually after four to five semesters.

- Stage II: The Department of Biochemistry certifies fulfillment of Stage II upon successful completion of (1) Course Requirements, (2), Preliminary Oral Exam and(4) the EPI test of Spoken English for international students. All reasonable efforts should be made to fulfill Stage II by the end of the graduate student's third year.
- Stage III includes fulfillment of at least one successful Annual Review (Grad Student Seminar) and completion of a one-semester teaching requirement if it has not already been completed in Stage II of the Doctoral Program.

In general, Stage III is primarily focused upon research, preparation of a dissertation, a final examination and deposit of dissertation.

The Department Director of Graduate Studies reviews the records and progress of all Biochemistry graduate students in an annual meeting that is typically held late in the Spring semester. General regulations relative to residence, examinations, required credits, and thesis research are those specified in the Graduate College Handbook for Students, Faculty and Staff.

5.2 Degree Requirements

The Doctor of Philosophy (Ph.D.) degree at the University of Illinois requires a total of 96 credit hours. Specific degree requirements for the Ph.D. degree in Biochemistry include the successful passage of the Biochemistry/MCB core courses: MCB 501 (Advanced Biochemistry, 4 hrs), MCB 502 (Advanced Molecular Genetics, 4 hrs), MCB 580 (Research Ethics & Responsibilities, 1 hr, S/U), and MCB 581/582/583 (Lab Rotations, 1 hr each up to 3 hours), MCB 540 (Scientific Writing 3hours) ,plus BIOC 555 (Analysis of Biochemistry Literature, 2 hrs). Physical Chemistry/Physical Biochemistry is also required (MCB 493 PBC and BIOC 446 - see Physical Biochemistry section below). In addition, at least 5 hours of advanced coursework ("electives" - approved 400-500 level*, and not BIOC 590 lab, 595 or 599) must be completed in the major field (Total of 32 hours of approved coursework).

Satisfactory completion of MCB 501/502/580/581/582/583 during the first year and a minimum of 6 hours of advanced coursework by the end of the second year is expected. Additional coursework should be planned with the advice of the student's thesis advisor and Ph.D. Advisory Committee. All coursework should be completed by the end of the third year.

* Updated lists of approved advanced courses are available in the Student Academic Affairs Office (SAAO).

Doctoral degree candidates must complete at least 64 hours of BIOC 599 (Thesis Research).

In addition to formal course work, all students are required to register and participate in the Biochemistry Seminar (BIOC 595 sect A – 1 hr) each semester throughout their degree program. First and second year students are required to participate in the seminar Journal Club and register in BIOC 590JC for 1 hour of credit per semester. After completing Journal club, students also

receive academic credit for participation and attendance in laboratory group meetings and should register for 2 hours of S/U credit each semester under their research advisor's BIOC 590. Students are required to maintain a 3.0 GPA ("B" average). A minimum of 1 semester of teaching is required. There is no foreign language requirement for the Ph.D. degree in Biochemistry.

5.3 The EPI (English Proficiency Interview)

Illinois state law requires that all instructors at the University of Illinois be orally proficient in English to be eligible to teach. Currently, all non-native speakers of English who wish to provide classroom instruction are required to pass the EPI with a score of 4CP, 5 or 6. There are no exceptions. The EPI is an interview in which there is a person who will talk to the student and a person who will assess the quality of spoken English. All School of MCB students who are in their first term and have a TOEFL iBT speaking score of less than 24 must contact Shawna Smith in the MCB Graduate Program Office to schedule a test in the fall semester. There are several possible outcomes for the initial EPI:

- If the student earns a 5 or 6, the student is eligible to TA.
- If the student receives a 4CP grade, the student is required to successfully complete "ESL 508: Seminar for International TAs" during or before the first semester of teaching.
- If the student earns a score of 4, 3 or 2, the student may retake the test after successful completion of an English improvement activity. English improvement options include enrollment in an ESL course (504, 506, or 510) or 10 hours of participation in Center for Innovation in Teaching & Learning approved tutoring and must be completed in the semester after the EPI was taken. Students have a maximum of 3 attempts. Not passing the EPI is grounds for dismissal from the department. Students can also take TOEFL (at their own expense) if they desire.

In addition, campus policy requires those who pass the English language assessment to: (1) attend both the All-Campus International Teaching Assistants Orientation and the All-Campus Teaching Assistants Orientation; (2) participate in microteaching; and (3) have their classroom teaching monitored closely by their department during the semesters in which they subsequently teach. Additional information may be obtained from the Center for Innovation in Teaching & Learning website (<http://cte.illinois.edu/>).

The EPT consists of two parts: a written test and an oral test. The writing test requires students to produce an academic essay based on the information obtained from a reading passage and a short lecture. In the oral test, students are given a topic on which to speak for three minutes. If students speak intelligibly, they will be exempted from further oral testing. Otherwise, students will be required to take another oral exam. Students will be placed into or exempted from the general oral or written ESL service courses based on the results of the test.

6. Master of Science

The Master of Science (M.S.) degree requires a minimum of 32 credit hours. Specific degree requirements for the M.S. degree in Biochemistry include the successful passage of a core of Biochemistry/MCB courses: MCB 501 (Advanced Biochemistry, 4 hrs), MCB 502 (Advanced Molecular Genetics, 4 hrs) or other Gene Expression course, (3 hrs), BIOC 455 (Techniques in Biochemistry & Biotechnology, 4 hrs), or equivalent experience or courses taken at other schools (approved by advisor on starting graduate school), MCB 580 (Research Ethics & Responsibilities, 1 hr), and MCB 555 (Analysis of Biochemistry Literature, 2 hrs). Physical Chemistry/Physical Biochemistry is also required (see Physical Biochemistry section below). *Currently, students are not admitted directly into the M.S. program.*

A Course work Master's degree requires a minimum of three full-time semesters and 32 hours of advanced coursework (500-level or approved 400-level), including the specified requirements (above), and Physical Chemistry/Biochemistry. In addition, at least 12 hours of advanced coursework ("electives" - 500-level or approved 400-level*) must be completed in the major field (BIOC/MCB). Course electives may not include BIOC 595 (seminar), but up to 4 hours of research (BIOC 590 lab or 599) or Journal Club (BIOC 595 JC) may be counted towards the 32 total hours, with approval.

Graduate College requirements:

Core curriculum: 32 hours; Total Hours: 32 Minimum Hours Required within the Unit: 8 hours
Minimum 500-level Hours required: 12 hours Minimum GPA: 3.0

A Thesis Master's degree usually requires a minimum of two year's work, with at least 12 hours of thesis research (BIOC 599). The coursework for a thesis Master's follows the requirements of the doctoral degree for Year 1 and Year 2. The thesis must be approved and accepted by the student's research advisor. The thesis must be deposited with the Graduate College. All students are expected to register and participate in the Biochemistry Seminar (BIOC 595 – 1 hr) and in the seminar Journal Club (BIOC 595JC - 1 hr) each semester throughout their degree program. Course electives may not include BIOC 595 (seminar), but up to 4 hours of research (BIOC 590 lab or 599) or Journal Club (BIOC 595 JC) maybe counted towards the 32 total hours, with approval.

Graduate College requirements:

Core curriculum 20 hours; Thesis Hours required (599): 12; Total Hours: 32 Minimum Hours Required within the Unit: 8 hours

Minimum 500-level Hours required: 12 hours Minimum GPA: 3.0

Physical Biochemistry: One year of physical chemistry is required for both the Ph.D. and M.S. programs. Many students have not taken two semesters of physical chemistry at the time of entry into the program, and they automatically take both courses listed below. The physical chemistry requirement for the Ph.D. or M.S. degree in Biochemistry consists of:

Principles of Physical Chemistry – MCB 493 PBC (Biological Perspective)

- an equivalent course taken previously (either as an undergraduate or graduate) may be accepted* if passed with a grade of “B” or better.

* -To be determined by departmental advisor upon entering the program.

Organic Chemistry: A strong background in organic chemistry is an important prerequisite for biochemistry coursework. Depending upon your area of interest and with advisor approval, it will be determined what courses, if any, need to be taken.

7. Departmental Seminar Program (BIOC 595 section A)

The Department of Biochemistry hosts a weekly faculty seminar series of predominantly outside speakers, which is normally held at noon on Friday. All graduate students are required to attend all of the scheduled departmental seminars and sign an attendance sheet. Occasionally additional seminars are scheduled at different times, and attendance at such seminars is also required. The primary goal of this seminar program is to enhance the intellectual atmosphere of the department by presentation from outside speakers that either complement or extend research within the department. The visitors meet with both faculty and students to allow in-depth exchange of ideas and technical expertise.

Graduate Student Research Seminar Program

The Department of Biochemistry hosts a weekly student seminar program held at 4:00 pm on Wednesday. All graduate students are required to attend all of the student seminars and are expected to participate actively. Students must sign an attendance sheet each week.

Although the seminar course (BIOC 595) is graded (S/U) based upon attendance, the goal is for students to develop communication skills and to receive feedback on their research progress.

The goals of this seminar program are to enhance the intellectual atmosphere of the department, to provide students opportunities to develop skills in publicly presenting research results, and to facilitate faculty monitoring of student research progress. Following the successful passage of the Preliminary Examination, students will present an annual 20-minute, public research seminar starting in their third year and continuing through the last semester before their thesis defense. The Biochemistry Office of Student Affairs will require confirmation from the Research Advisor on the anticipated graduation date. With approval by the Head of the Department, a student may substitute their annual department seminar by publicly speaking on their thesis research at a campus symposium or conference. Attendance of these seminars is mandatory for all students throughout the program. Requests for excused absence should be made in a timely fashion to the Office of Student Academic Affairs, copied to the Head of Department. Notification of conflicts with class schedules should be made to the Office of Student Academic Affairs at the beginning of the semester.

One week prior to the seminar, the student will provide a one (1) page summary of research accomplishments in the past year and a one (1) page summary of research plans for the coming year to Jeff Goldberg in the Biochemistry Office of Student Academic Affairs, as well as an

updated curriculum vitae; the Office will distribute these to the Ph.D. Advisory Committee. The student's Ph.D. Advisory Committee is expected to attend the seminar and provide evaluation of the student's progress (see Annual Review, below).

Students receive credit for participating in the Graduate Student Research Seminar Program by registering in the Biochemistry Seminar course (BIOC 595 A) for 1 hour of credit per semester. Although the course is graded Satisfactory/Unsatisfactory on the basis of attendance, the primary goal is to develop skills and provide feedback on research progress. Students begin registering for the seminar course in their first year (Spring semester) and begin their annual presentations one semester after passing their research preliminary examination (April of second year). Presentations and registration continue until the semester before their thesis defense. (Students who have class and/or teaching assignment conflicts that prevent routine attendance, should notify the Office of Student Academic Affairs at the beginning of the semester. These students, as well as those completing their dissertations, are encouraged to attend whenever possible.) Each student's presentations will be scheduled as regularly as possible, moving up each academic year (Spring to Fall) as they get more senior, so the student knows well in advance when his or her talk will be held. Students being scheduled for the first time are generally assigned dates later in the year (Spring term) but have at least 1.5 years to start their research and acquire adequate data for preparation of a seminar. Students continue to make annual presentations through their 6th year or within one semester of defending their dissertation (pre-defense meeting) whichever occurs first.

Benefits

- Students learn to present their research in public to a general science audience.
- Students receive regular feedback and advice on their research projects. The progress of our students is regularly monitored and they receive formal and regular feedback. This fulfills the Graduate College requirement for an annual review.
- A high level of participation in such a visible research-oriented activity helps build the intellectual "atmosphere" of the department.
- Increased knowledge of one another's research facilitates inter-group interactions.
- The students and faculty are able to meet on a regular basis, thereby encouraging more student-faculty interactions.
- Students receive academic credit for registration in the course.

In addition, faculty and postdoctoral associates participate in the seminar program by giving full length (50 minute) talks. The entire faculty is expected to rotate through the schedule and provides an opportunity for students to hear an overview of each laboratory's ongoing research directly from the faculty member.

8. Seminar: Journal Club (BIOC 590 section JC)

Designed specifically for new graduate students, this course utilizes the subject matter of the weekly departmental (Friday) seminars to provide a focus of learning and understanding the background for the seminars and techniques of current research. The primary goal is to train students in the essential skill of understanding the most up-to-date research and accessing the primary research literature. Reading and analyzing published work on the seminar topic prior to the seminar allows students to fully engage in the departmental seminar program. First and second year students are required to participate and receive course credit by registering in BIOC 590- JC for 1 hour of credit per semester. The Seminar Journal Club meets on Tuesdays from 5:00 – 6:00 PM in Room 419 RAL (Rose Seminar Room). The course is graded as Satisfactory/Unsatisfactory based upon attendance and participation.

Students will be required to read one assigned paper authored by that Friday's invited speaker, and the paper will be discussed at the Tuesday evening meeting. The discussion is typically facilitated by the faculty member who invites and serves as host of the speaker, or by a designated senior member of the host's laboratory, if the host is unavailable. Students should come prepared to ask questions about the work and to participate actively in the discussion. The goal for this class is that the informal discussion be essentially student-led.

9. Lab Group Meetings

Biochemistry graduate students receive academic credit for participation and attendance in laboratory group meetings. Students are required to register for 2 hours of credit each semester (starting in the third year) under their research advisor's BIOC 590 section. This course is graded Satisfactory/Unsatisfactory.

10. Exam and Committee Meeting Milestones

Year 1-December: Graduate student joins a research laboratory

Year 2-April: Ph.D. students undergo the Preliminary Exam to determine research potential with a committee that is assigned by the Department Head.

Year 3 (Spring): In an annual review, Ph.D. candidates provide an on-campus public presentation of their research progress. This will normally be during the Department Wednesday afternoon seminar, although student oral presentations at campus symposiums are also acceptable venues. The Dissertation Committee members will be present unless conflicts such as teaching obligations and travel plans exist.

Year 4 (fall), Year 5 (fall): In an annual review, Ph.D. candidates provide an on-campus public presentation of their research progress. This will normally be during the Department Wednesday afternoon seminar, although student oral presentations at campus symposiums are also acceptable venues. The Dissertation Committee members will be present unless conflicts such as teaching obligations and travel plans exist

6-month (pre-defense) meeting: Upon the recommendation of the Research Advisor, the Ph.D. candidate arranges a meeting with their Dissertation Committee with a timeline that is estimated to be about 6 months prior to the dissertation defense. This meeting briefly highlights published papers, manuscripts in preparation, and details experiments that need to be completed prior to the dissertation defense. This should be completed in the 5th year and no later than spring of the 6th year.

11. The Preliminary Examination

11.1 “Prelim”

The Preliminary Examination (Prelim) serves as the Department’s primary activity to determine research potential. This exam will be conducted in April of the second year and constitutes the Graduate College requirement for a two-year review. The Prelim consists of:

- A short (3 page maximum), written outline of the project, including a summary of research progress so far, plans (or “Aims”) for future work, and some vision of the significance of “the project”. References may be attached on additional pages. One additional page may be used for Figures, as needed.
- An oral examination on the research. The format is that of an oral “chalk talk” in which the white board in the exam room is the only available means for presenting hand-written or drawn information. PowerPoint presentations, transparencies and handouts cannot be used. A brief outline can be written on the board prior to the beginning of the exam. An especially complex molecular structure may also be drawn, with the permission of the Committee Chair. The overall goal is to establish the student’s understanding of his or her hypothesis-driven project and the background, including relevant literature, as well as the project’s significance. It is expected that the student presents some preliminary data to gauge research progress, a well-working understanding of relevant experimental methodologies, and plans for future work.

The Prelim committee (total 4 members) is appointed by the Head of the Department by random drawings specifically excluding the research advisor. The Research Advisor is permitted to recommend one committee member who has expertise in the student’s research area. This recommendation is subject to approval by the Head of the Department and/or the Director of Graduate Studies. Input from the research advisor is provided in a letter, which is read at the end of the oral exam if the committee is considering a deferral of decision or fail for the student performance. The Prelim committee signs a form indicating pass, fail or deferral. The Research Advisor is not a member of the Prelim Committee.

11.2 Purposes

The Ph.D. Degree is awarded to students who have demonstrated that they are able to conceive and carry out original research. Therefore, one of the requirements for Ph.D. students in the Department of Biochemistry is the demonstration of their potential to become effective independent research biochemists. The demonstration takes the form of an oral examination that deals directly with the student’s thesis research project and with related aspects of biochemistry that impinge upon the project. The examination asks (a) how well the student understands the

background and rationale for the research project, and (b) his or her ability to form a short and long-term hypothesis-driven experimental plan with a clear understanding of the approaches, techniques, projected outcomes and potential pitfalls of the project. In particular, the purposes are the following:

1. To motivate the students to:
 - focus, at the earliest possible time during their period of graduate study, both their thinking and their activities on their research project,
 - integrate the knowledge obtained in course work with the goals and rationale of the research project,
 - gain a thorough, in-depth grasp of the biochemical literature that pertains to their research project, and
 - develop a clear perception of the goals of their research project as they relate to the advancement of biochemical knowledge in their research area.
2. To provide a fair and thorough means for verifying that the graduate student shows promise of becoming adept in both the physical and scholarly aspects of biochemical research. This includes the ability to “think scientifically” and approach research problems. The Conclusions chapter should evaluate the material covered in all of the experimental results chapters and succinctly put the work in context of the appropriate field(s).

11.3 Nature of the Preliminary Examination

During the middle of the fourth semester of their graduate study at Illinois, each Ph.D. student in Biochemistry meets with a faculty Committee for an oral examination of the progress of the student’s research work. A delay of one semester’s duration can be granted for a student who changes labs. (See section below for rules applying to MD/PhD students – Medical Scholars.)

The Committee, which does not include the thesis advisor, is composed of four faculty members with academic appointments in the Department of Biochemistry and is selected by the Department Head by random drawing one semester prior to the scheduling of the research conference. The Research Advisor is permitted to recommend one committee member who has expertise in the student’s research area. Exam dates are also selected by random drawing. One member of the Committee is designated as Chair of the Committee.

If either the faculty advisor or the Chair of the Preliminary Exam Committee feels that none of the committee members selected is knowledgeable in the general research area of the candidate, either one may request one replacement with more appropriate expertise. Changes in committee membership may be made up to one month prior to the scheduled date of the exam by notifying the Department Head.

The SAAO will schedule the date of the Prelim Exam. At least one week prior to the exam, the student will give the Biochemistry Office of Student Academic Affairs and also each member of the Committee a copy of a brief (3 pages maximum) statement of the research project in

progress. This statement should include the background and status of the research project; the progress to date; the hypothesis, plans, and methods of approach for future work; and selected references to the literature. One additional page may be used for Figures, as needed.

At least two days prior to the oral exam the student will deliver to the Chair of the Committee his/her research notebook(s), properly indexed.

11.4 Conduct of the Examination

1. Areas that may be covered or types of questions asked:
 - The research of the candidate (the focus)
 - Goals
 - Reasons for experiments
 - How the goals fit into the large scientific questions
 - Future experimental plans
 - The background literature
 - Alternative approaches that might be used to achieve the goals of the work, even if the techniques are not ordinarily used in the advisor's laboratory
 - How methods that are used in the project work, including potential pitfalls and ambiguities.
 - Questions such as "How would you show ...", "What if ..., what would you do then?" In other words, questions on experimental design in order to test the student's ability to propose reasonable experiments and think about them critically.
2. Letter from the research advisor. The research advisor will submit a letter of evaluation to be read at the end of the exam in those cases in which the committee needs consultation. The letter is thereafter destroyed and does not become a part of the student's record.
3. Results. The results of the examination will be one of the following:
 - Pass the candidate.
 - Fail the candidate. A program may, but is not required to, grant the student another opportunity to take the examination after completing additional coursework, independent study, or research, as recommended by the committee. However, if a second attempt is given, a new committee must be appointed by the Graduate College. The new committee may, but does not have to, consist of the same members as the original committee. After a fail result, a student will only be allowed to take the preliminary examination one additional time while working toward the completion of any one program of study. The second preliminary exam, if granted, must be taken within 180 days.
 - Defer the decision. If this option is chosen:

- the same committee must re-examine the student,
- the second exam must occur within 180 days, and
- the outcome of the second exam must be pass or fail.

Note: Students with a GPA less than 2.75 may take the preliminary exam but are not guaranteed of continuation in the program.

12. Medical Scholars Program-MSP (MD/PhD students)

12.1 Preliminary Exam

Medical Scholars in Biochemistry are required to take the Preliminary Examination in Biochemistry in the early part of their fourth full semester as a Ph.D. Candidate in Biochemistry. This period does not include time spent primarily in Medical School studies, e.g., M1, M2 years. It is the responsibility of the thesis supervisor to certify to the Department when it is appropriate for a Medical Scholar to take the Preliminary Examination, i.e., the time when he or she should have had the research training and experience equivalent to Ph.D. candidates at the end of their fourth semester in Graduate School.

Sequence of Studies and Academic Progress: The Medical Scholars Program (MSP) provides an academic environment for integration of graduate and medical education and expects students to proceed at an appropriate pace through their dual degree studies. The time schedule for meeting the various milestones (preliminary examinations, course requirements, National Board examinations, and the like) will be based on established guidelines in consultation with the student and their graduate advisor. It is recognized that individual programs of study may vary greatly with respect to sequence due to factors such as differences in requirements among graduate programs, funding considerations, and the nature of the research. Consequently, petitions for exceptions to the policy may be approved by the Director of the Medical Scholars Program.

In order to assure both integration and reasonable academic progress:

- All MSP students begin their studies in full-time graduate course work and/ or research. Exceptions are granted for students already enrolled in medical studies and may be granted for students already enrolled in graduate study in the department in which they intend to do their PhD at the time of admission to the MSP. Students are encouraged to take M1 classes while completing their graduate program requirements.
- Students are expected to complete the Ph.D. (final defense) by the end of the second year of the medical curriculum (M2) or the student will be dropped from the roster. It is highly recommended the student defend prior to initiating the second year (M2) of the medical curriculum. Exceptions to this policy require explicit permission from the graduate thesis advisor and the MSP Director. The graduate advisor might also wish to consult with the student's thesis committee.
- M.D./Ph.D. students granted exceptions to policy 2 above must progress to Stage III of their graduate program prior to participating in more than one clerkship rotation in the medical curriculum.

- As per COM policy, MSP students must pass all M-1 courses taken during each academic year including summer makeup examinations(s). Students must repeat all M-1 courses taken to date if students fail any component of the M-1 curriculum.

13. Selection of the Ph.D. Dissertation Committee

Following successful completion of the Preliminary Exam a Ph.D. Dissertation Committee must be selected as soon as possible. This committee is typically chaired by the research advisor and constitutes a working basis for the Ph.D. Thesis Final Committee. It should also have three other members of the Graduate Faculty chosen jointly by the candidate and research advisor, have at least two members from the Department of Biochemistry (primary) and two with tenure. This Committee will administer the Final Examination in accordance with the Graduate College requirements. Also, the purpose of the committee is to provide on-going advice to the student concerning his or her research project, and the composition of the committee may need modification to provide the expertise commensurate with this expectation. This committee must be appointed by the end of the semester in which the Preliminary Examination is completed, and the Biochemistry Office of Student Academic Affairs notified. Changes in the composition of the committee can be made at any time, as might be appropriate to developments in the research project, or as dictated by faculty sabbaticals or departures from campus.

14. Annual Review and Six-Month Meeting

14.1 Annual Review

An annual review of the student's progress is made by the Ph.D. Dissertation Committee. The Annual Review is normally based on the student's annual research seminar presentation, or any other campus equivalents (such as one of the Training Grant Symposia). The student prepares a 2-page research summary of past year accomplishments and future plans, as well as their curriculum vitae, which is submitted to Jeff Goldberg in the Biochemistry Office of Student Affairs for distribution to the Ph.D. Dissertation Committee. If there are concerns about the research project or its progress, the Chair or any committee member of the Ph.D. Dissertation Committee may call for an additional closed meeting with the student's entire Ph.D. Advisory Committee to discuss the research accomplishments, progress, and plans. The chair of the advisory committee (normally the student's thesis advisor) summarizes the committee's findings, including any recommendations to the student, on the Thesis Committee Summary Form, signs it and delivers it to the Office of Student Academic Affairs. A copy is sent to the student and the original placed in the student's file in the Biochemistry Office of Student Academic Affairs (fulfills Graduate College Annual Review requirement).

14.2 "Six Month (pre-defense) Meeting" - Thesis Planning Meeting with the Advisory/Thesis Final Committee

When the student and advisor determine that the student is approximately one semester or 6 months from defending, the student will arrange to meet with the Ph.D. Dissertation Committee to review the proposed content of the thesis and notify the Biochemistry Office of Student Academic Affairs. This is commonly referred to as "the 6-month meeting". **This should be**

completed in the 5th year and no later than spring of the 6th year. The Department's expectation is that by the time of this meeting the student will have sufficient material for at least one first-authored publication in a major refereed journal. Normally, the meeting will be called and scheduled by the student in consultation with the advisor. One week prior to this meeting, the student will present to the Dissertation Committee a document that includes their curriculum vitae, a thesis cover page, proposed abstract of the thesis, and a detailed outline of the experimental chapters that might serve as the thesis Table of Contents. A copy will be provided to the Biochemistry Office of Student Academic Affairs.

Importantly, the meeting is NOT intended to provide a progress report but to succinctly describe what additional work is needed to complete and write up the thesis research. Thus, the student should plan an approximately 20-minute presentation that includes no more than 5 minutes of background material and an outline of the student's published work. The student should use the remaining 15 minutes to present an experimental plan to complete pending publications that will finalize his or her thesis work. The thesis planning meeting should comprise an active discussion between the Ph.D. candidate and his or her Ph.D. Dissertation Committee. In the event that the thesis is not submitted to the Ph.D. Advisory/Thesis Final Committee in a timely manner following this meeting (in a time period that exceeds a year) another thesis planning meeting will be called. A formal notification of this meeting should be given to the Biochemistry Student Academic Affairs Office.

The Ph.D. Dissertation Committee is the final composition of the Ph.D. Advisory Committee, first appointed after the Preliminary Exam (Research Qual). It is chaired by the research advisor and includes at least three other members of the Graduate Faculty chosen jointly by the candidate and research advisor. At least two of the committee members must be primary faculty members of the Department of Biochemistry and two members must have tenure. Additional members may be appointed at the request of the student in consultation with the advisor. The members of the committee should have expertise commensurate with the research project to be conducted by the student. The composition of this committee must be set by the time of the 6-month meeting.

15. Final Examination (Thesis Defense)

Final Examination for Ph.D. in Biochemistry: You should obtain a Ph.D. Final Defense Checklist from the Coordinator of Student Academic Affairs for more details. Also, the Graduate College website has checklists. The student must be registered for BIOC 599 (research) to defend. It is not necessary to register to deposit.

- In consultation with and approval by the Research Advisor, the Ph.D. candidate may schedule a tentative thesis defense date and time to accommodate and coordinate the schedules of the Thesis Final Committee.

The Biochemistry Office of Student Affairs should be notified and will assist with reserving an appropriate room for the public defense.

- Two weeks prior to the tentative thesis defense date, the candidate for the degree will deliver a draft copy of his/her thesis to each of the members of the Thesis Final Committee. This copy will have been read and approved by the thesis advisor for both form and content and will

be considered to be in final format, pending changes recommended by the Committee. If portions of the thesis have been published previously, reprints should be provided to the Committee along with the thesis. Reasons for declaring a thesis unacceptable include, but are not restricted to:

- 1) poor presentation, including grammar and organization;
 - 2) scientific inaccuracies;
 - 3) ambiguity about the candidate's contribution to collaborative work and
 - 4) ambiguity about the candidate's authorship of chapters that have been published.
- The candidate must present an open (public) seminar in defense of his/ her thesis. The Biochemistry Office of Student Academic Affairs will be responsible for publicizing the open seminar.
 - Following the public defense, the Thesis Final Committee and any other faculty member of Department of Biochemistry who so desires will meet with the student concerning the thesis. The thesis will be revised, if necessary, after this meeting. Final approval of the thesis requires assent of each member of the Committee. The Research Advisor will provide signature approval of the thesis when all of the expectations and requests of the Committee have been satisfied. The Head of the Department will provide signature approval when all Department requirements have been fulfilled.
 - If requested by the thesis advisor, the candidate will deposit one bound and electronic copy of the thesis with the thesis advisor in addition to the copies required by the Department and College. The Department requires that the candidate deposit an electronic version (PDF, CD or USB) of his/her thesis with the Department. The School of MCB requires that deposit of thesis occurs in the same semester as the defense.

16. Other Items of Interest

16.1 Change of Thesis Advisors

There are a number of personal, academic, and professional reasons whereby the relationship between a graduate student and his/her thesis advisor may prove to be unproductive. As a first step, we strongly recommend that the student attempt to resolve difficulties before seeking a new position with another faculty member. Should the student and advisor fail to resolve their differences, we advise the student to seek counsel with the Student Academic Advisor, Department Head and/or the Director of Graduate Studies. Alternatively, we recommend the student to consult the Student Academic Advisor, Department Head and/or the Director of Graduate Studies directly on those matters he or she considers impossible to broach with the advisor. Should a change of thesis advisors be required, it will be negotiated among the student, the involved faculty advisors, and the Department Head or Director of Graduate Studies with the aim of serving the best interests of the student and the department. A change in thesis advisors must be approved by the Department Head.

16.2 Grievance Procedures

University policy strongly encourages all students who believe they have a dispute or conflict to use all appropriate avenues for informal resolution before initiating the Graduate College grievance process described herein. Students may seek advice about how to address their situation informally from their faculty advisers, the Student Academic Advisor, the Department of Biochemistry Director of Graduate Studies, the Head of the Department of Biochemistry, The Associate Director of Graduate Studies of the School of Molecular and Cellular Biology, the Graduate College (see IV.A. below), the Office of the Dean of Students, and/or the Office of International Student Affairs before pursuing a formal Graduate College grievance. The Department of Biochemistry has chosen to use the Graduate College grievance policy for any formal graduate student grievances that arise in the unit. The Graduate College policy is available at www.grad.illinois.edu/policies/gc_grievances

16.3 Leave Policy

Graduate students are entitled to vacation on official University holidays (Labor Day, Thanksgiving, Christmas, New Year's Day, Martin Luther King Day, Memorial Day, and Independence Day). Research and teaching assistants are also entitled to 13 days non-accruable sick leave each year. In the event of more protracted illness, leave without pay may be negotiated.

16.4 Job Placement Sources

The Roy J. Carver Biotechnology Center:

Website: www.biotec.uiuc.edu/cgi-bin/placement.pl

The Roy J. Carver Biotechnology Center maintains a Placement Office, room 2610 Carl R. Woese Institute for Genomic Biology (MC-195) 1206 W. Gregory, Urbana; Phone: 333-1378) which provides a central location for companies seeking candidates for positions in biologically related areas.

Life Sciences:

Website: mcb.uiuc.edu/undergrad/careers.html

The School of Life Sciences maintains a Career Services and Resources Room, located in room 127 Burrill Hall (333-6774) that provides information about bio-logically-related careers. Brochures, pamphlets, and books about specific biological careers are available as well as information on corporations, government employment opportunities, and graduate programs.

17. Appendix

Articles (visit links):

- A. On Being a Scientist (Nat'l. Acad. Press, 1995)
<https://nap.nationalacademies.org/read/4917/chapter/1>
- B. Research Student and Supervisor (Council of Graduate Schools, 1990)
<https://eric.ed.gov/?id=ED327084>
- C. The Care and Maintenance of Your Adviser (Nature, vol 469)
<https://www.nature.com/articles/nj7331-570a>