

# **Biochemistry and Biophysics Graduate Student Handbook**



**Roy J. Carver Department of Biochemistry,  
Biophysics & Molecular Biology  
Iowa State University**

**Fall 2018**



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**THE OVERALL MISSION** of the Roy J. Carver Department of Biochemistry, Biophysics, and Molecular Biology (BBMB) is to investigate and understand the molecular mechanisms underlying biological processes as explained by the principles of chemistry and physics. Synergistic programs in teaching and research accomplish this mission. Undergraduate and graduate instruction emphasizes the fundamental relationships among the chemical, physical, and biological sciences. Basic research is the hallmark of the departmental mission, providing the knowledge that is essential for continual progress in the applied agricultural- and biomedical sciences. These two aspects of the mission are merged by involvement of students at all levels in primary research activities, and by a teaching approach that strives to promote rigorous and critical thought.

### Research

The research mission of the Department is focused in related areas that encompass biochemistry, biophysics, molecular and structural biology. BBMB produces novel discoveries that are highly significant to the worldwide biomedical and agricultural research efforts. The faculty members are funded by the major federal competitive funding agencies and publish in journals with the highest international impact. The Department also seeks to integrate its basic experimental research activities directly with State-of-Iowa industries.

### Teaching

Student learning is of paramount importance in the Department's program design. The teaching mission includes broad contribution to the physical- and life sciences training programs at Iowa State University. BBMB faculty teach graduate and undergraduate courses in biochemistry, biophysics, molecular biology, and interdisciplinary programs, emphasizing the ways that biological mechanisms are founded on chemical and physical principles. Students are prepared to pursue professional careers in a variety of academic and industry environments, and to serve society as broadly educated individuals. Undergraduates are also engaged in discovery-based learning by participating directly in the primary research activities of the Department.

### Outreach

The Department has a significant outreach mission in frequent and open communication with the public of Iowa. Basic research contributes significantly to this mission by providing the knowledge on which society can draw in the future to meet challenges dictated by limited global resources. Additionally the Department's outreach mission includes direct efforts to stimulate economic development within the State of Iowa, by bringing basic research results to bear on applied research and development.



## ADMINISTRATION

### Department Chair

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### Graduate Program Coordinator

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*The Department Chair, the Director of Graduate Education (DOGE), and the Graduate Program Coordinator oversee the biochemistry and biophysics graduate program. Please contact us if you have questions or concerns about the program.*

## WELCOME

The Roy J. Carver, Department of Biophysics, and Molecular Biology (BBMB) welcomes you to Iowa State University. We sincerely hope your years in graduate school will be both exciting and valuable in preparation for your life's endeavors. We are fortunate to be housed in the modern Molecular Biology Building. The building is designed to encourage collaboration among the many research laboratories it houses, and we believe your education will be greatly strengthened if you take advantage of the opportunities to interact closely with researchers in different areas of biochemistry, biophysics, molecular and cellular biology, genetics and genomics, plant biology, immunobiology, neuroscience, bioinformatics, and biotechnology.

To ease your transition into our department and life as a graduate student, especially during your first hectic weeks here, we have compiled this Biochemistry and Biophysics Graduate Student handbook describing the various academic and administrative matters which are, for the most part, specific to our department. Updates during the academic year will be incorporated into pdf version found on the Graduate Study [webpage](#). General information about BBMB and information about our faculty can be found on the [department website](#).

We have included some of the Graduate College policies in this handbook, but please also refer to the online [Graduate College Handbook](#) for the most up-to-date policy information.

Interdepartmental graduate students who join the BBMB home department should refer to their program's handbook for information and guidance.

We hope that your graduate studies with us will be interesting, challenging, and fruitful. BBMB looks forward to many rewarding interactions with you during your academic career in our graduate programs.



Graduate programs offered, minimum credits required, and time-to-degree or certificate

Graduate Certificate in Biochemistry  
(12 credits)  
2-3 semesters

Concurrent B.S./Graduate Certificate in Biochemistry  
(121 credits for B.S./12 credits for CRT)  
4 years

Concurrent B.S./Master's in Biochemistry or Biophysics  
(121 credits for B.S./30 credits for Master's)  
5 years

Master's Degree in Biochemistry or Biophysics  
(30 credits)  
2-3 years

Ph.D. Degree in Biochemistry or Biophysics  
(72 credits)  
5-6 years

## PROGRAM OVERVIEW AND STUDENT EXPECTATIONS

The graduate programs offered by BBMB are designed to provide students with focused study in the science and technology used to understand the mechanisms underlying biological processes at the molecular level, with an emphasis on the fundamental relationships among the chemical, physical, and biological sciences. Each program has established clear parameters for outcomes assessment and closely monitors the progress of graduate students during their course of study.

We offer a Graduate Certificate (CRT) in Biochemistry, and a Master's (M.S.) and a Doctor of Philosophy (Ph.D.) degrees with thesis in both Biochemistry and Biophysics. The prerequisite to graduate study in all these programs is a sound undergraduate background in biology, chemistry, mathematics and physics.

### Learning Outcomes

The Graduate Certificate programs provide graduates a mechanism for formal recognition of focused graduate study in a specialized area that is less comprehensive than required for a Master's degree.

The Master's and Ph.D. degrees with thesis are designed to train students in the ability to independently conceive and carry out original research in an area of interest. Advanced degree graduates become qualified to pursue or to continue basic and applied research careers in academia, government, and industry.

The program provides training relevant to academic, industrial, and research careers that will allow students to appreciate, navigate, discuss, and develop their career choices. Effective and regular career guidance activities will be provided, including exposure to academic and non-academic career options.

### Global expectations of all students

Students are expected to demonstrate professional behavior while enrolled in the graduate program and to act in a manner that demonstrates integrity and respect for others and the campus environment. The program follows the standards and policies set by Iowa State University outlined in the online Policy Library on [Student Life](#).



## Chemistry course background

All graduate students entering the Department should have one semester of analytical chemistry, one year of organic chemistry and one year of physical chemistry. A student lacking this background should acquire it as soon as possible.

## Core course requirements

All Graduate Certificate and Master's and Ph.D. degree students are required to take the following four 2 credit modular core courses in addition to other course requirements:

**BBMB 504:** Amino Acids and Proteins

**BBMB 505:** Bioenergetics and Metabolism

**BBMB 506:** Membrane Biochemistry

**BBMB 507:** Biochemistry of Nucleic Acids

## BBMB Graduate Degree and Certificate Options

The Biochemistry and Biophysics programs provide several options for graduate training. Coursework, teaching, thesis and administrative requirements vary with each option, but all degree types require admission to the Graduate College. Admission procedures and requirements vary, but are minimally a grade point average of 3.0, junior status (for ISU undergraduates), and three letters of recommendation. Please visit the Graduate Study [web pages](#) or contact the graduate program coordinator for more information.

### Graduate Certificate in Biochemistry

Required courses: BBMB 504, 505, 506 and 507 plus 4 additional credits of BBMB coursework at the 500- or 600-level. Total of 12 credits is required to earn a graduate certificate. The 12 credits earned may be applied to meet the course requirements for admission to the M.S. or Ph.D. with thesis program. Current graduate degree students may double count approved graduate course credits towards the graduate certificate.

### Graduate Minor in Biochemistry

Required courses: Any three of BBMB 504, 505, 506 and 507 plus 6 additional credits of BBMB coursework at the 500- or 600-level. Graduate students in other M.S. and/or Ph.D. programs at Iowa State University can earn a graduate minor in biochemistry by completing these requirements with a grade point average of 3.0 or above. A student wishing to declare a minor in biochemistry should arrange for a member of the graduate faculty in biochemistry to serve on the program of Study (POS) Committee.

### Concurrent B.S./Graduate Certificate in Biochemistry

Intended for Biochemistry undergraduate majors. The student enters the Graduate College after he/she achieves junior status and develops a plan of coursework (undergraduate and graduate) subject to the approval of the Director of Certificate (DOC). Required graduate courses are BBMB 504, 505, 506, 507, 561 and 561L. The student must satisfy the requirements of the B.S. in biochemistry (121 credits) and the Graduate Certificate in Biochemistry (12 credits). Six credits of graduate coursework can satisfy requirements of the B.S. degree and graduate courses taken for the B.S. degree cannot be used towards the graduate certificate.

### Concurrent B.S./M.S. in Biochemistry

Intended for biochemistry undergraduate majors. The student enters the Graduate College after he/she achieves junior status and develops a plan of coursework (graduate and undergraduate) subject to the approval of the DOGE. Required graduate courses are BBMB 504, 505, 506, 507, 561, 561L and GR ST 565 (Responsible Conduct of Research in Science and Engineering). The student must satisfy the requirements of the B.S. in biochemistry (121 credits) and the M.S. in biochemistry (30 credits, thesis). Six credits of graduate coursework can satisfy requirements of the B.S. degree.

## FIRST SEMESTER COURSES

Typically, entering graduate degree students take the following courses during their first fall semester:

### **BBMB 504** (2 credits)

Amino Acids and Proteins

### **BBMB 505** (2 credits)

Bioenergetics & Metabolism

### **BBMB 682** (Required)#

Departmental Seminar

### **BBMB 699** (Varying credit hours)

Research

### **GR ST 565** (1 credit)

Responsible Conduct of Research in Science and Engineering

#Not required for B.S./M.S. program

*PhD students should take a minimum 8 credits of additional BBMB 500-600 level courses during or after their first year in three specialty areas: bio-organic mechanisms, cell biology, and physical biochemistry. MS students are required to take 1 BBMB 500-600 level course.*

*International students may have other courses added based on results from English placement exams.*

## M.S. in Biochemistry or Biophysics

Required courses: BBMB 504, 505, 506, 507, 561, 561L, 681 (taken once), 682 (taken every semester) and GR ST 565 (Responsible Conduct of Research in Science and Engineering). Research credit (BBMB 699) taken to bring the graduate credit total to at least 30. Thesis and one semester of teaching required.

## Ph.D. in Biochemistry or Biophysics

Required courses: BBMB 504, 505, 506, 507, 561, 561L, 681 (taken once every year, except the first and last years), 682 (taken every semester), GR ST 565 (Responsible Conduct of Research in Science and Engineering) and an additional 8 credits of 500- and 600-level coursework in BBMB as follows: 2 credits in bio-organic mechanisms (BBMB 531X or 532X), 4 credits in cell biology (BBMB 510, 512X, 530, 615, 645, 661, 675 and/or 676), and 2 credits of physical biochemistry (BBMB 532X, 549X, 551X, 569 or 553X). Research (BBMB 699) taken to bring the graduate credit total to at least 72. Thesis and 2–3 semesters of teaching required.

## Thesis Program Requirements

The following other course and program requirements apply to all thesis students, except where noted. Students on an assistantship should enroll in a minimum of 12 credits each fall and spring semester and a maximum of one credit during summer term to be considered a full-time student. Students must maintain a Grade Point Average (GPA) of 3.0 or above, and after joining a research lab group, make adequate progress toward the successful completion of the thesis project.

### Seminars

In addition to courses list above for all graduate degree and certificate options, all thesis students in the department, with the exception of B.S./M.S. concurrent enrollees in biochemistry or biophysics, must meet the following program requirements to earn their degree.

#### **BBMB 681. Advanced Seminar (1 credit)**

Enroll once a year (fall or spring) except first and last year in program. Expected enrollment: once for M.S. students, three times for Ph.D. students. Seeks to have the student well-practiced in oral presentation skills.



## BBMB 682. Departmental Seminar (R credit)

Each fall and spring semester all students in the Department, with the exception of B.S./M.S. concurrent enrollees in biochemistry or biophysics, must enroll and attend the Departmental Seminar (BBMB 682), which consists of seminars by speakers from ISU and other research institutions.

The presentation of a thesis seminar by all Ph.D. students in BBMB 682 is encouraged and should take place directly before the Final Oral Exam. If there are no seminar openings in BBMB 682, then a special public seminar, outside of or as part of the Final Oral Exam, can be scheduled and advertised to the department and interested groups.

## BBMB 699. Research (varying credit hours)

Credits for research for the purpose of completing a thesis or dissertation are assigned under the course number 699 and are by permission of the instructor. A minimum of three semester credits is required for a thesis and enrollment will vary based on the semester and term. These credits are not calculated in the student's GPA.

Each professor in BBMB has a unique BBMB 699 reference number which can be obtained from the graduate program coordinator if needed. Entering rotation students will enroll using the DOGE reference number and, once a student joins a research group, they will enroll using the 699 reference number of their major professor.

## Teaching Experience

The biochemistry and biophysics graduate programs require students to have at least one teaching experience. Typically, Ph.D. students are assigned two to three semesters (and Master's students one semester) of teaching activities supported by teaching assistantships (TA). Students in an interdepartmental program in the BBMB home department are eligible for a teaching assignment.

Support for a teaching assistantship (TA) is paid by the department and is at the same level as a research assistantship (GA). While the TA may replace funding by the major professor, it does not replace the research appointment. It is expected that a student will continue to do lab research during their teaching appointment.

## SECOND SEMESTER COURSES

During the second, spring semester, graduate degree students take the following courses:

**BBMB 506 (2 credits)**  
Membrane Biochemistry

**BBMB 507 (2 credits)**  
Biochemistry of Nucleic Acids

**BBMB 561 (2 credits)**  
Molecular Biophysics

**BBMB 561L (2 credits)**  
Lab in Molecular Biophysics

**BBMB 682 (Required)#**  
Departmental Seminar

**BBMB 699 (Varying credit hours)**  
Research

#Not required for B.S./M.S. program

## COURSES BEYOND YEAR 1

*Ph.D. students take an additional 8 credit hours of BBMB 500-600 level specialty courses in areas of bio-organic mechanisms, cell biology and physical biochemistry. M.S. students are required to take one specialty course. Courses not under the BBMB designator can meet this requirement subject to the approval of the DOGE and thesis committee.*



## BBMB Course Listings

### New and Discontinued

BBMB changes course offerings in response to developments in biochemistry and biophysics and changes in its faculty. Unfortunately, new courses may take more than one year before they enter the annual [ISU online catalog](#). Information regarding new courses (and old courses that have been discontinued) is presented below. All of new courses satisfy one of the three areas (bio-organic mechanisms, cell biology and physical biochemistry) described under [Graduate degree and certificate options](#) on page 5.

[Link to new experimental courses not yet listed in the ISU catalog](#)

**BBMB 510X. Molecular Biology and Biochemistry of RNA.** (2-0) Cr. 2. F. *Prereq: BIOL 313, BBMB 405, BBMB 502, or Gen 409, or equivalent.* Biochemical processes that define structure and function of nucleic acids. Emphasis on the molecular processes that take place during synthesis, processing, and function of different RNA species; review of recent advances in RNA research.

**BBMB 512X. Principles of Glycobiology.** (2-0) Cr. 2. S. *Prereq: 3 credits in Organic Chemistry.* Structure, synthesis, and functions of glycans, glycoproteins, glycolipids, and glycosylated secondary metabolites in prokaryotic and eukaryotic organisms. Fundamental role of glycans in living organisms along with the most advanced techniques used for their characterization. Biotechnological applications of glycans and glycoconjugates for human needs.

**BBMB 531X. Plant Biochemistry.** (2-0) Cr.2. S. *Prereqs: BBMB 301 or equivalent.* In-depth exploration of plant biochemistry with a focus on the unique aspects of plants versus heterotrophic organisms. Analysis of unique pathways, metabolic trafficking between unique organelles and tissues, and techniques for their characterization.

**BBMB 532X. Enzyme Kinetics and Mechanisms.** (2-0) Cr. 2. S. *Prereq: BBMB 504.* Advanced concepts of enzyme kinetics and catalysis. Experimental methods for determining kinetic and chemical reaction mechanisms. Enzyme structure/function relationships and the role of dynamics in catalysis.

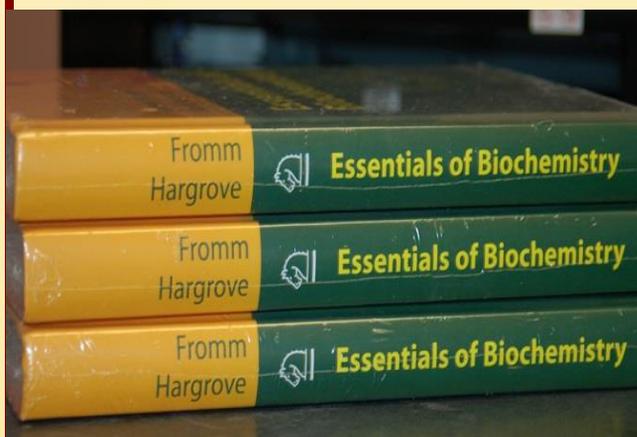
**BBMB 549X. Nuclear Magnetic Resonance Spectroscopy.** (3-0) Cr. 3. F. (*Cross-listed with CHEM 549X.*) *Prereq: any one of the following: CHEM 324, CHEM 325, BBMB 461, BBMB 561.* Theoretical principles of NMR, practical aspects of experimental NMR, solution and solid state NMR, methodologies for molecule characterization, protein structure determination, NMR relaxation, and recent advances.

**BBMB 551X. Computational Biochemistry.** (2-0) Cr. 2. F. *Prereq: BBMB 404 or equivalent.* Biological and structural databases, molecular visualization, sequence comparisons, homology searches, sequence motifs, construction of phylogenetic trees, structure comparisons, protein structure predictions, RNA structure predictions, molecular docking, metabolic pathways

**BBMB 553X. Current Research in Chemical and Physical Biology.** (2-0) Cr. 2. F. *Prereqs: BBMB 404 or equivalent.* Principles and applications of chemical and physical methods to analyze biological structures and function ranging from cells to individual biomolecules. Synthetic and biosynthetic strategies, cell surface engineering, single molecule and super-resolution spectroscopy and imaging, membrane biophysics, and use of nuclear magnetic resonance.

**Discontinued courses still in catalog and no longer offered:** BBMB 552, 607, 622, 632, 642, 652, 653, and 660.

Courses offered by other departments that may be of interest to biochemistry or biophysics graduate students can be found in the [ISU online catalog](#).



# Orientation: Your First Week

## Readiness for Graduate Study

In order to succeed in a graduate program requiring independent research resulting in a thesis, a student must be independent and self-reliant. Graduate students in BBMB are affiliated with several categories of students (see Pathways of Admission), and each student has to keep multiple bosses happy. The professor in charge of the research group (major professor) is happy if the student does good research. The professor in charge of the graduate program (Director of Graduate Education, a.k.a. DOGE) is happy if the student has a GPA above 3.0. The home department is happy if the student teaches well. BBMB has around 70 graduate students in all student categories, so you must be independent and self-reliant when you enter BBMB. The first step in self-reliance is finding the right room (Molecular Biology Building [floor plans](#)). Another step toward self-reliance is a complete reading and continued review of this handbook during your academic career.

## Pathways of Admission

After a couple of days some of you might begin to wonder how you got here. There are several routes to becoming a graduate student in BBMB.

*Direct admission.* The professor in charge of a research group (the major professor) can request that a student be admitted to his/her group if they have a research project and funding for that student. The department evaluates the student, and if appropriate, recommends acceptance. The professor-supported route is called *direct admission*. This route can be taken by students seeking an M.S. or Ph.D. degree in biochemistry or biophysics.

*Ph.D. rotation.* Alternatively, a student can apply to the biochemistry or biophysics Ph.D. rotation program, be evaluated by the department, and then accepted. Students visit several laboratories (rotations) and enter a research group subject to the interests of the major professor and student.

*Current ISU students.* Graduate students in an interdepartmental graduate program can join a BBMB faculty lab by requesting to join BBMB as their home department. Other ISU students can request to transfer, co-major or minor in a BBMB graduate program or certificate. The certificate program is also available to other graduated students. Finally, undergraduates seeking a Master's degree can apply to the B.S./M.S. concurrent enrollment program in biochemistry or biophysics.

## Orientation and Academic Advising

Every graduate program has a Director of Graduate Education (DOGE). For the biochemistry and biophysics programs the current DOGE is Professor [Richard Honzatko](#). He is the academic adviser for a graduate student until he/she enters a research group. The graduate program coordinator for all graduate students in BBMB is [Ms. Connie Garnett](#).

## BBMB FACULTY

Linda Ambrosio	294-9549
Amy Andreotti	294-4953
Adam Barb	294-8928
Donald Beitz	294-5626
Thomas Bobik	294-4165
Baoyu (Stone) Chen	294-9891
Michael Cho	294-6449
Alan DiSpirito	294-2944
Jack Girton	294-0342
Mark Hargrove	294-2616
Richard Honzatko	294-7103
Robert Jernigan	294-3833
Jorgen Johansen	294-2358
Kristen Johansen	294-7959
Gustavo MacIntosh	294-2627
W. Allen Miller	294-2436
Walter Moss	294-6116
Alan Myers	294-9548
Scott Nelson	294-3434
Basil Nikolau	294-9423
Marit Nilsen-Hamilton	294-9996
Reuben Peters	294-8580
Davit Potoyan	294-9971
Guru Rao	294-6116
Julien Roche	294-6437
Dipali Sashital	294-5121
Yeon-Kyun Shin	294-2530
Michael Shogren-Knaak	294-9015
Ravindra Singh	294-8505
Louisa Tabatabai	294-6116
Robert Thornburg	294-7885
Eric Underbakke	294-5793
Vincenzo Venditti	294-1044
Olga Zabotina	294-6125

Faculty and their research [Link](#)



The Graduate Program Coordinator is responsible for orientation support for all new students admitted to BBMB throughout the year and the orientation program for new Biochemistry and Biophysics rotation students at the start of the fall semester.

## Ph.D. Rotation Students - Your First Week

Fall orientation week includes:

- Rotation students should arrange to meet with faculty in preparation for establishing a calendar for rotations and the selection of a major professor.
- A half-day BBMB orientation program that includes a presentation of requirements of the graduate programs and first-semester course enrollment
- During the week-long fall orientation period, new students are also expected to attend various ISU activities, including lab safety training, Graduate College orientation, and, for non-native English speakers, International Student and Scholars Office ([ISSO](#)) orientation and a required English Placement Test ([EPT](#)).

## Selecting a major professor

The Biochemistry and Biophysics programs encourage students in the Ph.D. rotation program to enter a research group by the end of their first semester. Rotations through three laboratories acquaint the student with personnel, professors, and areas of current and planned research. The goal is a research group that provides the environment necessary for success. Students admitted to the certificate program or who have been directly admitted to a research group do not have lab rotations. Students from interdepartmental programs who join BBMB for their home department have independent rotation opportunities and usually enter a research group by the end of their second semester. Following are the steps in selecting a major professor for rotations.

## Learn about the professors and their research

During orientation week, you will have opportunities to meet with the faculty members of the department. The program will provide you with a list of the faculty seeking new graduate students. The [People](#) web page of the BBMB website provides links to the research programs of professors, but the most current information, such as the future direction of research, is learned by meeting with individual faculty. You may find you are interested in the research program of a faculty in another department, and it is possible to arrange a rotation period with faculty in other departments and to possibly select them as your major professor.

You are responsible for scheduling appointments with faculty to further discuss their research. The intent of meeting with faculty is not to provide comprehensive discussions of specific research problems; rather, it is to be an opportunity to become acquainted with the faculty and their professional interests so that you can make an informed selection of the laboratories through which you wish to rotate while selecting a major professor.

## UPON ARRIVAL AT ISU

### All students

Obtain your [University ID card](#) (UID) in 0530 Beardshear Hall. Your UID is your student identification, library card, meal card (if you have a residence hall meal plan); access card to university services, CyRide card, and cash card (if you activate the cash stripe).

**U.S. students and permanent residents** should complete their [new employee signup](#) that includes the Employment Eligibility Verification (I-9) form, prior to the first day of their assistantship appointment with Human Resources Records Management office, 3810 Beardshear Hall. Bring required documents to sign up for payroll.

**International students** will sign their I-9 form with the International Student and Scholars office and complete the rest of their payroll signup with Human Resources Records Management. International students who do not have a US Social Security (SS) number should wait at least two weeks after arriving in the United States to apply for one. Applying earlier could delay processing and your pay.



## Week Two and Beyond

### Listing lab preferences

Rotation students will be provided with a form to use to submit their rotation lab preferences, and about two weeks after entering the program, you will be asked to submit the list with at least five names of professors. On the form you will indicate a level of preference from 1 to 5 (5 being the highest) in whose research group you would do a rotation. The program will then schedule three four to five week rotation periods, lasting from September to December, based on student preferences.

### Lab rotations

During the rotation period, you will be expected to meet with the professors and research group to discuss their research and work in the laboratory. Requirements of each professor may vary, but often also include reading reprints and reviews and preparing yourself to decide which research group you wish to join. Occasionally, the outcome of a rotation is co-authorship on a paper or the initial steps toward a graduate thesis. During the rotation, not only is the student evaluating the research group, but the professor and research group is evaluating the student. During the rotation period, feel free to visit with additional professors whose research is of interest, even though you are not rotating through their laboratories.

### Lab assignments

In December, toward the end of the fall rotation period, you will be given a form to list, in order of preference, three professors in whose lab you have rotated whose group you would like to join effective spring semester. At the same time, faculty are given a form in which to list their preferences for students with whom they have interacted that they would like to have join their research group. The program will then match student preferences to those of the professors in whose lab they have done a rotation.

In many instances, the top choice of student and professor for lab assignment are in mutual agreement, but sometimes a student is assigned to a group they may have not ranked as their highest preference. Assignments are also subject to the availability of funds and in the interest of building and maintaining healthy research groups. Assignments are permanent; however, change is possible and often straightforward when a student and professor are in favor of change.

Lab assignments are effective starting in January. If you choose a professor in a department outside BBMB, that professor will become your co-major professor and the DOGE for biochemistry and biophysics will be your other co-major professor.

A significant part of the first semester for students admitted to the Ph.D. rotation program in the BBMB will be devoted to the important process of selecting a major professor who will be the person who will guide you in your graduate studies and whose research group you will join.

Students admitted to the certificate program or who have chosen and been accepted by a major professor prior to arrival on campus will not do lab rotations.



## Table: Requirements and Timeline to Graduate Degree

Summarized below are several major aspects of the biochemistry and biophysics graduate degree programs beyond week one. These requirements are intended to develop the knowledge base and skills that are expected from an individual with a graduate degree in biochemistry or related fields. All students are expected to fulfill these requirements within the timeframes indicated. Failure to reach some benchmarks can result in the loss or interruption of financial support.

Requirement	Completion Date
<b>Core and Other Courses</b> based on choice of major and degree sought	By the end of the second year
<b>Department Seminar</b> BBMB 682	Every fall and spring semester during program enrollment. Not required for B.S./M.S. concurrent enrollees.
<b>Advanced Seminar</b> BBMB 681	Either fall or spring semester each year during program enrollment, except the first and last year. Not required for B.S./M.S. concurrent enrollees.
<b>Individual Development Plan</b>	At the start of the first semester in the program. With the guidance of the BBMB Graduate Learning Committee (GLC), complete the online Individual Development Plan ( <a href="#">IDP</a> ), a self-assessment tool to be used as a learning tool and resource for professional development and career exploration. Recommended for all graduate students.
<b>Program of Study (POS) Committee</b>	Form and meet with committee before the end of 1st semester (M.S.), or by end of 2nd semester (Ph.D.)
<b>Online Program of Study (POSC)</b>	Submit online program of study plan (POSC) for Graduate College approval through Access Plus following first POS meeting, before the end of the 1st semester (M.S.), or by the end of the 2 <sup>nd</sup> semester (Ph.D.). Modify up to expected graduation.
<b>Annual Meeting with Major Professor</b>	Meet with major professor to confirm academic and research progress and review professional development goals are being met for continuation of financial support. By the end of each spring semester.
<b>Research</b>	Typically the research by a graduate student is expected to yield several publications in reputed journals. Every semester and summer.
<b>Teaching</b>	Typically, Ph.D. students are assigned to two to three semesters and Master's students are assigned one semester as a teaching assistant (TA). Students in an interdepartmental program in the BBMB home department are eligible for a teaching assignment.
<b>BBMB Oral Research Proposition Exam (ORPE)</b>	Department exam for Biochemistry and Biophysics Ph.D. students to be taken in the fall of their second year (third semester). Retake in spring if failed. Not required for M.S. degree
<b>Preliminary Oral Exam</b>	By the end of the fifth semester, exclusive of summer terms. Not required for M.S. degree. When exam date chosen, submit <a href="#">online exam request</a> to Graduate College
<b>Department Seminar Presentation</b>	Should take place directly before the Final Oral Exam. Not required for M.S. degree
<b>Final Oral Thesis Defense</b>	Must follow Oral Preliminary Exam by at least six months. Occurs at the end of graduate studies. In general, after 2 years for the M.S. degree and 5 years for the Ph.D. degree. When exam date chosen, submit <a href="#">online exam request</a> to Graduate College
<b>Graduation</b>	Follows successful final exam and completion of all requirements for the degree.

## Other Graduate Program Requirements

### All International Students

#### Tests of English proficiency for non-native English speakers

Non-native English speakers are required to take the following English proficiency tests after arriving on the Iowa State University campus and enrolling in the biochemistry or biophysics graduate program.

#### English Placement

The English Placement Test ([EPT](#)) is required of all entering international graduate students whose native language is not English. International students who have received their undergraduate degrees at Iowa State University must take the Graduate English Exam for International Students. These exams are scheduled in early fall.

Performance on these tests determines whether students take a follow-up exam or courses. The department requires that these courses be taken on a graded basis. Consult the graduate catalog for further details.

The English Placement Exam is a separate exam from the OECT (Oral English Certification Test), which is a requirement for non-native English speakers seeking a teaching assignment (TA).

#### OECT (Oral English Certification Test)

Non-native English-speaking students are required to take the Oral English Certification Test ([OECT](#)) or receive a waiver from the exam as early as possible after entering the graduate program. An OECT result of 3 or higher is required to be a teaching assistant in BBMB; a level 2 or higher is required to be a teaching assistant in Chemistry. English courses recommended to meet BBMB OECT certification must be taken before or during the semester of the student's first teaching assignment.

Without an acceptable OECT result, a student cannot be given a teaching assignment and will, therefore, not meet the teaching requirement which may delay their graduation. It is important, therefore, to take the test as early as possible, enroll in the recommended English courses, and retake the OECT. A student who takes the maximum of two recommended English courses and still receives an unacceptable OECT result must request a waiver for an unmet teaching requirement. Financial support then is determined exclusively by funding resources available to the major professor.



## GRADUATE LEARNING COMMUNITY

The BBMB Graduate Learning Community (GLC), led by current graduate student peer mentors and a faculty adviser, meet during the academic year to explore professional development and career planning. In addition, at least one career workshop is planned each year.

Most graduate students in BBMB perceive career options in academe and industry; however, a graduate training in biochemistry or biophysics provides a foundation for related professional careers in scientific journalism, patent law, government regulation, medicine, dentistry, engineering and public health . The GLC explores professional development and careers for graduate students in biochemistry and biophysics.

Visit the BBMB Graduate Learning Community [webpage](#) for more information and a schedule of planned activities.



## Individual Development Plan (IDP)

During the first semester in the program, with the guidance of the BBMB Graduate Learning Community ([GLC](#)), complete the online Individual Development Plan ([IDP](#)), a self-assessment tool to be used as a learning tool and resource for professional development and career exploration. Recommended for all graduate students.

The student should update and review their IDP with their major professor at least once a year. During the annual evaluation process is a convenient time.

The Graduate College offers Career Services to current and recently graduated students that includes individual consultations, networking opportunities and professional development workshops. Please visit the Graduate College Career Services [web page](#) to learn more information.

## Committee Appointment and Program of Study

Selecting a graduate program of study (POS) committee is done by consultation between the student and the major professor, and faculty members are nominated who seem appropriate for that particular student. For example, if a student has a concentration of course work in microbiology, it would be appropriate to nominate someone from that department. For the M.S. committee, at least three committee members, including the major professor, are required and for the Ph.D. degree at least five, including the major professor, are required. One committee member must be from outside the field of research interest.

After the POS Committee is selected, the student should schedule a meeting so the members can provide guidance for both the student and major professor on the details of the student's course plan. The student should bring a copy of their current unofficial transcript (printed from Access Plus) showing graduate courses taken and the completed [BBMB POSC worksheet](#).

Once the POS Committee has approved the program of study, the student should submit the online electronic POSC, found under the Student Tab in Access Plus, for routing and final approval by the Graduate College. The POS Committee and program of study must be submitted for Graduate College approval during the first semester for Master's students and no later than the second semester of graduate study (exclusive of summer sessions) for Ph.D. students. The POSC can be modified up to your expected graduation. Any POSC committee or other modifications should be approved by the Graduate College prior to submitting an [online request for the preliminary or final exam](#) to the Graduate College so the exam request can be approved in a timely manner.

The Graduate College program of study is one of the more important records a graduate student will submit during graduate study at Iowa State. It is a contract between the student and the Graduate College that indicates the minimum course work to be taken to complete a Ph.D. or M.S. degree. Modifications to the online POSC require the mutual approval of the student, the student's POS Committee, and the Graduate College.

## ORPE IN BIOCHEMISTRY AND BIOPHYSICS

The **Biochemistry and Biophysics Oral Research Proposition Exam (ORPE)** is a BBMB Department requirement for Ph.D. candidates in these graduate programs. Following a year of coursework, the student is tested during their second academic year on their ability to apply their graduate coursework toward creative independent thought. The exam must be completed successfully for the student to move on in the Ph.D. program.

### The ORPE is one exam

Comprised of an oral and written component presented by the student to a committee of three BBMB faculty who are not part of their POSC committee. The student is given two opportunities, one in fall and one in the spring, to successfully complete the exam.

### FAQ's about the OPRE

**Q:** *What if I do not choose a topic in time to get the examination scheduled in the fall semester?*

**A:** This is treated as a failure of the examination.

**Q:** *Should I be able to draw chemical structures related to the basic biochemistry of the system I am investigating?*

**A:** Yes, and the inability to do so has led to failure of the examination.



## BBMB Oral Research Proposition Exam (ORPE)

**What is the Biochemistry and Biophysics ORPE Exam?** The ORPE is a department test of the ability of Ph.D. students to apply their graduate course work toward creative independent thought, which must be completed prior to admission to candidacy.

**How is the Exam structured?** Students will write and present a research proposal in the area of biochemistry, but unrelated to the subject or general laboratory techniques associated with their thesis research. The written proposal should be no longer than three pages including an introduction to the problem, specific aims, and rationale and significance paragraphs (this should resemble the first two or three pages of an NIH, NSF, or USDA proposal). The student then defends the proposal in detail by constructing a ~ 30 minute presentation for a committee of three BBMB faculty.

**When is it given?** This examination is to be completed in the second year of study. The student has two chances to complete the examination. All students will take this examination in the fall semester, and those not passing the first time will take it again in the spring.

### How is it organized?

**The examiners:** The ORPE committee is responsible for administering these examinations. Three members of the committee will administer each examination. This committee is a separate committee from the student's POS committee and a student's major professor may not serve on their examination committee.

**The exam:** Students taking the examination will be randomly assigned three members of the ORPE committee to serve for their examination (this will happen in the first week of the fall semester). The student then needs to pick a topic and have it approved by their committee (see below), schedule an examination date (in accordance with the members of their committee), room, and audio/visual resources as needed. *This is a time consuming process; you should start it at the beginning of the semester; the examination needs to be completed by December 1st.* Failure to schedule the examination is considered a failed examination. The three-page written proposal is due one week before the examination date.

The examination consists of the student presenting their proposal and defending their ideas by answering questions from the committee. The questions will be specific to the examination, but will also cover material that the students should be familiar with as a result of their coursework. After this presentation, the student will leave the room for consideration and grading by the committee. When the student returns, a pass/fail decision is rendered.

## The written component of the ORPE exam

Prior to scheduling your examination, a student needs to select a topic, which is up to the student. The student's job is to select a topic from the literature and construct a feasible and significant proposal for its investigation. The only requirement is that the topic cannot be what the student is working on for his or her thesis research, or the focus of a previous research project on which he or she may have participated (such as a previous master's thesis). It can be related, but must differ in either the subject or method. **The student must get his or her topic approved by the committee prior to writing the proposal. Do not spend a lot of time preparing for a topic that has not been approved by the ORPE committee.** Students are encouraged to discuss topics and ideas with faculty and students, and to practice his or her presentation with them, but the final product should be the student's alone and he or she will be the only one in the room during the ORPE exam and should make sure he or she understands any input adopted from others.

The written component of the examination is due at least one week prior to the examination. The criteria for the written component are:

1. It should be no more than three single-spaced pages.
2. It should resemble the beginning of the description of research in a federally grant proposal (USDA, DOE, NIH, or NSF).
3. It should include the following sections:
  - A brief introduction that describes the problem to be addressed, and the long range goal of the research.
  - A description of each research project.
  - A Rationale paragraph that tells the reviewer (that's us) why this research is a good idea to conduct at this stage of the long range project.
  - A Significance paragraph that tells the reviewer why this work is important in general.

An example from a USDA proposal that meets these requirements will be forwarded to the student prior to the scheduling of his or her exam.

The members of the ORPE committee are going to spend some time reading about this topic, including a literature search, so the student should be ready to defend the current literature in the field during their oral proposal.

### FAQ's about the OPRE, Cont'd

*Q: Is it my responsibility to contact my committee and organize my examination, or will they eventually find me and make me do this?*

A: You will be contacted early in the Fall semester and given the names of the members of your committee. After that, it is your responsibility to contact them and schedule the examination.

*Q: Do I need to read the literature extensively concerning my research topic?*

A: Yes. The first thing your committee will do is search the literature in the area of your topic. (They may even do this during your examination.) If you miss significant articles that impact your proposal, it can easily lead to failure of the examination.

*Q: Do I need to understand the details of the experiments I am proposing?*

A: Yes. If you propose an experiment, you must be able to explain how it works. For example, treating a commercial "kit" as a black box will lead to failure of the examination.

*Q: Do I have to understand the graphs I present in my examination?*

A: Yes. If you put something on a slide or the board that you can't explain, it will cause you trouble.

## The oral component of the ORPE exam

### FAQ's about the OPRE, Cont'd

*Q: In my thesis research I work with kinases and use NMR to study their structures. Can I use NMR, or structural biology as part of my ORPE proposal?*

A: Yes, just don't work on kinases or other systems associated with your thesis research. Alternatively, it would be ok to focus on kinases in your ORPE exam, just don't study them by NMR or direct measurements of structure.

*Q: Is it ok for me to talk about my topic with my advisor or other students?*

A: Yes. But the ideas should be yours, and the writing and presentation should be yours. Use those around you for advice like you would in the lab. But beware, those you ask for advice will not be in the exam with you, so make sure that during your exam you are not presenting other peoples ideas and experiments that you cannot defend, because you will be asked to defend them, and that could get ugly.

The student should prepare a ~ 30 minute presentation of the ORPE proposal. Students may use the chalkboard, overhead, or a computer/slide presentation at his or her discretion. The student may be questioned over any aspect of the presentation, any aspect of the topic, or over any of his or her previous course material. These questions will be of a depth similar to what a student should expect in his or her graduate courses, Ph.D. qualifying examination, and Ph.D. thesis defense. The examination committee will be looking for clear communication, sound logic, and depth of scientific understanding of the topic more than its feasibility.

**The examination is limited to two hours.** If the examination is still going after two hours, the committee will ask the student to leave the room and decide among three options. 1) The examination will be continued; 2) The examination will be ended and a pass/fail grade delivered; 3) The examination will be rescheduled. The committee will choose one of these options based on examination performance and the reason it was running long.

### If a student fails the exam

If the student fails the Fall examination, written and verbal feedback will be provided to the student by the ORPE examination committee in a meeting attended by the student's major professor that will be scheduled within two weeks of the examination. The examination is then repeated prior to April 1 of the following Spring semester. The topic of the second examination will be dictated by feedback from the first examination. If the student fails the repeat (Spring) examination, written and verbal feedback will again be provided to the student by the second (Spring) examination committee in a meeting attended by the student's major professor that will be scheduled within two weeks of the examination.

Students failing the second examination cannot continue directly in the BBMB PhD program. Input from the department, the major professor, and the student may direct the student toward a transfer to another PhD program, to the BBMB masters degree program, or termination of support for graduate studies. A student or major professor may appeal the outcome of either the first or second ORPE examination through the Student Grievance Procedures described in the ISU [Graduate College Handbook](#).





## Timeline Requirements for the Preliminary Oral Exam

For admission to candidacy for the Ph.D. degree, BBMB requires a student to first pass the ORPE (generally attempted in the third semester) then take an oral preliminary exam by the end of the fifth semester, exclusive of the summer terms. The Graduate College requires that the Program of Study (POS) Committee and POSC be approved by the Graduate College no later than one semester before the preliminary oral exam.

*The preliminary oral exam request must be submitted [online](#) at least two weeks before the scheduled exam date.*

*Refer to the [online Graduate College Handbook](#) for more information.*

## Preliminary Oral Exam

### Guidelines for the Preliminary Oral Examination and Advancement to Candidacy for the Ph.D. degree

The goal of the Preliminary Oral Examination is to provide the Ph.D. student with a hands-on experience developing, writing, and defending a detailed and carefully prepared research proposal on their dissertation topic. Grant writing and experimental design are important components in the student's development, and will form a critical skillset for a future career. The Preliminary Examination demands the student demonstrate significant and in-depth knowledge with laboratory-based experience in the area of their proposed dissertation research and differs from the Oral Research Proposition Exam (ORPE) that covers a topic not directly related to the dissertation research. Furthermore, the written Preliminary proposal should discuss the proposed topic with significant depth. The Preliminary Examination is also an opportunity for the student to be tested on the necessary basic knowledge in the fields of biochemistry, biophysics and molecular biology to successfully test the proposal. During the oral component of the exam, students are asked to use their knowledge of the proposed topic to synthesize new information (i.e. "think on their feet"), acknowledge the limits of their knowledge and how they might address any weaknesses in their knowledge or proposed experimental designs.

### The Written Proposal

The written component of the Preliminary Exam should be provided to the POS committee members at least one week prior to the exam date. An incomplete or inappropriate written proposal as decided by the POS committee may result in a delay and rescheduling of the examination.

The proposal should be developed with the research mentor, and it is appropriate to solicit advice from POS committee members. Mentors may provide advice on appropriate framing of the proposed research, hypothesis development, etc., and should feel free to edit the document with the student. Mentors should refrain from writing sections of the document and students should not use sections of the mentor's grant proposals as a basis for their proposals. The written proposal should be 10-15 pages in length, 11-12 point font, double spaced with 1" margins. This page limit does not include a title page and references. A list of key references is expected. It is appropriate to use an NSF or NIH style organization for the proposal. Other formats may also be appropriate, though it would be preferable to solicit mentor/POS committee input prior to the exam if an alternative format is desired.

## Decision of the POS committee for advancement to candidacy

Following the preliminary oral exam, the student's POS committee will review the performance on the written and oral portions of the exam and complete the Report of Preliminary Exam. The student will be notified when the POS Committee has reached its decision. The committee has four options:

- The student passes and the POS committee recommends to the Graduate College that the student be admitted to candidacy.
- The student may continue his or her studies, but must meet other conditions specified by the POS committee on the "Report of Preliminary Oral Examination" form under "Conditional Pass" before being recommended for admission to candidacy.
- The student fails, but is given an opportunity to repeat the examination six months after the first attempt. An explanatory letter must accompany the report form.
- The student fails and is not permitted to continue to work toward a Ph.D. at ISU. An explanatory letter must accompany the report form,
- In the case of a failed exam, six months must elapse between the first attempt and the next. Note that the preliminary oral examination must be passed at least six months prior to the final oral examination and must be requested at least three weeks before the scheduled final exam.

## Preliminary Oral Exam Guidelines (Continued)

The body of the proposal should also include:

1. 2-4 research goals/aims that test the hypothesis of the proposal. It is possible that one aim may not directly test the hypothesis: it is appropriate to have an aim dedicated to developing an assay or preparing a research tool that will be used to test the hypothesis, if this is a novel assay, synthesis, etc. Each research goal may or may not have a separate hypothesis related to the "global hypothesis."
2. A statement of the barriers that have prevented this work from being performed previously. For example, "System X has not been defined previously because necessary component Y is required to probe this system and was only recently purified by our laboratory."
3. Introductory material: what is the current state of knowledge regarding your system? If the goal of the proposal is to define how a specific biological process occurs, discuss current models, whether or not you agree with those models, and propose your own testable model, if appropriate.
4. A definition of how the positive result of the proposed experiments will be beneficial. Will this result help develop a new drug, define a novel biochemical pathway, define a model system, etc.? What if the experimental approach fails? Discuss alternative approaches.
5. A thorough, but not overly detailed description of the proposed experiments. It's good to define experiments such that "enzyme X will be assayed with substrates a, b and c," but probably not necessary to mention the Sigma part numbers for each substrate or the order in which they will be added to the reaction vessel unless those details are fundamental to the experiment. It will be appropriate to describe how any critical materials are prepared. It is appropriate, though not required, to include preliminary data that support the proposed experiments, for example, an SDS-PAGE gel showing the target protein was expressed and purified by the student.
6. Some students may find they have accumulated a large amount of data and published one or more manuscripts prior to taking the Preliminary Examination. This preliminary work can address one or multiple aims and should be incorporated to strengthen the proposal. It is appropriate and beneficial to incorporate completed experiments into the Aims but also important to build on these data and provide a clear picture for where the project is headed. Furthermore, the committee will determine whether successful completion of the proposed experiments is sufficient for writing and successfully defending a dissertation.
7. Often, students work in collaborative teams to achieve a goal. It is important that the student describe and fully understand what work will be done by a collaborator, though the Preliminary Examination should focus on what contributions will be made by the student.

## Preliminary Oral Exam Guidelines (Continued)

Please note that this guideline for preparing the written proposal and guide the oral defense is intended to fit most students and most projects, however, some dissertation research projects might involve two or more separate research areas that cannot fit under a single “global hypothesis.”

It is strongly suggested that the proposal is written around a clear and testable hypothesis (the “global hypothesis”). Note that a good hypothesis provides new knowledge whether or not the expected result occurs.

### Here are two potential options for these proposals:

- Choose the strongest and most developed project and write a complete proposal covering that project alone. How would you thoroughly evaluate a single “global hypothesis?”
- Find a theme that links the two projects and develop each with a separate hypothesis. For example, one student is working towards solving the 3d structure of the transcription factor FgbT protein from *Saccharomyces cerevisiae* that controls methionine biosynthesis and developing a method to measure metabolic flux through valine biosynthesis. In an introduction section, the student would explain that the goal of their project is to describe two aspects of amino acid biosynthesis, then introduce each problem and the relevant hypotheses.

### The Oral Defense of the Preliminary Proposal

The goal of the defense is for the student to demonstrate a clear mastery of the current state of knowledge regarding the proposal topic, and the theoretical expertise to appropriately probe the topic according to the proposed experiments. A fundamental component is a defense of a hypothesis. Do the proposed experiments probe the hypothesis? Will successful completion of the experiments provide new information? What happens if the hypothesis is incorrect? Does the student display a deep understanding of the basis of the experimental techniques proposed, their strengths, and their limitations? Is the student an expert in the literature relevant to their project? Gaps in knowledge are expected; however, it is important to acknowledge those gaps and then be able to propose experiments or hypotheses to address gaps. The oral component of the Preliminary Examination may include questions regarding general knowledge in the field of biochemistry and courses completed by the student.

Students should plan on at least two hours for the preliminary oral examination. Schedule the exam with your program of study committee (POSC) and then submit an [Online Examination Request](#) at least two weeks prior to the exam date.



The preliminary oral exam is conducted by the student’s POS Committee. If a student fails the first preliminary exam, and is granted an opportunity to reattempt the exam, the reattempt must be taken no less than six months following the first attempt and must be completed by the end of the seventh semester. Failure to take the preliminary exam within the timeframe described above can result in termination of the Graduate Research Assistantship and loss of tuition scholarship.

Refer to the online [Graduate College Handbook](#) for more information

## Final Oral Exam

Schedule the final exam with your Program of Study Committee (POSC) and then submit an [Online Examination Request](#) at least three weeks prior to the exam date. Ph.D. candidates must wait at least 6 months after the preliminary exam before scheduling the final oral exam.

Consult the Graduate College [website](#) and online Graduate College Handbook for information regarding deadlines, policies and guidelines and plan for graduation through Access Plus.

Cancel your graduation plan as soon as you become aware of circumstances that will not allow graduation.

The results of the exam are reported on Report of Final Exam. The report form comes to the office of the Graduate Program Coordinator and is passed on to the student and the student's major professor.

As with the preliminary oral exam, the final oral exam (thesis defense) has outcomes of pass, conditional pass or fail.

A conditional pass requires additional work from the student, and a fail (a rare event) will not allow graduation.

## Finishing Up

After successfully passing the final oral exam, follow the deadlines set by the Graduate College to complete your degree requirements and earn your advanced degree. These include submitting the Graduate Student Approval Form, completing the online [Thesis Checklist](#), and uploading your thesis to [ProQuest/UMI](#). Watch for an email requesting revisions or stating acceptance of your thesis. Receiving an acceptance email is typically the last communication you receive from the Graduate College before you graduate.

Iowa State University holds a commencement ceremony following the fall and spring semester. The University does not hold a university commencement ceremony following the summer term. Students who plan to complete degree requirements during the summer term have the option of attending either the spring or fall university commencement ceremony. If you wish to attend your commencement ceremony, please visit the [Graduation and Commencement](#) website for information and instructions. And congratulate yourself for a job well done.

## Timeline Requirements for the Final Oral Exam

The final oral exam must be scheduled at least six months after successfully passing the preliminary exam.

*The final oral exam request must be submitted [online](#) at least three weeks before the scheduled exam date.*

*Refer to the [online Graduate College Handbook](#) for more information.*

# Graduate Student Support

## Research Assistantships

Graduate students in the Master's and Ph.D. degree programs receive financial support in the form of a graduate research assistantship (RA) or teaching assistantship (TA) that pays a student's stipend, health insurance and tuition scholarship. Generally, assistantship appointments are half-time (20 hours per week). The BBMB standard stipend rate for Ph.D. students on a half-time assistantship is \$26,004 per year, paid over 12 months, along with student health insurance and 100% tuition scholarship. The BBMB standard stipend rate for Master's students on a half-time assistantship is \$24,000 per year, paid over 12 months, along with student health insurance and 50% tuition scholarship.

The obligation taken on by the student in return for a half-time graduate research assistantship is a minimum of 20 hours per week of work towards the research objectives of their host laboratory and towards the student's graduate research project. This obligation is in excess of any formal course work or research course credits (BBMB 699). The obligation taken on by the student on a half-time graduate teaching assistantship is, in addition to work towards the graduate research project, is to provide a minimum of 20 hours per week as a teaching assistant (TA) for an undergraduate or graduate level lecture or lab course, generally in the department or for Chemistry.

Students admitted to the Ph.D. rotation program in the fall semester are required to participate in the research rotation program before selecting a host laboratory. Rotation students are supported by department or other funds during on a graduate research assistantship during the rotation period. Once a rotation student joins a research group, support is provided by the major professor. Every effort will be made to provide continuous support for Ph.D. rotation students for five years, as long as satisfactory progress is being made towards his or her Ph.D. degree.

Students admitted directly into a faculty lab, either through direct admission to either the biochemistry or biophysics graduate program for a Ph.D. or Master's degree, or through an interdepartmental graduate program into the BBMB home department, will be solely supported by the major professor and will receive the standard BBMB stipend rate, unless other support is outlined in the offer of admission letter.

B.S./M.S. concurrent enrollees are eligible for a half-time research assistantship as an RA or TA. Usually, only a quarter-time assistantship is provided to B.S./M.S. students while they are working toward their B.S. degree.

The stipend rate is set by the department faculty for the benefit of all graduate students in BBMB. A scholarship or fellowship award can add to a student's support.

## Assistantship Appointments

All graduate students on assistantships have signed a Graduate Assistantship Letter of Intent (LOI) listing the terms and conditions of the appointment. Graduate assistantship appointments are usually on a half-time (20 hours per week) basis.

Assistantship appointments can be terminated by mutual consent or for cause as described in the Letter of Intent (LOI), the [Graduate College Handbook](#), and/or this Biochemistry and Biophysics Graduate Student Handbook.

If you have any questions regarding your appointment, contact the DOGE or the Graduate Program Coordinator.



# Graduate Student Support (Continued)

## Teaching Assistantships

During the periods that students are serving as teaching assistants (TA) they will receive the same level of financial support as when they do on a research assistantships. Teaching assistants are obliged to spend 20 hours per week in their teaching duties for a half-time appointment in addition to performing their graduate research.

The Department makes assignments for Teaching Assistantships each spring for the following academic year. It is the TA's responsibility to meet with the assigned instructor to learn your obligations and requirements for successfully completing the TA position.

Non-native English speaking students are required to take the Oral English Certification Test ([OECT](#)) as early as possible when entering the graduate program. An OECT test result of 3 or higher is required to be a teaching assistant in BBMB; a level 2 or higher is required to be a teaching assistant in Chemistry. English courses recommended to meet OECT certification must be taken before or during the semester of the student's first teaching assignment. Without an acceptable OECT test result, a student cannot be given a teaching assignment and will, therefore, not meet the teaching requirement which may delay their graduation. It is important, therefore, to take the assessment as early as possible, take the recommended English courses, and retake the OECT test. If the student has taken the maximum two recommended English courses and still receives an unacceptable test result, it is at the department's discretion whether to waive the teaching requirement or not.

## Assistantship Reappointments

The department seeks to provide research assistantships or teaching assistantships to the greatest possible extent, so that all of our graduate students receive financial support. Following an annual evaluation at the end of spring semester, a student's financial support is typically extended for the next 12 month period, usually starting July 1, the start of the ISU fiscal year. Continuation of the assistantship, however, is not guaranteed beyond the period that was specifically committed in the offer letter that is transmitted when a student is originally admitted into the department.

Only in exceptional circumstances is assistantship support continued past the maximum time limits established by the Graduate College, which are five years for the M.S. degree and seven years for the Ph.D. degree.

## Tuition and Fees

Tuition scholarship is provided to students on assistantship by either his or her major professor (RA) or the department (TA), provided a student is in good standing (3.0 GPA; satisfactory academic and research progress.)

- Ph.D. students on a half-time assistantship receive 100% tuition scholarship
- M.S. and B.S./M.S. students on a half-time assistantship receive 50% tuition scholarship

If for any reason a student is enrolled but is not receiving a research assistantship, then he or she would be charged tuition at either the in-state or out-of-state rate –whichever is appropriate. In any case, mandatory fees assessed by the Registrar's Office are the responsibility of the student. See [Tuition & Fees webpage](#) for more information.

## Student Health Insurance

All graduate students with an assistantship are automatically enrolled in the ISU Student & Scholar Health Insurance Program free of charge. Graduate students may purchase optional health insurance coverage for their dependents and/or dental insurance for themselves and their dependents. International students are required to enroll their spouse/domestic partner and dependent children who have traveled with them to the United States within 30 days of their arrival at ISU.

Graduate students not on an assistantship, who are enrolled for 5 or more credit hours at ISU and actively attend classes, may also enroll in the ISU Student & Scholar Health Insurance Plans and will be assessed fees for this coverage. More information can be found at the Student & Scholars Health Insurance Program [website](#).

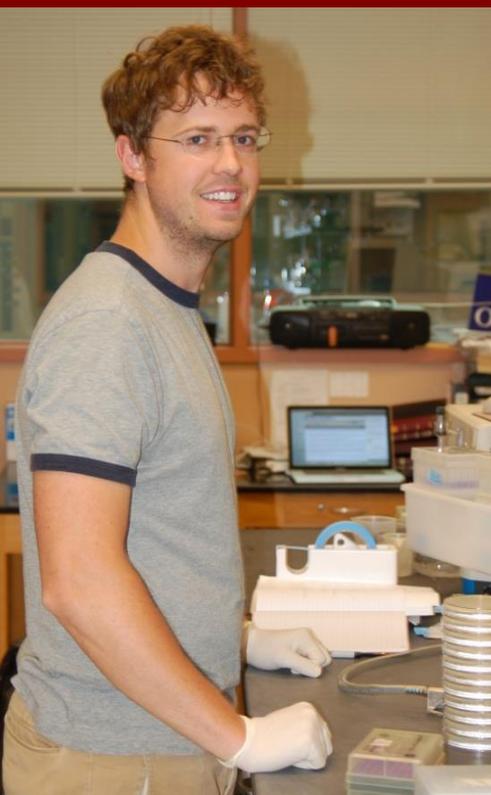
ISU no longer offers a continuing health insurance plan for graduates on a Post-Graduate M-base appointment and coverage must be purchased through the marketplace.

## BREAKFAST CLUB

The Breakfast Club is organized by the undergraduate biochemistry student organization to promote relationships among undergraduate students, graduate students, faculty, and staff.

Breakfasts prepared by the undergraduates are held the first Thursday of each month during the academic year in the Molecular Biology Atrium.

In addition to the Breakfast Club, the undergraduate biochemistry student organization hold other social activities throughout the year which all students, faculty and staff are invited to attend.



## Annual Evaluations

Every category of graduate student in BBMB should receive continual input and evaluation from their major professor and the Program of Study Committee. By the end of each spring semester, the student should meet with their major professor to confirm academic and research milestones and professional development goals are being met for continuation of support. Those milestones and goals include:

1. Maintaining a grade point average of 3.0 or above.
2. Completing the Individual Development Plan (IDP) career planning tool during the first semester in the program and taking action based on the results throughout the student's academic career.
3. Demonstrating diligent effort and productivity in laboratory research. Evaluation of laboratory research progress is made by the major professor, and by the Program of Study Committee.
4. Satisfactory performance in teaching assistant duties, when applicable. Evaluation of teaching assistantship performance is provided by the instructor of the course and from student feedback.
5. For Ph.D. students, completion of the ORPE by the end of the second academic year and the oral preliminary exam by the end of their fifth semester, excluding summer terms.
6. Meeting all ISU, Graduate College and program requirements in a timely manner. These requirements include selection and approval of the Program of Study Committee and submission and approval of the Program of Study in a timely manner, and, for non-native English speakers, meeting the English proficiency test and the OECT requirements.

## Unsatisfactory Performance

Reappointment and continuation of any graduate assistantship depends on satisfactory academic and research progress and the availability of funding. Failure to meet the requirements for satisfactory progress can result in various actions as outlined in the letter of intent for a student's assistantship, this graduate handbook, and the Graduate College Handbook. These include:

- renewal of the appointment for less than one year with successive continuation pending improved performance,
- a requirement that an M.S. thesis be completed as a prerequisite for the Ph.D. degree, dismissal from the Ph.D. program with a terminal M.S. degree to be granted if the requirements for that degree can be met, or
- dismissal from the Ph.D. or M.S. programs.

It is also possible that an assistantship can be terminated for reasons outlined in the letter of intent within the stated appointment period. More information reasons for terminations of an assistantship are outlined here and in the Graduate College Handbook..

The Graduate College stipulates that one or more of the following may be grounds for termination of during the stated appointment period:

- Failure to maintain a cumulative GPA of at least 3.0. The assistant can be dismissed at the end of the semester in which notice of academic probation is received. Dismissal for this reason is not mandatory, because a grace period during which students may continue even though their GPA is below 3.0 may be extended for a specified period of time by agreement between the department chair and the Graduate Dean.
- Failure to comply with graduate student responsibilities listed in the Graduate Student Handbook.
- Personal conduct seriously prejudicial to the university, including violation of the Regents' Uniform Rules of Personal Conduct and General University Regulations discussed in the ISU Information Handbook.
- Neglect of duty or incompetence.
- In addition to unsatisfactory performance, an assistantship may be terminated due to a lack of available funding.

## Pay

The University payday for graduate students on an assistantship is the last working day of each month. Graduate students paid on an hourly basis receive a paycheck twice a month retroactive by one pay period.

All pay is direct deposited into a checking or savings account specified by the student in Access Plus, which is where pay stub information is also viewable.

## Payroll Signup

All new employees should initiate their payroll signup paperwork, including the I-9 Employment Eligibility form, prior to the first day of work with the [Records Management Office of Human Resources Services](#) in 3810 Beardshear. International students are required to complete the I-9 form with the International Student and Scholars Office (ISSO).

## Deductions

If applicable, deductions are made for Federal and State income taxes and Social Security. International Students should review the Tax Treaty between their home country and the United States for possible exemption from these taxes.



## Leaves and Absences

Arrangement for a leave of absence is made between the student and their major professor or supervisor as outlined in the [Graduate College Handbook](#). As a guideline, not a policy, students in BBMB earn two (2) paid days off a month to be taken during the assistantship appointment period, unless other arrangements have been made between with their major professor or supervisor. As an example, a student on a one-year assistantship from July 1 to June 30, accrues 24 paid days off at 2 days per month to be taking during the appointment period. Students should not have the expectation that they can carry forward earned and accrued days off from one assistantship appointment to another without the approval of their major professor or supervisor.

While ISU does not have a leave policy for graduate students and BBMB provides a guideline for graduate student leave, graduate students are asked to complete a monthly leave report each month to report time off to be taken during the month (a reminder will be sent via email along with the form). The leave form will confirm your communication with your major professor or supervisor about your proposed leave of absence.

Leave reports are kept in a folder on the BBMB server during your academic career in the department. If a conflict arises between the graduate student and their major professor or supervisor regarding use of time off, either party may involve the appropriate Director of Graduate Education (DOGE) for their graduate program or take further action as outlined in the [Graduate College Handbook](#).

Students also have paid time off during official ISU holidays which is separate from earned paid time off. If it is critical to your research, compensatory (comp) time off may be used in exchange for working on official ISU holidays, with the permission of your major professor or supervisor.

## Travel to Scientific Meetings

BBMB expects a graduate student will travel to at least one scientific meeting during their academic career to either present their research or learn more about their research area.

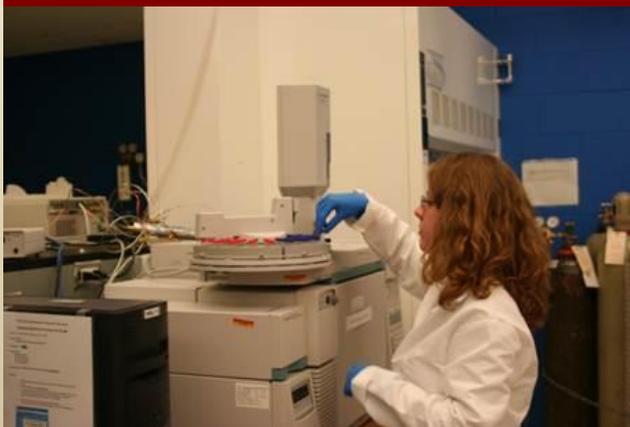
### Support

The BBMB department does not provide funds directly to graduate students for travel to meetings; it does offer travel funds to faculty when available to support these expenses for their students and research staff. Please talk with your major professor or supervisor about the availability of these funds as soon as possible before attending a meeting.

The ISU Graduate and Professional Student Senate ([GPSS](#)) offers limited support for travel to professional meetings and conferences. The online Professional Advancement Grant ([PAG](#)) application should be submitted as early in the semester as possible prior to travel anticipated during that academic year.

### Travel Expenses

A request for reimbursement for eligible expenses to attend a meeting should be submitted promptly upon return from travel. Original receipts are necessary for major expenses, such as hotel and car rentals. Airline tickets may be purchased through Travel and Transport or other selected agencies (see Tenann Everly for details) and can be charged directly to a fund account supporting this expense.



## Lab Safety and Injuries

All new graduate students must complete a lab safety orientation course offered by the ISU Environmental Health and Safety office ([EH&S](#)) during fall semester and must complete all required new and continuing online lab safety training during their academic career at ISU.

If you are injured while performing your duties as an employee, immediately report the incident to your supervisor and immediately see and receive initial treatment with [Occupational Health Works at McFarland Clinic](#) located at 1215 Duff Avenue in Ames Iowa (515-239-4496). Check their [website](#) if you are seeking care outside their office hours: Your supervisor or Kelly Yohnke ([raquel14@iastate.edu](mailto:raquel14@iastate.edu), 294-2226), the BBMB Administrative Specialist, will have to call to make the appointment. Within 24 hours your supervisor must complete a Workers' Compensation – First Report of Injury or Illness form. These forms may be obtained from Kelly.

First aid treatment is available through the [Thielen Student Health Center](#).

Due to the risk of liability to ISU, anyone who is not an enrolled student at ISU, including recently graduated students, can not enter or work in a research laboratory.

## EMERGENCY NUMBERS:

<http://info.iastate.edu/emergency/>

### Emergency

9-1-1 for Fire, Police, Ambulance

### Non-emergencies

ISU Police Department  
Armory Building, Room 168  
515-294-4428

Department of Public Safety [website](#)

### Environmental Health and Safety (EH&S)

2408 Wanda Daley Drive  
525-294-5359

Website and Urgent Counseling:

[www.ehs.iastate.edu](http://www.ehs.iastate.edu)

### Student Health and Wellness

<https://www.cyclonehealth.iastate.edu/>

### Student Counseling Services

Student Services Building, 3<sup>rd</sup> Floor  
515-294-5056

<http://www.counseling.iastate.edu/>



## Department Administrative Services and Procedures

The Roy J. Carver Department of Biochemistry, Biophysics and Molecular Biology provides a variety of administrative services. Contact the following individuals for assistance as needed:

[Tenann Everly](#), Administrative Specialist (1210 MBB, 294-9916): Purchasing, travel arrangements, standing orders and contracts, seminars, hourly payroll, teaching evaluations.

[Connie Garnett](#), Graduate Program Coordinator (1210 MBB, 294-3317): graduate program administration, including admission and orientation, arranging support, and advising students during their academic career until graduation. Also updates BBMB website graduate student pages. Works part-time, 20 hours per week.

[Tracy Di Marco White](#) System Support Specialist (1139 MBB, 294-6116): Information Technology

[Peter Lelonek](#), Manager for the Molecular Biology Building (1210 MBB, 294-2699) for access to the Molecular Biology building and labs, offices and conference rooms, and for building issues.

[Kelly Yohnke](#), Administrative Specialist (1210 MBB, 294-2226): All operations dealing with personnel and funding, grant records, departmental accounts, budgets.

### MBB Conference Room Access and Meeting Reservations

All students and staff working in the Molecular Biology building (MBB) have access to all four conference rooms in MBB via your lab or office key.

#### [MBB Conference Room Online Reservation System](#)

Login with your ISU NetID and password. There are two reservation categories ("MBB General" and "Computer Lab").

MBB General is available to all users in MBB.

The 1340 MBB Computer Lab can be reserved by submitting requests to [bbmb-tech@iastate.edu](mailto:bbmb-tech@iastate.edu) with the purpose of the reservation. Access is during hours posted on the door.

### Parking Permits and Bike Parking Regulations

Vehicle Parking Permits go on sale in July through Access Plus for students living outside Ames and students on a half-time or above assistantship.

Permits go on sale online in August for anyone living in Ames to one of the commuter lots that includes Lot 29, just north of the Molecular Biology building. Visit the ISU Parking Division [website](#) for more information.

Please see the ISU Parking Division website for information about Bike Parking.



## Iowa State University Property

### Apparatus and Furniture

Every item of ISU property that is in the laboratory or office assigned to you by your major professor becomes your responsibility, even though the arrangement may be temporary. This includes lab benches, all shelving, desks, chairs, stools and all scientific equipment. If you want to dispose of movable items of ISU property, you should first consult with your major professor; he/she may want to store it for future use or transfer it to someone else in the research group or in the department. Before removing any item, the inventory number must be reported to the department office.

### Theft of University Property

If an item of ISU property for which you are responsible has been stolen, please report the details of the theft to your major professor and the department office. The department is required to submit a report of thefts to the Vice President for Business and Finance, Campus Security Office and the Facilities Planning and Management Office.

### Lost and Found

A Lost and Found is located in the 1210 Molecular Biology Building Administrative Suite. Items are held until the end of each semester or term and then turned over to ISU. ISU also has an online Lost and Found [website](#).



Please contact Connie Garnett (617-294-3317, [cgarnett@iastate.edu](mailto:cgarnett@iastate.edu)), the graduate program coordinator, with questions about the contents of this handbook.