

Graduate Student Manual

Biochemistry and Molecular Biology Graduate Program

Department of Biochemistry

Purdue University

This version is for students entering the program in August of 2022.

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This manual is a reference for students in the Biochemistry and Molecular Biology Graduate Program to find program requirements and details. It supersedes prior editions of the manual. Policies and procedures of Purdue University and the Department of Biochemistry are subject to change periodically as a result of actions by federal and/or state government, trustees of Purdue University, and/or administrators of the Department of Biochemistry's Biochemistry and Molecular Biology Graduate Program. For detailed information on benefits and employment please refer to the OGSPS Employment manual: <https://www.purdue.edu/gradschool/documents/gpo/graduate-student-employment-manual.pdf>.

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ADMINISTRATION OF GRADUATE PROGRAM

- Department Head and Graduate Program Chair: Dr. Joe Ogas, ogas@purdue.edu
 - Dr. Ogas is the Head of the Department of Biochemistry and Chair of the Biochemistry and Molecular Biology Graduate Program. He is available to meet with graduate students about any problems or issues that may arise throughout their graduate career.
- First Year Graduate Chair: Dr. Scott Briggs, sdbiggs@purdue.edu
 - Until a Major Professor is selected, the First Year Graduate Chair's role is to work with the Senior Graduate Program Coordinator to help new students understand the academic requirements of the program; advise them and oversee their progress until they have a Major Professor. The First Year Graduate Chair meets with students to coordinate rotation selection and final lab placements. They are available to meet with graduate students about any problems or concerns during this time.
- Senior Graduate Program Administrator: Traci L. Edmonds, edmondst@purdue.edu
 - The Senior Graduate Program Administrator oversees and manages the graduate program and serves on the Graduate Executive Committee. The Senior Graduate Program Administrator collaborates with the Department Head and faculty to enhance the graduate student experience by encouraging open communication and engagement as well as to streamline processes and procedures associated with promoting student success. The Senior Graduate Program Administrator serves as liaison between faculty and students should they have any concerns or suggestions on improving the graduate student experience and facilitates anonymity in these exchanges.
- Graduate Program Coordinator: Jennifer Wilson, wils1135@purdue.edu
 - The Graduate Program Coordinator provides administrative support for the Biochemistry and Molecular Biology Graduate Program. They work closely with the Senior Graduate Program Administrator, Graduate Chairs, Major Professors, Department Head, and Office of the Vice Provost for Graduate Students and Postdoctoral Scholars (OGSPS) to ensure uniform and timely application of departmental and Purdue policies to support all aspects of graduate student education and training.
- Preliminary Exam Graduate Chair: Dr. Clint Chapple, chapple@purdue.edu
 - The Preliminary Exam Graduate Chair oversees preliminary examinations, approves preliminary examination proposal topics, assigns preliminary exam committees, and meets with graduate students about issues that may arise regarding preliminary exams.
- Curriculum Chair: Dr. Ann Kirchmaier, kirchmaier@purdue.edu
 - The Curriculum Chair oversees changes to the curriculum of the Biochemistry and Molecular Biology Graduate Program and serves as the program's representative to the Purdue University Graduate Council.
- Admissions Chair: Dr. Vikki Weake, vweake@purdue.edu
 - The Admissions Chair oversees the Graduate Admissions Committee and the admissions process and are responsible for organizing graduate student recruitment events.
- Graduate Executive Committee:
 - The Graduate Executive Committee serves to establish the rules and guidelines by which students matriculate through the Biochemistry and Molecular Biology Graduate Program. The committee comprises the individuals named above as well as the president of the Graduate Student Organization (GSO).
- Major Professor:

- The Major Professor is responsible for guiding students through their academic and research endeavors, offering mentorship, and ensuring the quality and progress of their thesis work on a daily basis. This includes providing expertise, resources, and the intellectual and financial support for research projects. The Major Professor also assists with professional development, and helps students navigate academic requirements and career opportunities and offers advice on problems or issues that may arise in their graduate career. The Major Professor also often serves as the bridge between the student and the broader academic community, fostering collaboration and networking opportunities. Each student's Major professor will be determined after lab rotations as described in greater detail under "Selection of the Major Professor."

STUDENT RESPONSIBILITIES

Responsibilities of Incoming Students: It is each student's responsibility to:

- Refer to this manual to ensure that they are on track to fulfill their degree requirements as they move through the graduate program. It is their responsibility to read and understand this manual and the requirements within. If students have questions, they should not hesitate to ask the Senior Graduate Program Administrator or the Graduate Program Coordinator.
- Attend orientation. First year graduate students must arrive on campus in time to attend Biochemistry orientation on Monday morning of the week before classes begin in mid-August. They are required to attend all scheduled orientation meetings, complete all required safety training certifications (<https://ag.purdue.edu/department/biochem/resources/bchm-safety.html>), Grad School admitted student checklist items (<https://www.purdue.edu/gradschool/admitted/checklist.html>), and be prepared to meet with faculty in the department to assist in choosing and ranking lab rotations.
- Check their @purdue.edu e-mail. The @purdue.edu email is the official communication method of the University, the department, and faculty. Students are responsible for the materials and information sent to their email, even if they neglect to read them. Students should check their email regularly so that they receive timely information and don't miss important reminders, deadlines, or opportunities. For students who would prefer to continue to use another e-mail service such as Gmail, instructions for how to have @purdue.edu e-mail forwarded can be found at <https://www.purdue.edu/apps/account/Account>.
- Obtain an ORCID iD. Students should register for an ORCID iD number at <https://orcid.org/> and send this number to the Graduate Program Coordinator. This identifier is used by the department to track student publications.
- Submit official transcripts. The OGSPS requires final official transcripts from each university of each incoming student by the end of their first semester. An official copy shows the type of degree and date the degree was awarded. Students are not allowed to register for subsequent semesters until this requirement is met. <https://www.purdue.edu/gradschool/admissions/how-to-apply/apply-transcripts.html>
- Obtain required immunizations. Indiana state law requires all new, regularly-enrolled students attending residential campuses of Indiana public universities to meet all immunization requirements by the end of the first semester of residence. The list of required immunizations is available at <https://www.purdue.edu/push/Immunization/>. Students will not be allowed to register for subsequent semesters until this requirement is met.

Responsibilities of Incoming International Students: International students must pass the Oral English Proficiency Test (OEPT) if it is required of them. The OEPT is required for international students if English is not their first language and their TOEFL score is below 27 in order to fulfil the program's one semester teaching requirement (at half time). If a student fails the OEPT test, they may be certified by passing ENGL 620 course.

Late Arrival (international students): There are times when visa issues occur that are out of the control of the student. Students who experience delays should contact the Senior Graduate Program Administrator as soon as possible. They will work with the graduate executive committee to see if a late arrival can be arranged.

Lab Rotations: In their first semester, graduate students will complete three lab rotations. (BCHM 60300, 6 Credits). In BCHM 69000 (3 credits) during their second semester, students will present their research from their thesis lab to the Department.

Selection of the Major Professor: Selection and assignment of the Major Professor generally occurs after rotations are completed in the first year. Through our departmental rotation program, structured events such as our departmental retreat, and informal interactions, every student will have the opportunity to robustly investigate various laboratories and to become acquainted with professors who have lab positions and funding available. The matching of students with their future Major Professor is based upon an array of factors including the preferences of both the students and the faculty members with whom the student rotated, the availability of openings in departmental laboratories, and funding consideration. The selection must be a mutually acceptable arrangement between student and professor. There is no guarantee that a student will be matched with their first choice of Major Professor, but every possible effort will be made to place students in their preferred lab.

Expectations for Progress: Graduate school is qualitatively different from the undergraduate education experience. To help students gauge their progress in the program, a set of expectations and measures of success are outlined in Appendix 1.

REGISTRATION

Students are responsible for registering for all non-research courses each semester, including summer, through the myPurdue portal. A Research Agreement Form must be completed with the signatures of both the Major Professor and the student and be submitted to the Graduate Program Coordinator each semester. The Graduate Program Coordinator registers all research credit hours, but it is the student's responsibility to check their registration for accuracy each semester and to remove any holds from their registration. Students who find they are not registered should contact the Graduate Program Coordinator. Students who miss the registration deadline will incur a \$200 late registration fee and are personally responsible for this fee. More generally, students should promptly take care of any academic or financial actions that are requested by their Major Professor, the department, or the OGSPS. Failure to do so can result in registration cancellation or a hold placed on their account.

Transfer Credits: In general, transfer credits will be considered only if 1) the student has a minimum cumulative graduate index at Purdue of 3.00 or better, and 2) the student obtained approval from the Thesis Advisory Committee for the requested transfer of credits, and 3) the request from the student includes documentation about the content of the transfer course and the level at which it was taught

(undergraduate or graduate). Transfer credits will be accepted only after one semester of satisfactory work in residence at Purdue.

Course Loads: Students are expected to make certain that the requested academic load is compatible with any appointment held under regulations and rules of the OGSPS. If a student holds a half-time graduate assistantship in research or a graduate teaching appointment, they may register for up to six credit hours of coursework plus a minimum of six hours of research (69800 or 69900). If a student holds a 1/4-time teaching appointment and a 1/4-time research appointment, they may register for up to nine credit hours of coursework plus a minimum of three hours of research (69800 or 69900).

Candidacy: If a student expects to complete their degree at the end of the semester for which they are registering, they must notify the Graduate Program Coordinator as soon as possible, ideally the semester prior to the semester they plan to graduate. There are time constraints related to graduation that may cause delays and it is best to know this in advance. Students who register for candidacy and don't graduate more than two times will incur a \$200 late fee upon the third consecutive candidate registration for which they are personally responsible.

Exam Only: Students can request to register for "Examination Only" if they have completed all of their other academic requirements but have not had their Final Examination and have not deposited their thesis prior to the first day of the academic session. Examination Only registration is at a reduced fee.

Degree Only: A student who has met all their degree requirements and for whom a positive Report of the Final Examination was received by the OGSPS prior to the first day of the academic session of graduation but has not yet deposited their thesis may request registration for "Degree Only" at a reduced fee by submitting a signed OGSPS Form 11 by the first day of the semester.

PLAN OF STUDY

Draft Plan of Study: A draft Plan of Study is prepared by the student electronically in myPurdue in the first few weeks of their first fall semester. The First Year Graduate Chair serves as the Advisory Committee Chair and members of the Graduate Executive Committee serve as additional committee members. The draft Plan of Study includes all graded required courses. Courses taken with a pass/no pass option cannot be used on a Plan of Study.

Final Plan of Study: The final Plan of Study is to be drafted in consultation with the Major Professor and discussed at the student's first Thesis Advisory Committee meeting (fall semester of second year). The final Plan of Study should be submitted by the end of that fall semester and approved by each committee member and the Department Head.

Electives: Additional elective choices should be made in consultation with, and be approved by, the Major Professor. Any course(s) beyond program requirements but related to the field of study must be added to the Plan of Study. Courses not related to the field of study are not to be included. All courses listed on the Plan of Study are included in the GPA calculation. Changes to the Plan of Study are submitted electronically using myPurdue.

PROGRAM REQUIREMENTS

Graduate Research: Graduate research in the Biochemistry and Molecular Biology Graduate Program consists of an original experimental or theoretical investigation, beyond undergraduate level, conducted by graduate students in consultation with the Major Professor. This research is undertaken by registration for BCHM 69900. Graduate students must acquire thorough knowledge of their field of inquiry based on scientific literature. Successful students will devote a majority of their time towards obtaining scientific insights through experimentation and/or novel analysis of existing datasets. These findings will form the basis of published manuscripts and the student's dissertation. Students must use an organized, transparent record keeping system in collecting and recording data. Critical thinking skills are needed to 1) identify critical gaps that need to be addressed in the field of interest 2) design appropriately controlled experiments, 3) analyze the results, and 4) reach conclusions supported by the evidence and existing knowledge in the field. Graduate students, in conjunction with faculty advisors, must exercise the highest integrity in collecting, analyzing, and reporting their scientific data, and will adhere to strict ethical standards in all aspects of their degree program.

In addition to graduate research, the Biochemistry and Molecular Biology Graduate Program has a modest set of course requirements that are outlined below.

Core Curriculum: All students must take the following core courses.

- Year 1, Fall
 - BCHM 60100, 2 credits, Critical Thinking & Communication in Biochemical Research I
 - BCHM 60300, 6 credits, Introduction to Graduate Research in Biochemistry I
 - BCHM 60500, 3 credits, Macromolecules
 - BIOL 66200, 1 credit, Research Integrity, Ethics and Responsible Conduct of Research or GRAD 61200, 1 credit, Responsible Conduct of Research
- Year 1, Spring
 - BCHM 61000, 3 credits, Eukaryotic Gene Expression
 - BCHM 69000, 1 credit, Seminar in Biochemistry
 - STAT 50300, 3 credits, Statistical Methods of Biology
- Year 2, Fall
 - BCHM 60200, 2 credits, Critical Thinking and Communication in Biochemistry Research II

Electives: An additional graduate level elective of 2-3 credits is required and could include any additional courses from the list below, or other graduate level courses relevant to the student's area of research.

- Fall
 - BCHM/HORT 64000, 3 credits, Metabolic Plant Physiology (offered in alternate years)
 - BIOL 60000, 2 credits, Bioenergetics
 - STAT 51100, 3 credits, Statistical Methods
 - STAT 51200, 3 credits, Applied Regression Analysis
- Spring
 - BCHM 62000, 2 credits, Protein Mass Spectrometry and Proteomics
 - BIOL 59500, 3 credits, X-ray Crystallography
 - STAT 51100, 3 credits, Statistical Methods
 - STAT 51200, 3 credits, Applied Regression Analysis
- Summer
 - BCHM 61200, 3 credits, Bioinformatic Analyses of Genome-Scale Data
 - STAT 51100, 3 credits, Statistical Methods
 - STAT 51200, 3 credits, Applied Regression Analysis

Responsible Conduct of Research / Ethics Training: All graduate students in the Biochemistry Program are expected to follow the guidelines set forth by the OGSPS regarding Responsible Conduct of Research. All students are required to take GRAD 61200 or BIOL 66200, which provides an overview of values, professional standards, and regulations that define responsible conduct in research. Typically, this course is taken in fall of a student's first year as shown above.

Grade Requirements: In addition to the standards set by the OGSPS, the following requirements apply to students enrolled in the Biochemistry Program.

- Students who finish their first year with a GPA below 3.0 in courses that are in their Plan of Study are required to hold a meeting with their thesis committee or their major professor and the head of the department if the thesis committee has not been selected. The meeting must take place before the beginning of the third semester of the student's studies. The meeting will be to determine whether the student shows sufficient indication of scientific understanding and growth in laboratory experience to warrant continued support in the program. If the answer is affirmative, there shall be assessments made by the Major Professor and the Thesis Advisory Committee within a month of the end of each semester thereafter until the student has surmounted the academic deficiencies. If the answer is negative, the student may pursue a Master's thesis at the discretion of the Major Professor or may be asked to leave the program
- Only grades of A, B, and C are acceptable on a Plan of Study. Incomplete (I) grades are not acceptable on a Plan of Study. Incomplete grades must be cleared within a year after the I grade was received. A Thesis Advisory Committee may require a higher grade than C in certain courses.
- The OGSPS considers a cumulative GPA of below 3.00 as performance below that expected of a graduate student, and grade reports will so indicate. A student with a cumulative GPA below 3.00 will be placed on probation within the Department of Biochemistry until they increase their cumulative GPA by retaking courses with low grades or by taking additional courses. A student who is on probation will not be allowed to take the Preliminary Exam nor will they be considered to be eligible for departmental awards. Students that are unable to remove their probationary status within one academic year will be terminated from the program.
- Continuation in the graduate program also requires satisfactory effort in performing research. Any student receiving an unsatisfactory grade (U) in BCHM 60300, BCHM 69800, or BCHM 69900 will be placed on probation. When a student is assigned a grade of U, the Major Professor will provide the student with a written explanation describing specific deficiencies that resulted in the unsatisfactory grade, a copy of which will be placed in the student's file. Research credits for which a student receives a grade of U cannot count toward satisfaction of the residency requirement. When a student receives two consecutive U grades in research, the Biochemistry and Molecular Biology Graduate Program is mandated to inform the OGSPS of proposed action/s. Students that receive two consecutive U grades in research or a U grade in research in the same semester as receiving an unsatisfactory evaluation for their Thesis Advisory Committee meeting will be required to: 1) leave the program or 2) remain in the program subject to certain conditions being met to allow the student to continue graduate study in Biochemistry.

Publication Expectation: At the time of thesis deposit, a Ph.D. candidate should show that at least one first author or co-first author paper from their thesis research was accepted by, or published in, a reputable scientific journal. It is preferable to have manuscripts covering all major results of thesis research published prior to the defense.

Computational Life Sciences (CLS) Program: Biochemistry is a participating department in the Computational Life Sciences program [<https://www.purdue.edu/gradschool/cigp/>]. CLS is an interdisciplinary area of specialization offered at MS and Ph.D. levels. Students enrolled in this program will perform Ph.D. thesis research in a laboratory in our department while simultaneously developing skills in the computational life sciences. A student's participation in the program is indicated on the transcript as a specialization in "Computational Life Sciences." An approved CLS plan of study enables participants to become proficient in the use of computational tools and techniques employed in the life sciences, preparing them for the discovery and implementation of algorithms that facilitate the understanding of biological processes. The CLS Ph.D. plan of study requires a minimum of 12 credit hours with 6 of these credits obtained from CLS-relevant courses specified by the Department of Biochemistry (currently BCHM 521, BCHM 56100, BCHM 56200, BCHM 60500, BCHM 61000, BCHM 61200, BCHM 62000). Remaining credits come from one of two CLS bridge courses, CLS core courses, and CLS relevant courses specified by the CLS graduate committee. Dr. Majid Kazemian is the Department of Biochemistry's representative to the CLS program.

SEMINAR SERIES AND ATTENDANCE

Departmental Seminar Series: The Department of Biochemistry has a weekly Tuesday afternoon seminar series at 3:30 p.m. Presentations are given by Purdue faculty as well as external-invited speakers. All graduate students are expected to attend. Students in the Biochemistry and Molecular Biology Graduate Program have the opportunity to invite one to two speakers per year to this seminar series in a process coordinated by the Graduate Student Organization and the faculty seminar committee.

Graduate and Postdoctoral Seminar Series: The Department of Biochemistry has a seminar series organized by graduate students and postdocs. The primary purpose of this series is to allow these trainees to showcase their research and receive important scientific feedback from their peers. It is intended to help the presenters get constructive feedback, but also to prepare attending graduate students to think critically and ask insightful questions. Graduate students and postdocs present their research, and all graduate students are expected to attend. Graduate Postdoc seminars are held Fridays at 12:30 pm. One to two faculty members will attend to provide feedback. Talks are expected to last 20-25 minutes with 5-10 minutes of discussion. Presentations need an introduction that explains the research to their peers, and speakers should recognize that within their audience are individuals with very diverse research backgrounds and interests. Methods and rationale for using the methods should be explained. Results should be presented and discussed in a way that is easy to read and interpret. The conclusion should have an overview of where the research fits into their respective scientific fields. Third year graduate students may be expected to spend more time on introduction, precedents (in literature and from the lab) and rationale, whereas, fifth year students may focus more on results and discussion and telling a clear cohesive story. Methods-based presentations may include a different format. First year students will present their research in the spring following their permanent lab assignment. The talks will replace the Grad Postdoc Seminars on those occasions.

The Graduate and Postdoctoral Seminar Series is also used for professional development opportunities. Representatives from a variety of life science companies and/or governmental agencies, some of which will be alumni of our program, will give presentations that will be geared toward helping students identify potential future career paths. Reading up in advance on the individuals and/or the organizations they represent is likely to facilitate a much more engaging and impactful dialog.

APPOINTMENT AS A TEACHING ASSISTANT

Teaching Requirement: Each Ph.D. graduate student is expected to fulfill a teaching requirement of one semester as a half-time teaching assistant or two semesters as a quarter-time teaching assistant. This appointment should involve interaction with students; an appointment as a grading teaching assistant does not fulfill this requirement. The teaching requirement may be fulfilled by serving as a teaching assistant in a course taught in another department on campus.

Teaching Requirement Rationale: Expectations of Ph.D. scientists go beyond designing and conducting experiments at the bench. Mentoring, teaching, and training others are critical skills for successful Ph.D. scientists in the professional world. Moreover, the ability to clearly and effectively communicate scientific knowledge to diverse audiences is another essential Ph.D. level skill tied closely to mentoring and teaching. Thus, the act of serving as a TA in our department is an extension of training as a research scientist, and one that we consider an essential component of achieving a Ph.D.

As mentioned earlier (see Responsibilities of Incoming International Students), students whose first language is not English must be certified by the Oral English Proficiency Program prior to being assigned duties involving direct instruction of students.

STUDENT SUPERVISION AND PROGRESS EVALUATION

Supervision During the First Semester: Until a Major Professor is chosen, a student's progress is monitored by the First Year Graduate Chair.

Supervision During Degree Completion: During the first semester in a Major Professor's laboratory, students will select a Thesis Advisory Committee in consultation with Major Professor. This committee includes the Major Professor as chair and three additional professors. The committee normally has three biochemistry faculty members including the Major Professor (faculty members with courtesy appointments in the department can serve in this capacity) and a faculty member outside the Department of Biochemistry, but in special circumstances, a committee may have two Biochemistry professors and two from other departments. The Thesis Advisory Committee will counsel and review the student's progress in both thesis research and coursework during their graduate study. On the rare occasion that a student needs to choose a Major Professor outside of the Department of Biochemistry, the Thesis Advisory Committee shall consist of the Major Professor, at least two faculty members from the Department of Biochemistry, plus one additional member.

Committee Meetings: Thesis Advisory Committee meetings are held with the specific purpose of helping students ascertain the robustness of their intellectual ownership and their efforts at the bench by critical discussion. Students are required to hold Thesis Advisory Committee meetings at least annually beginning no later than the fall semester of their second year. It is anticipated that students will have their Preliminary Exam in the fall semester of their third year, and have their second Thesis Advisory Committee meeting the following semester. At least three of the four committee members must be in attendance, either in person or virtually. Students are responsible for arranging each committee meeting. The student should contact the members of their Thesis Advisory Committee three to four months in advance to get their travel and teaching schedule, and then send them a When2meet poll (<https://www.when2meet.com/>) with two weeks of options to identify a specific date and time for the meeting. The student must also find and schedule a conference room for the meeting and inform the Thesis Advisory Committee and Graduate Program Coordinator of the date, time and location.

At meetings starting one year after the student passes their Preliminary Examination, the committee will discuss with the student and Major Professor the time table for completion of the thesis. The committee's report will include a statement as to when it can be expected that the student will be ready to graduate.

Several written items prepared by the student are associated with annual committee meetings, and they are described below. These documents must be submitted by the student to their Thesis Advisory Committee Members at least one week in advance of the Thesis Advisory Committee Meeting. The Thesis Advisory Committee Progress form (described below in "Evaluation of Thesis Advisory Committee Meeting Performance") from the previous Thesis Advisory Committee meeting (where applicable) will be shared with the Thesis Advisory Committee prior to the meeting by the Graduate Program Coordinator.

Following their Thesis Advisory Committee Meeting, graduate students are required to schedule a follow-up meeting with the Senior Graduate Program Administrator to confidentially discuss any concerns or challenges not addressed during the committee meeting.

Thesis Advisory Committee Meeting Report: Students must prepare and distribute a Committee Meeting Report to their Thesis Advisory Committee at least one week prior to each meeting. Students are to prepare their first report in the form of a proposal. This proposal is on their own research topic and should be hypothesis-driven and contain a series of aims that are justifiable with precedents, preliminary data, and reference to prior publications. Prior to passing the preliminary exam, the committee report/proposal should follow the guidelines for the Preliminary Exam Proposal (see "Content and Organization of the Written Preliminary Examination Document" below). Committee reports after a student has passed their preliminary exam should follow the format of a paper that aligns with the student's research, but students should work with their major professor to identify an appropriate format for each committee report as they progress through their candidacy.

Individual Development Plan (IDP): The IDP provides a process that identifies annual progress, professional development needs, and career objectives for graduate students. The IDP serves as a communication tool between a student and their Major Professor and offers a platform for broader discussion with their thesis committee. Identifying short-term goals gives students a better sense of expectations and helps identify milestones along the way to achieving specific objectives. The IDP is to be completed yearly about a month before their annual Thesis Advisory Committee meeting. Students should take primary responsibility for completing this document; by doing so, they will have a process that assists in developing and achieving long-term career goals. Students should schedule a time to review the document with their Major Professor prior to the Thesis Advisory Committee meeting. Students should be prepared to lead a review of their IDP at each Thesis Advisory Committee meeting and ask for assistance with areas of concern.

Annual Progress Report: The Annual Progress Report resembles a curriculum vitae and documents the student's major academic, professional, and scientific achievements as they progress toward their Ph.D. degree. The content and organization of the Annual Progress Report is outlined in Appendix 2 which also includes an example document. It is organized by academic years in the program, which, for the purposes of the preparation of this document, begin on the first day of the fall semester and ends on the last day of the summer semester in the following year.

Evaluation of Thesis Advisory Committee Meeting Performance: The student's performance in six major categories will be assessed by members of the committee using the Thesis Advisory Committee Feedback form. The Major Professor will then prepare the Thesis Advisory Committee Progress form that represents the consensus opinion of the committee, which will be sent to the Graduate Program Coordinator along with the Thesis Advisory Committee Feedback forms prepared by each member of the Thesis Advisory Committee. A copy of these forms will be sent to the student and a copy of each will be kept in the student file. Three of the four Thesis Advisory Committee members must judge the overall performance in Thesis Committee Meeting as satisfactory in order for the student to pass. The criteria used to evaluate student performance in these meetings is outlined in Appendix 3.

The Thesis Advisory Committee Meeting Report, the Annual Progress Report, and the completed Thesis Advisory Committee meeting forms must be sent to the Graduate Program Coordinator so that this material can be placed in the student's file along with other material pertaining to progress toward the degree objective. Registration for subsequent semesters will be contingent upon compliance with this rule. Students who are delinquent in holding committee meetings will also not be considered for departmental awards.

Change to the Thesis Advisory Committee: If a student's research changes substantially, and the Major Professor believes that the composition of the Thesis Advisory Committee must be changed, the student should submit an electronic Change of Advisory Committee in the Plan of Study using myPurdue. This also applies should a professor leave the university and is replaced on the committee. If a committee member is absent from campus only at the time of the final examination, please see the Graduate Program Coordinator for alternate options as participation in defenses by Zoom is allowed when necessary.

DEPARTMENTAL AWARDS

An array of awards are available to graduate students in the Biochemistry and Molecular Biology Graduate Program to promote their research and academic success. A full listing is available at: <https://ag.purdue.edu/department/biochem/awards/departmental-awards.html>. Detailed information regarding eligibility, deadlines, and instructions on how to apply sent to all students in the program on an annual basis.

Beach Travel Award: Established in 2006 from the Beach Family Endowment. The award is given twice a year to a graduate student to help defray the costs of attending a scientific meeting.

Weiner Travel Award: Established in 2012 from the Weiner Family Endowment. The award is given twice a year to a graduate student to help defray the costs of attending a scientific meeting.

Henry Moses Award: Established in 2008 by Dr. Bradley Sheares and his wife Adrienne Simmons to honor fellow Purdue Department of Biochemistry alumnus Dr. Henry Moses for his contributions to research, education and service. This award is given annually to a graduate student in the Department of Biochemistry based on a scientific paper that the applicant has authored that demonstrates his/her productivity and excellence in scientific research.

Outstanding Teaching Assistant: This award honors graduate students with teaching responsibilities from across campus for their dedication to Purdue students and their outstanding teaching contributions. Recipients are selected by each academic department for their commitment to undergraduate

education. Departments may select one recipient for every 50 graduate teaching assistants they support. The Graduate Teaching Award is sponsored by the Teaching Academy and the Office of the Provost and is given annually to recognize a student's outstanding performance as a teaching assistant.

Bird Stair Research Fellowship: The purpose of Bird Stair Fellowships in the Department of Biochemistry is to promote the research success of students in the Department of Biochemistry. Students who are awarded Bird Stair Fellowships will be allocated funds to be used to support their graduate research. Such funds will be held in an account by the Business Office of the Department of Biochemistry to pay for supplies and expenses incurred in the course of the student's research. Students or student teams may apply for these fellowships on a semi-annual basis. Qualifying students or teams will be awarded a Bird Stair Research Fellowship in the amount of up to \$5,000 per student (subject to annual review by the Head of the Department of Biochemistry) to pursue independent or collaborative research opportunities.

Bilsland Dissertation Fellowship: The College of Agriculture in conjunction with the OGSPS provides Bilsland Dissertation Fellowships to assist graduate students who are within the final year of completing their Ph.D. degree.

Ross-Lynn Research Scholar Grant: The College of Agriculture in conjunction with the Office of the Vice President for Research provides the Purdue Research Foundation (PRF) Research Grant to the Department of Biochemistry. For each grant, successful candidates will have shown excellence in research. The primary criterion for the one (1) PRF Award allotted to the Department of Biochemistry will be that candidates will have shown excellence in research. The evaluation of research excellence will include the quantity and quality of published work the applicant's role in published research and the quality of scholarship demonstrated in the written application. In close decisions, preference will be given to students who have also demonstrated a commitment to the Department of Biochemistry through service such as serving as a departmental teaching assistant.

PREPARATION FOR THE PRELIMINARY EXAM

Students are required to defend a hypothesis-driven research proposal for their preliminary examination. This proposal must be original and designed to advance the current state of knowledge in the chosen field by addressing a meaningful gap in that knowledge. Preliminary Exam Proposals cannot be directly based on student's own research project or past or ongoing projects from the Major Professor's lab, but can be, and is strongly recommended to be, "project adjacent" (see below and Appendix 4 for further details). The Preliminary Exam is taken in the fall semester of the third year of study unless an early exam is requested. Although the general process/steps to prepare for the exam occur over a period of about six months, it is anticipated that the student will continue to make meaningful progress in their efforts in the lab as they prepare for the exam.

Preliminary Exam Timeline: The following timeline has been established to provide ample time for students to formulate their proposal, and receive feedback on it from the Preliminary Exam Chair and their Examining Committee. The dates for students taking their Preliminary Exam in 2025 are as listed below. Dates for future years' exams will be close to these and adjusted accordingly in the future.

- March 29, 2024, Student chooses a topic and submits a first draft of their Specific Aims Document to the Preliminary Exam Graduate Chair
- April 19, 2024, Topic is approved and a committee is assigned

- April 26, 2024, Student sends the Specific Aims Document to their Preliminary Exam Committee and organizes a time for the exam in the fall
- May 10, 2024, Student receives feedback from committee
- August 19, 2024, Proposal is submitted to committee and Graduate Program Coordinator for iThenticate report
- September 3, 2024, Student meets with the Preliminary Exam Committee Chair to discuss any issues with proposal
- October 1-October 31, 2024, Oral Exam

Forms: Forms to be completed by student are listed below. All forms are on the website of the Department of Biochemistry at <https://ag.purdue.edu/department/biochem/academics/graduate-program.html> (see Current Student Forms).

- OGSPS Form 8 Request for Appointment of Examining Committee
- Certification of Preliminary Exam Topic

Selection of Topic and Specific Aims Document: The Preliminary Exam is based on a hypothesis-driven research proposal designed by the student to advance the current state of knowledge in the field. Although the Preliminary Exam Proposal may address a topic entirely unrelated to the student's research project, it is strongly recommended that students write a proposal that is in some respects related to their thesis project (a.k.a. "project adjacent"). See Appendix 4 for guidelines on writing a "project adjacent" Preliminary Exam Proposal. Nevertheless, it must focus on a research problem that is different from the student's current or past research project(s). The project must also be different from any other research project from the advisor's or collaborator's labs.

Student proposals must satisfy the following criteria:

- No Specific Aim can be identical to or overlap with the student's current or past research projects.
- No Specific Aim can be identical to or overlap with any goal(s) of ongoing or past research projects in the advisor's lab conducted by the advisor, postdocs, graduate students, undergraduates, or technicians.
- Specific Aims are different from research groups actively collaborating with the advisor's lab.
- The Specific Aims must be different from any developed in the context of previous graduate courses or previous research experiences.

Students should prepare their Preliminary Exam Proposal with a scope in line with a graduate student fellowship to the NIH. Typical proposals have three Specific Aims, but two to four may be appropriate depending on topic and the hypotheses to be evaluated.

The Specific Aims Document should be a concise summary of the research plan and rationale for the proposed project. It should begin with a short paragraph that gives a concise description of key background information, states the hypotheses or model that underlies the proposal, explains what will be learned when the research is complete, and gives a rationale for experimental approaches and/or aims listed. It should contain a brief list of the Specific Aims of the proposed research.

The Specific Aims Document should employ 1.5 line spacing, 11 pt Helvetica or Arial font, no less than one-inch margins, contain a title page (1 page), the Specific Aims (up to 1.5 pages) and references (no

page restriction) formatted according to the standard for articles published in the Journal of Biological Chemistry. The Specific Aims Document will become the first 1.5 pages of the full written proposal.

Guidance on Specific Aims Preparation from the Preliminary Exam Graduate Chair: In the spring of the second year of the program, the Preliminary Exam Graduate Chair will meet with the cohort of graduate students who intend to take the Preliminary Exam the following fall, and provide them with advice and guidance on how to prepare their Specific Aims Document and their Preliminary Exam Proposal. Students will have a deadline in late March, listed in this handbook, by which they must submit the first draft of their Specific Aims Document, and the Preliminary Exam Graduate Chair will provide them with written and oral feedback on their document within two weeks. Students will have a further two weeks to revise their Specific Aims Document prior to submission to their Examining Committee.

Certification of Specific Aims Document by Thesis Advisor: At the same time the student submits the first draft of their Specific Aims Document to the Preliminary Exam Graduate Chair they will also provide it to their Major Professor. Together, the student and the Major Professor will complete the Certification of Preliminary Exam Topic form which verifies that the topic and Specific Aims meet the criteria of being independent from research in the Major Professor's lab (as described in "Detailed Preliminary Exam Process/Selection of Topic and Specific Aims Document"). The Major Professor will submit the signed Certification of Preliminary Exam Topic form to the Graduate Program Coordinator.

If the Major Professor thinks that the proposal topic or Specific Aims cannot be certified, the student must select a new topic and/or set of Specific Aims. The Major Professor can explain why the certification wasn't approved, but they cannot help the student select a new topic or help modify the Specific Aims. It is the student's responsibility to make the necessary revisions. A change in topic or major alterations in the aims/objectives requires re-certification by the Major Professor that the topic does not overlap research in the student's home laboratory.

Submission of "Request for Preliminary Examination" Form and Documents: After the Major Professor certifies the Specific Aims Document, the student will submit an electronic OGSPS Form 8, Request for Appointment of Examining Committee, via myPurdue for approval of the exam committee and date.

Assignment of Examining Committee and Feedback on Specific Aims Document: The Preliminary Exam Graduate Chair will next assign members of the Examining Committee and the Examining Committee Chair and will provide these names to the Graduate Program Coordinator who will in turn inform the student. The committee consists of four faculty from the Department of Biochemistry or other departments. It does not include the Major Professor but generally does include the remaining members of the thesis committee. The Graduate Program Coordinator will send a copy of the Specific Aims Document to the Examining Committee who will provide feedback to the student through the Exam Committee Chair within two weeks of the distribution of the document, typically by the end of the spring semester. The goal is to provide early feedback that the student can incorporate into the full proposal. Resubmission after feedback is not required, and the approved Specific Aims Document may be revised prior to submission of the final written proposal.

Scheduling the Preliminary Exam: It is the student's responsibility to schedule the exam by their assigned deadline in October. The student should contact the members of the Examining Committee three to four months in advance to get their travel and teaching schedule, and then send them a When2meet poll (<https://www.when2meet.com/>) with two weeks of exam options to identify a specific

date and time for the exam. The student must also find and schedule a conference room for the exam and inform the Examining Committee and Graduate Program Coordinator of the date, time and location. In special circumstances, deadlines can be postponed, but only with the approval of the Preliminary Exam Graduate Chair. Students and Exam Committees do not have the authority to independently change deadlines.

Preparation of the Written Preliminary Exam Proposal: The Preliminary Exam is primarily an oral defense of the proposal; however, the student should know that the written proposal is very important to the committee as they will use it to prepare for the exam. This document provides a first impression of the scientific quality and merit of the proposal. The student should also note that evaluation of the preliminary exam performance includes rating the ability to communicate scientific ideas in writing. A poorly prepared document may lead the committee to have an initial negative view of the proposal and could adversely affect the overall evaluation of the exam. Proposals should be prepared with a scope in line with a graduate student fellowship application to the NIH or NSF. Another way to think about the scope of the proposal is to outline a series of experiments that if successfully completed could be published as a paper in the Journal of Biological Chemistry or similar journal. Experiments should be designed so all aims could be completed by one graduate student within two to three years.

The final written proposal must be sent to the Graduate Program Coordinator on or before the due date, typically in the first week of the fall semester. The Graduate Program Coordinator will forward the proposal to the Examining Committee who will provide feedback to the student through the Exam Committee Chair within two weeks of the distribution of the document, typically by the beginning of September.

Feedback on Written Proposal: The student will meet with the Examining Committee Chair to receive written and verbal feedback on the Preliminary Exam Proposal. This will include an assessment of the significance of the proposed project, the clarity of the presentation, the justification of the experimental aims, experimental approach, controls and analysis of data. The goal is to provide the student with an indication of strengths and weaknesses of the proposal prior to the exam. The student is not obliged to make changes to the written proposal in response to the Examining Committee's feedback, but should adjust their oral presentation and be prepared to respond to the Examining Committee's critiques during the Preliminary Exam.

A strong written Preliminary Exam Proposal does not guarantee success in the Preliminary Exam nor does a weak written document predetermine failure. If the student presents a strengthened set of aims and approaches during the Preliminary Exam and provides a solid intellectual defense, a weak written document can still result in a successful Preliminary Exam. Nevertheless, a strong written Preliminary Exam Proposal and a strong oral defense of it is the best path to a successful outcome.

CONTENT AND ORGANIZATION OF THE WRITTEN PRELIMINARY EXAM PROPOSAL

Guidelines for preparing the written Preliminary Exam Proposal are outlined below. The Examining Committee Chair may refuse any document that exceeds the page limitations or does not meet the guidelines. The Specific Aims through the research plan sections of the proposal can be no longer than 12.5 pages. There is no page restriction on references or figures and tables.

Cover/Title Page: This page should include: student name, proposal title, list of Examining

Committee members, the date, time and location of the exam, and a section where the student can sign to verify iThenticate screening (See Appendix 5 for Example Cover Page).

Specific Aims: (1.5 page) See section above entitled “[Selection of Topic and Specific Aims Document](#)” for details on the content of this section.

Significance and Innovation: (3 pages) The student should explain the importance of the topic/problem and how scientific knowledge will be improved as a result of the project. An introduction to key background information (prior knowledge / precedent) that is required to understand the proposal and formulate the hypothesis should be included. The student should also describe any controversial issues or inconsistent findings in the area of study and identify innovations that challenge current paradigms or have potential to shift research directions. The impact that the results of the proposed research will have on the field should be clearly explained. Most importantly, the student should identify the knowledge gaps in the field or problem and how the proposed work will overcome this lack of knowledge.

Experimental Approach: (8 pages) The student should concisely describe the experiments that will be performed to achieve the goals of each aim listed on the Specific Aims page. This section should be organized so that research plans are presented for each Specific Aim. The rationale for selecting the methods and analyses that will be utilized to achieve the Specific Aims should be provided. Several major experimental approaches may be used for each Specific Aim. For each approach, the experiments to be performed should be outlined and it should be briefly explained how data will be collected, statistically analyzed, and interpreted. The student should list potential caveats, pitfalls and alternatives.

The student should design their Preliminary Exam Proposal around hypotheses and experiments that will generate mechanistic biochemical insights into the problem they are studying. It is acceptable for one aim to have an approach such as a genetic screen or an RNA-seq component for example, but the student will be expected to full describe and justify the biochemical model motivating the proposed analysis, understand its strengths and weaknesses, include appropriate controls, have a detailed understanding of how to undertake the proposed analysis, and explicitly describe secondary screens/experiments that will need to be undertaken to analyze the results in light of the original model that motivated the proposed analysis.

The page limit will prevent the inclusion of detailed procedures in the written report. Although they can't be included in the written proposal, these details are likely to be important in the Preliminary Exam when the student will be expected to understand the mechanics of experiments, the necessary controls, underlying physical and chemical principles, and the basic operation of any instrumentation required. The student will also be expected to understand and evaluate the strengths and limitations of the methods selected.

References: (no page limit) In the text of the proposal, the student should cite references for important work in the field. This is essential for the committee to obtain supplemental information as well as to evaluate whether the proposal is novel or derivative. References must be formatted according to the style used for the Journal of Biological Chemistry. Most personal bibliography programs (e.g. Endnote) have this style set up.

Tables and Figures: (no page limit) Figures and tables, if used properly, can greatly enhance the

document by making it easier for the committee to follow and understand the proposal. Figures can contain models and diagrams that enhance presentation of background material. Figures and/or tables may also be employed to illustrate the data and results the student expects to obtain from the proposed experiments. Figures and tables must be legible and of publication quality. Each figure or table must have a title and should be accompanied by a suitable legend. The text for the legend should be placed on the same page as the figure. As long as the figures are legible, more than one figure and accompanying legends can be on a single page. If data is plotted, all axes must be properly labeled. If figures are taken from the literature, they must be appropriately acknowledged and the source cited. We recommend using the Journal of Biological Chemistry as a source of examples illustrating high quality figures and tables.

Formatting: The Preliminary Exam Proposal text should use only 11 pt Arial or Helvetica. Ten pt fonts can only be used for legends to go with tables or figures. Other fonts may only be used for Greek characters, symbols, or other special characters. One-inch margins should be used at the top and bottom of pages and on the left and right. Line spacing should be 1.5. All pages should be numbered including those containing figures and tables.

COMPLETION OF THE PRELIMINARY EXAM

Preparation: The best preparation for the Preliminary Exam are practice sessions with senior graduate students and/or postdoctoral scientists. The most useful pre-prelims are scheduled well in advance of the Preliminary Exam and before the submission of the written Preliminary Exam Proposal. Students need to use their own judgement to decide which, if any, suggestions to incorporate. More than one pre-prelim is often helpful.

Presentation: The rules of the OGSPS state the Preliminary Exam itself should not last over 2 hours; however, the exam meeting should be scheduled for 2.5 hours to allow for committee discussion and paperwork. The exam begins with a short student presentation of the background, hypothesis or model to be tested and a brief description of each aim and the experiments proposed. This presentation should not last more than 20 minutes (12- 15 slides). The student may bring additional slides to clarify information or details later in the exam, but the student should not be overly dependent upon these. The committee may interrupt with questions for clarification; thus, the talk may last longer than 20 minutes. Nevertheless, the student should prepare a talk that can be delivered in 20 minutes. The student should be prepared to be asked to go to the board to diagram models, methods, as well as anticipated and alternative results.

Questioning: After the presentation, the student will be asked questions by the Examining Committee. There are no restrictions on what committee members may ask. Questions may pertain to details of the experimental approach(es), measurements, data interpretation, significance of the results, justification for the proposed study including previous work in cited literature, or fundamental principles of biochemistry and molecular biology that relate to the proposed project. General knowledge expected may consist of mastery of the content of any major upper-level biochemistry textbook (e.g. Stryer, Lehninger, etc.) and Lewin's GENES XII. Accordingly, many questions may probe basic knowledge of biochemistry, molecular biology or other relevant topics even if they are not directly mentioned in the proposal.

Absence of a Committee Member: If an Examining Committee member is not able to attend the exam, the Preliminary Exam can proceed if three of the four Examining Committee members are present

(Note: passing requires approval from three members). The student may request to postpone/reschedule the exam so all four committee members can be present. In this case, the Graduate Program Coordinator and the Preliminary Exam Graduate Chair are to be notified and the Preliminary Exam must be rescheduled within three weeks.

Evaluation of Preliminary Exam Performance: Three of the four Examining Committee members must judge the overall performance in defense of the original proposal as satisfactory to pass the Preliminary Exam. The student's performance in five major categories is assessed by members of the committee using the Committee Report of Oral Preliminary Examination form. The Examining Committee Chair will then prepare a Committee Report of Oral Preliminary Examination form that represents the consensus opinion of the committee. It will be sent to the Graduate Program Coordinator along with those prepared by each Examining Committee member. A copy of these forms will be sent to the student and Major Professor, and a copy of each will be kept in the student's file.

To help students understand how they will be evaluated, the Committee Report of Oral Preliminary Examination form is available at <https://ag.purdue.edu/department/biochem/academics/graduate-program.html> (see Current Student Forms). The longer list of evaluation criteria is listed in Appendix 6.

Preliminary Exam Fail: If the student fails the Preliminary Exam on the first attempt, one reexamination is permitted. A student who fails the Preliminary in the fall semester will retake the exam during the following spring semester. A student who fails the Preliminary Exam in the spring semester will retake the exam in the fall semester. OGSPS policy dictates that the second exam cannot be taken in the same semester as the first attempt. Students are encouraged to meet in person with their Preliminary Exam Chair and Examining Committee members in the weeks that follow their exam to discuss how they might improve their proposal and exam performance for their second attempt.

Preliminary Exam Second Attempt: For the second preliminary exam, a new GS Form 8 must be submitted. The student will have the same Examining Committee for the second Preliminary Exam unless a change in its composition for their second exam is granted or deemed necessary by the Preliminary Exam Graduate Chair. Written documents submitted for a second attempt on the same topic are due to the Examining Committee no later than two weeks before the exam date. No additional written feedback will be provided by Examining Committee members on revised proposals that focus on the same topic as the student's first exam.

The student may change the topic of the second Preliminary Exam, but this will require certification of the new topic by the Major Professor (as described above in "Certification of Specific Aims Document by Thesis Advisor"). If there is a change in topic for the second Preliminary, the Preliminary Exam Graduate Chair may elect to change the Examining Committee membership to better match the expertise of the committee to the topic. If the student changes topic for the second Preliminary Exam attempt, the revised Preliminary Exam Proposal must be submitted one month before the exam date. Feedback on the revised proposal will be provided by the Examining Committee through the Exam Committee Chair as occurred in advance of the first exam (as described above in "Feedback on Written Proposal").

Early Preliminary Exam (Spring 2nd year): Students who request an early Preliminary Exam need approval from their Major Professor and their thesis committee. They must schedule and hold their first thesis advisory committee meeting by October 31st of their second year. The student is responsible for obtaining approvals, and conveying their intention to do the exam early to the Preliminary

Exam Chair and Graduate Program Coordinator via email immediately following the first committee meeting. The deadline for submitting the Specific Aims Document and written proposal is determined by the Preliminary Exam Graduate Chair.

iThenticate Screening and Avoiding Plagiarism: The OGSPS and Office of the Vice President for Research contracted iThenticate to provide electronic document screening services for Purdue students as a safeguard to avoid plagiarism. The university policy on research misconduct can be found at: <https://www.purdue.edu/policies/ethics/iiia2.html>.

Preliminary Exam Proposals must be screened using the iThenticate system by the Graduate Program Coordinator to detect potential plagiarism. A summary report in PDF format will be sent to the Examining Committee Chair and the student. After reviewing the iThenticate report, the chair of the Examining Committee will determine whether the proposal contains substantial evidence of plagiarism and communicate their findings by email to the Graduate Program Coordinator, other members of the Examining Committee, and the student. Other Examining Committee members may request a copy of the iThenticate report by contacting the Graduate Program Coordinator.

If the chair finds no evidence of potential plagiarism, no further action will be necessary by the student. If the document contains substantial segments of text that have clearly been inappropriately duplicated from the work of others, the chair may conclude that the proposal contains evidence of potential plagiarism. Upon notification by the Examining Committee Chair, the student must arrange a meeting with the Examining Committee Chair to discuss the problem(s) found in the iThenticate report at the earliest mutually agreeable date. If a limited number of sentences or phrases have been improperly copied from other sources, the chair will request that the student immediately modify the problematic text and provide a revised proposal to the committee. The revised proposal must be rescreened by iThenticate as described above.

If the chair finds evidence of plagiarism in the iThenticate report generated from the screen of a revised proposal, the student will fail the scheduled Preliminary Exam.

THESIS, DEFENSE, AND GRADUATION

Thesis Preparation: Ideally, students should publish their work as it is completed and ultimately assemble their completed and published manuscripts into a thesis in preparation for their defense. Students should present a thesis outline to their Thesis Advisory Committee one semester in advance of their planned defense date. A final draft of the thesis must be in the hands of the Major Professor at least six weeks before the defense date, but this requirement should be a topic of discussion between the Major Professor and the student well in advance. Some Major Professors will require a much earlier submission to facilitate publication of the student's thesis research. The thesis must be approved by the Major Professor who has directed the research before it is submitted to the Thesis Advisory Committee. Each member of the Thesis Advisory Committee must receive a copy of the thesis at least two weeks before the date of the defense date. The student can ask their committee if an electronic version via email is acceptable. Failure to meet this two-week deadline may result in a member refusing to honor the defense date, which could affect the student's graduation date and financial support.

All candidates must meet certain requirements in thesis preparation. University format requirements that will be reviewed by the Thesis/Dissertation Office, covering paper requirements; typeface and quality; spacing; margins; page numbering; title page; and abstract.

As students prepare to write their thesis and schedule their defense, they should take the following steps.

- When ready to begin writing, plan to attend the next thesis format/deposit workshop offered. Workshops are scheduled once a semester and may be attended as often as needed. See <https://www.purdue.edu/academics/ogsps/research/thesis/events.html>
- Register as a Candidate the session the degree is expected with the Graduate Program Coordinator.
- Visit the Thesis/Dissertation Office website: <https://www.purdue.edu/gradschool/research/thesis/>
- Review the Deposit Steps: <https://www.purdue.edu/gradschool/research/thesis/requirements.html>
- Submit a first draft of the thesis to the Major Professor six weeks prior to the defense date.

Defense Scheduling: An OGSPS Form 8, Request for Final Exam, (through myPurdue) must be submitted online at least two weeks prior to the Final Examination. The Form 8 must be approved by all members of the thesis examining committee and OGSPS before the final exam date. Final Examinations must be held before the last week of classes.

Including Unpublished Collaborative Work in a Thesis: If all the figures, legends or tables within thesis chapters are not the student's sole effort, the student's own contribution must be described and other researchers who contributed to the generation of data must be acknowledged. If significant data or findings from collaborators are described in the thesis but not shown in figures or tables, text to acknowledge their contribution(s) should be included in a footnote of the chapter.

Including Published Collaborative Work in a Thesis: Text, figures and tables prepared for publication often have significant contributions from co-authors, including Major Professors. If the thesis contains previously published materials where multiple authors contributed to the text, experimental design, figures, or analysis, a Declaration of Collaborative Work page should be included that clearly indicates the contributions of the candidate and others to the publication (e.g. figures contributed, analysis, writing and editing). Copyright permission may be required if journal-formatted publications are used as thesis chapters.

Defending Collaborative Work in a Thesis: Students must be prepared to defend all of the data, results and conclusions included in their thesis, whether or not they were the primary data gatherer. That is why it is important to carefully consider whether or not to include publications to which they made relatively minor contributions.

Final Examination: The Final Examination must be held before the last week of classes of the semester. Once the Ph.D. thesis is written, the Ph.D. candidate will present their thesis research in an open seminar of no longer than forty minutes. Immediately after, the candidate is examined on the material in the thesis and on related topics by members of their Thesis Advisory Committee. If the thesis is acceptable and they pass examination, the candidate is recommended to the OGSPS for a Doctor of Philosophy degree. The Report of the Final Examination form must be fully approved at least a week before the last day of classes of the semester in which the degree is expected.

Ph.D. Completion Policy: A graduate student must defend their Ph.D. thesis in a timely fashion, typically within six years of entering the Biochemistry and Molecular Biology Graduate Program. Extensions substantially beyond the six-year time frame must be approved by the Head of the Department. At least two sessions (including summer), but no more than five years, must elapse and be devoted to research between the Preliminary Examination and the Thesis Defense.

Thesis Approval, and Distribution

After the defense, students must prepare a final version of their thesis. This Deposit Copy will incorporate all editorial changes and modifications requested by the members of the Examining Committee and will comply with both University and departmental format requirements. Once a committee member has signed the Thesis Acceptance, the document is approved by that individual. Theses are submitted electronically. Deadlines for deposition are established by the OGSPS for each term and are normally the last day of classes prior to final examination week. Formatting compliance will be checked at that time. No changes may be made to the thesis after it has been deposited. Students should provide a printed bound copy of the thesis to both their Major Professor and the Graduate Program Coordinator.

Master's Degree

The Biochemistry and Molecular Biology Graduate Program currently accepts Ph.D. students to its graduate program. If a graduate student is not successful in the Preliminary Exam or wishes to leave the Ph.D. program for any reason, they may complete a thesis-based Master of Science (M.S.) degree. Financial support during completion of the M.S. by the Department of Biochemistry or the Major Professor is not guaranteed.

M.S. Thesis Advisory Committee: This committee will consist of the Major Professor as chair and two additional members. It is not necessary to include a member from another department.

Course Requirements: A thesis-based M.S. degree requires the completion of the same number and type of course credits as the Ph.D. (see section entitled "Program Requirements" above). M.S. research is undertaken by registration for BCHM 69800. As stated for Ph.D. students above, no grade lower than a C is allowed for a course on the Plan of Study. The OGSPS considers a GPA of below 3.00 as performance below that expected of a graduate student, and grade reports will so indicate. Students with unsatisfactory academic records (GPA below 2.70) will be placed on probation within the Department of Biochemistry. Failure to remove probationary status will become the basis for terminating the training of a student.

Thesis: A thesis-based M.S. requires the preparation of a thesis according to the procedures outlined above for the Ph.D. (see section above entitled "Thesis, Defense, And Graduation").

EXPECTATIONS FOR SCHOLARLY AND ETHICAL CONDUCT

Guidelines for Authorship: A commonly accepted standard states that all authors of a scholarly publication should satisfy three conditions:

- Each author should have made a significant contribution to the work described. A significant contribution entails a substantial role in the conceptualization, design, execution, and interpretation of data, as well as a clear understanding of the goals and outcomes of the work.

- Each author must be prepared to take responsibility for all aspects of their work described in the publication. They should be sufficiently familiar with the total project that they are comfortable with the description, methods, and conclusions and that they are willing to accept responsibility for the content of the publication.
- Each author will read and approve the final draft of the manuscript and explicitly consent to the submission of the manuscript to a publisher. Individuals who contributed to the project, but whose contributions do not rise to the level justifying authorship, should be recognized in the Acknowledgements section of the manuscript.

Plagiarism: Purdue University is committed to the highest standards of ethical behavior with respect to writing and reporting. Plagiarism is considered to be a form of academic dishonesty at Purdue and is not permitted as stated in the Student Code of Conduct. Moreover, plagiarism is not tolerated in the scientific community and attempts to publish plagiarized material can have severe consequences. Guidelines for avoiding plagiarism can be found in Appendix 7.

Use of Large Language Models: Generative AI is a type of artificial intelligence able to create novel content like text, images, or sounds. Generative AI technology can be used in a variety of ways; from aiding researchers and students in their academic pursuits, to optimizing administrative tasks. As with any new technology, there are risks. Ethical concerns also arise around AI authorship. Some AI based tools, including tools that promise AI-detection capabilities, use user-supplied data to further train their models. Third-party AI tools have widely-varying approaches to privacy, security, encryption, and so forth, and instructors must, as always, comply with FERPA requirements for student information and privacy.

Students should not use their Purdue credentials (Purdue username, password, or any Purdue email address) to sign up for a publicly available Generative AI tools. Using a Purdue email address to sign up for online services, even if they are free, may be put your personal information and Purdue University data at risk. Not all companies meet Purdue's security standards when it comes to protecting user data.

MISCELLANEOUS INFORMATION

Graduate Student Organization

The GSO is involved in recruiting, social activities, professional development (including running the Grad/Postdoc Seminar Series), and other initiatives that graduate students identify as being important. The responsibilities of the Biochemistry Graduate Student Organization (BCHM GSO) cabinet are outlined below.

- **President:** Organize and conduct monthly GSO meetings and also attend monthly meetings of the GEC. Aids other cabinet members in accomplishing tasks. Communicates information to GSO cabinet and graduate student body from monthly meetings with faculty representatives of the Biochemistry department and the College of Agriculture.
- **Social Chair:** Plan and execute monthly social events for graduate students. Submit event planning forms (APFs) for approval from Purdue Student Activities Organization (SAO) and Business Office for Student Organizations (BOSO). Update BCHM twitter page with events and photos. Coordinate with the Treasurer to manage social event funding.
- **Treasurer:** Manage funds for GSO events. Apply for short Purdue grants to fund GSO events as needed. Act as liaison between GSO social chairs and BOSO to fund and reimburse for event purchases.
- **PGSG Senator:** Represent the interests of the BCHM graduate students at monthly Purdue Graduate Student Government meetings. Reports back to the GSO and graduate student body about updates at from the OGSPS.
- **Mentor Chair:** Pair incoming first year graduate students with a current graduate student (that shares similar personality traits and research interests) to establish 1-on-1 peer mentorship throughout the students' initial year in the department. Additionally, schedule and host preliminary exam practice talks and invite senior graduate students to give feedback.
- **Grad Seminar Chair:** Coordinate weekly graduate student seminars by recruiting and introducing student presenters. Communicate with BCHM business office to maintain the budget for ordering lunch.

For Fall 2024-Spring 2025 the GSO cabinet positions are held by the students listed below.

- **President:** Kendall Cottingham (4th year, HallH lab, souderk@purdue.edu)
- **Social Chairs:** Matt Martin (3rd year, Puthiyaveetil lab, mart2361@purdue.edu) and Laura Hiotaky (2nd year, Puthiyaveetil lab, lhiotaky@purdue.edu)
- **Treasurer:** Seth Lammert (3rd year, Weake lab, slammert@purdue.edu)
- **PGSG Senator:** Gaoya (Grace) Meng (4th year, Weake lab, mengg@purdue.edu)
- **Mentor Chairs:** Geethma Lirushie (2nd year, HallH lab, tlirushi@purdue.edu) and Leah Durst (2nd year, Liu lab, ldurst@purdue.edu)
- **Grad Seminar Chairs:** Kratika Singhal (4th year, Mesecar lab, singha27@purdue.edu) and Bridget Kaiser (4th year, Mesecar lab, kaiser66@purdue.edu)

HR, Employment and Benefits Summary

The OGSPS Staff Employment Manual contains detailed information on all aspects of employment including payroll, insurance, leave time and other benefits. Please refer to it for the most updated and complete information. <https://www.purdue.edu/gradschool/documents/gpo/graduate-student->

employment-manual.pdf. Below is a brief summary of this information and links to relevant web sites for quick reference.

Parking Permits: <https://www.purdue.edu/parking/permits/students/index.html>

Printing: Graduate students get an \$80 annual print/copy quota (= 2,000 BW copies) for academic use at any ITaP printer locations on campus. See: https://it.purdue.edu/facilities/instructionallabs/printing/print_quotas.php

Keys: Keys are issued for the outside door of the laboratory/building to which students are assigned. Some buildings require individuals to swipe their PU ID to gain entrance to the building.

Mail: After a student is assigned to a Major Professor, their mail will be delivered to the lab's mailbox. Mailboxes are located in BCHM 18.

Pay: Students are paid every other Wednesday. A Biweekly Calendar of Pay Dates can be found at: <https://www.purdue.edu/hr/paytimepractices/paycontractdates/fycontractbi.php> Employees are paid via direct deposit. A detailed earning statement and direct deposit notice of net pay, indicating applicable deductions, is available through Employee Launchpad - SuccessFactors. See One Purdue at <https://one.purdue.edu/>.

One Purdue: <https://one.purdue.edu/> Employee Launchpad – SuccessFactors, myPurdue, and many other links to employee and student information are located at this site.

Leaves: All leaves/time off must be requested using the SuccessFactors system for which Boiler Key login is required. Leaves must be approved by the Major Professor, unless the student is serving as a teaching assistant in which case, they will be approved by Dr. Orla Hart. Any leaves taken during a semester when a student is a teaching assistant must be coordinated with the instructor for whom the student is serving as a teaching assistant, Dr. Hart and the student's Major Professor.

Vacation: Fiscal year graduate staff paid vacation begins to accrue from their employment start date. Four hours are accrued in the months of September and March and 8 hours in all remaining months. Vacation leave must be requested through the SuccessFactors system. Vacation in excess of 22 days is forfeited.

Holidays: Fiscal-year, Benefits-Eligible Graduate Student Staff receive paid leave for all official University holidays. The Purdue Holiday schedule is at <https://www.purdue.edu/hr/Benefits/LTD/holidays.php>

Class Breaks: When classes are not in session, graduate students are still in work status unless they take vacation leave. Questions regarding leaves of absence should be directed to Human Resources – Employee Benefits at 765.494.2222 or e-mail hr@purdue.edu.

Sick Leave: Graduate student staff are eligible for ten working days per year of paid sick leave for illness. "Illness" is defined as a staff member's own illness, disabling injury, or pregnancy.

Illness in Family: Graduate student staff are eligible for three working days per fiscal year paid leave for immediate family illness (spouse, parents, children, grandparents, grandchildren, sisters, brothers, and corresponding in-laws, step-relatives, and any other relative residing in the employees home.)

Bereavement Leave: Graduate student staff are eligible for up to five (5) working days per occurrence of paid bereavement leave for a death in the immediate family. One work day is allowed for other relatives or fellow employee. Refer to the Graduate Staff Employment Manual for more detail, or check with the business office.

Jury and Witness Duty: Graduate student staff are eligible for paid leave of absence as a juror or court witness if a subpoena is issued by a court.

Military Leave: Graduate student staff who are members of the Indiana National Guard, or members of the reserve components or retiree personnel of the US naval, air, or ground forces, and are required to report for up to 15 days, may take a leave for military duty without loss of benefits, time, or pay. Refer to the Graduate Staff Employment Manual. For questions contact Human Resources – Employee Benefits at 765-494-2222 or e-mail hr@purdue.edu.

Paid Parental Leave Policy: Purdue University has Paid Parental Leave to benefits eligible employees, including graduate student employees. To qualify, graduate staff must have been employed by the University for at least one continuous year (12 months), half-time or more, in a benefits-eligible position. An Eligible Employee must give their supervisor at least 30 calendar days advance notice of this leave or as soon as is practicable. Questions regarding Paid Parental Leave Policy may be directed to Human Resources – Employee Benefits at 765-494-2222 or e-mail at hr@purdue.edu.

Insurance: Graduate research and teaching assistants with appointments of 50% or greater are covered under Purdue’s insurance program for graduate student staff. Each graduate staff member pays an annual premium via payroll deduction and the University covers the remaining cost. A graduate staff member has the option of insuring their spouse and dependents under the same plan. The graduate staff member is responsible for 100% of these premiums. Eligible graduate staff who have medical coverage through other sources can opt out of the coverage. International students are required to obtain health insurance. Information is provided by the Bursar's Office at registration time. Worker's compensation covers accidents occurring while on the job in the lab.

Fringe Benefits & Privileges of Graduate Research Assistants, Teaching Assistants and Instructors:

Accident Insurance	Worker's compensation
Group Medical Insurance	Graduate staff are covered by Purdue’s insurance program for graduate student staff if graduate appointment or fellowship is 50% or more.
Fee Reduction	Tuition is waived. Current graduate fees are \$298 per semester. Summer session fees are \$149. Student’s employment is certified each semester with the Registrar’s Office by the Graduate Program Coordinator
Staff Dependent Fee Reduction	Yes, staff spouse/staff child reduction
Parking Privileges	Yes, for a fee. C permit, A/B permit if employed 75% or more
City Bus	Free with pass, see https://www.purdue.edu/parking/green_benefits/city-bus.html
Co-Rec Gymnasium	Included in fees
Athletic Tickets	At staff rate
Purdue University Hospital	Included in fees

Counseling & Psychological Services (CAPS): Clinicians are available for mental health emergencies. If a crisis is life threatening, please call 911 or call 988 to contact the National Suicide and Crisis Lifeline. Otherwise, hours for walk ins at CAPS are 8 a.m. to 5 p.m. Monday to Friday. To speak to a clinician, call (765) 494-6995 and press #1 for consultation and/or referral.
<https://www.purdue.edu/caps/services/therapy/index.html>

Appendix 1: Expectations for Progress in the Program

Expectations During First Year: Completing required graduate coursework in their first year is part of the transition from an accomplished undergraduate to a successful PhD. Success in graduate school requires students to take ownership of their own learning and professional development. Because there is less structure in a graduate program, students are accountable for keeping their research focused and on track, taking initiative to read related literature, making sure they are fulfilling degree requirements, and meeting expectations of research progress. At the same time, students should understand that stipends and research supplies are paid from grants awarded to faculty members by the federal government, private foundations, or other outside sources. As a recipient of such funds, students are obligated to contribute to the scientific enterprise by publishing their research findings.

Hallmarks of Success for First-year Students: Below are goals for students in the first year of the Biochemistry and Molecular Biology Graduate program to serve as a gauge of student progress. The first year is different from subsequent years in that students are rotating in different labs, learning about the department, and completing course requirements. Once course and elective requirements are met, subsequent years are spent primarily on research in the Major Professor's laboratory and publication of research findings.

- Realize that a graduate student's position is a professional appointment with professional responsibilities, not a continuation of undergraduate studies.
- Understand that each student's reputation in the department will be based in large part on productivity in the lab as shown by the generation of new data and publications.
- Handle course material efficiently and effectively. Most required courses are taken during the first year.
- Balance course work with commitments to laboratory research.
- Attend all Tuesday Faculty Seminars, attend all Friday Grad/Postdoc Seminars and any other special departmental seminars.
- Work professionally and safely with others in the laboratory, and in general be a good lab citizen.
- Show initiative and effort in first-year laboratory rotations with regard to both experimental work and intellectual understanding of the project.
- Assemble and present their research at the end of each lab rotation to fellow lab members to demonstrate their basic knowledge of the research area and the project data they acquired. This presentation will also be submitted to the First Year Graduate Chair at the end of each rotation.
- Select and be accepted into a permanent lab.
- Make their first departmental presentation in the Grad/Postdoc Seminar Series in the spring semester that describes their ongoing or anticipated project in their thesis lab.
- Be sufficiently proficient at research that they have generated several completed figures for their first manuscript, or a manuscript being prepared by someone else in the lab.

Expectations for Continuing Progress: Each year, reasonable progress should be made and is expected in order to stay in the program. All students in the Biochemistry and Molecular Biology Graduate Program are expected to:

- Demonstrate a strong commitment to research and give scientific endeavors highest priority.
- Show initiative and effort in both experimental work and intellectual ownership of their project.
- Continue to read literature, increase knowledge of research related to their field of study, and seek professional development opportunities.

- Attend departmental and other relevant seminars.
- Attend and make presentations at lab meetings that demonstrate an advancing knowledge of research area.
- Work professionally with others in the laboratory and fulfill lab responsibilities.
- Conduct themselves in a professional, safety conscious, and ethical manner.
- Seek opportunities to serve as a mentor, either to undergraduate students or to newer graduate students in the lab.

Expectations After Permanent Lab Assignment: Benchmarks for subsequent years of the Biochemistry and Molecular Biology Graduate Program are described below to help students gauge their progress. These are intended as exemplary guidelines only, as progress and expectations are often project- and lab-dependent.

- Year 2
 - Completed core course work with a strong GPA, preferably greater than 3.5.
 - Scheduled and hold first advisory committee meeting in first semester of 2nd year.
 - Be acquainted with most literature in areas directly related to research topic.
 - Present research findings as a poster during the Biochemistry Research Retreat.
 - Design experiments and conduct research in consultation with their advisor.
 - Have research for a first manuscript almost complete, with most figures assembled and an outline of manuscript.
- Year 3
 - Taken and passed the preliminary examination.
 - Master prior literature in areas directly related to research topic and demonstrate a good knowledge of research area.
 - Present research findings as a poster or oral presentation at an intra- or extra-mural meeting.
 - Perform research well enough to manage and benefit from the assistance of trained undergraduates.
 - Begin or continue to design and conduct experiments independently.
 - Have first manuscript in press.
 - Participate in the Graduate Student Association in some way, including the selection of student-invited speakers.
 - Make a presentation at a regional or national meeting.
- Years 4-5
 - Keep up with new literature directly and peripherally related to research topic.
 - Demonstrate a thorough knowledge of research area, setting an example for more junior students.
 - Present research findings orally during the Biochemistry Department Retreat.
 - Be a mentor to newer graduate students in all aspects of professional development and research integrity.
 - Take initiative and provide leadership in dealing with the operation of their lab.
 - Train undergraduates to complete unfamiliar tasks and mentor undergraduate students in the theory, design, and practice of specific laboratory experiments.
 - Design and conduct all experiments independently and give advice to newer graduate students on research techniques and experimental design.
 - Identify new research opportunities that are based upon current experimental goals.
 - Critically evaluate and review the manuscripts of others.

- Present research findings as a poster or oral presentation at a regional, national, or international conference.
 - Begin to make inquiries concerning post-doctoral or industrial positions.
- When appropriate
 - Serve as Teaching Assistant and fulfill the responsibilities of the position efficiently and effectively.

Appendix 2: Annual Progress Report Instructions and Example

The first section of the document will list the student's name, Major Professor's name, the date in which they entered the program, and the date when they expect to complete their thesis research. For each academic year, the student should list the following information documenting major achievements and milestones:

- Give courses completed with grades earned.
- Include formal oral presentations of student's research and the dates they were given. These may include rotation talks, formal presentations given at lab group meetings, talks given at the annual Biochemistry retreat, presentations given at journal clubs or other seminar series on campus, and presentations given at professional meetings.
- All poster presentations at local meetings on campus or at national or international meetings. Include the title of the poster, name of the event, location, and dates. Please list any special awards or recognition received.
- All peer-reviewed authored or co-author publications. List publications that were submitted to a journal, are in press, or were published. Do not list publications that are in progress. List book chapters, published presentations from academic conferences, scientific publications on the internet or special technical reports, but they must be clearly distinguished from standard peer-reviewed articles.
- Any competitive fellowship applications submitted whether funded or not. Include the date submitted, the funding agency, and the outcome (pending, not funded, or funded).
- Special recognition or scientific related awards. List award name, organization giving the award, and date received.
- Include the date when the Preliminary Exam was completed.
- Service as a teaching assistant and include the course, semester, and instructor of the course.
- Serving as a mentor for an undergraduate or new graduate student in the lab can be included if student played a substantial role in guiding and instructing the mentored student that is acknowledged by their Major Professor.
- There may be other professional achievements that are suitable for inclusion. Please consult with the Major Professor to determine whether an activity or achievement is appropriate for this document.

An example Annual Progress Report Example is provided on the next page.

Student Name: Jane Doe
Major Professor: Boris Badenov
Date of Entry into Graduate Program: Fall 2023
Proposed Year of Graduation: Spring 2028

Year 1 Sept 2023 - August 2024

Courses Completed: BCHM 60100 A, BCHM 60200 A, BCHM 60300 B+, BCHM 60400 A, BCHM 60500 B+, STAT 50300 A+, BIOL 66200 A, BCHM 61000 A
Oral Presentations: 3 Rotation Presentations, 1 presentation in Grad/Postdoc Seminar Series.

Year 2 Sept 2024 - August 2025

Courses Completed: BCHM 66400 A, BIOL 54100 B, MCMP 62500 A, ENTM 61200 A, BCHM 69000 (1) A
Oral Presentations: 1st Annual Thesis Committee Meeting, Lab Group Meetings (3): Oct 2024, Feb 2025, May 2025
Fellowship: NSF Pre-doctoral Fellowship, Nov 2024 - Not Funded

Year 3 Sept 2025 - August 2026

Courses Completed: BCHM 69000 (2) A
Passed Preliminary Exam Nov 2025
Oral Presentations: 2nd Annual Thesis Committee Meeting Lab Group Meetings (4): Sept 2025, Dec 2025, Feb 2026, May 2026
Poster Presentations: Biochemistry Annual Retreat, October 2025 Characterization of the MP2 kinase, Doe, J., and Badenov, B.; ASBMB 2026 Annual Meeting, San Francisco, CA, April 2026, The MP2 kinase regulates the nuclear localization of the YFG protein. Doe, J., Jetson, G., and Badenov, B.
Publications: Spacely, A., Doe, J., Jetson, G., and Badenov, B. (2026) MP2 binds the Xxz activator in a hormone-dependent manner. J. Biol. Chem. 282: 1601-1606.
Fellowship: American Heart Association Predoctoral Fellowship, January 2026-Dec 2028
Mentoring: Supervised Maxwell Smart, undergraduate student, Summer 2026

Year 4 Sept 2026 - August 2027

Teaching Assistant: BCHM 561, Spring 2027, Dr. Kirchmaier
Oral Presentations: 3rd Annual Thesis Committee Meeting Lab Group Meetings (4): Sept 2026, Nov 2026, Feb 2027, April 2027 Biochemistry Annual Retreat, October 2026
Poster Presentations: Purdue Cancer Center Retreat, Sept 2026, Identification of Substrates for the MP2 kinase, Doe, J., and Badenov, B.; FASEB Summer Research Conference, Protein Phosphorylation, July 13-18, 2027, Snowmass Village Conference Center Snowmass Village, CO, Mechanism of Regulation of the MP2 kinase. Doe, J., Smart, M., and Badenov, B.
Publications: Doe, J. and Badenov, B. (2027) The MP2 kinase is Regulated by the AMP kinase in Cardiac Myocytes. EMBO J. 26: 2635-2640. Doe, J., Fatale, N., and Badenov, B. (2027) The Dynamic Subcellular Localization of the MP2 Protein Kinase Governs Its Access to Substrates. Mol. Cell Biol. manuscript submitted.
Mentoring: Helped Supervise Nell Fenwick, new graduate student, Fall 2026

Appendix 3: Guidelines for Evaluation of Committee Meeting Performance

The Advisory Committee will use this document as a guide in assessing your performance during your committee meeting. It will be important to carefully consider these criteria when conducting your research and preparing for your committee meeting. As part of the evaluation process, the committee will rate your performance in each of the five major categories and record their consensus ratings on the attached form. In making their final decision, committee members may use their own discretion in assessing the relative importance of these criteria, and each of the five major categories will not necessarily receive equal weighting. Expectations will also reflect the length of time that the student has spent in the program.

- Overall Breadth of Knowledge
 - Student exhibits knowledge of pertinent literature and underlying theoretical concepts
 - Student understands and can discuss the data supporting the major concepts/hypotheses/models in the field
 - Student understands principles and/or theory underlying proposed experimental techniques
 - She/he is able to synthesize knowledge from multiple fields or disciplines
- Originality and Significance of the Research
 - Research is original and addresses important issues within the field where there is a gap in understanding or a reason to challenge existing hypotheses or dogma
 - Student can articulate the significance of their findings and can explain how those findings advance the field
 - It is clear the student has made independent contributions to the research project, which extend beyond the technical execution of the experiments.
- Critical Thinking and Experimental Design
 - Student formulates testable hypotheses or models
 - Student can explain how and why the proposed experiments will provide an adequate test of the hypotheses or models
 - The rationale for the experimental approaches employed in each aim/objective is strong and clearly articulated
 - Student explains how anticipated results will be interpreted, and defines conditions under which data will support or contradict the hypothesis
 - Student understands the limitations of proposed experiments and includes potential alternative approaches
 - Student understands the scientific method and has critical thinking skills expected of a PhD candidate
- Communication Skills (Written)
 - Document is organized in a concise and logical manner
 - Writing style is scientifically rigorous and precise; the text contains no jargon or vague terminology
 - Writing is of a quality adequate for publication
 - There are few errors in grammar, punctuation, spelling and word use
 - Literature is adequately cited
 - Figures have properly labeled axes; figures and tables contain clear and concise legends
- Communication Skills (Oral)
 - Background information is presented in a logical, clear and coherent manner
 - Slides/overheads are clear, properly labeled, not crowded with text or data, and well

organized

- Student exhibits no distracting mannerisms or nervous habits when speaking
- Responses adequately address the questions/issues posed by committee members
- Responses to questions are clear and reveal depth of knowledge and command of subject
- Student exhibits confidence, is comfortable fielding questions and performs well on their feet

Appendix 4: Guidelines on Writing a “Project-Adjacent” Preliminary Exam Proposal:

As mentioned previously, students have the option of writing a Preliminary Exam Proposal that is entirely unrelated to their research and the research ongoing in their Thesis Advisor’s lab, although it is often much more difficult to identify a suitable topic, develop testable hypotheses, and become sufficiently familiar with the research area to successfully defend a proposal that focuses on it. Instead, it is strongly recommended that students write a proposal that is “project adjacent” so that they already have a baseline of familiarity with the topic area and can more readily identify questions that are outstanding in the field. Further, in the course of preparing for the exam, the student will gain a greater understanding of their own area of research that will benefit them as they continue with their studies. The key to writing a proposal related to a student’s ongoing work is to understand how close is close enough, and how close is too close. One way for a student to think about crafting a “project adjacent” proposal is for them to identify a project that could be assigned to an incoming graduate student who is joining their lab such that their new project shares a common overall theme with those of other students in the lab, but does not overlap with them. Alternatively, it could be a project that a student might want to take on once they finish their Ph.D. if they were to continue on in the Thesis Advisor’s lab as a post-doctoral fellow, but wanted to take on a project related to, but distinct from, their previous research project.

In order to identify a suitable “project adjacent” proposal topic, students should first conduct a comprehensive review of the literature related to their ongoing research. Attention should be paid to studies, theories, or findings that are related to the work but have not been directly incorporated into the current project. Based on reflection and the literature review, new research questions should be considered that are adjacent to the ongoing research but explore different aspects or dimensions of the topic. The factors that might distinguish these new research directions could include changes in biological context, different mechanistic considerations, and/or novel methodological approaches. Students should avoid simply applying the same questions and approaches used in their current research to another related macromolecule involved in the same process being studied. Similarly, students should avoid asking whether the process being studied in their current research works the same way in a different organism, as this would only result in an incremental increase in knowledge.

Another possibility would be for students to consider exploring interdisciplinary projects or approaches that could complement their ongoing research and open up new avenues for inquiry. If students decide to take this approach, they should look for connections or intersections between their field of study and other disciplines that could inspire important and innovative research questions. Students should consider how addressing these questions with novel perspectives or approaches could contribute to the broader understanding of the field.

Finally, students should ensure that their selected research question and proposed topic do not overlap with their ongoing research project. They should avoid duplicating efforts or revisiting questions that are already being addressed in their current work or the projects of their lab co-workers. As with any proposal, students should clearly articulate the significance of their proposed research question and its potential contribution to the field. There are many questions that can be asked. Students should explain why addressing this particular question is important and how it fills a gap or extends existing knowledge in their area of study in an important way.

Appendix 5: Example Cover Page for Written Preliminary Exam Document

TITLE
Student Name
Preliminary Exam Committee
Dr. XXX, Dr. YYY, Dr. ZZZ, Dr. CCC
Preliminary Exam November 15, 2024
2:30 PM
BCHM 101

This document has been submitted for screening by iThenticate and a PDF report generated from this screen will be sent to the preliminary examining committee chair.

_____ (Student Signature)

Appendix 6: Guidelines for Evaluation of Preliminary Exam Performance

Criteria listed below are given as a guide to assist in evaluating a student's overall performance on the preliminary examination. Committee members may use their own discretion in assigning a weight to each of these criteria.

Knowledge and Scholarship

- Student exhibits knowledge of pertinent literature and underlying theoretical concepts.
- Student understands and can discuss data supporting the major concepts/models in the field.
- Student understands principles and/or theory underlying proposed experimental techniques.
- Student is able to synthesize knowledge from multiple fields or disciplines.
- Student effectively supports the novelty, importance, and validity of their ideas and hypotheses using existing literature.

Communication Skills – Written and Oral

- Document is organized in a concise, logical manner and writing is of adequate quality to publish.
- There are few errors in grammar, punctuation, spelling and word use.
- Literature is adequately cited.
- Figures have properly labeled axes; figures and tables contain clear and concise legends.
- Background information is presented in a logical, clear and coherent manner.
- Slides are clear, properly labeled, not crowded with text or data, and well organized.
- Responses adequately address the questions/issues posed by committee members.
- Responses to questions are clear and reveal depth of knowledge and command of subject.
- Student exhibits confidence, is comfortable fielding questions and performs well on their feet.
- Student is able to draw models, flow charts, etc. on the board when requested.
- Provides detailed background information, experimental strategies and alternative strategies.

Critical Thinking

- Student independently developed their specific aims.
- Student understands the scientific method and has critical thinking skills expected of a Ph.D. candidate.
- Student questions the validity of scientific conclusions, hypotheses, and models based on experimental results and recognizes and identifies invalid assumptions, inconsistencies, or alternative explanations.

Ethical and Responsible Research

- Student has demonstrated the ability to conduct research, scholarly and/or creative endeavors in an ethical and responsible manner that aligns with best practices in their field of study.

Professionalism

- Student demonstrates professionalism consistent with expectations/norms in their field of study.

Originality and Significance of the Proposal.

- Proposal is original and addresses important issues in the field where there may be a gap in understanding or a reason to challenge existing hypotheses or dogma.
- Student articulates significance of anticipated findings to explain how they may advance the

field.

- Proposal does not simply involve the application of standard, established experimental paradigm to a new system or organism; creative and innovative ideas and approaches are viewed favorably.

Experimental Design

- Student formulates testable hypotheses or models.
- Student explains how and why proposed experiments provide an adequate test of hypotheses or models.
- The rationale for experimental approaches for each aim/objective is strong and clearly articulated.
- Student explains how expected results will be interpreted, which conditions will either support or contradict the hypothesis, and understands the limitations of proposed experiments and includes alternative methods.

Appendix 7: Guidelines for Avoiding Plagiarism:

The following guidelines are taken directly from “Avoiding plagiarism, self-plagiarism, and other questionable writing practices: A guide to ethical writing. Miquel Roig St. John’s University 2015”. The full text is available at <https://ori.hhs.gov/sites/default/files/plagiarism.pdf>

- An ethical writer ALWAYS acknowledges the contributions of others and source of ideas.
- Any verbatim text taken from another author must be enclosed in quotation marks.
- We must always acknowledge every source that we use in our writing; whether we paraphrase it, summarize it, or enclose it quotations.
- When we summarize, we condense, in our own words, a substantial amount of material into a short paragraph or perhaps even into a sentence.
- Whether we are paraphrasing or summarizing we must always identify the source of the information.
- When paraphrasing and/or summarizing others’ work we must reproduce the exact meaning of the other author’s ideas or facts using our words and sentence structure.
- To make substantial modifications to the original text resulting in a proper paraphrase, an author must have a thorough understanding of the ideas and terminology being used.
- A writer has an ethical responsibility to readers, and author/s from whom s/he is borrowing, to respect others’ ideas and words, to credit those from whom we borrow, and whenever possible, to use one’s own words when paraphrasing.
- When in doubt as to whether a concept or fact is common knowledge, provide a citation.
- Authors who submit a manuscript for publication containing data, reviews, conclusions, etc., that have already been disseminated in some significant manner (e.g., published as an article in another journal, presented at a conference, posted on the internet) must clearly indicate to the editors and readers the nature of the previous dissemination.
- Authors of complex studies should heed the advice by Angell & Relman (1989). If the results of a single complex study are best cited as a ‘cohesive’ single whole, they should not be partitioned into individual papers. If there is any doubt as to whether a paper submitted for publication presents fragmented data, authors should enclose other papers (published or unpublished) that might be part of the paper under consideration (Kassirer & Angell, 1995). Similarly, old data that is merely augmented with additional data points and that is then presented as a new study can be an equally serious ethical breach.
- Because some instances of plagiarism, self-plagiarism, and even some writing practices that might otherwise be acceptable (e.g., extensive paraphrasing or quoting of key elements of a book) can constitute copyright infringement, authors are strongly encouraged to become familiar with basic elements of copyright law.
- While there are some situations where text recycling is an acceptable practice, it may not be so in other situations. Authors are urged to adhere to the spirit of ethical writing and void reusing their own previously published text, unless it is done in a manner consistent with standard scholarly conventions (e.g., by using of quotations and proper paraphrasing).
- Authors are strongly urged to double-check their citations. Authors should always ensure that each reference noted in the body of the manuscript corresponds to the correct citation listed in the reference section and vice versa. Each source listed in the reference section must be cited at some point in the manuscript.
- Authors should only use the original paper’s citation (e.g., spelling of authors’ names, volume number of journal, pagination) rather than a citation that appears on a secondary source to be

certain it's correct. Finally, you should ensure that you credit those authors who first reported the topic or phenomenon being studied.

- The references used in a paper should only be those that are directly related to its contents. The intentional inclusion of references of questionable relevance for purposes of manipulating a journal's or a paper's impact factor or a paper's chances of acceptance is an unacceptable practice.
- Authors should follow a simple rule: Strive to obtain the actual published paper. When the published paper cannot be obtained, cite the specific version of the material being used, whether it is conference presentation, abstract, or an unpublished manuscript.
- Generally, when describing others' work, do not rely on a secondary summary of that work. It is a deceptive practice, reflects poor scholarly standards, and can lead to a flawed description of the work described. Always consult the primary literature.
- If an author must rely on a secondary source (e.g., textbook) to describe the contents of a primary source (e.g., an empirical journal article), s/he should consult writing manuals used in her discipline to follow the proper convention to do so. Above all, always indicate the actual source of the information being reported.
- When borrowing heavily from a source, authors should always craft their writing in a way that makes clear to readers, which ideas are their own and which are derived from the source being consulted.
- When appropriate, authors have an ethical responsibility to report evidence that runs contrary to their point of view. In addition, evidence that we use in support of our position must be methodologically sound. When citing supporting studies that suffer from methodological, statistical, or other types of shortcomings, such flaws must be pointed out to the reader.
- Authors have an ethical obligation to report all aspects of the study that may impact the independent replicability of their research.
- Researchers have an ethical responsibility to report the results of their studies according to their a priori plans. Any post hoc manipulations that may alter the results initially obtained, such as the elimination of outliers or the use of alternative statistical techniques must be clearly described along with an acceptable rationale for using such techniques.
- Authorship determination should be discussed prior to commencing research collaboration and should be based on established guidelines, such as those of the International Committee of Medical Journal Editors.
- Only those individuals who have made substantive contributions to a project merit authorship in a paper.
- Faculty-student collaborations should follow the same criteria to establish authorship. Mentors must exercise great care to neither award authorship to students whose contributions do not merit it, nor to deny authorship and due credit to the work of students.
- Academic or professional ghost authorship in the sciences is ethically unacceptable.

References cited above:

Angell, M. and A.S. Relman (1989). Redundant publication. *New England Journal of Medicine*, 320, 1212-14.

Kassirer, J. P. & Angell, M. (1995). Redundant publication: A reminder. *The New England Journal of Medicine*, 333, 449-450.