

Department of
Biochemistry, Microbiology and Immunology
Biochemistry & Molecular Biology
Master of Science Handbook

Revised April 2021

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Welcome from the Chair

To prospective and current students, thank you for your interest and participation in our graduate programs.

The Department of Biochemistry, Microbiology, and Immunology (BMI) serves our community, state, nation, and the world by applying principles of these disciplines to the improvement of health and wellness for all members of our society, including historically underserved populations. We accomplish important parts of this by providing high quality classroom education that is coupled with opportunities to perform pioneering research. This will enable you to development into a scientific leader in the international biomedical arena.

Our students learn how to work independently and collaboratively on multidisciplinary biomedical problems, in the context of high standards in research and scholarship. Our educational programs facilitate development of critical skills in areas such as experimental design, robust application of classic and modern laboratory methods, data analysis, performing research in accordance with the highest ethical standards, and preparation of data for written and oral presentation.

We have a long tradition of students participating in and presenting data at national and international scientific conferences, and of ultimately assuming positions of significant responsibility in academia, industry, and government.

This Handbook provides a roadmap for navigation of the complexities of your chosen graduate program. Your fellow students and the faculty will be there to fill in the gaps and to provide educational and personal support during the challenging periods that are part of what will be a period of tremendous personal and professional growth for you.

We are in this together. Best wishes for the journey,

Philip E. Pellett, Ph.D.
Professor and Chair
Department of Biochemistry, Microbiology and Immunology
Wayne State University School of Medicine

Purpose of the Handbook

As a student, you are here first-and-foremost for your education. The role of the Department and the Graduate School, from the viewpoint of the student, should be to foster individual, scientific, and professional growth. That being said, the intent of this handbook is to both guide and protect the students along the path to degree completion. While this guide may not answer all the questions students come upon, it should at least point in the right direction. It is important to note that all students are expected to be familiar with and adhere to the rules and regulations set forth by the Department and the University whether they are contained within these pages or not. I wish you the best of luck as you begin your journey. I know you'll do great.

William L. Close, Ph.D.
Graduate Student President, 2015 – 2017

Mission Statement

The Department of Biochemistry, Microbiology, and Immunology (BMI) serves our community, state, nation, and the world by applying the principles of these disciplines to the improvement of health and wellness of all members of our society, including historically underserved populations. We provide our diverse student body with high quality biomedical scientific education and opportunities to perform pioneering research that will enable their development into scientific leaders in the international biomedical arena. The Department offers two separate graduate programs: (1) Immunology and Microbiology and (2) Biochemistry and Molecular Biology. Each program offers both Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees. Graduates from the Biochemistry and Molecular Biology division will acquire a broad understanding of the concepts and methodology in the field, as well as a high level of expertise deriving from their original thesis research, which is an unusually large component of this degree and prepares students for PhD research, related commercial research, and liaison roles in the industry.

Learning Outcomes

Fundamental Principles

Students will understand the fundamental principles and be able to evaluate the scientific literature of their disciplines.

Research Skills

Students will be able to design, execute and interpret state-of-the-art experiments in their discipline.

Research Ethics

Students will be familiar with principles and guidelines for ethical conduct of biomedical research, and competent in applying these to research in their discipline.

Scientific Communication

Students will develop skills in oral, graphic, and written communication of scientific ideas and data to audiences that range from scientifically naïve to specialists in the areas of the student's research.

Graduate Programs

Two graduate programs are offered by BMI: the Immunology and Microbiology Program and the Biochemistry and Molecular Biology Program. Each program offers both a Doctor of Philosophy (Ph.D.) track and a Master of Science (M.S.) track. Each program has distinct admission requirements, course offerings and graduation requirements.

This Handbook describes the M.S programs in the Biochemistry & Molecular Biology division of the department.

BMB Master of Science (M.S.) Program

Overview of the Program

The M.S. degree in Biochemistry and Molecular Biology requires 30 graduate credits and a written thesis based on the successful completion of an original research project. The

program typically takes two years to complete. Due to the accelerated time frame required to finish an M.S. degree, students will need to think critically and have a clear goal in mind. Throughout the process, students will experience various disciplines while honing their individual, professional, and scientific acuity.

Admission Requirements

Applicants must meet the following minimum requirements and comply with all other requirements from the Office of Graduate Admissions:

- Qualified applicants must hold a B.S. or B.A. degree, usually with a major in Biology, Chemistry, or in approved cases, Physics or Mathematics from an accredited college or university. Competitive applicants should have a strong undergraduate background in the basic biological, chemical, and physical sciences.
- An undergraduate grade point average (GPA) of 2.8 is required together with strong grades in science courses.
- Applicants must also submit the following documents and information:
 - (Optional but recommended) Graduate Record Examination (GRE) scores. When requesting official GRE test scores from ETS, the Department Code 0202 for biochemistry should be used.
 - Three letters of recommendation, preferably from faculty members who know you and your academic work. Ask your letter writers to tell us how they know you, and their opinion about your potential for success in a career related to your area of interest.
 - A personal Statement of Purpose (one page). Include a description of long-term goals, research experiences, and why our program seems suited for you.
 - Approval by the BMB MS admissions committee and by the Graduate Admissions Office
 - International students must satisfy English Proficiency Requirements of the Wayne State University Graduate School. All applicants are required to provide evidence of proficiency in English to the Office of Graduate Admissions. A minimum score of 550 (paper based), 213 (computer based) or 79 (Internet based) is required on the Test of English as a Foreign Language (TOEFL), 6.5 is required on the International English Language Testing System (IELTS), or 85 is required on the Michigan English Language Assessment Battery (MELAB). Please report your TOEFL score to Wayne State University using institution code 1898.
- Other Graduate School Admissions policies can be found at the [Office of Graduate Admissions](#); you can also enter the online application portal at this website.
 - **Checklists for:**
 - Domestic Students
 - International Students
 - **Registration** information
 - **Financial aid**
- **Email** questions with subject heading "Masters Applicant" to:
 - April Wolak: awola@med.wayne.edu
 - Dr. Robert Akins: rakins@med.wayne.edu

Tuition

- Tuition per term can be estimated with this [calculator](#).
- Currently, the Department of Biochemistry, Microbiology, and Immunology does not offer financial assistance to students pursuing an M.S. degree. Students are encouraged to apply for various grants and awards, both inside and outside of the University, to help reduce their cost towards degree. The WSU Graduate School posts several [competitive awards](#), including some specifically for MS students. Students may file a [FAFSA](#) and apply for financial aid or college work study through the University to help finance their degree. Some students also elect to maintain a job outside of schooling to offset living expenses and tuition costs; this may extend the time needed to complete the research needed for the thesis.
- In some years, the department may have its own scholarship program. If funding is available, the BMI graduate committee will make decisions on recipients based on first semester performance. The merit scholarship provides 50% of tuition and fees per academic year for 22 research credits and journal club courses required by the program after the initial semester. The award starts with the second semester. Full time research is expected of award recipients (~30+ hours per week). Courses taken beyond program requirements are not covered by the scholarship and will void the agreement unless approved by the adviser and Graduate Committee via the Full Time Commitment form. Leaves of absence for a semester will extend the date of completion by a semester; merit for the return semester will be evaluated on the last semester of attendance.

Program of Study

Overview

- A minimum of 30 credit hours are required for M.S. degree completion; 15 to 19 of these credits must be from research, 8 from core courses (BMB7010 and BMB7030), 3 from Journal Club (BMB7890), and 0-4 from optional elective courses with adviser approval.
- The first semester focuses on classroom instruction, during which students will select a thesis adviser and committee, and draft a Research Proposal, typically following short informal rotations in at least two labs; the length of these is negotiated with specific advisers, typically two weeks. The committee consists of the adviser and two other BMI faculty. Students also complete a Plan of Work (listing courses the student intends to take over the remaining semesters) at the end of the 1st Fall semester in consultation with their adviser.
- From the 2nd semester on, the attention shifts to conducting thoughtful and thorough research in the laboratory and field of their choice. Program expectations include ~30 hours of lab work per week for the Winter, Spring-summer, 2nd Fall and 2nd Winter semesters.

A typical course plan is:

| Year | Fall | Winter | Spring-Summer | Credits |
|------|--|---|-------------------------------------|---------|
| 1 | BMB 7010 General Biochemistry 4 cr; BMB 7030 Core Concepts 4 cr; BMB 7890 Journal Club 0 cr ^a | BMB 7996 Research 7 cr ^b ; BMB 7890 BMB Journal Club 1 cr ^a | BMB 7996 Research 2 cr ^b | 17 |
| 2 | BMB 7996 Research 2 cr ^b ; Master's research BMB 8990 4 cr; 7890 BMB Journal Club 1 cr ^a | Master's research BMB 8990 4 cr 7890 BMB Journal Club 1 cr ^a | -- | 13 |

^a Attendance at Journal club and seminar is required both Fall and Winter semesters regardless of registration. ^b BMB 7996 research credits are flexible and may be traded for up to 4 credits of formal coursework with adviser approval. Research is expected to be full time from the 2nd semester and is not proportional to registration credit numbers. Note: international students or those with external requirements based on scholarships may have to take credits beyond the 30 required by the program.

Comments:

- Courses between the 5000-6999 levels cannot be used towards a master's degree unless they have been approved by the Departmental Graduate Committee.
- No courses below the 5000 level can be used towards a graduate degree.
- Students enrolled in a master's degree program are required to file a Plan of Work by the end of the first Fall semester. Students who fail to submit a Plan of Work may be required to take additional coursework. Following this, the applicant should petition his/her research adviser to advance to the rank of 'candidate'. Other forms are required and posted on this BB site.
- Master's candidates with less than 16 hours of course credits in BMB may apply to the PhD program with the approval of the Graduate Committee, typically in their first November-December. All credits earned towards the MS degree will apply toward the PhD. Master's candidates with more than 16 hours must complete the Master's degree, and apply to the Ph.D. program if they wish, typically in their 2nd November-December.
- All coursework must be completed in accordance with the regulations of the Graduate School and the College. A minimum G.P.A. of 3.0 must be maintained throughout the program, 3.5 is required to maintain the scholarship. Students should strive to be 1st or 2nd author on one peer reviewed publication to validate the quality of their research and to compete effectively in their post-graduate careers.

Seminars and Research Conferences. Attendance at departmental seminars and journal club presentations in all semesters is mandatory for all graduate students regardless of registration for credits. M.S. students in their first year are required to participate by presenting a journal article of their choice to gain experience in oral presentations. Participation in the annual Chuan-Pu Lee, Ph.D. Endowed Graduate Student Research Presentation Day (GSRPD) is encouraged; this event commemorates the former Professor Emeritus C. P. Lee in our department.

Research Requirements

- The successful completion of an original research project is an essential part of the M.S. program and requires a full-time commitment of ≥ 30 hours per week in the lab after the first semester for Research track students, or after the second semester for Research and Course track students, for the remaining 4 semesters. "Plan of Work" and "Research Plan" forms should be filed by the end of the first semester with the department and with Office of Graduate Studies.
- Thesis committee meetings. Students are required to have a committee meeting in the final weeks of each semester beginning Winter semester of the first year, including a pre-defense committee meeting at which the committee must agree the student is ready to defend. These meetings are important because they ensure that the student is on track, the research being done is of the appropriate quality, and any issues are addressed. The committee will complete a formal evaluation and grade for research credits at these meetings and make recommendations as needed.
- Writing the thesis. In the 2nd Winter semester, students finalize the writing of their thesis, a process that should be ongoing from the time the Research Proposal was approved in the 1st Fall semester. The thesis is written using a format similar to a research paper and is a complete account of all research carried out by the student in pursuit of the degree. **The content of the thesis is at the discretion of the student and their adviser but the formatting must strictly adhere to [guidelines](#) set forth by the Graduate School.** After it is written, committee members should be given at least two weeks to review the thesis and make the necessary corrections/suggestions before submission for the formatting check. In consultation with the adviser, every effort should be made to incorporate the committee members' suggestions in the final version of thesis. A thesis draft, minus the reference section, should be submitted to the program director for a preliminary plagiarism check.
- Final Presentation. The presentation of thesis work consists of an approximately one-hour seminar followed by a question-and-answer session. After all questions have been answered, the student's thesis committee will convene with just the thesis committee for more questions and to decide whether the student has fulfilled all requirements. If the committee is satisfied, the student must make sure all administrative tasks have been completed prior to graduation. This includes final corrections if any, submitting a signed thesis cover page, submitting a signed Final Form, and uploading the final thesis to the WSU digital commons website. Students should consult with their adviser whether or when to make the uploaded thesis visible to the public.

Graduation. Once all requirements have been met and the student is finished with their degree, they are able to participate in the graduation ceremony. It is not required but rather strongly encouraged that students participate. Caps and garments can be rented or bought from the University Bookstore. Students who attend the ceremony will receive their diploma at that time, otherwise it will be mailed. Specific information regarding regalia rental and other ceremony specifics will be emailed to the student by the Commencement Office prior to the event.

Timetable/Deadlines

| Semester | Time | Activity | Form |
|------------------------|------------------------|--|---------------------------------------|
| 1 st Fall | Sept-Nov | Two informal rotations in prospective research labs; length of these is negotiated with specific advisers | |
| | Mid Dec | Select an adviser and committee, fill out BMB MS Commitment Agreement form as part of BMB 7030 | BMB MS Commitment Agreement |
| | Finals week | Consult with adviser on coursework you should register for over the next 4 semesters | Plan of Work |
| 1 st Winter | Jan | Develop Major research question(s) and Specific Aims; present written and 5 min ppt to peers and adviser on a day in the last week Jan as part of BMB 7996 | Research Plan part 1 |
| | Jan-Apr | Begin full time research in adviser's lab; build on written research plan->thesis (more extensive lit review; experimental approaches) | |
| | Finals week | 1 st thesis committee progress report presentation/evaluation | Progress Report; Research Plan part 2 |
| Spring Summer | May-Aug | Continue full time research, continue writing thesis | |
| | Finals week | 2 nd thesis committee progress report presentation/evaluation | Progress Report |
| 2 nd Fall | Sept-Dec | Continue full time research, continue writing thesis | |
| | | 3 rd thesis committee progress report presentation/evaluation; agree on final elements of research needed for completion | Progress Report |
| 2 nd Winter | Jan-Apr | Continue full time research, finalize writing thesis and consult the WSU degree requirements page | |
| | 4 th week | Consult with adviser; apply for graduation; reserve a room for the public Final Defense | |
| | 2 weeks before defense | Distribute copies of the thesis manuscript to committee members for review and to the program director for a plagiarism check; then submit the thesis manuscript electronically to the Graduate School Proquest website for a formatting check; consult with your adviser and submit an Electronic Thesis and Dissertation Permissions Form allowing Wayne State University Libraries to make the dissertation available through DigitalCommons@WayneState | |
| | Before final | Present oral thesis defense; get signatures and finish all format and content revisions for the submitted dissertation manuscript, then resubmit to the Proquest website | Thesis cover page; Final Form |

| | | | |
|---|--------------------|--|--|
| | grades deadline | | |
| Consult the Graduate School deadlines for school-level deadline dates at the start of each semester. Note that students who may not have completed the writing of the thesis can extend graduation to a later semester; as of this writing, no further registration or fees are required. | | | |

Graduate Student Resources

[WSU Graduate Bulletin](#) for policies, regulations, deadlines, tuition, calendar etc

BMB Forms:

- [Change in Plan of Work \(pdf\)](#)
- [Final Report \(pdf\)](#)
- [Membership payment request \(pdf\)](#)
- [Plan of Work Full-time Research Track \(pdf\)](#)
- [Plan of Work Research Track \(pdf\)](#)
- [Plan of Work Student Track \(pdf\)](#)
- [Approved Courses for Student Track \(pdf\)](#)
- [Progress Report \(pdf\)](#)

Housing

- Housing may be off-campus or in university sponsored housing as described at this [link](#).

Parking

- Students may purchase parking passes from the University to park in Parking Structure #4 or Surface Lot #51, both which are located across from Scott Hall on East Canfield St. Students that are also considered employees of the University can elect to have costs deducted from their paychecks. For more information, please see the parking and transportation [website](#).

Faculty Research Interests:

BMI faculty research interests are posted by links to individual faculty at this [portal](#); a **list** faculty accepting new students for the current year is posted [here](#).

Graduate Student Council: Overview

The Department of Biochemistry, Microbiology, and Immunology graduate students maintain a student council to facilitate communication, camaraderie, and carrying out of departmental responsibilities. Elections are held at the beginning of the fall semester and terms are one year in length. Holding office increases student engagement with faculty, exposes students to the inner workings of running a department at a research institution, and encourages students to invest in the betterment of the Department.

Graduate Student Council Positions and Duties

President

- Leads monthly graduate student meetings
- Maintains communication between the chair, faculty, and students
- Attends monthly **Faculty Meetings** as a representative of the students
- Delegates tasks needed for Departmental maintenance

Secretary

- Handles correspondence regarding meetings and events
- Maintains student council meeting minutes
- Manages Departmental journal collections

Graduate Student Representative

- Acts as student representative for the Departmental Curriculum Committee and Graduate Committee
- Organizes student interactions during interview process for prospective graduate students and provides feedback to Graduate Officer

Monthly Graduate Student meeting

- All graduate students are encouraged to participate in monthly meetings led by the Graduate Student President, scheduled immediately following the monthly Faculty meeting

Seminar Committee

- Participates in the Seminar Committee and represents student interests in speaker invitations
- Manages communication with local student hosted speakers including sending invitations, arranging visits, setting itineraries, etc.

Social Committee

- Plans monthly student luncheons and outings at local establishments
- Plans the New Student Reception (August), Holiday Party (December), and Departmental Picnic (Summer)

Aline U. and James M. Orten Memorial Lecture. This prestigious annual lecture was endowed by the Orten's, as described at this [link](#). Graduate students take a primary role in nominating the guest lecturer each year.

Student Invited Speaker

Each year, the departmental graduate students vote on and invite **two** seminar speakers from anywhere within the contiguous United States. It is an invaluable opportunity where students are able to interact with renowned researchers and it also serves as a great opportunity for senior students to network in anticipation of their search for post-graduate work. The only rules are students are limited to one candidate per person to maintain equal representation and the topic must be relevant to the department. Voting takes place at a meeting in the fall and all students interested in inviting a speaker are encouraged to prepare a brief (no more than five minutes) presentation for the meeting describing the research and merits of their candidate. After all presentations have been given, all the students anonymously rank their top three choices and the votes are tallied. The person whose candidate wins the vote is then in charge of planning and facilitating their candidates visit for the end of the winter semester. Visits include dinner with a select group of students the night before the seminar, the seminar the day of, and meetings with faculty and students. It is highly encouraged that all students participate regardless of year. For more information, please see the office staff.