

HANDBOOK FOR GRADUATE STUDY
in the
CELL AND MOLECULAR BIOLOGY PROGRAM



College of Natural Science
Michigan State University

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- *Correction of Due Date for Written Comprehensive Exam (Pg. 12-13)*
 - *Clarification of Written Performance Report (Pg. 11)*

CMB HANDBOOK FOR GRADUATE STUDY
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1. INTRODUCTION

The purpose of this Graduate Handbook is to inform students of the directives, regulations, and policies that pertain to the Cell and Molecular Biology (CMB) Program. This Handbook is a reference document for graduate education in CMB that provides program requirements and working guidelines. This Handbook is provided as required by the [Graduate Students Rights and Responsibilities](#) document. This Handbook is not a substitute for, and is superseded by, the following documents:

[Academic Programs](#)

[Graduate Students Rights and Responsibilities \(GSRR\)](#)

[MSU/GEU Contract](#)

[Guidelines for Graduate Student Advising and Mentoring Relationships](#)

[Guidelines for Integrity in Research and Creative Activities](#)

[Policy on Relationship Violence and Sexual Misconduct](#)

[Anti-Discrimination Policy](#)

2. PROGRAM OVERVIEW

2.1 Objective of the CMB Program.

The CMB Program is an interdisciplinary, all-University organization of scholars in multiple departments and is administered by the College of Natural Science. The objective of the Program is to provide training in contemporary cell and molecular biology to qualified students. The major emphasis is on training students for the Doctor of Philosophy degree, and in doing so, to prepare students for a variety of careers. The Ph.D. degree is a research-oriented degree; thus, the emphasis is on experimental and creative work, and the aim is to enable the student to become a self-educating and original scholar. The CMB Program does not host a targeted Master's Degree, but may grant the Master of Science degree in some circumstances. Requests and recommendations for the Master's Degree will be considered through consultation with the student, the Research Adviser, the Guidance and/or Examination Committees, and the Executive Committee.

2.2 Organization of the CMB Program.

The graduate program of each student will be processed through the College of Natural Science. The CMB Program is overseen by the Director and the Associate Director, who are assisted and advised by the Executive Committee. The Program is regulated by Bylaws, which contain the framework of procedures by which the CMB faculty and graduate students govern the Program. As outlined in Article 6 of [Graduate Students Rights and Responsibilities](#), students have the opportunity to elect representatives to the CMB Executive Committee and any ad hoc committees thereof that may arise.

2.4. Year-by-Year Synopsis.

A year-by-year synopsis can be found in [Appendix A](#).

3. PROGRAM COMPONENTS/PLAN OPTIONS

3.1 Degree Programs.

Graduate study leading to the Doctor of Philosophy degree is offered as a stand-alone program, and concurrently with professional education for students of human medicine, osteopathic medicine, and veterinary medicine. When circumstances dictate, graduate study leading to the Master of Science degree is possible. Milestones of the PhD degree programs are entered into Gradplan (<https://student.msu.edu/>) as they are assigned and completed.

3.2 Admissions.

Students enter the CMB Program through the BioMolecular Science (BMS) Gateway. All applications for admission will be considered by the BMS admissions committee, which considers the applicants' transcripts, supporting letters, statement of purpose, GRE and TOEFL scores, in-person interviews, and other factors.

3.3 Doctoral Training Program Components.

The objectives of the Ph.D. program are to provide doctoral students with the fundamental knowledge and research skills so that they may become independent and self-educating scholars. The components are Laboratory Rotations, Courses, Research Forum, Responsible Conduct of Research (RCR), Comprehensive Exam, Teaching, Dissertation, and Final Exam.

3.4 Ph.D. Program Concurrent with Professional Medical Program.

The CMB Program offers Ph.D.-D.V.M., Ph.D.-M.D., or Ph.D.-D.O. programs for the exceptional professional student interested in academic medicine. Unless stated otherwise, the existing directives and requirements for the doctoral program will be followed for students in the concurrent programs. These students must also fulfill requirements of their professional program in the College of Human Medicine, College of Veterinary Medicine, and College of Osteopathic Medicine unless stated otherwise to accommodate existing policy of the colleges. The current university policy on dual degree and dual major programs can be found [here](#).

3.5 Master's Degree Components.

The Master's Degree can be obtained in some circumstances. The components of the Plan A Master's Degree Program are Courses, RCR, Thesis, and Final Research Seminar or Oral

Examination. The components of the Plan B Master's Degree Program are Courses, RCR, Final Report, and Oral Examination.

4. DEGREE REQUIREMENTS

4.1 English Language Proficiency and Residency Requirements.

All international students must fulfill English Language proficiency requirements as part of admission. More information is available from The Graduate School [here](#). Students must fulfill the residency requirements specified by the University Registrar, found [here](#).

4.2 Ph.D. Degree Requirements.

A. Laboratory Rotations.

Most CMB students complete three 8-week laboratory rotations during their first two semesters as part of the BMS program. Each rotation must be in the laboratory of a faculty member from CMB or another participating program (Biochemistry and Molecular Biology, Genetics and Genome Sciences, Microbiology and Molecular Genetics, Physiology, Pharmacology and Toxicology, and Molecular Plant sciences). Following rotations, students select a permanent thesis advisor/research mentor, and formally join the CMB Degree Program.

B. Course Requirements.

Students are required to complete the following courses:

- BMB 801: Molecular Biology
- BMB/MMG/PSL 825: Cell Structure and Function
- One of the following:
 - MMG 833: Microbial Genetics
 - MMG 835: Eukaryotic Molecular Genetics
 - BMB 856: Plant Molecular and Omic Biology
- 2 Elective 3-credit 800 level courses. A [list of potential elective courses](#) is posted on the CMB website and will be periodically updated. This list includes courses that may be used as electives; other courses may also be used.
- 3 CMB 800 Seminar courses, at least two of which must incorporate critical reading, evaluation, and presentation of journal papers. A [list of seminar courses](#) is posted on the CMB website each semester
- 2 semesters of CMB 892: Research Forum. In addition, students are required to present at least one seminar related to their research in CMB 892 every two years (See Section 4.2.C). The [schedule for CMB 892](#) is posted on the CMB website each semester.
- CMB 999: Doctoral Dissertation Research, 24-36 credits

[Elective courses](#) are related to the student's research and are usually chosen in consultation with the Research Mentor; these courses may also fulfill fellowship requirements. [CMB](#)

[800 Seminar courses](#) may be substituted by other graduate-level courses, subject to approval by the CMB Program Director. [CMB 892](#) involves presentation of current research by CMB students, Responsible Conduct of Research (RCR), and faculty seminars. Exceptions to course requirements are based on satisfactory performance in graduate-level courses of similar content. Requests for a waiver from a required course must be approved by the CMB Program Director after consultation with the instructor in charge of the relevant required course.

A minimum of 24 and maximum of 36 CMB 999 credits may be obtained; overrides to exceed the maximum must be approved by the college and registrar. Students should enroll in 1-4 credits per semester, and will be advised on the number of credits on a case-by-case basis.

- C. Seminar Presentations.** Students are required to present at least one seminar every two years in CMB 892 sessions. This includes presenting a seminar they are enrolled in the course, as well as when they are not enrolled. Presentations may include/be focused on their own data; in addition, students early in their programs may present background/historical work that is relevant to the studies they propose.
- D. RCR Requirements**
All students are required to complete training in RCR. Specific requirements are detailed in [Appendix B](#).
- E. Comprehensive Exam**
The comprehensive exam includes written and oral components, and completion must be achieved within 7 semesters of entry to graduate school, including summers. For most students, this is Fall semester of Year 3. Details of the exam are described in section 7.
- F. Teaching Requirement**
Students in the PhD program are required to complete a minimum of 1 teaching assignment. Students should confer with the CMB Program Director and research mentor regarding the timing and nature of the teaching assignment. In their teaching assignments, students may be appointed as Teaching Assistants for MSU courses, which are governed by the rules of the [MSU-GEU collective bargaining agreement](#). Students may serve as TAs for additional semesters to obtain additional training. Students are encouraged to participate in various workshops, courses, and certificate programs that are available through the College and/or Graduate School.
- G. Thesis and Final Exam**
At least six months prior to the expected completion date, doctoral candidates must meet with their Guidance Committee to finalize plans for completion and request permission to write. Details of the thesis and final exam are described in section 8.
- H. Publication Requirement**
One or more accepted peer-reviewed original research publications listing the student as first author or co-first author is expected prior to completion of doctoral research. The

student's Guidance Committee will review exceptions to this guideline. Publications by the student may be incorporated directly into the student's dissertation.

I. Time Limit

The average time to completion is approximately five years. Graduate School regulations specify that all requirements for the Ph.D. must be completed within 8 years from the time when a student begins their first class at MSU that appears on their doctoral program of study. Exceptions to this must be approved by the Program, College, and Graduate School. Upon approval of the extension, students may be required to repeat the doctoral comprehensive exams. Except where specifically noted, timelines and deadlines are for all Ph.D. students including dual degree and early start students.

4.3 Ph.D. Program Concurrent with Professional Medical Program

The course requirements are the same as those of the Ph.D. degree, with the exception that one 800 level elective course is waived, and the teaching requirement is waived. For dual degree students, comprehensive examination must be taken within 5 years from the time when a student enters graduate school. All requirements must be completed within 8 years from the time of the student's first enrollment into the doctoral program.

4.4. M.S. Degree Requirements

A. Plans of study

Plan A M.S. students must complete a minimum of 4 and a maximum of 10 credits of CMB 899 (Master's Research). Plan B M.S. students may complete a maximum of 8 credits of CMB 890 (Independent Study).

B. Course Requirements

Students in the M.S. program are required to earn a total of 30 credits, which must include:

- BMB 801: Molecular Biology
- BMB/MMG/PSL 825: Cell Structure and Function
- One of the following:
 - MMG 833: Microbial Genetics
 - MMG 835: Eukaryotic Molecular Genetics
 - BMB 856: Plant Molecular and Omic Biology
- 2 elective 800 level courses
- 1 CMB 800 course
- 2 semesters of CMB 892 (Research Forum).

Elective courses are related to the student's research and may fulfill fellowship requirements. CMB 800 courses may be substituted by other graduate-level courses, subject to approval by the CMB Program Director.

Exceptions to course requirements are based on satisfactory performance in graduate-level courses of similar content. Requests for a waiver from a required course must be approved by the CMB Program Director after consultation with the instructor in charge of the relevant required course.

C. RCR Requirements

All students are required to complete training in the Responsible Conduct of Research. Specific requirements are detailed in [Appendix B](#).

D. Teaching Requirements

Students in the M.S. program may or may not participate in teaching.

E. Thesis Final Exam

Plan A M.S. students will prepare a written thesis and have an oral thesis defense. Plan B M.S. students must complete a written report and pass a final oral exam.

F. Time Limit.

Graduate School regulations specify that all requirements must be completed within six years from the beginning of the M.S. Program. Exceptions to this requirement must be approved by the Program, College, and the Graduate School.

5. SELECTION OF RESEARCH MENTOR

[Mentorship guidelines set forth by the Graduate School](#) shall be used as guidelines towards the professional mentoring relationship between the student and the Research Mentor. During the first year in the Program, students will be advised by the Director and/or Associate Director of the BMS Program along with the Director of the CMB Program. During the second semester of the first year, students will choose a permanent research advisor. The Research Mentor is usually a tenured or tenure-track (regular) faculty member in the Cell and Molecular Biology Program and serves as the chairperson of the student's guidance committee. In cases where students select a Research Mentor who is not a regular CMB faculty member, a regular member of the CMB faculty will be appointed as a co-advisor and chairperson of the guidance committee.

In situations where an advisor leaves MSU or the student needs to change advisors for other reasons, the Program Director/Associate Director will work with the student to identify a new advisor. Together, the student, Program Director/Associate Director and the new advisor will review the appropriateness of the student's plan of study and guidance committee membership and recommend any necessary changes.

6. GUIDANCE COMMITTEE FORMATION, DUTIES, AND MEETINGS

6.1 Duties of the Guidance Committee

The duties of the Guidance Committee are to: establish the program of study; evaluate the pace and progress of the student's research on at least an annual basis; serve as the Comprehensive Examination Committee (for further information, see Section 7); provide guidance and advice in

addition to that given by the research mentor; conduct the Dissertation Defense/Final Examination (see Section 8); provide professional advice on research, career development, and scholarship.

6.2 Membership

The committee is selected from regular tenure-track CMB Program faculty by the student, with the advice and approval of the research mentor and the Program Director/Associate Director. Selection should be based on the relevance of the faculty member's research interests to the student's dissertation project, and shall be in compliance with the [University rules on composition of the Guidance Committee](#).

A. Membership of Ph.D. Guidance Committee

Soon after the research mentor has been chosen, students should work together with their mentor to identify potential members of the guidance committee. The guidance committee must be formed by the end of the third semester (usually Summer semester of Year 2) after entering the graduate program; for MD/PhD and DO/PhD students, the three semesters do not include those spent in medical school.

The Guidance Committee shall consist of at least five regular (tenure stream) MSU faculty members. The guidance committee members consist of:

- The Research Mentor, who usually acts as Chair of the Guidance Committee;
- At least four CMB faculty members, including the research mentor and the CMB Program Representative;
- At least four tenured or tenure-track (regular) faculty members. Non-tenure-track faculty members may serve on the Guidance Committee as long as this condition is met. The number of non tenure-track faculty on a Guidance Committee may not exceed the number of regular committee members.
- Faculty from at least two different departments.

After the student and mentor have identified potential Guidance Committee members, and prior to their invitation to the committee, the committee membership must be approved by the CMB Program Director. From the student's proposed Committee members, the Director will identify and invite one person to serve as the CMB Program Representative. The CMB Program Representative will serve on the guidance committee for the duration of the student's Ph.D. program, and will:

- Serve as the Chair of the Comprehensive Examination Committee (Section 7).
- Prepare written evaluation comments for the [Annual Progress Report](#) on behalf of the Guidance Committee. These comments will serve as the committee's annual evaluation of the student's progress.

B. Membership of M.S. Guidance Committee

For M.S. students the Guidance Committee shall normally consist of three regular MSU faculty members, two of whom must be regular CMB faculty. This guidance committee

will be formed by the end of the second semester in the M.S. program, and will meet at least annually.

C. Policy for non-regular, emeritus, and non-MSU faculty

Non-tenure track MSU faculty and faculty members from outside MSU must be approved by the dean of the graduate school in order to serve on guidance committees. Only in special circumstances will this person be approved to serve as a chair for an individual student. Instructions for applying for approval can be found [here](#). Emeritus faculty may serve on graduate committees with the approval of the CMB Director.

D. Conflict of Interest

Potential conflicts of interest of voting committee members (such as a connection with the sources of funding for the student's project) should be disclosed and taken into consideration by the Program Director and/or Executive Committee before approval of committee membership.

E. Committee member substitution and replacement.

If it becomes necessary to substitute a member of the Guidance Committee, this should be arranged in consultation with the Program Director/ and Research Adviser.

6.3 Committee Meetings

A. Frequency of Committee Meetings

Guidance Committee meetings must be held at least annually, and the first meeting must be held by the end of the 4th semester after entry into the graduate program (usually by the end of Fall semester of their second year). Failure to hold regular/annual Committee meetings may lead to a review of the student's progress in the program by the Program Director/Associate Director.

B. Purpose of Committee Meetings

Evaluation and advising. The objectives of the first Committee meeting are to review the proposed research, to discuss elective coursework, and to agree on program of study. Subsequent meetings are designed to review progress on proposed dissertation research and assess pace and adequacy of progress. In addition, committee meetings provide an opportunity for the student to gain experience in the presentation and defense of their work. The student will be evaluated by committee members with respect to oral and written scientific communication as well as methods, appropriateness of the research plan, and/or overall direction as they relate to the student's research project. Written evaluations are included in the [annual progress report form](#), which must be returned to the CMB Graduate Program Coordinator within one week of the committee meeting.

Confidential discussion with the Guidance Committee. At the conclusion of each Guidance Committee meeting, the student will be given the opportunity to consult with the Guidance Committee confidentially in the absence of their Research Mentor. The purpose

is for the students to have an independent, neutral, and confidential source of advising and advocacy. Committee members can receive a student perspective on their progress and experience.

For implementation, the advisor is asked to step out of the room for 5-10 minutes so that the committee can confer with the student. The Committee chairperson should explain to the student that each of the Committee members can be trusted as a confidential advocate independent of the advisor. The Committee chair then asks the student if they would like to discuss any issues or concerns regarding the progress toward the degree. Examples may include the quality of their training environment, progress toward their degree, and/or professional development goals. The student should understand that most matters of discussion will be kept confidential, except in cases where mandatory reporting is required.

It is anticipated that most of these sessions will describe standard graduate school issues and result in productive discussion. However, in the event that the student has encountered harassment, has personal safety concerns, has witnessed scientific misconduct, or has other concerns that they feel uncomfortable discussing with the Research Mentor, the committee will be able to document and intervene, and direct the student to the appropriate campus resources.

Student Responsibilities. For each meeting, the student is responsible for the following:

- Scheduling a time and location of the meeting. Because of difficulties in scheduling, these should be done well in advance (2-3 months). Meetings usually run for about 2 hours. The student must notify the Graduate Program Coordinator of the time and location of annual committee meetings, and may ask for assistance from the Program Coordinator for room reservations.
- Professional Performance and Potential report
One week prior to the committee meeting, the student should submit a 1-2 page written report consisting of:
 - Professional goals statement
 - Progress towards achieving goals of the past year
 - Goals for the next year of study
 - Papers submitted and/or published, presentations at professional conferences
 - Other (e.g., participation in undergraduate education; areas in which you are experiencing difficulty; perceived obstacles that have hindered your progress)
- Annual Progress Report form. Prior to the meeting the student should complete the upper portion of the form. The form serves as the documentation of formal evaluation by the Guidance Committee and the Research Mentor.
- At the conclusion of the meeting, the form will be given to the CMB Program Representative, who will draft evaluative comments. After all members of the committee sign the report, the report is given to the Research Mentor, who will complete their evaluation of the student within the form. The completed and signed report must be returned to the Program Coordinator within one week of the committee meeting. The completed report is required by the Graduate School; failure to return the report may result in missed opportunities for Fellowships and other awards, and/or delays in approvals and/or graduation.

- [Gradplan](#). Within one semester after the first committee meeting, the student must submit a program of study for approval via GradPlan. Gradplan serves as the official documentation of completion of the program requirements and is required by the Graduate School. After submission of the program by the student, the program is routed, in the following order, for approval by the CMB Program Director, the Research Mentor, and the members of the Guidance Committee. After all of these individuals have approved the Program, the final submission will be completed by the CMB Program Coordinator. Failure to submit a program to Gradplan may result in delays of approvals and/or graduation.

7. COMPREHENSIVE EXAMINATION

7.1 Purpose and Preparation for the Ph.D. Comprehensive Examination

The Comprehensive Examination is a mechanism to explore the scientific potential of a Ph.D. student and their progression towards scientific independence. During this examination, the student is tested on their ability to integrate a large body of information, develop significant hypotheses, devise an experimental strategy to test these hypotheses, interpret data, and clearly and concisely convey scientific information to the audience. The oral portion will evaluate the student's comprehension of the overall significance/objectives of the proposed research, as well as the student's proficiency of the basic principles of molecular and cellular biology that are related to the research proposal.

7.2 Comprehensive Examination Overview

Criteria: To attempt the Comprehensive Examination, the student must meet the academic performance standards described in Section 9. Additionally, prior to the Comprehensive Exam, at least one meeting with the Guidance Committee must be held and documented.

Committee: The comprehensive exam committee is comprised of the Guidance Committee minus the Research Mentor. The CMB Program Representative serves as the chair of the committee.

Timing: The examination must be taken by the end of the 7th semester of graduate study (usually by the end of Fall semester of Year 3), and must be passed within five years from the time the first class that is used to fulfill the degree requirements for the doctoral program of study is taken. For dual degree (MD/PhD and DO/PhD) students, the exam must be taken by Fall semester of year 5. For all students, any remediation required must be completed by the end of the following semester. Deviations from these timelines require approval from the Program Director.

Scheduling: The student is responsible for setting the date and scheduling a room for the Comprehensive Examination. The date should be set after consulting with the members of the Guidance Committee and should be scheduled several months in advance. Three hours should be scheduled (one for the Oral Presentation and two for the Closed Questioning portion). The written

proposal must be submitted to each member of the Guidance Committee two weeks before the open seminar and oral defense. The CMB Program Coordinator will post an announcement of the seminar presentation to CMB faculty at this time. The announcement will include the title and the Project Summary of the student's proposal.

Comprehensive Examination Form: Prior to the exam, the student should fill out the top portion of the Comprehensive Examination Form and bring the form to the exam. Following the exam, the CMB Program Representative will draft evaluative comments and distribute to the Guidance Committee members for editing. After all members of the Committee have signed the form, the form will be returned to the student, who will then submit the form to the CMB Program Coordinator. This must be completed within two weeks of the oral portion of the comprehensive exam.

7.3 Components of the Comprehensive Examination

Three parts compose the Comprehensive Examination. One is the written research proposal. The second is the oral presentation of the research project. The third involves questioning by the Comprehensive Examination Committee in closed session.

A. Written Proposal

Content: The written proposal is based on the proposed dissertation research. It should include sufficient information needed for evaluation of the project, independent of any other document.

Students should discuss their aims and experimental approaches with the Research Mentor. During the preparation of the proposal, the Mentor may offer guidance to assist with proposal development. The mentor may not, however, directly edit or re-write the proposal.

Timeline: The written proposal is submitted to the examining committee at least two weeks prior to the scheduled seminar and oral defense.

Format: Students should follow one of the two styles provided in [Appendix C](#), which are similar to NIH- and USDA-style training proposals. These formats are used to assist students in preparation of training grants to be submitted to federal funding agencies. While submission to federal agencies is not required, it is encouraged.

All proposals must adhere to the basic formatting guidelines:

- 0.5-inch top/bottom/side margins
- 11-point Arial font
- No smaller than 9-point font in figure legends and tables

All proposals shall include:

- Title page
- Project Summary (no more than 30 lines of text)
- Project Summary and Narrative (2-3 sentences)
- Specific Aims (1 page)

In addition, students must follow either the Modified NIH-Style format or the Modified USDA-Style format ([Appendix C](#)).

- Research Strategy (NIH-Style) or Project Narrative (USDA-Style) (6 pages including figures and tables, but excluding references)
- Literature Cited (no page limit)

B. Oral Presentation

The oral presentation is a formal open seminar given by the student and should be 35-45 minutes in length. It is open to all faculty and students. Organization of the seminar will normally include a general introduction, rationale for the proposed research, statement of the problem, preliminary data obtained, proposed experimentation and potential results. At the end of the seminar, members of the audience are given an opportunity to ask questions to the student. The members of the Comprehensive Examination Committee will reserve questions until the closed session that follows.

C. Closed Questioning by the Comprehensive Examination Committee

The closed session that immediately follows the oral presentation should be scheduled for 2 hours. The Chairperson of the Comprehensive Examination Committee (CMB Program Representative) will preside over this portion of the examination. The Research Mentor may listen to/watch the proceedings via an electronic/web-based method, but may not be present in the room, and may not be present by video conference.

7.4 Evaluation and Outcomes of the Comprehensive Examination

A. Expectations

Students will be evaluated by the following criteria based on the written proposal, oral presentation, and closed questioning:

- The candidate shall have effectively communicated their understanding of the hypothesis, rationale for the work, proposed and completed experiments, data interpretation, and future directions;
- The candidate shall have done a reasonable amount of laboratory or theoretical work directed toward an original problem (negative data may be included);
- The candidate shall make clear to the examining committee that in performing this research (s)he has understood why the experiments were undertaken, what conclusions can be drawn from the results, what alternative approaches have been considered, what previous work related to the student's research had been done by others, and what future experiments are being proposed;

- The candidate shall have demonstrated an understanding of the fundamental concepts on which the procedures and ideas were based;
- The candidate shall have demonstrated an understanding of the significance of the research, as well as a breadth of factual knowledge of related areas when the research is viewed in a larger setting.

B. Procedure for Determining Outcome of the Oral and Written Comprehensive Examination

Following the Closed Questioning session, the student is excused from the room. The student's performance is discussed, including any concerns about the Written Proposal, Oral Portion, and Closed Questioning. While the student is out of the room, the committee discusses the performance of the student on the written proposal, seminar, and oral exam. After discussion, the Committee votes on performance in the oral exam by confidential ballot, each member submitting a Pass or a Fail outcome:

1. Pass: A "Pass" decision is usually arrived at by a unanimous vote by the Comprehensive Examination Committee and admits the student for candidacy to the doctoral program. If a unanimous decision cannot be reached, or if there are more than four members of the Committee, one dissenting vote is allowed.

The Examination Committee has the freedom to recommend or require rewriting of the research proposal, execution of certain laboratory procedures, or other alternatives which the examining committee may regard as uniquely appropriate to the candidate. In the case that the Committee identifies a correctable deficiency in the Comprehensive Examination, the committee will specify remediation, in writing, with a time limit for satisfactory completion.

2. Pass with Honors: In cases of students unanimous passing, the committee may discuss whether the student should receive a Pass with Honors recognition. This "Pass with Honors" decision is reached if the committee agrees, unanimously, that the student performed exceptionally well in all three portions of the comprehensive exam.
3. Fail: A "Fail" decision is usually obtained by unanimous vote of the Comprehensive Examination Committee. If a "fail" decision is reached by the committee, the Committee will give specific recommendations for remediation in writing, and the student may be allowed to retake one or all portions of the Comprehensive Exam, as determined by the Committee.

After the committee has reached a decision, the student is asked to re-enter the room and informed of the outcome. The student is informed of any deadlines for re-writing of the proposal and/or retaking of the exam. At the discretion of the examining committee, a discussion may be held with the research mentor at the conclusion of the exam.

The [Preliminary Exam Report](#) form should be completed by the Comprehensive Examination Committee Chairperson, signed by each committee member, and returned within two weeks of the examination date, to the Graduate Program Coordinator for recording of the

result, filing, and distribution of copies to the student, the Research Mentor, the CMB Program Director and each member of the Examination Committee. Once all conditions (including remediations) the date of passing of the Comprehensive Exam will be entered into Grad Info by the Academic Programs Coordinator.

8. THESIS/DISSERTATION, ORAL PRESENTATION, AND ORAL EXAMINATION

8.1 Requirements and Deadlines

At least six months prior to the expected completion date, doctoral candidates must meet with their Guidance Committee to finalize plans for completion of research and request permission to write. Ph.D. and Plan A M.S. students are required to submit a written thesis/dissertation on their research. Plan B M.S. students are required to submit a written report to their Guidance Committee. The format of the Plan B written report will be established by the Guidance Committee.

Students are required to apply for graduation in the semester in which their thesis is submitted/accepted by the electronic submission to [ProQuest](#) and the graduate school, and must be registered for at least one credit during the semester that they defend their thesis or complete the oral exam. There are firm deadlines, listed [here](#), for thesis and dissertation submission/acceptance in order to graduate in a given semester.

8.2 Examination Committee

The Guidance Committee serves as the examination committee and is chaired by the Research Mentor. The committee evaluates the Thesis/Dissertation and Oral Presentation and conducts the Final Oral Examination.

8.3 Dissertation

A. Format

The dissertation must conform to the guidelines and requirements of the Graduate School, as published in the [Formatting Guide](#) for Submission of Master's Theses (Plan A) and Doctoral Dissertations. Additional information on formatting of the dissertation, including a tutorial, common pitfalls, deadlines, sample pages, and submission instructions are provided [here](#). Material that involves more than two authors (the student and research mentor) may be included in the body of the thesis or as an Appendix with a brief explanation of what portion of the work has been done by the student.

B. Timing and approval to write

At least six months prior to the expected completion date: each candidate must meet with their Guidance Committee to finalize plans for graduation. Items to be accomplished at this meeting include evaluation of current status of research and/or course work and identification of areas to be completed or strengthened, and identification of a realistic

timetable for completion. The timetable must include sufficient time between evaluation of the student's final draft of the thesis and their planned departure to allow for adequate completion of changes and corrections specified by the Guidance Committee.

At least six weeks before the defense, the student submits the thesis/dissertation to the research mentor for editing.

At least two weeks before the defense, the student submits the thesis/dissertation to the committee.

8.4 Final Examination.

For plan B M.S. students, the final examination consists solely of an oral exam. For Plan A Masters and Doctoral candidates, the final examination consists of two parts, a public presentation/seminar and an oral defense. The public presentation consists of a formal seminar describing the thesis/dissertation research and is open to faculty members and members of the public. An announcement will be posted one week prior to the final examination. The oral examination will be held immediately following the seminar presentation for Ph.D. and plan A M.S. students or at the end of the program for Plan B M.S. students.

Successful completion of the degree requires acceptance of the thesis (Ph.D. and Plan A MS) and a vote of Pass on the oral exam by at least three fourths of the examiners, with not more than one dissenting vote. At the conclusion of the exam, the committee will complete and sign the appropriate form indicating the outcome of the exam. For Doctoral students, the [Record of Dissertation of Final Exam](#) form must be signed by the Guidance Committee and returned to the CMB Program Office. For M.S. students, the [M.S. Final Examination Form](#) must be signed by the committee and returned to the CMB Program Office.

8.5 Submission of Dissertation

After passing the Final Exam, the student will incorporate any required revisions into the thesis before submitting it via ProQuest; instructions on ProQuest submission are provided [here](#).

Several forms, found [here](#), must be filled out and submitted before a degree is conferred by the graduate school. In addition, CNS requires completion of an [Exit Survey](#). This form should be completed and submitted to the CMB office. The CMB Program office and the Research Adviser must each receive an electronic copy of the Ph.D. dissertation or M.S. thesis.

9. ACADEMIC PERFORMANCE

9.1 Annual Evaluation of Progress

Graduate students have a right to periodic evaluation of their academic progress, performance, and professional potential ([GSRR 2.4.8](#)). These will be reviewed at least once per year by a three-tiered system: via the Research Mentor, the Guidance Committee, and the Director and/or Associate Director of the CMB Program.

The Guidance Committee's review will be conducted as part of the Annual Committee Meetings. The annual evaluation by the advisor should be coordinated with the review of the student's progress by the guidance committee. The form to be used in the evaluation by the Guidance Committee and Research Mentor is the [Annual Progress Report](#).

The CMB Director and/or Associate Director will meet annually to review all aspects of the annual progress report. At this occasion, the graduate student has the opportunity to discuss any aspects of their studies that seem relevant for successful completion of the graduate program, including problems that may hinder progress, and any appeal of the Research Mentor/Guidance Committee's evaluation. Recommendations based on this review will be communicated in writing to the faculty advisor and the graduate student within two weeks of the meeting.

If a student's progress or performance is deemed to be unsatisfactory and/or a student's standing in the CMB program in jeopardy, the student shall be notified in writing in a timely matter, and a copy of the notice shall be placed in the student's academic file. Students who wish to appeal any part of the faculty advisor's evaluation may do so in writing to the Director, and this appeal will be filed together with the annual progress report. All policies concerning access, maintenance, and release of students' records will follow guidelines of the [MSU Access to Student Information policy](#). Students have the right to access and view their educational records.

9.2 Requirements

A. Grades.

College level policies relative to academic standards can be found in the [Academic Programs Book/College of Natural Science Graduate Study section](#).

Grade Point Average (GPA)

Students are required to maintain a minimum GPA of 3.0. If the GPA falls below 3.0, a review of the student by their Guidance Committee and the CMB Program will be conducted. The accumulation of grades below 3.0 in more than three courses of 3 or more credits each, or deferred in more than three courses of 3 or more credits, or a combination of the above in excess of four courses, removes the student from candidacy for the degree.

Grades in individual courses

Students must receive a grade of 3.0 or better, or a P in a P-N course, for elective and required courses. In the event of earning a grade below 3.0 in a required course, the course must be repeated;

if in an elective, the student may remediate by either repeating the same course or replacing the course with a different elective. The remediation plan must be approved by the Program Director. Repeating a course requires an override from the Dean's office if the grade is not below a 2.0. Satisfactory remediation is documented by a grade of at least 3.0 upon repeating the course.

Failure to obtain a satisfactory grade on remediation, or receiving unsatisfactory grades in more than two required courses, may result in the CMB Program Director's decision, in consultation with the Associate Director and the Guidance Committee, to dismiss the student from the program.

B. English Proficiency.

All foreign students must fulfill oral and written English proficiency requirements as certified by the University's English Language Center, and as demonstrated by satisfactory performance in courses, seminars and scientific writing. Since participation in the teaching program is normally done in the second or third years, certification that a foreign student has demonstrated the ability to communicate effectively in English is a requirement before the teaching duties are assigned. Failure to achieve certification (*i.e.* by passing the SPEAK test or equivalent) by the end of the second year will normally result in dismissal from the graduate program.

9.3 Academic Progress, Probation and Dismissal

If a student encounters difficulties in meeting the program requirements, their research mentor (if one has been chosen), the Director, Associate Director, and the Guidance Committee will work together with the student to overcome these problems. There are isolated instances in which the Director or Guidance Committee may conclude that it is in the best interest of the student (and/or the Program) for them to be dismissed from the program and may so recommend. Such dismissal requires approval of the Director and the Dean. In cases of dismissal, or in instances in which a student chooses to terminate their graduate education in the Program or fails to meet the minimum academic standards of the Program, College or University, the Director/Associate Director and/or research mentor will work with the student to identify alternative career opportunities. For further information, See [GSRR](#) article 2.4.9.

10. ETHICAL STANDARDS

Students are expected to adhere to the ethical standards set forth in University regulations <https://grad.msu.edu/researchintegrity/> and those conventionally used in the conduct of scientific research. In addition, students are required to obtain training in several areas as described below.

10.1 Training and Resources

All CMB students are required to complete training in the Responsible Conduct of Research (RCR) as detailed in [Appendix C](#).

Links to specific training sites, research conduct policies, and student wellness and safety, are listed:

[Environmental Health and Safety \(EHS\)](#) and [EHS training](#)
[Human Subjects Research](#)
[Use of animals in research](#)
[MSU Guidelines on Authorship](#)
[MSU's Institutional Date Policy](#)
[MSU's Procedures Concerning Allegations of Misconduct in Research and Creative Activities](#)
[Domestic violence and sexual misconduct policy and training:](#)
[Additional resources for Student Wellness and Safety](#)

Additional resources that provide excellent discourses on crucial matters affecting scientific integrity and conflict resolution, and that provide practices and guidelines generally accepted by our faculty are:

- [MSU Guidelines for Integrity in Research and Creative Activities](#)
- [On Being a Scientist](#), Committee on the Conduct of Science; National Academy Press, 1994.
- [Guidelines for Investigators in Scientific Research](#), Harvard University Faculty of Medicine. National Academy of Sciences (US), National Academy of Engineering (US) and Institute of Medicine (US) Panel on Scientific Responsibility and the Conduct of Research. Washington (DC): National Academies Press (US); 1993.

In the uncommon situation in which a student is charged with violating the standards described above, the student's Guidance Committee will judge the validity of the charge and, if necessary, recommend to the Director an appropriate course of action. If the student in question does not have a Guidance Committee, the CMB Executive Committee will act in its place. In extreme cases, the Director may recommend dismissal. The student may appeal the Director's decision to the Executive Committee. Further appeals would be considered by the College of Natural Science Graduate Hearing Board as defined in article 5 in the [Graduate Students Rights and Responsibilities](#).

11. STUDENT CONDUCT AND CONFLICT RESOLUTION

11.1 Professional Behavior

Professional behavior, as outlined in the [Student Employment Manual](#), is expected at all times; violations of these rules shall be regarded as cause for disciplinary action, up to and including termination.

11.2. Grievances

The grievance procedure for the CMB program is outlined by the [Office of the University Ombudsperson](#). As outlined in Article 5 of the [Graduate Student Rights & Responsibilities](#), redress of problems that arise in the relationship between the Research Mentor and the student should be attempted first with informal, direct discussions between the mentor and the student, and then with the CMB Director or Associate Director. If problems remain unresolved, adjudication will be aided by the Executive Committee following the procedure outlined [here](#). If

satisfactory resolution of a conflict is not achieved after hearing by the Executive Committee, formal resolution through the [College of Natural Science Graduate Hearing Board](#) may be sought; if resolution is not achieved at the College level, it may be adjudicated by the [University Graduate Judiciary](#). At any stage of the process, the grievant or respondent may consult with the [University Ombudsperson](#).

12. WORK RELATED POLICIES

12.1 Student Files

All CMB Program graduate students have a departmental file that is kept by the CMB program office. The file contains the student's application to the program, ID numbers, evaluations, certificates, results of all committee meetings, comprehensive examinations, and dissertations. The student (with the exception of the confidential letters of recommendation) and CMB faculty members have access to the departmental file. Requests to access the file must come to the Graduate Program Coordinator, CMB Director, or CMB Associate Director. In the event that a student wishes to challenge the accuracy of material in the file, they may write a letter explaining their objections, and this letter will be added to the file.

12.3 Appointment and Reappointment to Assistantships and Fellowships

CMB students pursuing a Ph.D. are typically supported as graduate research assistants, teaching assistants or fellows. This support is generally provided from research grants, training grants or departmental/program funds and are subject to availability. Assistantships may be provided to M.S. students at the discretion of the Mentor. Graduate research and teaching assistantships are normally made for 1-2 semesters at a time. Students who are appointed as Teaching Assistants are subject to the terms of the [GEU contract](#). [Stipend levels and benefits](#) for research and teaching assistants are issued annually, at [assistantship levels I-III](#). Due to the tuition waiver, students receiving assistantships, fellowships, and additional scholarships should consult with current federal tax guidelines for descriptions of deductible expenses.

The CMB Program makes every effort to provide continuing financial support for all Ph.D. students making good progress towards their degree for a minimum of five years in the Program. Students are encouraged to apply for fellowships or other financial aid internal or external to MSU.

12.4 Check Disbursement

The stipend checks for Graduate Assistants are typically disbursed biweekly. The payroll schedule can be found [here](#).

12.5 Travel

Financial support for travel of graduate students to present their research at national and international meetings may be provided by internal or external sources. External support is from grants and contracts and will be at the discretion of the Research Mentor. Internal support may be provided by the program, college, graduate school, or (for international travel) the International Studies and Programs office. Travel funding criteria and the travel request form can be found [here](#), and students requesting travel support should submit the completed and signed form to the CMB Program Office along with a copy of an accepted abstract.

Any student traveling on University business must complete a [travel authorization form](#) prior to leaving. Students should consult the [MSU Travel Clinic](#) for information about travel-related safety, including vaccination recommendations and requirements.

12.6 Vacation

Graduate assistants appointed for 12 months are expected to be on campus and actively pursuing graduate education for at least 11 months. Breaks between semesters, if taken, are considered part of the annual one-month vacation. Vacations must be arranged with research mentor or in the first year with the professor in whose laboratory the student is rotating.

12.7 Illness/injury/Pregnancy Leave

A graduate assistant unable to fulfill the duties of the appointment because of illness, injury, or pregnancy shall notify the Director as soon as circumstances permit. During the illness, injury, or pregnancy the Program will adjust (reduce, waive, or reschedule) the graduate assistant's duties as those duties and the assistant's circumstances reasonably dictate. If total absence from duties becomes necessary, the stipend will be maintained, provided the graduate assistant is still enrolled, for a period of two months, or to the end of the appointment period, whichever should occur first.

The graduate assistant shall have the right to return to the assistantship, within the original semesters of the appointment, at such time as they are able to reassume the duties of the position. Additional guidelines and policy notes are found [here](#).

12.8 Bereavement

The grief absence policy can be found [here](#). Students who believe their rights under this policy have been violated should contact the [University Ombudsperson](#).

12.9 Graduate Student Benefits/Professional Development

MSU provides health coverage for graduate research and teaching assistants and their eligible dependents. Information on this coverage can be found [here](#). Graduate students supported on fellowships (usually including students on training grants) are covered by a separate insurance policy, which can be found [here](#). Various opportunities for professional development and career services are available to students through the Graduate School, found [here](#).

13. UNIVERSITY RESOURCES

A comprehensive list of resources with descriptions and links to specific initiatives is available from:

<https://grad.msu.edu/>

[*Academic Programs*](#)

[*Career Services and Placement*](#)

[*Cell and Molecular Biology Program*](#)

[*College of Natural Science*](#)

[*Council of Graduate Students*](#)

[*Course Descriptions*](#)

[*Graduate Assistant Health Insurance Plan*](#)

[*Graduate School, Michigan State University*](#)

[*Graduate Student Resource Guide*](#)

[*Graduate Student Rights and Responsibilities*](#)

[*Guidelines for Graduate Student Advising and Mentoring Relationships*](#)

[*Integrity in Research and Creative Activities*](#)

[*MSU/GEU Contract*](#)

[*MSU Parking & Permits*](#)

[*MSU Technology services*](#)

[*Office of Environmental Health and Safety*](#)

[*Office of the Ombudsman*](#)

[*On Being a Scientist: Responsible Conduct of Research*](#)

[*Payroll Schedule*](#)

[*StuInfo*](#) This site provides students, student guests, and authorized faculty or administrative staff access to student and enrollment information. Student specific information includes: Schedule/enrollment, Grades, Academic, Student account, Holds, Address, and Financial Assistance data. Direct deposit and other payroll forms such as the W-4 withholding form can be submitted on-line as well.

14. AMENDING AND REVISING THIS HANDBOOK

Students enrolling in the CMB Program after the date of revision of this handbook are subject to the guidelines of this handbook. For students enrolled in the Program prior to the date of this revision, requirements to follow the revised guidelines will be reviewed on an as-needed basis by the Program Director and/or the CMB Executive Committee.

Any faculty member or graduate student may submit proposals to amend or revise this Handbook. Amendments to be considered must be written and circulated to the faculty and graduate students not less than 14 days prior to the meeting at which they are to be voted upon. Amendments must be passed by a majority of the "voting faculty" which is defined in the CMB Program bylaws.