GRADUATE PROGRAM HANDBOOK

DEPARTMENT OF MOLECULAR GENETICS

2012 - Present

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Preface

This handbook contains guidelines and information for graduate students and faculty in the Molecular Genetics Graduate Program; it has been prepared by the Graduate Studies Committee (GSC). Key provisions have been discussed and approved by a vote of the graduate faculty of the Department.

Throughout the handbook, reference is made to the Graduate School Handbook, available at


Departmental guidelines define or extend Graduate School polices, particularly with regard to rules for Candidacy and Dissertation Exams, as well as maintenance of good academic standing. In unusual circumstances not explicitly addressed in this handbook, students should turn to the GSC for advice. These guidelines may be modified and are subject to change.

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Program Overview

The Department resides within the Division Natural and Mathematical Sciences of the College of Arts and Sciences. The Graduate Program offers a course of study leading to the Ph.D. degree. In rare cases, students leave the program with a Master's degree.

Research in faculty laboratories addresses fundamental questions in molecular, cellular, and developmental biology, using genetic approaches. A wide range of model organisms is employed in the ongoing research. The goal of the Program is to train scientists for careers in academia, government, or industry.

Graduate Studies Committee

The Graduate Studies Committee (GSC) oversees and administers the Program and is the liaison between the Graduate School and the Department. Actions of the Committee are subject to approval by the faculty of the Department. The GSC is responsible for formulating and administering rules of the Program concerning faculty membership, student admission, transfer and registration, as well as the requirements for the Ph.D. and M.S. degree programs.

The GSC consists of at least three members of the graduate faculty of the Department, one of which serves as the Chair. GSC members are appointed annually by the Chair of the Department, in consultation with the faculty.

Committee members for the 2012-2013 academic year are:

Robin Wharton, Professor, Chair of the Committee  
Patrice Hamel, Associate Professor  
Susan Cole, Associate Professor

This handbook is available on the Departmental website:

www.molgen.osu.edu

Ethics

Appropriate ethical standards are at the core of the training mission of the program, since transparent and honest presentation, evaluation, and criticism of experimental results constitute the foundation of scientific research. In the preparation of Candidacy Exams, research presentations, scientific manuscripts, and dissertations, students are required to acknowledge ideas, figures, and conclusions of others in the field.
The GSC organizes an informal discussion of ethical issues for first-year students during orientation the week before Fall semester classes begin in August. In addition, part of MG 7600, which is required of students in the first year, addresses these issues. Finally, University guidelines and policies regarding academic and research misconduct can be found at:

http://www.gradsch.ohio-state.edu/academic-and-research-misconduct.html

Overview of the typical graduate student experience

In year one, students focus on laboratory rotations and courses, both of which lay the foundations for independent research. In the Spring semester, students choose a thesis advisor and research topic for their dissertation. In year two, students finish course electives and serve as teaching assistants; teaching experience is useful in preparation for careers in academia and in oral presentations that are a critical aspect of research. Students are strongly encouraged to complete the Doctoral Candidacy Exam by the end of the second year; they must do so by the end of the Fall semester in year three. The second year is particularly challenging, as students are required to balance the demands of coursework, teaching responsibilities, research, and preparation for the candidacy exam.

Beginning in the third year, each student presents his or her research annually in a formal talk to the Department. Throughout their entire course of study, students are expected to attend a number of seminar series. After completion of the Candidacy Exam, students focus on completing their thesis research project, ultimately preparing a doctoral dissertation. A successful dissertation depends on the generation of a significant body of original research; as such, there is no timeline for completion. Most students finish in approximately 6 years.

Lab rotations

These are a critical aspect of the first-year experience--an opportunity for students to explore different lab environments, scientific problems, and experimental systems with the ultimate goal of choosing a research topic and thesis advisor. Students do three ten-week rotations commencing shortly after the start of the Fall semester. Rotations are chosen with the advice and consent of the GSC. At the end of the third rotation, students and advisors "match," making mutual choices. In the rare case that students do not identify a thesis lab, a fourth rotation is permitted. It is imperative that an advisor be identified by the end of the fourth rotation. Although waivers are rarely granted, students may petition the GSC to do fewer than three rotations.

While the primary goal of the rotations is to mutually introduce students, labs and advisors, rotating students are expected to engage fully in a semi-independent
research project, acquiring necessary background knowledge and participating in lab meetings. Students make short presentations on their projects to the Department at the end of each rotation.

Department faculty present short talks to incoming students during the week before classes start in August. Students use these talks to generate a short list of faculty with which to meet and discuss rotation projects, informing the GSC of the four (or more) faculty on their short list. The first three rotations must be in Department labs; one of these may be in the lab of an Adjunct Member. If desired, a fourth rotation outside the Department may be pursued with the consent of the GSC. Lab rotations are not directly tied to the academic calendar; thus students are expected to pursue research during breaks in the calendar when classes are not held.

Coursework

The second major aspect of the first year is coursework that is designed to lay foundations and expose students to a variety of experimental systems and approaches. The second year is transitional, with an increasing emphasis on research as well as teaching responsibilities. Thus, students have a reduced load of in-class coursework in year two, and typically none in following years.

Required courses are as follows.

**Year 1 Fall Semester**
- MolGen 5700 Systems of Genetic Analysis
- MolGen 5701 Molecular Genetics: DNA Transactions
- MolGen 7600 First Year Orientation
- MolGen 7800 Seminar Program
- MolGen 7780 Lab Rotations

**Year 1 Spring Semester**
- MolGen 5705 Advances in Cell Biology
- MolGen 5715 Eukaryotic Developmental Genetics
- Elective #1
- MolGen 7800 Seminar Program
- MolGen 7780 Lab Rotations

**Year 1 Summer Semester**
- MolGen 8999 Dissertation Research

**Year 2 Fall Semester**
- Elective #2
- MolGen 7800 Seminar Program
- MolGen 8999 Dissertation Research
Following is a list of electives. Students may petition the GSC to substitute courses not on the list.

Biochem 6761 Proteins and Macromolecular Structures
Micro 8050 RNA World
MolGen 5623 Genetics and Genomics
MolGen 5643 Plant Anatomy
MolGen 5645 Quantitative, Population, and Evolutionary Genetics
MolGen 5650 Analysis and Interpretation of Biological Data
MolGen 5733 Plant Biochemistry
MolGen 5796 Current Topics in Signal Transduction
MolGen 6625 Plant Metabolic Engineering
MolGen 6725 Circadian Biology
MolGen 6741 Reproductive Biology of Flowering Plants
MolGen 6795 Special Topics in Molecular Genetics
MolGen 7741 Molecular Biology and Pathogenesis of Viruses
MolGen 7801 Research Seminar: Developmental Genetics
MolGen 7802 Research Seminar: Cell Biology
MolGen 7806 Research Seminar: Transcriptional Control
MolGen 7807 Research Seminar: Post-Transcriptional Control

Students must maintain full-time status to remain enrolled in the Program. Before passing the Candidacy Exam, most students must enroll for a minimum of 8 credit hours in the Fall and Spring semesters and 4 hours in the Summer semester; students supported by a fellowship, are required to register for minimums of 12 (Fall and Spring) and 6 (Summer) credit hours. Students are responsible for registering for the appropriate courses in a timely fashion. For a detailed description of the enrollment requirements for maintenance of status and degree requirements, students are encouraged to consult the Graduate School Handbook.

The Program Administrative Assistant, Deborah Dotter, should be consulted for advice on enrollment prior to each semester.

A Special Note to International Students

Students educated abroad may have a significant, additional course burden, mandated by Graduate School requirements for mastery of English as a Second Language (ESL). Incoming students are placed into ESL classes as a result of their performance on a placement exam administered before the start of the Fall
Semester. Separate classes address spoken and written English. Students are strongly encouraged to attain sufficient mastery of ESL such that they pass a test of spoken English by the end of the Summer semester of year 1; this exam ensures that students are adequately prepared for appointment as teaching assistants. Students are required to pass the exam by the end of the Fall semester of year 2; failure to do so results in a loss of Good Academic Standing.

Seminars and Research Presentations

Attending seminars and learning to present research talks are vital aspects of graduate education. Students receive graded (S/U) academic credit for doing so, and are required to attend the following seminars:

- the Thursday Departmental seminars
- Fourth-year student seminars (in the Spring semester)
- the Falkenthal Colloquium and Waller Lecture.

Students are also strongly encouraged to attend the Tuesday MCDB/OSBP seminars.

As indicated by its name, in year four students present 50 minute research talks in the Spring semester in the student seminar series. In year three, year five, and in each subsequent year students give short 10-15 minute talks in the Departmental Colloquium that are similar in format to those given at national scientific meetings. Most students attend such meetings at least once in the course of their careers. To encourage the practice, post-candidacy students may apply once in their careers to the Chair of the GSC for a Berl Oakley Travel award, which provides up to $500 for travel to a national or international meeting, provided they will make either an oral or poster presentation.

Student Advisory and Exam Committees

Students typically choose an Advisory Committee, in consultation with their advisor, in the Fall semester of year two. The same Committee usually serves throughout the student's career for annual advisory meetings, as the Candidacy Exam Committee, and the Dissertation Defense Committee. The Committee is comprised of the advisor (who is Chair of the Committee) and three other faculty. For the Candidacy Exam, at least three members must hold salaried appointments within the Department. For advisory meetings and the Dissertation Defense, at least two members of the Committee must hold salaried appointments within the Department. Composition of all Committees is subject to approval of the GSC.

Post-candidacy students are required to hold a meeting of their Advisory Committee before December 19 in year 3 and annually thereafter. Although not
required, students are strongly encouraged to hold a first meeting of the Committee before candidacy, in the Spring or early Summer of year 2; input from the Committee is most valuable when the thesis research project is in its nascent stages. After each advisory meeting, the student writes a brief summary of the meeting that is circulated for comments to the Committee. The summary is then sent to the Administrative Assistant for the Program and the GSC Chair.

Occasionally, students may wish to change membership of the Committee, when the direction of their research changes, for example. Changes to the membership of the Committee are approved by the advisor and the GSC Chair. Composition of the Committee is recorded with the Graduate School for the Candidacy and Dissertation Exams.

In the event of conflict between the student and his or her advisor, the student may turn either to the Advisory Committee or the Graduate Student Committee for council. In very rare circumstances, students may be best served by changing research projects and advisors.

Teaching

Students are required to teach two semesters, typically Fall and Spring in year two. As described by the Graduate School, serving as a Teaching Assistant is an apprenticeship meant to provide practical experience to complement formal classroom instruction and lab research; teaching should not interfere with reasonable progress toward the degree. In addition to preparing students who wish to pursue an academic degree, teaching develops skills useful for oral research presentations. International students must pass the ESL exam before serving as teaching assistants.

Candidacy Exam

Purpose. The Candidacy Examination is not only a test of the students’ comprehension of the field of Molecular Genetics and allied areas of study, but also of the capacity to undertake independent research, and of the ability to think and express ideas clearly and succinctly. This is a rigorous examination that is composed of both written and oral portions.

Timing. Students are expected to complete the Candidacy Exam by the end of Summer of year two. To meet this requirement, it is critical that students have an approved exam topic by the end of Spring semester of year 2. Topic approval may take several weeks; thus students are encouraged to submit their topic for approval by the middle of the spring semester, at the latest. In extraordinary circumstances, the GSC may extend this deadline. However, students who fail to complete the candidacy exam by the end of Fall semester of year three will no longer be in Good Academic Standing and therefore not be allowed to register. Under extraordinary circumstances (change in advisor, serious illness, etc.), a
petition to further delay the examination may be made to the GSC.

Role of the Advisory Committee. The Advisory Committee, chosen as described above, serves as the examination committees for both written and oral portions of the Candidacy Examination. Note that in order to complete the exam on time, it is critical that the Committee be defined by the end of Fall semester of year two. If a member of the advisory committee is not able to participate in the candidacy exam, another MG faculty, with the approval of the advisor and the GSC, may be recruited for the purpose of the candidacy exam.

Examination Procedure

• Selection of the Topic. The student should identify a topic for the development of an original research proposal in consultation with the advisor and the advisory committee. The student should write and present a single page detailing the goal of the research and the specific aims of the proposal. The Advisory committee has one week to approve the topic and general aims. This may be done either by email, or in a meeting of the Advisory committee. The proposal must meet with unanimous approval of the Advisory Committee as indicated by each committee members’ signature on the summary page. If not approved, the student will be asked to find another topic or to make major changes to the existing topic, and the process described above is repeated. Once the topic is approved, the student schedules an oral exam to be held 8 to 9 weeks later.

• The Written Portion of the Examination. Upon approval of the topic, the student will have 4 weeks to prepare a written proposal. The proposal should follow the guidelines for a grant submitted to a national funding agency, such as the NIH, NSF, or DOE and should conform to the structure for the relevant agency. The proposal (excluding abstract, specific aims, and references) should be no more than 15 pages double-spaced, with 1-inch margins including all figures and tables. The abstract, the specific aims page, any figure or table legends, and the references may be single-spaced. The document must be written in at least a 12-point font. Figures legends may be single spaced, but must be a minimum 10 point font. Since additional material may not be included in an Appendix, the proposal must contain figures of sufficient size and quality to ensure legibility. The Abstract and References (which should be cited in full, including all authors and titles) are not included in the page limitations. All pages must be numbered.

• Guidelines for Preparing the Proposal. Sufficient information should be included in the proposal to facilitate an effective review by committee members without requiring reference to the literature. The proposal should be specific, informative, and avoid redundancies. Brevity and clarity make the reviewer’s job easier, and are an indication that the applicant is knowledgeable on the chosen subject. While the Background should be sufficient to convey the rationale for the proposal as well as a command of the relevant literature, this portion should not
dominate the proposal: the primary focus should be on designing experiments to test hypotheses rather than reviewing the literature.

Students must cite all literature they have utilized in the writing process. Each citation must include the names of all authors, title of the paper, name of the book or journal, volume number, page numbers, and year of publication. The proposal must be written entirely in the student's own words; quoting of published works (even if properly cited) is not acceptable. Students are strongly encouraged to read successfully-defended proposals before writing.

- Faculty input. During preparation of the proposal, faculty input should be minimal. The work must largely represent the student's own thinking, and the student must be prepared to defend and justify the proposal. If a student has submitted a fellowship application prior to initiating the candidacy, the student may still complete the candidacy exam on a topic related to the student's thesis work. However, at least one aim of the candidacy proposal must be novel, absent in all previously written fellowships.

- Evaluation of the Written Proposal. A copy of the proposal is submitted to each member of the Advisory Committee, who are given one week to formulate their evaluations. Each Committee member must submit a written evaluation on the form provided to the advisor, who copies all such evaluations to other members of the Committee. After consultation between Committee members, the proposal will be graded "Pass," "Pass with revisions," or "Fail," as follows.

*Pass* Presentation of a strong proposal, combining a well-designed, well-chosen, timely project with a well-designed and well-reasoned approach to the research. The proposal is appropriate for oral defense as written.

*Pass with revisions* Presentation of a very good proposal containing minor flaws. The proposal contains minor scientific errors in experimental design, poor organization or format, confusing text, etc. The student should modify the proposal within two weeks as indicated on the evaluation form. The student should meet personally with specific committee members to discuss criticisms, thereby allowing appropriate modification prior to re-submission to the Committee. The re-written proposal will form the basis for evaluation of the written component of the candidacy exam; no further faculty approval or input is required at this stage.

Only one round of revisions is allowed. Students who receive evaluations of either "Pass" or "Pass with revisions" take their oral exam within three weeks, and file the appropriate form with the Graduate School at least two weeks prior to the scheduled date.

*Fail* A grade of fail will result if, for example, the proposal contains serious misconceptions or is fatally flawed; the basic premise or experimental approach is faulty; the experiments proposed are unreasonable or implausible; the
f. The Oral Examination The student should be prepared to begin the exam with a brief presentation (~ 10 minutes) that introduces the core ideas and approaches of the proposal. Questioning by the Committee may begin during this presentation, or be delayed until its' conclusion, as decided by the committee. The Oral examination will last for approximately two hours.

The written proposal serves as a backdrop for questioning of the student, but the oral examination should be sufficiently wide-ranging to permit an assessment of the student's overall knowledge of Molecular Genetics and allied fields. The oral examination should also test the student's ability to think and express ideas clearly. At the end of the examination, the committee will decide whether the student has passed the Candidacy Examination. The oral and written portions are considered one exam. It is possible that one portion could be unsatisfactory but other portions of the exam of sufficiently high quality to merit an overall satisfactory grade. Committee approval must be unanimous. If the committee decides that the student has failed the Examination, the Candidacy Examination committee "must decide whether the student will be permitted to take a second Candidacy examination and must record that decision on the Candidacy Examination Report form." If permitted, the student must then prepare an entirely new proposal and repeat the procedure outlined above. The Candidacy Examination Committee for a second examination must be the same as in the first examination unless the Dean of the Graduate School approves a substitution. No student may take the Candidacy Examination more than twice; students who are judged unsatisfactory after two examinations are dismissed from the Program.

Following the exam the Committee reports the outcome to the Chair of the GSC, and in the event of failure, to the Chair of the Department as well.

Dissertation

As described in the Graduate School Handbook, the Ph.D. dissertation is "a scholarly contribution to knowledge in the student's area of specialization." In the field of Molecular Genetics, contributions to the field are directly reflected in
research publications. Published papers are the most important indicator of productivity and original thinking; thus, students should strive to publish first-author papers in well-regarded journals. A dissertation should contain, at a minimum, work in one major first-author paper that has been published, submitted, or is on the verge of submission.

Before proceeding with preparation of the dissertation, the student calls a meeting of the thesis Committee, which determines whether the student is ready to write and defend. Many factors ultimately contribute to the length of time a student pursues experimentation before they have completed a significant body of research. Readiness to defend is determined by research accomplishments, not following a pre-determined timetable.

The nature of current research is that most students participate in collaborative research projects. However, the dissertation contains only the student's individual contributions to such projects, such that the document reflects the original thoughts and work of the Ph.D. candidate.

The final exam committee is augmented by an outside representative assigned by the Graduate School. The Committee is given finished copies of the thesis sufficiently in advance of the scheduled oral defense to allow time for reading and thoughtful consideration. This period is set by the Committee, but typically is at least one week.

The final oral exam consists of two parts. The first is a one-hour public seminar scheduled at least two weeks in advance, with announcements circulated to faculty and graduate students of the Department. Immediately following the seminar, the Committee meets with the candidate for approximately two hours to discuss the originality of the research, the independence of the candidate, and the ability of the candidate to interpret their work and place it in the broader context of the field.

As for the Candidacy Exam, a successful outcome requires unanimity. In the event of an unsatisfactory outcome, the Committee determines whether a second final exam will be permitted. In such circumstances, the Committee is encouraged to consult relevant portions of the Graduate School Handbook.

**Maintenance of Good Academic Standing**

Students must remain in good academic standing or face dismissal from the Program. Academic standing is assessed by performance in graduate classes, timely preparation of the Candidacy Exam, and demonstration of reasonable progress toward the Ph.D. Poor academic standing results from:

- failure to maintain a GPA of 3.0
• for international students, failure to pass the ESL requirements by the end of the fall semester in the second year
• failure to hold the Candidacy exam before the end of the fall semester in year 3
• failure to hold a Committee meeting prior to December 19 of year 3, and annually thereafter
• failure to participate as a member of the audience or, commencing in year three, speaker in the various Departmental seminars
• poor research performance, resulting in receipt of an unsatisfactory (U) grade from the advisor in MolGen 8999
• excessive, unexcused absences

Students who fail to maintain an adequate GPA are placed on probation by the Graduate School. The consequences of probation are described at length in the Graduate School Handbook. Given the other requirements of the Program, students on academic probation at the end of the Spring semester in year 1 will have great difficulty working simultaneously to raise their GPA and carrying out their other responsibilities. As a consequence, such students will likely be dismissed from the Program. Students on probation are monitored closely by the GSC.

Although students are required to hold a thesis advisory meeting of their Committee by December 19 in year 3, they are strongly encouraged to do so during the second year.

Maintenance of an adequate GPA is monitored by the Graduate School, which acts administratively to place students on probation when appropriate. It is the joint responsibility of the student and the advisor to inform the GSC of other events that can lead a student into poor standing. Once informed of poor standing, the GSC meets to gather information, issue an official warning, develop a plan for remediation, and inform the Graduate School.

**Graduate Associate Appointments**

Students without Fellowships (either internal or external) receive financial aid in the form of Graduate Associate appointments, which consist of a stipend and waiver of University fees and tuition. Students are typically appointed as Teaching or Research Associates, and occasionally as Administrative Associates. Appointments are made annually, beginning in the Fall semester. No student in the Department is permitted to hold employment outside the University. Students who fail to maintain Good Academic Standing lose eligibility for appointment as a Graduate Associate.

Students holding appointments as Teaching Assistants should expect to be continuously present throughout the semester. Some courses require significant
advance preparation; Teaching Assistants for such courses should also be available before the start of the semester and are encouraged to consult with instructors in advance.

Students are trainees and thus do not earn annual vacation time or sick leave. Students are excused for illness and personal emergencies at the discretion of the advisor or, in the first year, the Chair of the GSC. Students are granted two weeks of excused absence per year in addition to University holidays, by prior arrangement with the advisor.

Admissions

International applicants must apply by November 30 and domestic applicants by December 15. Only applications received by November 30 can be considered for the University fellowships. Applications are considered only for admission in the Fall semester, except in extraordinary circumstances. Most components of the application can be submitted electronically to the Graduate School at http://admissions.osu.edu/grad/apply_online.htm.

Official GRE scores, TOEFL (or MELAB or IELTS) scores (if applicable), and transcripts are submitted to the graduate school.

To expedite evaluation of the application, unofficial transcripts and standardized test scores can be submitted directly to the Program via e-mail to molgen-gc@osu.edu.

Letters of recommendation can be submitted electronically via the Graduate Admission portal (above). If referees wish to submit hard copy letters of recommendation, these should NOT be sent to the Graduate School, but rather mailed directly to the Department:

Graduate Admissions Committee
Department of Molecular Genetics
The Ohio State University 112
Biological Sciences Building 484
West 12th Avenue Columbus, OH 43210-1292 USA.

All admitted students are offered financial aid that includes payment of tuition and fees as well as an annual stipend of $26,976 (as of September, 2012). Students awarded a University Fellowship receive a stipend supplement from the Department.
Master's Degree

The M.S. degree is offered to students unable to finish the Ph.D. program. Students consult with their advisory Committee and the GSC Chair before changing their degree program status. Students may pursue either thesis-or non-thesis Master's degrees. The Master's degree must be completed within six years of entering the Program.

For the Master's degree, students must have completed 30 credit hours of courses, including all courses required in the first and second years of the Ph.D. program. Students must also be in Good Academic Standing in the Ph.D. program.

For the thesis-based Master's degree, students prepare a thesis as described in the Graduate School Handbook. The final examination is identical in format to that of the Ph.D. exam, except that the private meeting with the Committee following the student's seminar presentation to the Department typically lasts for approximately one hour. The Master's Exam Committee is composed of the advisor and two other members of the faculty.

For the non-thesis based Master's degree, the Exam Committee is composed of the advisor and either one or two other members of the faculty. The Exam consists of a four-hour written portion on topics assigned by the Committee, followed the next day by a brief oral exam that may cover additional topics, at the discretion of the Committee.

Students may also earn a Master's degree on the basis of having passed the Ph.D. Candidacy Exam, as described in the Graduate School Handbook.

Graduate Faculty Membership

Faculty with 50% or greater salaried appointment in the Department are eligible for appointment as Category M or P Graduate Faculty in the Department (as appropriate), provided they meet the qualifications described in the Graduate School Handbook. Faculty with less than 50% salaried appointment in the Department are eligible for Graduate Faculty appointment commensurate with the appointment in their home department of the University.

Regular, salaried faculty in other departments of the University or affiliated institutions (e.g., Nationwide Children's Hospital) may request a non-salaried appointment to the Department for the purpose of mentoring a graduate student member of the Program. Such individuals nominate themselves by submitting a CV to the Chair of the GSC for consideration at a meeting of the entire faculty, which votes on the nomination. The appointment of such individuals as Graduate Faculty ends when the mentored student leaves the Program.