

Molecular and Cellular Biology Interdisciplinary Graduate Program

**Graduate Student Handbook
2011 – 2012**

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Overview of the Program

Molecular and Cellular Biology Interdisciplinary Graduate Program

The goal of the Molecular and Cellular Biology (MCB) Interdisciplinary Graduate Program is to provide a diverse range of research and training opportunities for doctoral students interested in pursuing a multidisciplinary degree in molecular and cellular biology. MCB is ideal for students that wish to approach their studies by extending beyond the traditional boundaries of biological research. Participating faculty and researchers are drawn from multiple departments, colleges, centers, and institutes across the Arizona State University, as well as from partner institutions in the greater Phoenix metropolitan area. Students have the flexibility to tailor a program to meet their specific professional goals. This provides for a dynamic and innovative research and training environment that embraces the goals of the New American University at ASU by breaking from traditional disciplinary and organizational constraints to allow scientist to harness new knowledge and approaches that will help transform our global society.

The MCB website is a great resource for information. A copy of this manual is available at this site.
<http://mcb.asu.edu/index.html>

General degree information and policies can be found on the Graduate College website.
<http://graduate.asu.edu/>

MCB PhD program information at the Graduate College website:
<https://webapp.asu.edu/eadvisor/MajorInfo.external?sp=SASU00&sp=SLACELLPHD&sp=Sgraduate>

This Handbook was prepared by the MCB Interdisciplinary Graduate Program Executive Committee. It is intended to provide programmatic information for all students. A number of program changes were instituted which apply to students entering 2008-2009 and forward. A large portion of the information in the Handbook is relevant to all students. However, where program changes have been made, it should be understood that all students who entered MCB prior to 2008-2009 are "grandfathered" in this regard. These students have the option to follow new policies for comprehensive exams and course requirements that were in place at the time of matriculation.

MCB Graduate Program Administration

Executive Committee (2011-2012)

Kenro Kusumi, Ph.D., Chair

Douglas Chandler, Ph.D.

Heather Cunliffe, Ph.D.

Brenda Hogue, Ph.D.

Douglas Lake, Ph.D.

Jeffrey Touchman, Ph.D.

Jeanne Wilson-Rawls, Ph.D.

Faculty

A list of participating faculty can be found at <http://mcb.asu.edu/faculty>.

MCB Graduate Student Progress Committee

The MCB Graduate Student Progress Committee is responsible for tracking the progress of all graduate students in the program. All graduate students are required to submit a progress report **May 1** each year. Failure to meet this deadline will result in the student being placed on probation. The progress report is completed by the student, with input from their mentor. The Committee will review progress reports. Students that are deemed to not be making sufficient progress will be asked to meet with the Committee

to discuss their progress and ways to enhance productivity and meet expectations toward staying on track toward completion of their degree. The Committee will discuss the outcome of the meeting and plans to help get students back on track with the mentor.

Any anticipated changes in student status (e.g., change of advisor, leave of absence, transfer from Ph.D. to M.S. track) must be discussed with the MCB Graduate Student Progress Committee.

Graduate Student Progress Committee (2011-2012)

Jeanne Wilson-Rawls, Ph.D., Chair

Molecular and Cellular Biology Colloquium

All MCB graduate students are required to register for and attend the Colloquium (MCB 701) each semester while in the program. The Colloquium consists of weekly seminars given by graduate students, postdoctoral fellows, faculty and invited speakers. The weekly meeting serves to bring all graduate students and participating faculty together to hear about ongoing research. Participation in the seminars gives graduate students the opportunity to polish presentation skills and showcase their research, answer questions, hear about the research being done by others, ask questions and provide constructive critique, and suggestions in a friendly open environment. All MCB graduate students are required to present each year beginning in the third year. Students that enter into a lab immediately without rotations in the first year and those with extensive research experience may present in the second year.

Other Seminars

One of the best ways to expand your scientific knowledge is to attend seminars. This gives students the opportunity to hear about cutting edge research that is ongoing, often before it is published. There are many weekly seminars both on campus and at other affiliated partner institutions from which to choose. These include regular seminars in the School of Life Science (SoLS), Biodesign Institute, College of Medicine Downtown, Barrows Neurological Institute, Translational Genomics Institute (TGen), Ira A. Fulton School of Engineering, Biochemistry, Mayo Clinic and many other programs and departments. Students should check weekly announcements for seminars and select topics that are not only relevant to their research, but also general interest areas that will broaden and strengthen their background.

Dissertation Supervisory Committee

Graduate students choose their Dissertation Supervisory Committee in consultation with the mentor. The Committee must consist of the mentor and a minimum of three other faculty members. At least two of the members must be MCB core faculty. Members should be chosen for their expertise as related to the area of dissertation research. The Committee serves an advisory role and helps monitor research progress.

At least one committee meeting is required each year. Usually the first Committee meeting will include a brief description of the planned dissertation research project and a discussion of the student's proposed Plan of Study (POS). The Plan of Study is a document indicating all the coursework to be completed by the student. The student in consultation with his/her mentor should prepare a draft POS that meets all degree requirements for approval by the Committee. Previous coursework and laboratory experiences should also be presented in the POS.

The list of committee members and the approved POS is sent to the MCB Graduate Student Progress Committee which will review this information. This should be completed by May 1 of the first year, but not later than early in the fall semester of the second year. The student and mentor will submit the POS to the Graduate College before 50% of the semester hours have been fulfilled (42 hours for the Ph.D. track).

Graduate Student Responsibilities

It is your responsibility to understand the rules and policies of the MCB Program and the Graduate College. Use the information contained in this handbook, but also make use of other resources such as websites, the MCB Director and Executive Committee. Policies and requirements can change. You are responsible for staying informed about changes and requirements and how these may impact you. You are responsible for being aware of and meeting deadlines for progression through your graduate career. After you have selected a laboratory, work with your mentor to assure that all deadlines are met and that you stay on track to progress through the degree process according to the guidelines and policies. While you will work closely with your mentor, it is ultimately your responsibility to assure that you are on track and meeting deadlines. Planning, self assessments, frequent meetings with and feedback from your mentor, yearly meetings with your committee and submission of complete yearly progress reports will help keep you on track.

IMPORTANT DEADLINES	
Dissertation Supervisory Committee Meetings	Prior to May 1 (annually)
MCB Progress Reports Due	May 1 (annually)
Plan of Study and Dissertation Supervisory Committee member list submitted to the MCB Graduate Student Progress Committee for review	May 1 (Year 1)
Final mentor selection (for students with MCB approved lab rotations in Year 1)	May 1 (Year 1)
Comprehensive Exam Deadline	April 15 (Year 2)
Plan of Study (POS) submitted to Graduate College	Prior to 50% of semester hours fulfilled (42 hours for Ph.D. track)
Presentation of Dissertation Prospectus to the Dissertation Supervisory Committee	Prior to the late fall semester (Year 3)

Ph.D. Degree Requirements and Typical Curriculum

Overview

The Plan of Study (POS) is developed by the student and their mentor/advisor with consultation and input from the Dissertation Supervisory Committee. The Plan of Study is tailored to the needs and goals of each individual student. A minimum of 84 semester hours is required to complete the Ph.D. degree. A minimum of 12 designated semester hours of MCB courses and six semester hours of elective course work are required.

The following courses/credits must be included: MCB 555 (6 credits), MCB 556 (3 credits), an advanced genetic course (MCB 543 Molecular Genetics (3 credits) or mentor-approved alternative), MCB 701 Colloquium each semester (1 credit), BIO 591/510 Introduction to Responsible Conduct of Research (1 credit).

A PhD student must record the Plan of Study (POS) and take 12 hours of 799 dissertation credit. The dissertation credit is generally completed during the final semester. If the credits are completed prior to the last semester students should register for continuing credit under MCB 795.

The remaining courses are selected by the student in consultation with their mentor and Dissertation Supervisory Committee. If the Committee finds that 400 level courses are an appropriate component of the POS, up to 6 credit hours may be included in the POS for this student. Of the 84 semester hours, at least 54 hours (which may include research credits) of the approved Plan of Study must be completed after admission to the Ph.D. program but before 50% of the 84 semester hours have been fulfilled. Students may not apply credit hours earned for a doctoral degree previously awarded at any institution toward their current ASU doctoral degree. Up to 30 semester hours from a previously awarded master's degree can be applied toward a doctoral Plan of Study if approved by the program. Written and oral comprehensive examinations are required before a student advances to candidacy. A written dissertation

based on an original body of high quality research that demonstrates proficiency in the area of specialization is required. The final defense consists of a public seminar immediately followed by a private discussion and questions with the Dissertation Supervisory Committee. Evidence must be presented that the presented research has been or is publishable in the peer reviewed literature.

Typical Curriculum for MCB Ph.D. Degree

MCB Graduate Students are expected to enroll in a minimum of 6 and a maximum of 12 credit hours per semester.

FIRST YEAR

Students should attend the New Student Orientation meetings the week before classes start. Students will receive an overview of the MCB Program and will be advised on selection of courses. A minimum typical curriculum for the First Year is presented below, and depending on the commitments to TA, courses listed in the First or Second Year section can also be considered.

Fall Semester Curriculum

MCB 555 Advanced Molecular and Cellular Biology I. Required. 6 credits. Intensive lecture and literature based studies in membrane biology, neurobiology, signal transduction, bioimaging and molecular-based disease.

MCB 701 Molecular and Cellular Biology Colloquium. 1 credit. Required. Weekly seminar series that includes student, postdoctoral fellows, faculty and visiting speakers. Registration and attendance is required each semester.

MCB 792 Research. 1-5 credits.

Elective. Please see First or Second Year section.

Spring Semester Curriculum

MCB 556 Advanced Molecular and Cellular Biology II. Required. 3 credits. Intensive lecture based studies on gene regulation, developmental biology, microbiology and immunology and introduction to the methods and logic of reading the scientific literature and scientific writing (manuscripts, abstracts, and grant proposals) and oral presentation.

Elective. Please see First or Second Year section.

MCB 701 Molecular and Cellular Biology Colloquium. Required. 1 credit.

MCB 792 Research. 3-5 credits.

FIRST YEAR Research and Student Progress

Students who have chosen a mentor/research advisor before starting the program will carry out exploratory research the first semester as part of defining their dissertation research aims.

The Dissertation Supervisory Committee should be selected, a committee meeting should be held to briefly discuss progress toward defining research aims and approval of the POS should be completed by May 1 of the first year, but an extension can be requested from the MCB Graduate Student Progress Committee until the fall semester of the second year

FIRST OR SECOND YEAR

Fall and Spring Semester Curriculum

An Advanced Molecular Genetics Course. Required. This is typically fulfilled by one of the course options below:

Option 1: BIO 543 Molecular Genetics. 3 Credits. An in-depth and comprehensive treatment of molecular biology including DNA replication, repair, transcription, RNA processing, transcription and control of these processes.

Option 2: Students who have completed a comparable graduate genetics class or who have significant undergraduate course work in genetics may select BIO 545 or another appropriate graduate level genetics course, with the approval of their mentor.

BIO 610 Introduction to Responsible Conduct of Research in the Life Sciences 1 credit, offered in the **Fall semester only**. All MCB graduate students must attend this research ethics class during the first or second year. This 10-week course meets once a week for 75 minutes. It introduces the ethical and regulatory issues in the nine core areas of responsible conduct of research, as defined by the National Institutes of Health.

Electives. 2-4 credits. Typical electives are in any area of molecular biology or cellular biology or any course that substantially prepares the student for his/her dissertation research. (Note: a total of 6 hours of electives is required for the degree)

MCB 591 Literature Seminar/Journal Club. 1 credit. MCB 591 classes are offered on different topics by faculty facilitating student presentations of research literature.

MCB 701 Molecular and Cellular Biology Colloquium. Required. 1 credit.

MCB 792 Research. Up to 9 credits.

SECOND YEAR Research and Student Progress

The comprehensive exam must be completed no later than **April 15** during the spring of the second year. The exam consists of a written research proposal, an oral presentation and defense of the proposal. Additional information regarding the oral exam is described below.

Students who do not meet this deadline will be placed on probation and will be dropped from the program if the exam is not satisfactorily completed by the first day of the fall semester at the beginning of the third year. Students are strongly advised to meet the spring deadline since it is often difficult to schedule exams and meetings around faculty summer schedules. Scheduling difficulties will not justify extension of the deadlines. Any remediation associated with the exam must be satisfied within the timeframe specified by the Exam Committee. This means that it is important to begin thinking about and planning for your comprehensive exam no later than the beginning of fall semester in the second year.

Third Year

Fall and Spring Curriculum

MCB 701 Molecular and Cellular Biology Colloquium. Required. 1 credit.

Elective. Continued participation in Literature Seminar/Journal Club electives are recommended.

MCB 792 Research. up to 11 credits.

THIRD YEAR Research and Student Progress

During the early part of the fall semester a written prospectus should be prepared that includes a short review of the literature, description of the dissertation goals, testable hypotheses, overview of experimental approaches to be used. This should be presented to the Dissertation Supervisory Committee, both in written and oral forms. The student should be aggressively working on their research directed toward publications. Research results should be presented at national or local professional meetings. The student should be gaining experience in writing abstracts, posters and his/her first research manuscript. The student should also present their work in the MCB Colloquium. Students should meet with the Dissertation Supervisory Committee prior to the May 1 progress report due date.

MCB Ph.D. track students may request a M.S. in passing, after successful completion of **both** the Comprehensive Exam and the Prospectus. The student and the Dissertation Supervisory Committee will need to complete the necessary paperwork to submit for approval by the Graduate College.

Fourth Year

Fall and Spring Curriculum

MCB 701 Molecular and Cellular Biology Colloquium. Required. 1 credit.

Elective. Continued participation in Literature Seminar/Journal Club electives are recommended.

MCB 792 Research. up to 11 credits.

THIRD YEAR Research and Student Progress

Students should be fully concentrating on their research. The large bulk of data that will go into the dissertation and which will result in multiple research publications should be obtained during this year. Students are expected to report their research at national, possibly international, meetings. A second more extensive seminar in the MCB Colloquium should be presented. Students should begin to deciding on plans following completion of the Ph.D. Whether considering postdoctoral work or a job in industry, takes time, thus the fourth year is not too early to be networking and initiating discussions with potential mentors and employers. A committee meeting should be held before the May 1 progress report deadline. During this meeting the student should discuss the status of their work in light of the overall research aims and plans to complete their research during the coming year. If the student's work is not progressing in this direction it is important to discuss with the mentor and committee how to get back on course.

Fifth and Final Year

FINAL YEAR(S) Fall and Spring Curriculum

MCB 701 Molecular and Cellular Biology Colloquium. Required. 1 credit.

MCB 799 Dissertation or 795 Continuing. up to 11 credits.

Research and Student Progress

Significant effort should go into completing the experimental work and writing the dissertation. Students should be submitting manuscripts, with the goal to have all papers accepted by the time of their defense.

Writing takes a lot of time and focused effort, thus it is important to plan and also to work closely with the mentor during this year. The dissertation is organized as a series of research manuscripts with each chapter representing a separate, but related manuscript. Ideally each chapter will represent a manuscript that will be published, or at least submitted, by the time that the student defends and leaves for postdoctoral work or a job. The dissertation should be prepared according to the Graduate College format and guidelines. Students should obtain the guidelines early in the year and be aware of all relevant deadlines for scheduling the defense and graduation. The defense should be scheduled well in advance to assure a date that the entire Dissertation Supervisory Committee can be present. The completed written copy of the dissertation should be delivered to the Dissertation Supervisory Committee no later than one week prior to the scheduled defense. The defense consists of a public seminar, followed by a private discussion and defense of the dissertation with the Dissertation Supervisory Committee.

MCB Master of Science (M.S.) Degree: This degree is no longer offered.

Comprehensive Exam

The comprehensive exam is a major milestone during the Ph.D. program. The exam is also called the “prelim” or “qualifying” exam. A comprehensive exam is not required of students working toward the MS degree.

The comprehensive exam is intended to:

- i. determine if you have the breadth and depth of knowledge in Molecular and Cellular Biology to continue on the Ph.D. track
- ii. demonstrate that you can identify significant research questions, provide a rationale for proposing specific questions and design experiments to address the proposed questions.

The exam consists of a written research proposal that is based on a hypothesis driven problem. You should identify two currently relevant topics of interest within your research track area, including the fields of cell biology, genetics, biochemistry, neurobiology, microbiology, immunology, developmental biology, molecular ecology. The topics cannot be related to the specific research being carried out by you or your laboratory. You should prepare two abstracts (250 words each) describing the topics and the specific questions or problems that you propose to address. The abstracts should be submitted by e-mail attachment to the Chair of the Comprehensive Exam Committee. The Exam Committee will select one of the abstracts. The Chair will inform you within 1 week of the selection.

You should prepare a written proposal based on NIH format for postdoctoral fellowship applications (<http://grants.nih.gov/grants/funding/416/phs416.htm>)

Only the “Research Proposal Description: Project Proposal Description” and “Research Training Plan Sections 2-5” for the PHS 416-1 postdoctoral fellowship application format needs to be prepared for the proposal. The proposal will include the following sections (i) title, (ii) description (abstract/description - project summary and relevance), (iii) specific aims, (iv) background and significance, and (v) research design and methods (vi) references. A full description of these sections can be found in the PHS 416-1 instructions. The proposal should have two specific aims. The written proposal should be no more than 10 pages single-spaced including figures, using a font size not smaller than 11 point. The instructions for formatting, including allowable fonts and margins, should be followed. The proposal will be due four weeks from the date on which you are notified of the abstract selection. Printed copies of your proposal should be delivered to the members of the Exam Committee at the end of the fourth week and the oral exam should take place one week following.

It is **very important** that you submit a well developed and written proposal. Significant effort should be made to present an exceptional proposal. You must work independently on developing and writing the proposal. After turning the proposal in to the Exam Committee, students are strongly encouraged to have practice session(s) with other students and postdoctoral fellows for the oral presentation and exam.

The Comprehensive Exam Committee will consist of all members of the Dissertation Supervisory Committee except the mentor. The Comprehensive Exam Committee selects who will chair the exam. It is the responsibility of the Exam Chair to make sure that the specified timeframe for the exam is met, to coordinate scheduling of the exam, to guide the process during the exam and to report the outcome of the exam to the Graduate Student Progress Committee. The mentor is not a member of the Comprehensive Exam Committee. The mentor may attend the comprehensive exam for reference in the event that future remediation is required for a conditional pass, but should not ask questions or participate in the exam in any way. The mentor must leave the room with during the deliberation following the exam.

Possible Outcomes

The Committee will evaluate the written proposal and your performance during the oral presentation and discussion part of the exam. They will consider your ability to develop hypothesis driven research questions and your ability to plan and carry out independent research. Your general scientific knowledge be determined by your ability to answer questions during the exam in light of your successful completion of coursework and academic success expected by your second year, and prior research experience. The following outcomes of the exam are possible:

- i. Pass -
Proceed for admission to candidacy without conditions.
- ii. Conditional Pass -
The Committee will determine what conditions must be met and the time specification for these. Possible conditions include, but are not limited to, coursework to strengthen knowledge in a given area(s), revision of the written proposal, complete redevelopment/design of the proposal, and reexamination of the oral part of the exam, complete reexamination. If the conditions are met within the specified time, a pass will be granted and the student will proceed to submit for admission to candidacy. If conditions are not met satisfactorily or if the conditions are not met within the specified time frame, the student will be terminated from the program.
- iii. Fail -
The student will not be allowed to continue works towards a Ph.D. in the MCB Program. At the discretion of the Dissertation Supervisory Committee and Graduate Student Progress Committee, requirements and timelines towards completion of a M.S. in the MCB Program can be determined.

Financial Support

Graduate students are supported primarily by teaching assistantships (TA) or research assistantships (RA).

Teaching Assistants

The MCB Interdisciplinary Graduate Program does not control any TA positions. Teaching assistants are assigned through the School of Life Sciences (SoLS) or the home school/department/institute of mentors whose primary appointment is not in SoLS. First year students are assigned TA positions directly. After the first year it is the responsibility of the mentor to request TA positions for their graduate students.

Graduate Research Assistants

Faculty with research grants may have funds to support graduate research assistants. Graduate students should discuss this with their mentor prior to entering the lab.

University Fellowships

There are a limited number of fellowships for entering graduate students. The Graduate College nominates incoming students for these fellowships based on recommendations from the MCB Admissions Committee. Nominations are based on the strength of the student's application to the program.

Other Competitive Fellowships

There are competitive predoctoral fellowships through the National Institutes of Health, National Science Foundation, National Aeronautics and Space Administration, and various foundations and professional societies. Students who qualify for these fellowships should apply. The awards are prestigious and generally provide 2-3 years of support. The Graduate College and School of Life Sciences sends out e-mails announcing various deadlines for some fellowships. You are strongly encouraged to pay attention to these announcements, to explore websites for information about fellowships and to discuss possibilities with your mentor.

General Information

Leave of Absence

Graduate students are expected to remain in residence throughout their graduate studies. Should a leave of absence be necessary, a student must discuss this with their mentor as soon as it is recognized that they need to take time away from school. Immediately following the discussion with their mentor, **a letter must be submitted for approval by the Graduate Student Progress Committee and the Dissertation Supervisory Committee** explaining the reason for requesting a leave of absence and the amount of time to be taken. The expectation is that a student will not take more the minimal amount of time necessary, with no more than a maximum of two semesters being taken while in the program.

Academic Integrity

Scholastic dishonesty includes, but is not limited to, plagiarism (using another's word, ideas materials or work without properly acknowledging and documenting the source), cheating, falsifying academic work, research or records. The MCB Graduate Program and ASU maintain a zero tolerance policy regarding academic dishonesty. Students caught in acts of academic dishonest as described above will face immediate dismissal from the program.

All MCB graduate students must attend the following class once during the first or second year.

BIO 610 Introduction to Responsible Conduct of Research in the Life Sciences 1 credit, offered in the **Fall semester only**. All MCB graduate students must attend this research ethics class during the first or second year. This 10-week course meets once a week for 75 minutes. It introduces the ethical and regulatory issues in the nine core areas of responsible conduct of research, as defined by the National Institutes of Health.

Additional information can be found in the ASU "Student Academic Integrity Policy" manual. Students are responsible for knowing the rules governing academic and research dishonesty.

http://www.asu.edu/studentaffairs/studentlife/judicial/academic_integrity.htm#definitions

Holidays

Graduate students do not follow the same break schedules as undergraduates. MCB graduate students are paid continuously during the fall and spring semesters. They have the same holiday schedule as University staff. The less busy campus environment during breaks and summer is an excellent time to make significant progress in the laboratory.

Laboratory Safety Requirements

All laboratory personnel, including graduate student, are required by Arizona State University to complete safety classes on an annual basis. All MCB graduate students must attend Fire Safety and Prevention and Laboratory Safety. Depending on type of laboratory work, some students will be required to take other types of training classes.

Fire Safety and Prevention Training
Laboratory Safety Training

Radiation Safety Training - http://uabf.asu.edu/radiation_safety_training

Biosafety - http://uabf.asu.edu/biosafety_program

Hazardous Waste Management - http://uabf.asu.edu/ehs_hazmat_compliance_guidelines

Environment Health and Safety Office - http://uabf.asu.edu/health_safety_training