

Graduate Program in Molecular Medicine Doctor of Philosophy

GRADUATE STUDENT HANDBOOK

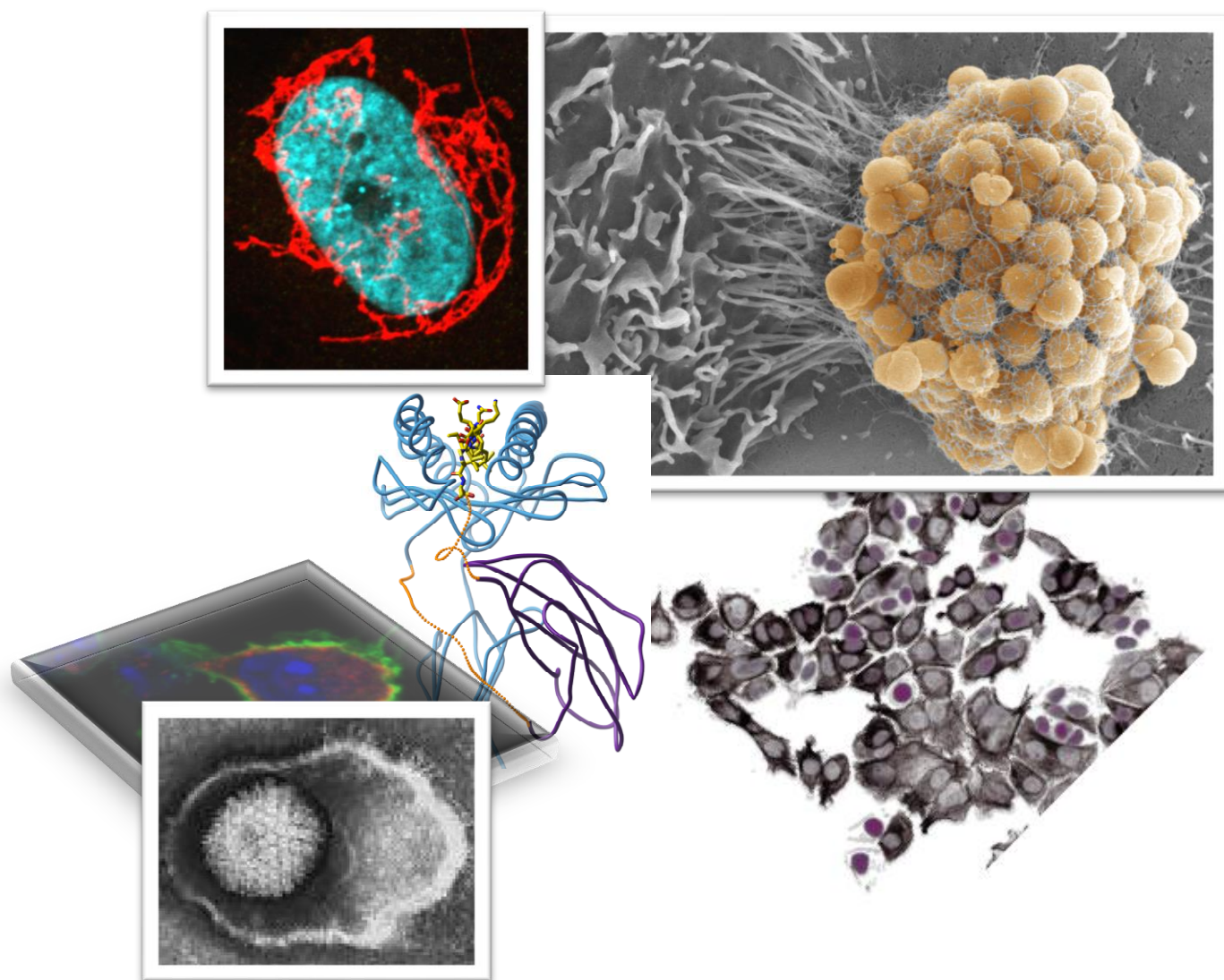


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INTRODUCTION and OBJECTIVES

Welcome to the Graduate Program in Molecular Medicine (GPMM) at the University of Arizona. The primary goal of this training program is to foster the development of scientists and educators who are prepared for lifelong participation in scholarly and intellectual pursuits. Students may pursue training and research under three Emphasis Tracks: Cell Biology, Immunobiology, and Medical Biophysics.

The Doctor of Philosophy degree in Molecular Medicine requires outstanding scholarship and significant research contributions that advance the fields of cell biology, immunology, and biophysics, with an eye toward translation to human health. Under the mentorship and guidance of supportive faculty and exceptional colleagues, students in the program are expected to design and conduct original research that constitutes a complete body of scholarly work suitable for publication in high-quality, peer-reviewed journals. Students in the program develop independence and critical-thinking skills, as they learn to transform original ideas into substantive hypotheses. In addition, they are exposed to an array of advanced biomedical techniques and approaches, either as part of their curriculum or through their original research. Our graduate program prepares students for careers in various disciplines that require advanced expertise in and knowledge of biomedical research, including academia, biotechnology industry, law, journalism, and public policy.

This handbook summarizes the requirements of the GPMM and the Graduate College of the University of Arizona for obtaining a PhD degree. Graduate students are responsible for knowing and fulfilling graduate requirements of both the Graduate College and GPMM.

ADMINISTRATION and RESOURCES

The Graduate Studies Committee (GSC) for the GPMM, with the approval of the affiliated Department Heads, administers all aspects of the graduate program including establishment of policies, student advisement, and other matters relevant to graduate education. The administrative contacts for the Program are given below.

Title	Name	Office	Phone	Email
Program Director	Lonnie Lybarger	LSN 442	626-1044	lybarger@email.arizona.edu
Affiliated Department Heads	Carol Gregorio (CMM) Janko Nikolich-Zugich (IMB)	MRB 325 MRB 225	626-8113 626-6065	gregorio@email.arizona.edu nikolich@email.arizona.edu
Graduate Studies Committee	Lonnie Lybarger	LSN 458	626-1044	lybarger@email.arizona.edu
	Deepta Bhattacharya	MRB 217	626-8088	deeptab@email.arizona.edu
	Curtis Thorne	AZCC 4947	626-0395	curtisthorne@email.arizona.edu
	Samantha Harris	MRB 310	621-0291	samharris@email.arizona.edu
	Sam Campos	BIO5 429	626-4842	skcampos@email.arizona.edu
Emphasis Track Leaders	Sam Campos (Immunobiology)	BIO5 429	626-4842	skcampos@email.arizona.edu
	Samantha Harris (Medical Biophysics)	MRB 310	621-0291	samharris@email.arizona.edu

	Curtis Thorne (Cell Biology)	AZCC 4947	626-0395	curtisthorne@email.arizona.edu
Program Coordinators	Barbara Kahn-Sales Nicole Swinteck	LSN 444 Works Remotely	626-6655 626-0710	bkahnsales@email.arizona.edu nperri@email.arizona.edu

Program Website: <http://gpmc.medicine.arizona.edu/>

University of Arizona Graduate College Website: <http://grad.arizona.edu/>

GPMM Assessment Criteria: can be found in the Appendix of this handbook. They summarize how GPMM, the Graduate College and the Provost's Office evaluate the quality of training in GPMM. *These assessment criteria are very useful to illustrate degrees and levels of mastery that students should attain over the course of their doctoral studies.*

PREREQUISITES and REMEDIAL COURSEWORK

Students entering the Ph.D. Program in Molecular Medicine should have a strong background in biology, biochemistry, molecular biology, chemistry, physics, and math. Courses in cell biology, microbiology and immunology, developmental biology, genetics, and statistics are also desirable. Academic preparation in other areas of science may also provide a good background, and the program welcomes students with diverse backgrounds and majors. After entering the program, a student may, under the direction of the GSC, take remedial courses in particular subjects.

QUICK CHECKLIST OF STUDENT RESPONSIBILITIES

The following are key administrative responsibilities of students. Some are one-time responsibilities and others recur during the student's time in the program. It is up to the student to ensure that these tasks are completed. Many of the milestones for Program progress are accessed through the Graduate College using the **GradPath** tool (<http://grad.arizona.edu/gsas/gradpath>)

	Submit Responsible Conduct of Research statement on GradPath
	Submit your Plan of Study on GradPath prior to Comprehensive Exam
	Form your Comp Exam Committee (2nd year) and submit the corresponding form on GradPath for approval
	Submit Comprehensive Exam Announcement on Grad Path prior to Comprehensive Exam
	Ensure that Comprehensive Exam Committee submits (i) Student Milestone Assessment and (ii) exam results on GradPath following the exam.
	Post-Comprehensive exams, ensure that the Doctoral Dissertation Committee is named and the appropriate forms filed on GradPath
	Schedule at least one Dissertation Committee meeting per year and ensure that the Dissertation Committee Chair submits the Student Milestone Assessment form following each committee meeting.
	Ensure that the Student Seminar Coordinator completes your Student Seminar Assessment form online each year.

	Complete Self-Evaluation prior to annual meeting with the Graduate Studies Committee.
	Make sure you send your dissertation to your Dissertation Committee

DEGREE REQUIREMENTS

The Doctor of Philosophy degree is earned through a rigorous set of standards for excellence in research, academic performance, and original contribution to a chosen scientific field. While the degree will inevitably reflect a set of qualifications unique to each student, general requirements are set forth below.

A. Credit Requirements

Students seeking a PhD degree will successfully complete the following course credit requirements with a grade-point average of at least 3.0. The course work required for the PhD degree is a total of at least 63 credits comprised of required and elective courses, research, seminar, and journal clubs.

In the second year, students will choose a track within Molecular Medicine: Immunobiology, Cell Biology, or Medical Biophysics. Each track has specific course requirements (see 'COURSEWORK' for details).

Note: Courses taken in the first year in the ABBS program may be used to satisfy the required or elective requirements with the approval of the GPMM Directors.

B. Major and Minor Fields of Study

The Graduate College requires that all doctoral students complete a graduate Minor. Students will major in Molecular Medicine and are encouraged to minor in Molecular Medicine. Students also have the option to minor in a different life sciences graduate program. The credit requirements for a Minor can vary by programs and students wishing to minor in a different program or department should consult those programs to determine the specific course requirements for the Minor. Course details for the Major and Minor are provided below.

C. Comprehensive Examination and Advancement to Candidacy

Students seeking a PhD degree must successfully complete the Comprehensive Examination. The Comprehensive Exam should be completed by Fall of the third year, at which time all Major coursework should also be completed. Extensions on the date for completion of the Comprehensive examination must be approved by the GPMM Directors. The Comprehensive Examination consists of two parts. The first is a written research proposal in NIH format (see 'COMPREHENSIVE EXAMINATION' section for details and timeline). The second part is an oral examination designed to test basic and field-specific knowledge and critical thinking.

D. Doctoral Plan of Study

The Doctoral Plan of Study (DPOS) is a contract between the student, the Major and Minor programs, and the Graduate College specifying which courses the student will take to fulfill the requirements of the doctoral degree. The Graduate College does not allow doctoral

students to take the Oral Comprehensive Examination until the DPOS has been approved. *The Graduate College recommends that students submit their Plan of Study in the third semester in residence at University of Arizona.* It is in the student's best interest to submit the Plan of Study for approval as soon as he or she has consulted with the Major and Minor advisor and formulated an expected list of courses to be taken during the degree program. The DPOS – and all related forms - can be revised at any time, and is completed through the GradPath system, which is accessible through UAccess student. More information can be found at <https://grad.arizona.edu/gsas/gradpath/gradpath-videos>.

E. Publications

Students are expected to develop and demonstrate the ability to independently interpret and disseminate their research findings. Publication is the most tangible currency of academic achievement in biomedical research. Therefore, students that graduate with a PhD degree from GPMM are expected to publish at least one first-authored paper in a peer-reviewed scientific journal. Graduation may occur for students that do not meet this requirement in exceptional circumstances, and this decision is discussed and approved by the student's Graduate Advisor and Dissertation Committee. Students should discuss publication requirements, expectations, and timelines with their Graduate Advisor and Dissertation Committee.

F. Dissertation Committee and Dissertation

Student Dissertation Committee selection is detailed in the DISSERTATION COMMITTEE section. The committee should consist of at least 4 faculty members, at least 3 of which are tenure-eligible. Committee composition must be approved by the GPMM Directors. Students seeking a PhD degree will successfully write and defend before their Dissertation Committee a dissertation representing original research. See “DISSERTATION and FINAL DEFENSE” for details and guidelines for submitting the dissertation.

G. Journal Club/Work-In-Progress

Students are expected to register and participate in at least one journal club/work-in-progress colloquium each semester (Fall and Spring) during the tenure of their PhD. These courses are designed to give students exposure to pertinent literature in their chosen field and to educate them in the critical evaluation of the work presented in journal articles. Further, through Journal Clubs, students receive training and experience to develop their public presentation skills. Journal Clubs/colloquia should augment your education in the laboratory. Students will choose pertinent courses with the help of their Graduate Advisor; some options are provided below in the “COURSEWORK” section.

H. Conference Presentations

Communication of research findings to the greater scientific community and meeting scientists from other institutions and countries is a fundamental aspect to the development of a scientist and a scientific philosophy. Students are expected to participate in and present their research at a minimum of two research conferences. Ideally, students would present their research at least yearly at some combination of national/international meetings, regional and local meetings. Poster presentations or oral presentations are acceptable.

I. Graduate College Doctoral Degree Requirements

The Degree Requirements specified by the GPMM agree with or exceed those specified by the Graduate College. To earn a doctoral degree in Molecular Medicine, the student must meet the requirements of the GPMM's policies, set forth in this handbook. The Graduate

College Doctoral Program requirements can be reviewed at the following site <http://grad.arizona.edu/gsas>. Note: the terms ‘units’ and ‘credits’ are synonymous.

J. Code of Academic Integrity

Integrity and professionalism are critical parts of graduate education and continuing scientific pursuits. Students are ultimately responsible for their ethical conduct. Student activities in fulfillment of degree requirements including, but not limited to, research, coursework, exams, dissertation, and attendance/participation at seminars and journal clubs are subject to the [Code of Academic Integrity](#) established by the University. As it pertains to research, students must conduct their experiments in an ethical manner and any fabrication or theft of data will not be tolerated. Students will keep laboratory records and data in a format acceptable to their Graduate Advisor and be prepared to turn over their records to the Graduate Program at any time. Students working with animal and human research subjects must complete the University-mandated training requirements for each, and abide by all University policies therein.

K. [Annual Evaluation](#)

On an annual basis each student will complete the “Graduate Student Progress Report” online and submit it to the GPMM. The Graduate Advisor will also complete an online evaluation of the student. The Graduate Advisor is expected to discuss their evaluation with their student. The GSC will review the Progress Report and Graduate Advisor Evaluation in conjunction with a formal meeting with the student. The Progress Report and Evaluation forms will be retained in each student’s file. In this annual evaluation, the GSC will be using the assessment criteria listed in the Appendix, as well as other criteria listed in this Handbook, related to scientific productivity, progress through the plan of study, etc.

MENTORING

A successful graduate education for the fulfillment of the Doctor of Philosophy is dependent on the resourcefulness, initiative, and effort of the student as well as mentoring on multiple levels. The student’s primary and secondary mentors will be their Graduate Advisor and their Dissertation Committee, respectively. Mentoring from other faculty members, scientists, staff, and students at the University should be sought as needed. There are also workshops available on broad topics that may contribute to your professional development. Please consult the GPMM Directors if you have identified an area in which you would like specialized help finding additional mentoring opportunities.

COURSEWORK

The GPMM requires 36 credits of coursework (18 credits in graded courses plus 9 credits for the Minor, at least 5 of which are graded) for the Doctor of Philosophy degree. All GPMM students will take a core of 8 required units of program CORE courses. Students will take at least 6 credits of EMPHASIS TRACK COURSES (see each track for requirements). In addition, students will take at least 6 credits of Student Seminar and at least 6 credits of Journal Club/Work-In-Progress meeting. Note that these are the *minimum* numbers of credits; students are expected to take Student Seminar and a Journal Club/Work-in-Progress course each semester while in the program. Finally, 18 credits of Dissertation are required. With the approval of the graduate mentor, students may take additional courses for credit. While registered for Dissertation units (typically after completion of the Comprehensive Exam), students are expected to continue to participate in journal club, seminars, etc. *Students must maintain a GPA of 3.0 or higher each semester to remain in good standing with the graduate program.*

Students with a GPA of less than 3.0 will be placed on academic probation for a period of one semester. At the completion of the probationary semester, the student's cumulative GPA must reach a minimum of 3.0 or the student will be disqualified by the Graduate College, although the Program may seek a one semester extension. See the "Student Appeals" section below for more information.

MAJOR REQUIRED COURSES:

These are courses required for the PhD degree in Molecular Medicine. 18 credits of graded Core and Elective/Emphasis Track courses are required and must be completed with a grade of B or better.

MINOR COURSES:

Students are encouraged to minor in Molecular Medicine. The Molecular Medicine Minor is typically satisfied within the 36 course credits required by the department. Students may seek a Minor in other departments *with the approval of their graduate mentor and the GPMM Directors*. Coursework requirements for a Minor in another department must be approved by the Minor department. The Graduate College requires a Minor for all doctoral students. A Minor in GPMM requires 9 credit hours of courses, and at least 5 of these must be graded. Student may minor in other departments/programs. In these cases, the credit requirements are set by the respective programs and students should consult those programs for details.

RESEARCH COURSES:

Students will register for 6 credits of Research each semester until they complete the Comprehensive Exam (Advance to Candidacy). From then onward, they will register for 6-8 credits of Dissertation Units each semester until graduation. These credits are designated as IMB/CMM 900 Research units and IMB/CMM 920 Dissertation units. Each faculty advisor has a different course section number for these units; a table listing these numbers can be found in the Appendix.

SEMINARS:

Students are expected to attend a research seminar series each semester. The selection of an appropriate series in which to participate should be made by the student in consultation with her/his advisor. IMB and CMM both host departmental seminar series that may be appropriate.

STUDENT SEMINAR COURSES: IMB 696B or CMM 696B

Students will register for 1 graded credit of student seminar each semester (Fall and Spring) while in the program. Students may choose to take either course, and should make their selection in consultation with their advisor. Details about each course can be obtained from the respective course directors: Dr. Deepta Bhattacharya (IMB 696B) or Dr. Curtis Thorne (CMM 696B).

JOURNAL CLUB/COLLOQUIUM COURSES:

Students will register for 1 graded credit of a journal club/colloquium course each semester in the program (Fall and Spring) and will be expected to make an in-class presentation one time per semester. There is a minimum requirement of 6 graded credits of journal club/colloquium for graduation.

COURSE REQUIREMENTS and EMPHASIS TRACKS

CORE COURSES for all Tracks	Credits	Grading
CMM/MCB 577 Principles of Cell Biology (Fall)	4	A/B/C
CMM/MCB 695E Science, Society, & Ethics (Spring)*	1	S/P/F
MCB 580 Introduction to Systems Biology (Fall)	3	A/B/C
OR		
BIOC 568 Nucleic Acids, Metabolism, and Signaling (Spring)**	4	A/B/C
Student Seminar (CMM 696B or IMB 696B; Spring and Fall)	6 (1/semester)	A/B/C
Colloquium/Journal Club Course (Spring and Fall). Each Emphasis Track has specific recommendations (see below)	6 (1/semester)	A/B/C
CMM or IMB 900 Research Units	12	S/P/F
CMM or IMB 920 Dissertation Units	18	S/P/F
Credit Subtotal:	50	

*Or an equivalent course approved by the GPMM Directors

**The requirement is for MCB580 OR BIOC568, not both. Equivalent courses may be substituted in unusual circumstances with approval from the Program Directors.

EMPHASIS TRACK: Immunobiology	Credits	Grading
<i>Required in addition to Core Requirements (see above)</i>		
IMB 548 Basic Immunological Concepts (Fall) [§]	3	A/B/C
IMB 565 Principles and Molecular Mechanisms of Microbe-Host Interactions (Spring)	3	A/B/C
<i>Recommended Electives (pick 1)*</i>		
CMM 605 Medical Immunology and Microbial Pathogenesis (Fall)	4	A/B/C
IMB 521 Scientific Grant Writing (Spring)	2	A/B/C
IMB/CMM 695L Advanced Topics: Modulation of the Biology of Aging by Inflammation, Infection and Immunity	1	A/B/C
ECOL 509 Evolution of Infectious Disease (Fall)	3	A/B/C
BIOC 568 Nucleic Acids, Metabolism, and Signaling (Spring)	4	A/B/C
CMM 588 Princ. Of Cellular and Molecular Neurobiology (Fall)	4	A/B/C
<i>Recommended Colloquium/Journal Club</i>		
IMB 595A Immunobiology Journal Club (Fall and Spring)*	1 (counted above)	A/B/C
Credit Subtotal:	≥6	

[§]Recommended that students take this course in their first year. If a student does not have a background in basic immunological concepts, students may consider taking CMM605 in Fall of first year and take IMB548 in Fall of Second year

*Other Electives/Journal Club may be chosen with approval from the GPMM Directors.

Note: any course in any track can be taken as an elective in another track.

EMPHASIS TRACK: Cell Biology	Credits	Grading
<i>Required in addition to Core Requirements (see above)</i>		
<i>(Choose 2 of the following)</i>		

CMM 595H Problems in Biology of Complex Diseases (Spring)	2	A/B/C
MCB 580 Introduction to Systems Biology (Fall)	3	A/B/C
OR		
BIOC 568 Nucleic Acids, Metabolism, and Signaling (Spring) (Whichever was not taken as a “core” requirement)	4	A/B/C
CBIO 552 Cancer Biology Survey Course (Fall)	4	A/B/C
PATH 515 Mechanisms of Human Disease (Spring)	4	A/B/C
MCB 572A Cell Systems (Fall)	4	A/B/C
<i>Recommended Electives (pick 1)*</i>		
CMM 605 Medical Immunology and Microbial Pathogenesis (Fall)	4	A/B/C
IMB 521 Scientific Writing (Spring)	2	A/B/C
CMM 588 Principles of Cellular and Molecular Neurobiology (Fall)	4	A/B/C
MCB 546 Genetics and Molecular Networks (Spring)	4	A/B/C
CMM 695D Human Genetic Disease Colloquium (Spring)	3	A/B/C
IMB/CMM 695L Advanced Topics: Modulation of the Biology of Aging by Inflammation, Infection and Immunity	1	A/B/C
<i>Recommended Colloquium/Journal Club</i>		
CMM 595A CMM Journal Club (Fall)*	1 (counted above)	A/B/C
Credit Subtotal:	≥6	

*Other Electives/Journal Clubs may be chosen with approval from the GPMM Directors.

Note: any course in any track can be taken as an elective in another track.

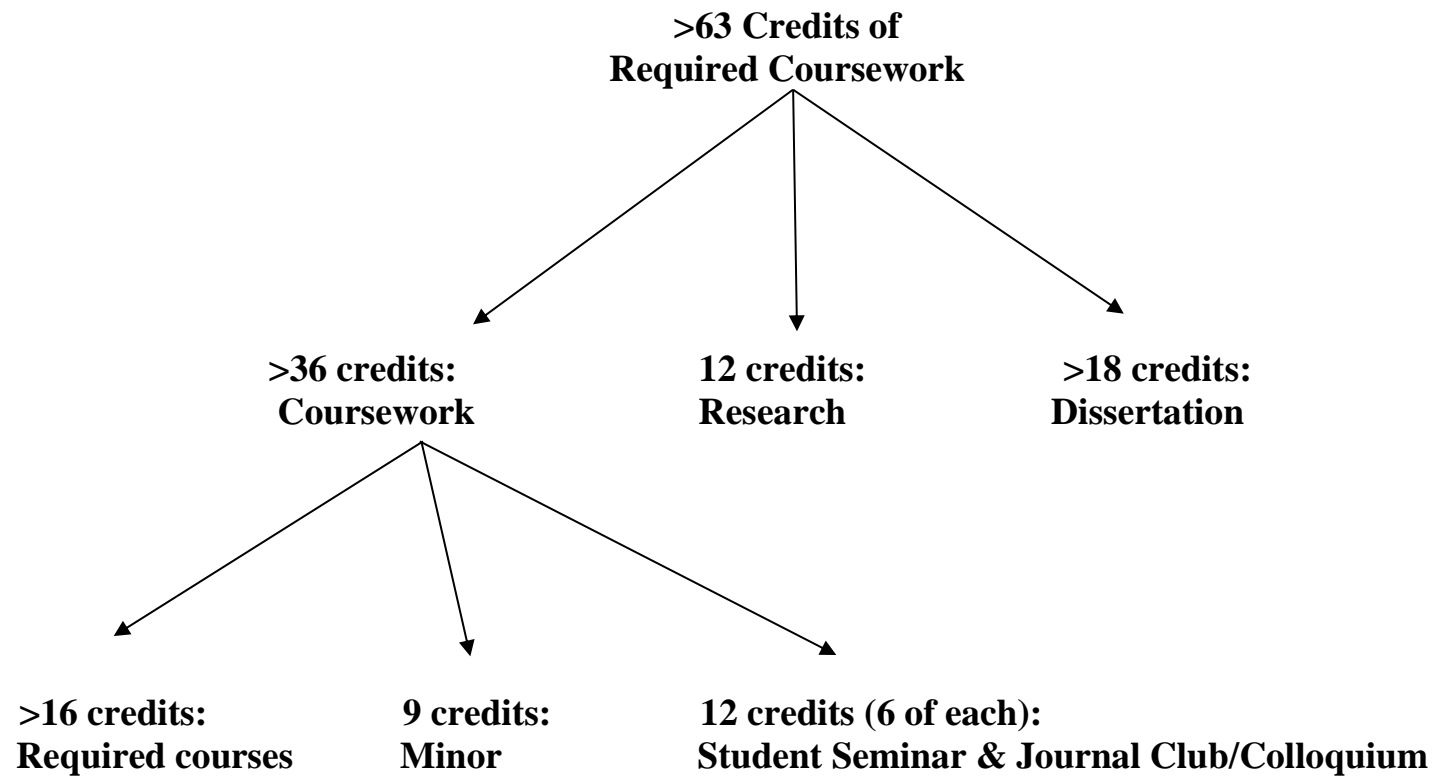
EMPHASIS TRACK: Medical Biophysics	Credits	Grading
<i>Required in addition to Core Requirements (see above)</i>		
PSIO/CMM 584 Cardiovascular Muscle Biology and Disease (Spring)	3	A/B/C
Choose 1		
CMM 565A Fundamentals of Light Microscopy and Electronic Imaging (Spring)	3	A/B/C
BIOC 555 Methods of Physical Biochemistry (Fall)	3	A/B/C
BIOC 558 Biological Structure I (Spring)	4	A/B/C
<i>Recommended Electives (pick 1)*</i>		
CMM 595H Problems in Biology of Complex Diseases (Spring)	2	A/B/C
CPH 576B Biostatistics of Research (Spring)	3	A/B/C
BIOC 565 Proteins and Enzymes (Fall)	3	A/B/C
BIOC567 Computational Biophysics (Spring)	3	A/B/C
<i>Recommended Colloquium/Journal Club</i>		
CMM 595A-Section 003 CMM Journal club (Medical Biophysics emphasis)	1 (counted above)	P/F

Credit Subtotal:	≥ 6	

*Other Electives/Journal Clubs may be chosen with approval from the GPMM Directors.

Note: any course in any track can be taken as an elective in another track.

SCHEMATIC OF GRADUATE COURSE WORK



Note: Coursework will be tailored for individual students. Courses taken in the first year through ABBS or transferred from another program (at the University or another institution) may be applied with the approval of the GPMMDirector.

SUGGESTED TIMETABLE

Proposed Timetable for Program of Study and Milestones

The Program is designed to be completed within five years. Students are advised to adhere to the timetable provided below to help ensure a timely graduation. However, research projects are somewhat unpredictable, and some students may take longer to complete their studies.

YEAR ONE		
Courses	Fall	CMM 577 Principles of Cell Biology One elective course or Core Course Seminar series/journal club encouraged
	Spring	One Core Course or elective One Emphasis track courses CMM 695E Science, Society, and Ethics Seminar series/journal club encouraged
Research		Complete 3 rotations Choose a lab and Major/Minor Programs(s)
YEAR TWO		
Orientation		Attend Molecular Medicine Orientation after joining program
Courses	Fall	Any remaining Emphasis Track Courses Any remaining Elective or Minor Course CMM/IMB 696B Student Seminar Series Journal Club
	Spring	CMM/IMB 696B Student Seminar Series IMB521 Scientific Writing, recommended Journal Club
GradPath	Fall	Submit Doctoral Plan of Study (prior to Comprehensive Exam)
	Fall	Submit Comprehensive Exam Committee Appointment (prior to Exam)
	Spring	Submit Comprehensive Exam Announcement (prior to Exam)
	Spring	Submit Proposal Confirmation (Written Exam must be on file with Program)
	Summer	Submit Comprehensive Exam Results (following Exam)
Candidacy	Summer/Fall	Fulfill requirements and take Comprehensive Exam
Dissertation		Choose Dissertation Committee, prior to Comprehensive Exam
Fees		\$35 following comprehensive exam submitted to the Bursar
Symposium	Spring	Immunobiology track students attend and participate in Symposium
YEAR THREE and BEYOND		
Research		Apply intense focus to research and manuscripts Submit graduate fellowships
Courses	Fall and Spring	CMM/IMB 696B Student Seminar Series Journal Club
Symposium	Spring	Immunobiology track students attend and participate in Symposium
GRADUATION YEAR		
Courses	Fall and Spring	CMM/IMB 696B Student Seminar Series Journal Club Register for Dissertation credits in final two semesters
GradPath		Submit Announcement of Final Oral Defense Submit Result of Final Oral Defense
Graduation		Discuss graduation plans with mentor and Dissertation Committee

RESEARCH ROTATIONS

Student rotations will be conducted during the first year under the ABBS program. Students are expected to rotate in 3 laboratories. In exceptional cases, arrangements can be made for a fourth rotation. During the first year, we encourage students to engage with Programs they are interested in joining to become fully informed about expectations and requirements.

CAREER DEVELOPMENT

To foster proactive discussion and development of each student's career, students are required to complete and annually update an individual development plan (IDP), discuss the plan with their dissertation advisor and their Dissertation Committee. The IDP is available online at the following website: <http://myidp.sciencecareers.org/>. *Completion of the IDP is a requirement for students funded on federal grants such as the F31.*

DISSERTATION COMMITTEE

In the first year of graduate work, students will be mentored by a First Year Advisory Committee in the ABBS program. Once students have chosen a dissertation laboratory, the role of the First Year Advisory Committee will be assumed by the student's Dissertation Committee and secondarily by the GPMM Graduate Studies Committee. By the end of the Second semester of study (Spring of the First Year) the student is expected to have selected a laboratory for their dissertation research. By the end of their second year, students should have formed a Dissertation Committee with guidance from their graduate advisor and approved by the GPMM Directors. The Dissertation Committee must be submitted for approval on GradPath.

The Dissertation Committee will ultimately consist of at least four faculty members. Three of the four members must be members of the GPMM (one of these must hold a primary appointment in IMB or CMM). One of the three GPMM members will be the graduate mentor. One member of the committee (excluding the graduate mentor) will be elected as the chair of the Dissertation Committee. One of the four members will be from the Minor program/department or outside departments as approved by the graduate mentor and the GPMM Directors. For students who have declared a Minor (in a program outside of GPMM), one committee member must be from the Minor department. Three of the committee members must be considered by the Graduate College to be tenure-track or equivalent for the dissertation defense.

At the final committee meeting prior to the defense of the dissertation, the student will present the bulk of their dissertation work and the committee will give their approval of the scope and content of the dissertation. This is an informal "Permission to Write" meeting. One member of the committee (excluding the graduate mentor) will be elected as the chair of the Dissertation Committee. According to the Graduate College policy, at least three committee members including the member from the Minor program must be present for the final defense.

Special note regarding the Comprehensive Exam: For students on the **Immunobiology Track**, the examining committee will NOT include the student's Major Advisor/Mentor. An additional faculty member will instead be recruited to the committee to serve during the Comprehensive Exam. This additional committee member will be selected by the chair of the student's committee. For students within the other GPMM Tracks (Cell Biology and Medical Biophysics), the mentor will be a member of the Comprehensive Exam committee.

The Dissertation Committee should represent a range of scientific areas that will benefit the student's chosen research. The purpose of the Dissertation Committee is to guide the student's scientific research and progress toward completion of degree requirements.

Dissertation Committee Meeting Requirements:

The student is responsible for scheduling at least one committee meeting every year beginning in the second year. The initial meeting is used to discuss possible research paths, review coursework, and approve the Plan of Study. Committee meetings must be documented. Documentation consists of completion of the [Student Milestone Assessment Form](#) (Appendix D, check “Committee Meeting”) by the Chair of the committee, and this will be filed with the Graduate Program Coordinator.

TEACHING

There is no requirement for a teaching experience for GPMM students. However, if a student is interested in gaining experience in this area, there are opportunities to do a teaching assistantship (TA) or preceptorship on campus. However, these are not typically paid TA positions. (For students interested in paid T/A positions, see Financial Support section below). Pursuing a TAship requires the approval of the student’s Mentor and of the Course Coordinator for the course in which the student wants to assist.

Below are some potential options for teaching experiences. Additional courses may also be appropriate and come available intermittently, but require approval of the Directors of Graduate Studies. Students that pursue the route of a formal TAship or Preceptorship experience may be eligible to register for CMM 691 (Practical Science Education) and receive course credit and additional training as they develop their teaching skills. Interested students should consult with the Course Directors for more information about CMM 691.

Note: students wishing to Preceptor in specific CMM courses must have completed their intended course successfully for a grade prior to pursuing any teaching experiences.

1. Histology or Human Gross Anatomy. A student may elect to preceptor in medical school Histology (CMM 510) or Human Gross Anatomy (CMM 501). Please contact Dr. Helen Amerongen (CMM 510; amerongen@email.arizona.edu) or Dr. Diana Darnell (CMM 501; darnell@email.arizona.edu) for more information about these courses.
2. CMM/MCB 577 Principles of Cell Biology. Please contact Dr. Greg Rogers (gcrogers@email.arizona.edu) or Dr. Curtis Thorne (curtisthorne@email.arizona.edu) for more information about preceptoring for this course.
3. CMM 595H Problems in Biology of Complex Diseases. Please contact Dr. Donata Vercelli (donata@email.arizona.edu) to discuss further.
4. PSIO584/MCB 584 Cardiovascular Muscle Biology and Disease. This is an elective course for CMM/GPMM students. Please contact the Dr. Henk Granzier (granzier@email.arizona.edu) to discuss further.
5. Undergraduate MCB courses. If opportunities are available, students may TA in one of the

undergraduate biology courses offered by the Department of Molecular and Cellular Biology. No preparatory coursework is required. This must be arranged through MCB, however. To find potential opportunities or discuss any requires, please contact the MCB Graduate Coordinator, Denise Slay: dslay@email.arizona.edu.

6. Path 515 (Mechanisms of Human Disease). This is an elective course for CMM and GPM students. Please contact Dr. Margaret Briehl (mmbriehl@email.arizona.edu) for more information.

COMPREHENSIVE EXAMINATION FOR ADVANCEMENT TO CANDIDACY

The exam is intended to test the breadth and the depth of the student's knowledge in his/her area of research and in related areas of science. The Comprehensive Examination consists of two parts: A) a written examination, and B) an oral examination. In preparing for the Comprehensive Examination, students are encouraged to become familiar with the assessment rubrics in the Appendix of this handbook. It is also highly recommended that students participate in the IMB 521 Scientific Grantsmanship (or equivalent) course prior to their Comprehensive Exam.

Contact Information: Any questions or concerns about any aspect of the Comprehensive Exam process should be directed to the Graduate Program Director, Dr. Lonnie Lybarger, at lybarger@email.arizona.edu or 626-1044.

A. Written Examination

Format: Students will develop a grant proposal closely aligned to their dissertation research, written in the format of a NIH grant proposal, similar to an F31 fellowship. For MD/PhD students, this proposal will take the form of an F30 fellowship proposal. This format has been selected with the hope that each student will be able to submit his/her written exam as a fellowship application. Guidelines for fellowship proposals can be found at: <http://grants.nih.gov/grants/funding/416/phs416-1.pdf>. For the Written Exam you will only provide the sections listed below. The length of the proposal is not to exceed 7 pages of text (single-spaced, at least one-half inch margins on all sides), excluding the abstract and references. Tables and figures are included within the 7-page limit; be sure to make them large enough to be legible. Use Arial font 11 point or larger for the text. A symbol font may be used for Greek letter or other special characters. Pages should be numbered. Include your name in a header on each page. The proposal should include the following sections:

a. Abstract: A concise description of the content of the proposal, including long term objectives. One-half of one-page is the recommended length. The abstract does not count against the overall page limits. The abstract should serve as a free-standing description of the entire proposal, not as an introduction to it. Thus, after a few sentences in which you describe the topic and key information that provides the basis for your hypothesis, you should give the overall hypothesis. The hypothesis should be followed by a sentence or two about each of the Aims, describing the Aim and the general experimental approach that you will use to pursue each Aim.

b. Specific Aims: The experimental design and methods for attaining the goals. What are you going to do? This section usually opens with an introduction to the topic and its significance, and then defines the broad, long-term objectives of the project and states the major hypothesis that you have formulated. Then, list the Specific Aims, which may be presented as goals to be

reached or as questions to be answered. This section has a one-page limit. This section will inevitably repeat some of the contents of the Abstract.

c. Background and Significance: Explain the importance of the topic addressed by your proposed project. Explain how the proposed project will improve scientific knowledge, technical capability, and/or clinical practice. Describe how the concepts, methods, technologies, treatments, services, or preventative interventions that drive this field will be changed if the proposed Specific Aims are achieved. (Paraphrased from NIH instructions) Be sure to critically evaluate existing knowledge and evaluate the conclusions that have been made in previous studies. Explain how your proposal challenges and seeks to shift current research or clinical practice paradigms. Describe any novel or innovative theoretical concepts, approaches, methodologies, instrumentation, or interventions to be developed or used, and any advantages over existing strategies. Explain any improvements or new applications of existing theoretical concepts, approaches, methodologies, instrumentation, or interventions. (Paraphrased from NIH instructions)

d. Preliminary Studies: Describe the studies performed to date and explain your interpretation of the data that are pertinent to the hypotheses proposed. This will help evaluators assess your competence and the basis for the questions you propose to test in your aims. For the purpose of the exam, you may include key data provided from the literature or others in your lab to fill in gaps where you do not have data.

e. Research Design and Methods: Describe the overall research strategy and the procedures you will use to accomplish the Specific Aims of the project. Include the means by which you will collect, analyze, and interpret data. Describe any new methodology and its advantage over existing methodologies, again emphasizing innovation in either technique or approach. Discuss the potential difficulties and limitations of the proposed procedures and alternative approaches to achieve the Aims. For each set of experiments, include a consideration of possible outcomes and how you will interpret those different possibilities. Indicate how you will establish priorities. Point out particular hazards (beyond routine laboratory activities) associated with the planned research and the appropriate precautions to be taken, including institutional approval. The scope of the investigation should be appropriate for a three-year project for one investigator and one technician. The Approach section (parts c through e) should constitute most of the proposal (this section contains the bulk of the 7-page limit for sections b through e).

f. Bibliography and References Cited: Provide complete references, including all authors and titles. If you get information from Web sites, include the URL in this section. Use of bibliographic software such as EndNote is strongly encouraged. Also, if you refer to DNA sequences or protein structures, you should include the GenBank accession numbers or the PDB file numbers respectively in the text. The reference list does not count against the 6-page limit.

Input from others: The proposal allows the committee to assess the ability of the student to engage in critical thinking and assess the student's knowledge of experimental techniques. Therefore, though the research proposal will of necessity draw from the basic ideas and research environment in the advisor's lab, the student is expected to extend the lab's research with original ideas. For this reason, the student is responsible for generating the proposal – from the hypotheses to experimental design and writing – without direct scientific oversight from the advisor. However, scientists do not function in a vacuum, and Principal Investigators often seek advice from their peers when writing grant applications. The student is therefore encouraged to consult others (including fellow students, post-docs, faculty, *etc.*) with regard to preliminary data, hypothesis formation, experimental details, presentation/articulation of

ideas, and English usage. An excellent way for students to receive general assistance with grant writing is to take IMB521 - Scientific Grantsmanship (or an equivalent course).”

Avoid plagiarism: The proposal must be written in your own words; use of sentences (even with a word or two changed) or ideas from another's work, without attribution, is unacceptable. If it is necessary to use someone else's words, they must be indicated as such by quotation marks, with the appropriate source cited. Violations of acceptable citation practices will not be tolerated and will be pursued through the Honor System of the University.

Cautionary Tale: Avoid computer problems if at all possible. Additionally, make sure to keep a backup copy of all your relevant files (text, figures, references, etc.) on a separate memory device or on the Cloud at least once a day. Loss or damage to your files for any reason (hardware or software problems, virus, theft) will not be accepted as a reason to extend the deadline for exam completion.

Timeline for your exam: *The due date to submit the written portion of the exam is August 1st, just prior to the start of the third year*; students may choose to submit earlier. To submit your written comprehensive exam, please provide an electronic PDF file to your committee members and copy the Program Coordinators. The due date set above is a firm deadline; late proposals will NOT be accepted, and you will receive a grade of Fail for the exam. If there is some reason why you cannot make the deadline, contact the Graduate Program Director and your committee as soon as you know there is a problem.

Special note regarding the committee composition for the Comprehensive Exam: For students on the **Immunobiology Track**, the examining committee will NOT include the student's Major Advisor/Mentor. An additional faculty member will instead be recruited to the committee to serve during the Comprehensive Exam. This additional committee member will be selected by the chair of the student's committee. For students within the other GPM Tracks (Cell Biology and Medical Biophysics), the mentor will be a member of the Comprehensive Exam committee.

Written Exam Evaluation: The written examinations for all students will be reviewed by the student's Dissertation Committee. Exams will be given a grade of Pass, Fail, or Conditional Pass within 2 weeks of the submission. Students should take the written portion of the exam very seriously. It is to the student's advantage that they submit a well-written and thoughtful proposal.

- **PASS:** *Students who pass the written examination will proceed to the oral examination, which must be completed by September 15.* It is the student's responsibility to schedule their oral exam with their Dissertation Committee once they have passed their written qualifying exam.
- **FAIL:** Students who fail the written exam must submit a substantially revised proposal to their Dissertation Committee. The timeframe for resubmission will be established by the Dissertation Committee, but should not exceed one year. The written exam can only be retaken once; students failing the second written exam will be dismissed from the program.
- **CONDITIONAL PASS:** Written examinations that are flawed in a manner that could be remediated in a short period of time will receive a grade of Conditional Pass. The written exam must be resubmitted to the Dissertation Committee (and the Graduate Program Coordinator) **within three weeks** for reevaluation. Students who pass the re-write will proceed to the oral examination to be completed by September 15 (*note: no extra time is allowed for the re-write – it is expected that students give their best effort on their first submission*).

B. Oral Examination

The Oral Exam is meant to assess the ability of the student to discuss ideas, think through scientific pitfalls and defend experimental design and rationale. Students are encouraged to seek input from other students, postdocs, and faculty in preparing for the oral exam through practices, lab meetings, journal clubs, etc. Oral Exams will be conducted by the student's Dissertation Committee. ***It is the responsibility of each student to schedule the Comprehensive Exam with their Dissertation Committee prior to September 15, just prior to the start of the third year.*** During the oral exam, students will defend their written proposal and answer questions on general knowledge posed by the Committee.

Outcomes: Students will be given the grade of “pass” or “fail” at the time of the Exam. According to Graduate College policy, “More than one negative or abstaining vote will result in failure of the exam.” A minimum of four committee members must be present for the exam. It is expected that the student's Advisor should have minimal input during the questioning of the student. Failure of the oral examination may be grounds for dismissal from the graduate program. However, the student's Dissertation Committee may allow the student to retake the exam. According to Graduate College policy, a student may take the oral Comprehensive Exam only twice. The timing of the retake will be determined by the Committee.

Following completion of the Comprehensive Examination, the student will advance to Candidacy to the Graduate College (through GradPath). The Chair of the student's Dissertation Committee must also complete the [Student Milestone Assessment Form](#) (Appendix D, check Oral Comprehensive Exam) and submit this via Qualtrics to the Graduate Program Coordinator.

At the time you complete your Comprehensive Exam and advance to candidacy, the Graduate College will apply a small fee to your bursar's account to cover fees for candidacy, dissertation processing, and microfilming. This is a one-time fee and you will not be billed again if you change your anticipated graduation date. Pending funds, this fee will be covered by GPM. Copyrighting a dissertation is optional and carries an additional fee; details can be found [here](#).

CHANGE OF DEGREE: From Doctoral to Master's Degree

In individual and unusual cases, a student may terminate early from the PhD program and receive a Master of Science degree in Molecular Medicine. If a student wishes to receive a terminal Master's degree, he/she must notify their advisor, the Dissertation Committee, and the Graduate Studies Committee (see pages 3 and 4). To receive a terminal MS, the student must demonstrate mastery of a subject beyond the undergraduate level. Thus, students choosing this option must *earn* the MS degree. The following requirements, and any additional ones required by the student's Dissertation Committee, must be met:

1. **Coursework.** The student must complete at least 30 units of coursework in the Major, at least half of which must be graded.
2. **Comprehensive Exam.** For a student to be considered for a terminal MS degree, he/she must have successfully passed the written and oral sections of their Comprehensive Exam.
3. **Thesis.** The student must submit to their advisor and Dissertation Committee a written thesis. The thesis must describe a body of scientific research completed by the student in

their course of study, or an approved substitute, and must be submitted to the advisor and Dissertation Committee in the format of a publishable, scholarly paper.

4. **Thesis defense.** The thesis must be defended in an oral exam administered by a committee of at least three GPMM faculty members, normally selected from the student's Dissertation Committee by the student and his/her advisor. Information about committee

*Note: stipend support is not guaranteed when a student opts for the MS track and support for completion of the degree must be determined in consultation with the Advisor.

DISSERTATION and FINAL DEFENSE

All PhD students must write a dissertation that meets the general standards of scholarship and demonstrates the ability of the student to conduct original research contributing to the fields of immunology and molecular pathogenesis. The dissertation is to represent the work of the student. Contributions of others (such as figures in a collaborative manuscript) should be clearly noted. Instructions relating to the format of the dissertation are included in the Manual for Theses and Dissertations, which can be obtained from the Graduate College website:

<http://grad.arizona.edu/gsas/dissertations-theses/dissertation-and-thesis-formatting-guides>

The Dissertation must be submitted one month prior to the scheduled final defense. Two to three weeks prior to the scheduled defense, the Chair of the student's Dissertation Committee will poll the committee to determine if the dissertation can be defended. If two or more committee members cast a dissenting vote, the student must revise and resubmit the dissertation. The student will defend the dissertation in an oral format. The defense will focus on the dissertation but can also include general questioning related to the field of study. The time and place of the defense must be scheduled with the Graduate Degree Certification Office at least 7 working days in advance and announced publicly in *Lo Que Pasa*. Additionally, students must fill out the Announcement of Final Oral Defense form on GradPath; once accepted by the Graduate College, the defense will be announced on the UA Main Calendar.

The Chair of the Dissertation Committee will preside over the defense. The student will begin the defense with a seminar and question/answer session that is open to the University community and public. The examination portion of the defense is restricted to the dissertation committee. According to the Graduate College, at minimum of three committee members must be present for the defense, though if the student has more than 3 members of his/her Dissertation Committee, all are expected to attend. The defense is expected to be at least two hours and not to exceed three hours. At the end of the examination, the committee will vote on the acceptability of the final defense. Three of four committee members must vote in favor of passing to confer the PhD degree. In the event a student does not pass the defense, the committee may request that the student revise the dissertation and be re-examined within 12 weeks.

Immediately following the defense, the student and the Dissertation Committee Chair must complete the [Student Milestone Assessment Form](#) (Appendix D, check Final Defense). Following the successful defense, the student must submit the dissertation to the Library of the University of Arizona and to University Microfilms, Inc. The student is required to provide GPMM with an electronic copy of the dissertation within two weeks of the defense. Dissertations can be bound for a nominal fee at the Copy Technology Services (3rd floor AHSC). Upon receipt and approval of the finalized dissertation, the Dean of the Graduate College will recommend conferral of the Doctoral degree by the Arizona Board of Regents.

STUDENT ROLES IN PROGRAM GOVERNANCE

Student input and feedback are invaluable to building and maintaining a strong training program. Multiple mechanisms are available for students to shape the direction of the program:

First, students meet individually with the GPMM Graduate Studies Committee on an annual basis. During these student progress meetings, students can alert the Committee to any issues within the program and can provide constructive feedback and ideas on different elements of the program. Significant changes have been made in the past based on student input arising from these meetings.

Second, students are encouraged *at any time* to meet with members of the Graduate Studies Committee if they have concerns or ideas regarding the program. Additionally, the Graduate Program Coordinator is available for students to talk to, when issues arise.

Third, two Student Representatives are elected by their peers and approved by the Co-Directors of the program to serve a two-year term. Representatives meet at least twice per year with the Co-Directors to discuss the state of the program. Furthermore, the Student Representatives are tasked with soliciting input from other students about the program and coordinating social functions for the program.

ADDITIONAL STUDENT RESOURCES

Links to information on academic, professional, and personal resources available to graduate students can be found here: <http://grad.arizona.edu/new-and-current-students>. This includes information on Academic Services, Policies, and Procedures, Funding, Professional Development Resources, Child Care Subsidies and Family-Friendly Information, and Health, Wellness and Safety information.

SATISFACTORY ACADEMIC PROGRESS AND STUDENT APPEALS

Academic Progress. Students are required to demonstrate satisfactory academic progress toward degree completion. Beyond maintaining a minimum 3.00 grade-point average, students are assessed for their progress in many ways. In addition to informal feedback from the student's dissertation advisor, course instructors, and dissertation committee, students are formally evaluated by their advisor on an annual basis, and these evaluations are reviewed by the Graduate Studies Committee. Student activities such as seminar presentations and dissertation committee meetings are also evaluated, and recorded through the student milestone form. The criteria to evaluate student progress and the expectations for satisfactory progress are detailed in the assessment tools and rubrics found [here](#).

Failure to make satisfactory academic progress is grounds for dismissal by the Dean of the Graduate College. The Graduate College will apply the GPMM criteria for satisfactory progress if the program requests a student disqualification. Should the student's advisor and/or the graduate studies committee determine that the student is not making satisfactory progress, the student will be notified in writing, with a copy of this document also sent to the Graduate College. The written notification will include steps for remediation and a timetable in which to complete the steps; these will be determined by the advisor in consultation with the Graduate Studies Committee.

Incomplete Policy. If a grade of "incomplete" is assigned to a student in any course, it is the student's responsibility, in conjunction with the Director for that course, to complete this [Report of Incomplete Grade](#). Instructions can be found on the form; they include the development of a plan for timely completion of the requirements for the course. A copy of this form should be sent to the Co-Directors

of the Graduate Program. Failure to complete the requirements as stated on the form may constitute a failure to make satisfactory academic progress as determined by the Graduate Studies Committee, in consultation with the student's Dissertation Advisor. In this event, the steps outlined above will be followed. Students have up to one year following the granting of an 'I' grade to resolve this issue, otherwise the grade converts to an 'E'.

Student Appeals. Students may appeal or rebut program decisions regarding satisfactory progress. Students should respond to the notification of unsatisfactory progress in writing, through a letter to the Graduate Studies Committee. This will be followed by a meeting with the Committee. The student may also appeal to the Graduate College to determine whether the program followed the established program policies.

Graduate College policies for how to appeal program decisions can be found at the link below, along with information on how to deal with other types of potential grievances by graduate students:

<http://grad.arizona.edu/policies/academic-policies/grievance-policy>

MECHANISMS OF FINANCIAL SUPPORT

Financial support in the form of a Graduate Research Assistantship with individual health insurance paid by the University of Arizona is available to all students admitted into the program and accepted into a laboratory. Support is provided by the student's graduate advisor in the form of a research assistantship. Limited teaching assistantships (often outside of CMM) and preceptorship opportunities are available to partially support students, if necessary, during their graduate studies.

Graduate students hired as Research or Teaching Assistants will be hired at half-time (0.5 FTE), and will receive 100% remission of their base in-state tuition covered for the Fall and Spring terms. Students who are not residents of the State of Arizona will also receive a waiver of their nonresident tuition fees. Finally, Graduate Assistants will also have individual health care coverage paid for by The University of Arizona.

Outstanding students are encouraged to apply for independent predoctoral fellowships from sources outside the University such as the NIH F31 or, depending on trainee availability and research, NIH T32. Announcements to apply for these opportunities will be sent out yearly. Additionally, there are yearly opportunities to apply for scholarships through organizations such as the [ARCS Foundation](#) and a number of University or University-Affiliated partners. All graduate students are highly encouraged to sign up for the [GradFunding newsletter](#) offered through the UA Office of Fellowships and Community Engagement.

In the extraordinary event that the Major Advisor is unable to provide support for the student, the advisor and/or the student may petition the Department Head for supplemental funding. If such a request is approved, support may be provided in the form of a teaching assistantship, in which case the student may be required to assist in teaching a departmental course. Please contact your respective Graduate Program Coordinator if you need further details.

For more information on available financial aid resources, please refer to the following Graduate College websites:

<http://grad.arizona.edu/funding>

<https://grad.arizona.edu/funding/ga/benefits-appointment>

FORMS

GradPath

GradPath forms are utilized by the UA Graduate College to track and monitor student progress over the course of their graduate studies. There are several forms that must be submitted at various stages of the student's graduate career. These forms are completed online through the GradPath system, which can be accessed by UAccess Student. Please see Page 12 for a timeline delineating what forms need to be submitted and when.

Assessment Forms

In addition to the forms hosted through GradPath, GPMM requires documentation of student activities for both student and programmatic assessment. This assessment is mandated by the University Office of Instruction and Assessment and is required for all students in all program. This information is used to evaluate student progress and provide constructive feedback, as well as to assess program effectiveness and identify areas for improvement. Student activities such as annual self-evaluations, annual Dissertation Committee meetings, Comprehensive Exams, Dissertation Defenses, and even Student Seminar feedback are evaluated and documented for these purposes.

- The form for annual student self-evaluation can be found [here](#).
- The Student Milestone Form is used for committee meetings, comprehensive exams, and dissertation defenses, and can be found [here](#).
- Please follow these links to the **assessment rubrics** for the annual [Evaluation of the Student by the Mentor](#), and the [Student Seminar Evaluation](#).

MOLECULAR MEDICINE MINOR

This information is for students in other graduate programs (non-GPMM) who desire a Minor in Molecular Medicine. 9 credits are required in addition to the units used in your major that fit with the "Molecular Medicine theme". *CMM 577 is required* for all students minoring in Molecular Medicine, plus two courses in any of the Emphasis Tracks or its electives. There may be additional courses that would be appropriate; interested students should consult with the Directors of the GPMM to develop a plan for the MM Minor.

APPENDICES

ASSESSMENT CRITERIA FOR STUDENT EDUCATION

The Graduate Program in Molecular Medicine at the University of Arizona strives to educate top-level scientists who will address the challenges facing human health, understanding the balance between health and disease. Our graduate program offers a highly interactive and interdisciplinary environment for the development of scientists ready to address complex biomedical problems.

For more information on assessment, please visit our assessment page:

<http://assessment.arizona.edu/med/medicine>

Information regarding GPMM faculty research can be found at:

<http://gpmm.medicine.arizona.edu/research>

FACULTY CONTACT INFORMATION

Graduate Faculty	Department	Bldg and Rm	Telephone (Area Code 520)	Email Address
Ahmad, Nafees	Immunobiology	AHSC 6106	626-7022	nafees@email.arizona.edu
Amerongen, Helen	Cellular & Molecular Medicine	LSN 441	626-7480	hma@email.arizona.edu
Ampel, Neil	Medicine	VAHSC	792-1450	nampel@email.arizona.edu
Antin, Parker	Cellular & Molecular Medicine	Forbes 314	621-5242	pba@email.arizona.edu
Bhattacharya, Deepta	Immunobiology	MRB 217	626-8088	deeptab@email.arizona.edu
Boitano, Scott	Physiology	AHSC 2341	626-2105	sboitano@email.arizona.edu
Burgess, Shane	Immunobiology	Forbes 306	621-7621	sburgess@cals.arizona.edu
Campos, Samuel	Immunobiology	Keating 429	626-4842	skcampos@email.arizona.edu
Churko, Jared	Cellular & Molecular Medicine	Sarver 6143	626-2347	jchurko@email.arizona.edu
Colson, Brett	Cellular & Molecular Medicine	MRB 310	626-1950	bcolson@email.arizona.edu
Cress, Anne E	Cellular & Molecular Medicine	AZCC 3963C	626-7553	cress@email.arizona.edu
Cusanovich, Darren	Cellular & Molecular Medicine	BSRL 421	626-8639	darrenc@email.arizona.edu
Doetschman, Thomas	Cellular & Molecular Medicine	MRB 321	626-4901	tdoetsch@u.arizona.edu
Doyle, Kristian	Immunobiology	MRB 214	626-7013	doylekr@email.arizona.edu
Elliott, David	Cellular & Molecular Medicine	-	-	dae1@email.arizona.edu
Ellis, Nathan	Cellular & Molecular Medicine	AZCC 4919	626-7979	naellis@email.arizona.edu
Fane, Bentley	Plant Sciences	Keating 219	626-6634	bfane@email.arizona.edu
Galgiani, John	Medicine	MRB 124	626-4968	spherule@email.arizona.edu
Goodrum, Felicia	Immunobiology	Keating 425	626-7468	fgoodrum@email.arizona.edu

Gordon, Herman	Cellular & Molecular Medicine	LSN 443	626-2103	flash@arizona.edu
Granzier, Henk	Cellular & Molecular Medicine	MRB 325	626-3641	granzier@email.arizona.edu
Gregorio, Carol	Cellular & Molecular Medicine	MRB 315	626-8113	gregorio@email.arizona.edu
Harris, David	Immunobiology	AHSC 6122A	626-5127	davidh@email.arizona.edu
Harris, Samantha	Cellular & Molecular Medicine	MRB 310	626-0291	samharris@email.arizona.edu
Hastings, Karen	COM Basic Med Sciences	COM-Phx 326	602-827-2106	khasting@email.arizona.edu
Heimark, Ronald	Surgery	AZCC 3943	626-1913	rheimark@email.arizona.edu
Ignatenko, Natalia	Cellular & Molecular Medicine	AZCC 3999B	626-8044	nai@email.arizona.edu
Johnson, Michael	Immunobiology	MRB 240	626-6905	mdljohnson@email.arizona.edu
Katsanis, Emmanuel	Pediatrics	AHSC 5346	626-4850	katsanis@peds.arizona.edu
Kiela, Pawel	Pediatrics	AHSC 6341E	626-7050	pkiera@peds.arizona.edu
Knox, Kenneth	Internal Medicine	AHSC 6326E	626-6114	knox@email.arizona.edu
Konhilas, John	Physiology	MRB 320	626-6578	konhilas@email.arizona.edu
Koshy, Anita	Neurology	Keating 229	626-2006	akoshy@email.arizona.edu
Krieg, Paul	Cellular & Molecular Medicine	MRB 330	626-9370	pkrieg@email.arizona.edu
Kuhns, Mike	Immunobiology	MRB 224	626-6461	mkuhns@email.arizona.edu
Lantz, Robert	Cellular & Molecular Medicine	LSN 447	626-6716	lantz@email.arizona.edu
Ledford, Julie	Cellular & Molecular Medicine	AHSC 4205	626-0276	jledford@email.arizona.edu
Lybarger, Lonnie	Cellular & Molecular Medicine	LSN 442	626-1044	lybarger@email.arizona.edu
Maggert, Keith	Cellular & Molecular Medicine	AZCC 4918	626-9545	kamaggert@email.arizona.edu
Miranti, Cynthia	Cellular & Molecular Medicine	AZCC 3945B	626-2269	cmiranti@email.arizona.edu
Mouneimne, Ghassan	Cellular & Molecular Medicine	AZCC 0985	626-4616	gmouneimne@email.arizona.edu
Nikolich-Zugich, Janko	Immunobiology	MRB 225	626-6065	nikolich@email.arizona.edu
Ottenheijm, Coen	Cellular & Molecular Medicine	MRB 340	626-4198	coeno@email.arizona.edu
Page, Rebecca	Chemistry & Biochemistry	BSW 517	626-0389	rebeccapage@email.arizona.edu
Pandey, Ritu	Cellular & Molecular Medicine	AZCC 1939	626-0391	ritu@email.arizona.edu
Pappas, Christopher	Cellular & Molecular Medicine	MRB 330	626-5209	ctpappas@email.arizona.edu
Pivniouk, Vadim	Cellular & Molecular Medicine	Keating 300	626-9644	vadimp@email.arizona.edu
Purdy, John	Immunobiology	MRB 240	626-4371	jgpurdy@email.arizona.edu
Restifo, Linda	Neurology	AHSC 6205	621-9821	LLR@email.arizona.edu

Riggs, Michael	Animal & Comparative Biomed Sci	BSW 430	621-8445	mriggs@u.arizona.edu
Rogers, Gregory	Cellular & Molecular Medicine	AZCC 3951	626-3925	gcrogers@email.arizona.edu
Romanoski, Casey	Cellular & Molecular Medicine	Keating 327	626-7244	cromanoski@email.arizona.edu
Runyan, Raymond	Cellular & Molecular Medicine	LSN 456	626-2326	rrunyan@email.arizona.edu
Schenten, Dominik	Immunobiology	MRB 240	626-7767	dschenten@email.arizona.edu
Shrikant, Protul	Immunobiology	UACC 4985C	626-2444	pshrikant@email.arizona.edu
So, Magdalene	Immunobiology	Keating 245	626-3097	somaggie@email.arizona.edu
Song, Jin	Cellular & Molecular Medicine	AZCC 4999B	626-9048	jinsong@email.arizona.edu
Tardiff, Jil C	Biomedical Engineering	MRB 312	626-8001	jtardiff@email.arizona.edu
Thorne, Curtis	Cellular & Molecular Medicine	AZCC 4947	626-0395	curtisthorne@email.arizona.edu
Van Doorslaer, Koenraad	Virology	BSRL 315	626-9585	vandoorslaer@email.arizona.edu
Vercelli, Donata	Cellular & Molecular Medicine	Keating 339	626-2567	donata@arc.arizona.edu
Viswanathan, V.K.	Animal & Comparative Biomed Sci	VSM 227	626-7687	vkv@email.arizona.edu
Warfel, Noel Andrew	Cellular & Molecular Medicine	AZCC 0985A	626-7756	warfelna@email.arizona.edu
Wilson, Jean M	Cellular & Molecular Medicine	LSN 459	626-2557	jeanw@email.arizona.edu
Wilson, Justin	Immunobiology	UACC 4985A	626-7622	wilsonje@email.arizona.edu
Wu, Hsin-Jung Joyce	Immunobiology	MRB 219	626-7787	joycewu@email.arizona.edu
Zarnescu, Daniela	Molecular and Cellular Biology	LSS 552	626-1478	zarnescu@email.arizona.edu

COURSE SECTION NUMBERS FOR PARTICIPATING FACULTY

When registering for Research and Dissertation credits (900 and 920, respectively), the section number for the corresponding faculty member is required.

IMMUNOBIOLOGY (IMB) Section Numbers (updated Summer, 2019)

Course	Section	Last Name	First Name
IMB 900 & 920	012	Ahmad	Nafees
IMB 900 & 920	010	Bhattacharya	Deepta
IMB 920	015	Bernstein	Harris
IMB 900	028	Boitano	Scott
IMB 900	029	Bommireddy	Ramireddy
IMB 900 & 920	042	Campos	Samuel
IMB 900 & 920	026	Doyle	Kristian
IMB 900 & 920	056	Fane	Bentley
IMB 900 & 920	017	Friedman	Richard
IMB 900 & 920	018	Galgiani	John
IMB 900 & 920	188	Gerba	Charles
IMB 900 & 920	027	Goodrum	Felicia
IMB 900 & 920	054	Gruessner	Rainer
IMB 900 & 920	021	Harris	David
IMB 900 & 920	050	Hastings	Karen
IMB 900 & 920	014	Johnson	Michael
IMB 900 & 920	023	Katsanis	Emmanuel
IMB 900 & 920	051	Kiela	Pawel
IMB 900 & 920	058	Koshy	Anita
IMB 900 & 920	057	Knox	Kenneth
IMB 900 & 920	053	Kuhns	Michael
IMB 900 & 920	052	Larmonier	Nicolas
IMB 900	025	Lybarger	Lonnie
IMB 900 & 920	016	Nikolich-Zugich	Janko
IMB 900 & 920	011	Purdy	John
IMB 900 & 920	207	Riggs	Michael
IMB 900 & 920	022	Schenten	Dominik
IMB 900 & 920	040	So	Magdalene
IMB 900 & 920	209	Sterling	Charles
IMB 900 & 920	024	Vercelli	Donata
IMB 900	015	Wilson	Justin
IMB 900 & 920	041	Wu	Joyce (Hsin-Jong)

CELLULAR AND MOLECULAR MEDICINE (CMM) Section Numbers

Course	Section	Last Name	First Name
CMM 900 & 920	030	Amerongen	Helen
CMM 900 & 920	012	Antin	Parker
CMM 900 & 920	034	Churko	Jared
CMM 900 & 920	045	Colson	Brett
CMM 900 & 920	010	Cusanovich	Darren
CMM 900 & 920	013	Darnell	Diana
CMM 900 & 920	014	Doetschman	Tom
CMM 900 & 920	019	Elliott	David
CMM 900 & 920	025	Ellis	Nathan
CMM 900 & 920	040	Goodrum	Felicia
CMM 900 & 920	032	Gordon	Herman
CMM 900 & 920	029	Granzier	Henk
CMM 900 & 920	022	Gregorio	Carol
CMM 900 & 920	028	Harris	Samantha
CMM 900 & 920	015	Krieg	Paul
CMM 900 & 920	026	Lantz	Clark
CMM 900 & 920	030	Ledford	Julie
CMM 900 & 920	020	Lybarger	Lonnie
CMM 900 & 920	027	Maggert	Keith
CMM 900 & 920	033	Miranti	Cynthia
CMM 900 & 920	024	Mouneimne	Gus
CMM 900 & 920	042	Restifo	Linda
CMM 900 & 920	031	Rogers	Greg
CMM 900 & 920	021	Romanoski	Casey
CMM 900 & 920	017	Runyan	Ray
CMM 900 & 920	035	Slepian	Marvin
CMM 900 & 920	038	Tardiff	Jil
CMM 900 & 920	016	Thorne	Curtis
CMM 900 & 920	018	Vercelli	Donata
CMM 900 & 920	046	Warfel	Noel
CMM 900 & 920	011	Wilson	Jean