

Department of Immunobiology

GRADUATE STUDENT HANDBOOK: Doctor of Philosophy in Immunobiology

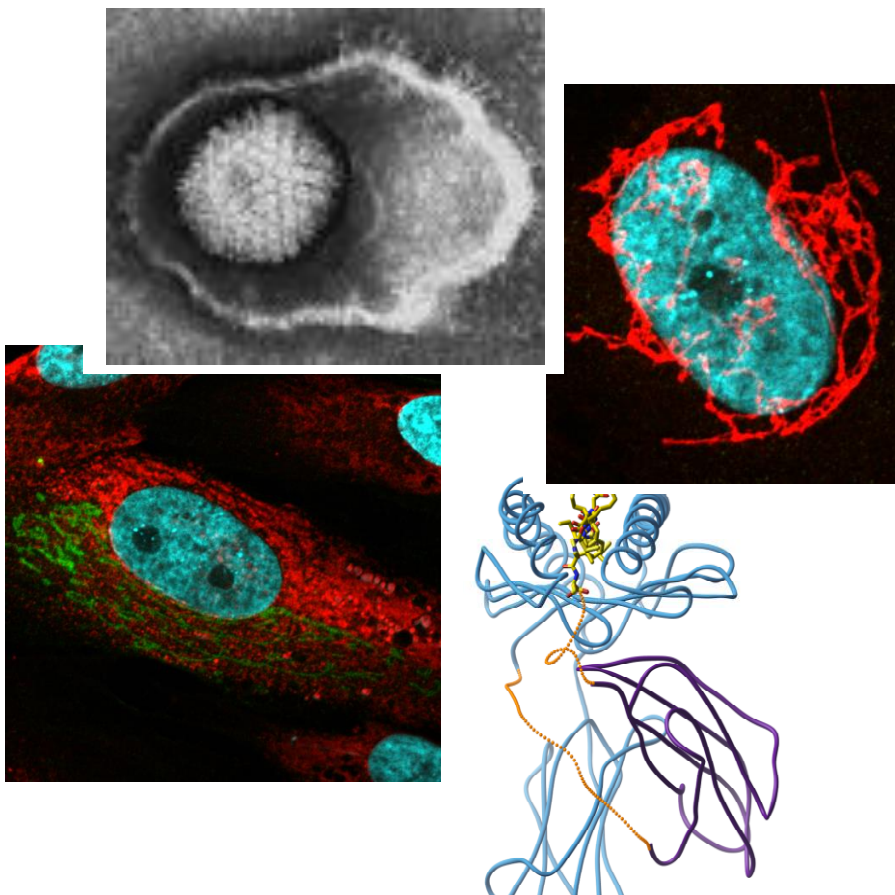


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INTRODUCTION

Welcome to the Graduate Program in Immunobiology (GPIMB) at the University of Arizona. We, as we hope you do, look forward to your studies and research as you embark on this challenging journey. Your graduate studies should provide intellectual adventure, an exploration of new ideas, and a journey of discovery from beginning to end. Your education will be what you make it. The faculty members of the Department of Immunobiology look forward to the opportunity to guide and facilitate your education.

The Doctor of Philosophy degree requires outstanding scholarship and distinguished research that contributes significantly to the fields of immunology and molecular pathogenesis. The student is expected to design and conduct original research with the guidance of their graduate mentor and dissertation committee. Ultimately your scholarship will culminate in writing and defending a dissertation based on your research.

This handbook summarizes the requirements of the GPIMB and the Graduate College of the University of Arizona for obtaining a PhD degree. These requirements are applicable to all students enrolled as of Fall 2011 seeking a PhD degree in Immunobiology. These requirements meet and exceed those of the Graduate College of the University of Arizona. Graduate students are responsible for knowing and fulfilling graduate requirements of both the Graduate College and the academic department. This document is designed to address the needs of most students in the GPIMB. Due to diverse backgrounds, some plans of study may require individual tailoring. Those students should discuss their situation with the Graduate Student Advisor, the GPIMB Director, or their Graduate Advisor.

CONTACTS/RESOURCES

Title	Name	Office	Phone	Email
Graduate Program Immunobiology (GPIMB) Director	Felicia Goodrum	BIO5 425	626-7468	fgoodrum@email.arizona.edu
Graduate Student Advisor (GSA)	Jeff Frelinger	MRB 218	626-6447	jfrelin@email.arizona.edu
Department Chair	Janko Nikolich-Zugich	MRB 225	626-6065	nikolich@email.arizona.edu
Graduate Program Coordinator	Nicole Swintek	MRB 240	626-0710	nperri@email.arizona.edu
Education and Curriculum Committee	Nafees Ahmad (Chair)	AHSC 6106	626-7022	nafees@email.arizona.edu
	Felicia Goodrum	BIO5 425	626-7468	fgoodrum@email.arizona.edu
	Maggie So	BIO5 245	626-3097	somaggie@email.arizona.edu
	Bentley Fane	BIO5 219	626-6634	bfane@email.arizona.edu

Department of Immunobiology Website: <http://immunobiology.arizona.edu>

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

Current Semester Schedule: <http://garnet.ccit.arizona.edu/cgi-bin/schedule/schedule.cgi>

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

DEGREE REQUIREMENTS

The Doctorate 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 work credit requirements with a grade of 3.0 or better GPA. The course work required for the PhD degree is a total of 70 credits. (see 'COURSEWORK' for details)

Required Courses:

Core Courses (9 units minimum)

IMB 548 3 units

IMB 565 3 units

IMB 521 2 units

CMM695 1 unit

Journal club and seminar (1 unit of each every semester; minimum of 12 units)

IMB 595A 1 unit (or an approved journal club)

IMB 696A 1 unit

Research (minimum of 22 letter-grade credits of Research and 18 credits of Dissertation)

IMB 900 (year 2) or IMB 920 (year 3 and onward) as required.

Electives:

9 units (minimum) from the list or as approved by the GSA or the GPIMB.

Note:

Students are expected to attend a journal club and seminar throughout their tenure at UA. 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 GSA or the GPIMB.

B. Major and Minor Fields of Study

Students will major in Immunobiology and are encouraged to minor in Immunobiology. Students also have the option to minor in a different Life Sciences Graduate Program or Department. The requirement for doing minor in a different program or department is 9 credit hours of graded course work, some minors require more.

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 summer of the second year; at which time all major coursework should be completed. Extensions on the date for completion of the Comprehensive examination must be approved by the GPIMB Director. The Comprehensive Examination consists of two parts. The first is a written research proposal in NIH format (see 'COMPREHENSIVE EXAMINATION' on page 16 for details). The second part is an oral examination by the student's Dissertation Committee. The student

must file the Advancement to Candidacy Form after successful completion of the Comprehensive Examination.

D. Doctoral Plan of Study

The Doctoral Plan of Study is a contract between the student, the major and minor departments, 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 can be revised at any time. More information can be found at <http://grad.arizona.edu/degrecert/dpos>.

E. Publications

Students seeking a PhD degree are expected to publish at least two first author papers (at least one published and one submitted at the time of thesis defense) in peer-reviewed journals. These papers are expected to be of high quality representing a novel and significant contribution towards the student's field of study. It is recommended that the student's published work be thematically consistent. Reviews do not count towards the two-paper requirement. Technical papers will be considered on a case-by-case basis by the student's Dissertation Committee. The GPIMB Director must approve any exceptions to the publication requirement. Papers published prior to enrollment in the Graduate Program cannot count toward fulfilling this requirement. The requirements for publication are to be interpreted in the context of the overall work, progress, and contribution of the student.

F. Dissertation Committee and Dissertation

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

G. Journal Club (IMB 595A)

Students are expected to register and participate in at least one journal club/work in progress each semester (Fall and Spring). Journal Clubs 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. Journal Clubs should augment your education in the laboratory. Students will choose pertinent journal clubs with the help of their Graduate Advisor. Active participation in journal clubs will be overseen by the Graduate Student Advisor and the student's chosen Graduate Advisor.

H. Meeting Presentations

Students will participate in a minimum of four meeting presentations. Ideally, these would be represented by a combination of national/international meetings, regional and local meetings. Both poster presentations or oral presentations are acceptable. Immunobiology seminar series participation does not count towards fulfilling this requirement.

I. Graduate College Doctoral Degree Requirements

The Degree Requirements specified by the GPIMB agree with or exceed those specified by the Graduate College. To earn a doctoral degree in Immunobiology, the student must meet the requirements of the Department. The Graduate College Doctoral Program requirements can be reviewed at the following site <http://grad.arizona.edu/Catalog/>. The terms 'units' and 'credits' are synonymous.

J. Code of Academic Integrity

Code of Academic Integrity

Integrity is expected of every student in all academic work. The guiding principle of academic integrity is that a student's submitted work must be the student's own. Students engaging in academic dishonesty diminish their education and bring discredit to the academic community. Students shall not violate the Code of Academic Integrity and shall avoid situations likely to compromise academic integrity. Students shall observe the provisions of the Code whether or not faculty members establish special rules of academic integrity for particular classes. Failure of faculty to prevent cheating does not excuse students from compliance with the Code. Any attempt to commit an act prohibited by these rules will be subject to sanctions to the same extent as completed acts. The procedures for reviewing a suspected violation are found in the complete Code of Academic Integrity available in the Dean of Students Office or <http://catalog.arizona.edu/policies/974/acacode.htm>.

Integrity and professionalism are critical parts of graduate education and continuing scientific pursuits. Students are ultimately responsible for their ethical conduct. Student activities in fulfilling degree requirements including, but not limited to, research, coursework, exams, dissertation, and attendance/participation at seminars and journal clubs is subject to the Code of Academic Integrity as stated below. 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.

K. Annual Evaluation

On an annual basis each student will complete the "Graduate Student Progress Report" online and submit it to the GPIMB. Also, the Graduate Advisor will complete an evaluation of the student online. The Graduate Advisor is expected to discuss their evaluation with their student. GPIMB 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 Director of GPIMB 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 Doctorate 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. Other faculty members, scientists, and students at the university should be sought as needed for mentoring. Please consult the GSA if you need assistance finding additional mentors.

Dissertation Committee

The Dissertation Committee will serve the student in the following capacities:

1. Annual meetings with each student following the successful completion of Comprehensive Exam to assess progress and fulfillment of graduation requirements.
2. Approval of Graduation based on Justification of Graduation. The committee will assist in devising any plan necessary for the student to fulfill any deficiencies.

COURSEWORK

The GPIMB requires 70 course credits for the Doctorate of Philosophy degree. All GPIMB students will take a core of 9 required units of departmental core courses. Students will take elective courses for an additional 9 credits. In addition, students will take at least 6 credits of Seminar (IMB 696A) and at least 6 credits of Journal Club (IMB 595A), 22 credits of Research, and 18 credits of Dissertation. With the approval of the graduate mentor, students may take additional courses for credit. While registered for Dissertation, students are expected to continue to participate fully in journal club, seminars, etc. *Students must maintain a GPA of 3.0 or higher for 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 be a minimum of a 3.0.

REQUIRED Courses:

These are courses required for the PhD degree in Immunobiology. 18 credits of graded Core and Elective courses are required (Core courses plus Electives) and must be completed with a grade of B or better.

MINOR Courses:

Students are strongly encouraged to minor in the GPIMB. The GPIMB minor is satisfied within the 52 credits required by the department. Students may seek a minor in other departments *with the approval of their graduate mentor and the GPIMB Director*. Coursework requirements for a minor in another department must be approved by the minor department as departments may have different requirements for fulfillment of a minor. The Graduate College requires 9 credit hours of letter-graded courses for a minor requirement. Courses taken towards a minor other than GPIMB may not apply towards fulfilling the credit requirement for graduation.

RESEARCH Courses: IMB 900 Research and IMB 920 Dissertation

Students will register for 1-6 credits of Research each semester of until they only register for Dissertation. This will constitute a total of at minimum of 22 credits of Research. Dissertation only

students will register for 9 credits of Dissertation only for two consecutive semesters (18 credits total). There is a minimum requirement of 30 credits of research and/or dissertation.

SEMINAR Courses: IMB 696A

Students will register for 1 graded credit of seminar each semester (Fall and Spring) and present a seminar every year. First through third year students will register for IMB 696A and give a 30-minute seminar each year. Students in their fourth year and above will register for IMB 696A and give a one-hour seminar each year. There is a minimum requirement of 6 graded credits of seminar for graduation and each of these credits must be from IMB 696A.

JOURNAL CLUB Courses: IMB 595A or the approved equivalent

Students will register for 1 graded credit of journal club each semester (Fall and Spring) and present a research paper one time per semester. There is a minimum requirement of 6 graded credits of seminar for graduation.

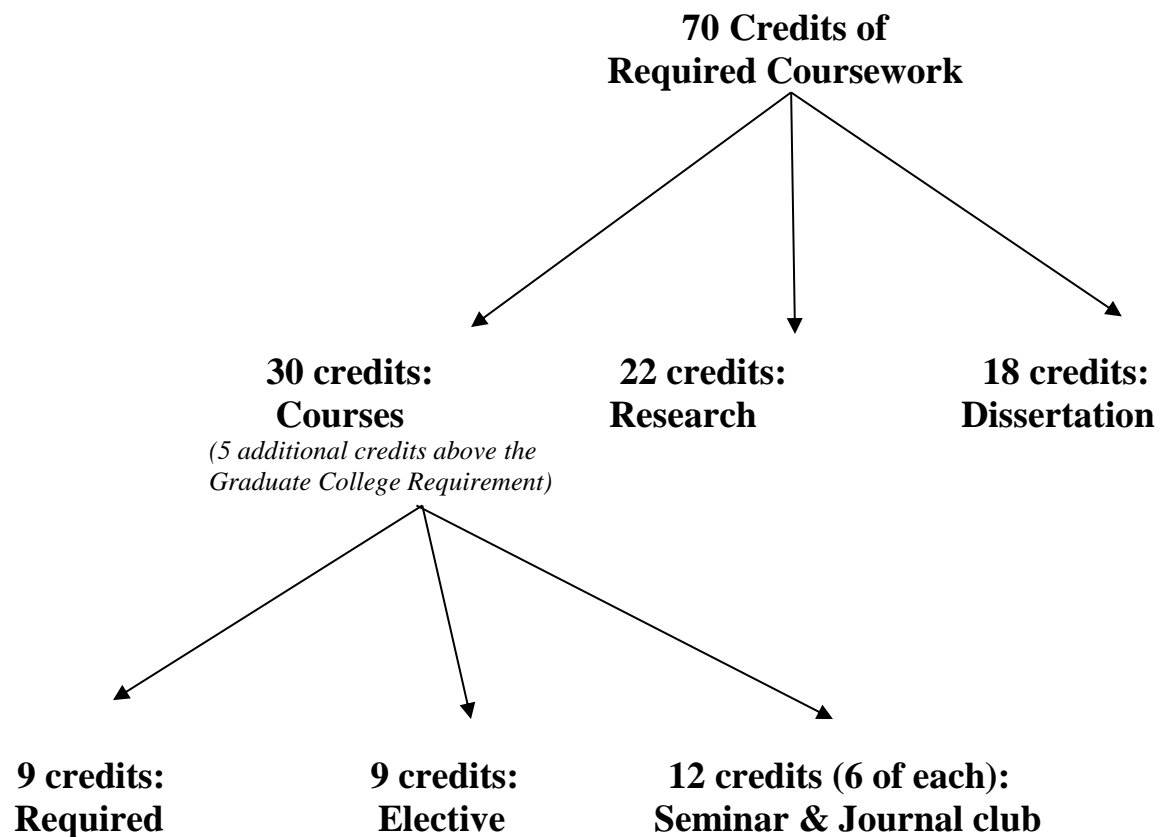
Immunobiology Courses

Required CORE Courses <i>Students are required to take 3 units of IMB 548 and 3 units of IMB 565. In addition, at least 6 units each of IMB 696A and 6 IMB 595A (or alternant journal club), and 2 units of IMB 521 plus 1 unit of CMM 695E.</i>				
Course #	Director/Instructor(s)	Title	Credits	Offering
IMB 548	M. Kuhns, J. Wu	Basic Immunological Concepts	3	Fall
IMB 565	M. So, S. Campos, F. Goodrum	Principles and Molecular Mechanisms of Microbe-Host Interactions	3	Spring
Any		Journal Club (e.g. IMB 595A)	1	Fall/Spring
IMB 696A	M. Kuhns	Research Seminar	1	Fall/Spring
IMB 521	F. Goodrum J. Frelinger J. Wilson	Scientific Writing	2	Fall
CMM 695E	P. Antin	Science, Society, and Ethics	1	8 weeks, 3 offerings per yr

Program Electives

Elective Courses - <i>Students will take electives for a minimum of 9 credits. One elective course (3 credits or more) must be chosen from each of the three groups below for a total of 9 elective credits.</i>					
Group 1	Biochemistry	Instructor	Title	Credits	Offering
	BIOC 568	P. Charest	Nucleic Acids, Metabolism, and Signaling	3	Spring
	BIOC 565	J. Schwartz	Proteins and Enzymes	3	Fall
Group 2	Molecular Biology and Genetics	Instructor	Title	Credits	Offering
	MCB 580	A. Capaldi	Introduction to Systems Biology	3	Fall
	MCB 516A	L. An	Statistical Bioinformatics and Genome Analysis	3	Spring
	MCB 546	C. Dieckmann F. Tax G. Yao	Genetics and Molecular Networks	4	Spring
	ECOL 509	M. Worobey	Evolution of Infectious Disease	3	Fall
	ECOL 553	Sanderson Whiteman	Functional and Evolutionary Genomics	3	Fall
Group 3	Cell Biology	Instructor	Title	Credits	Offering
	CMM 577	C. Gregorio L. Lybarger G. Mouneimne J. Wilson G. Rogers	Principles of Cell Biology	3	Fall
	CMM 588	A. Fuglevand G. Dussor K. Zinsmaier L. Restifo	Princ. Cellular and Molecular Neurobiology	4	Fall
	MCB 572	T. Weinert	Cell Systems	3	Fall

SCHEMATIC of GRADUATE COURSE WORK



Note: Coursework will be tailored for individual students. Courses taken in the first year may be applied with the approval of the GSA or GPIMB Director.

Proposed Timetable for Program of Study and Milestones

Students are strongly encouraged to complete the Ph.D. program within five years. Students are advised to adhere to the timetable provided below to meet major milestones.

YEAR ONE		
Courses	Fall	IMB 548 Basic Immunological Concepts One elective course Seminar series/journal club encouraged
	Spring	IMB 565 Principles and Molecular Mechanisms of Microbe-Host Interactions MCB 695E Science, Society, and Ethics One elective course Seminar series/journal club encouraged
Research		Complete 3 rotations Choose a lab and Major/Minor Department(s)
YEAR TWO		
Orientation		Attend Immunobiology Orientation
Courses	Fall	IMB 521 Scientific Writing IMB 696A Research Seminar One elective course Journal Club
	Spring	IMB 696A Research Seminar 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 Department)
	Summer	Submit Comprehensive Exam Results (following Exam)
	Summer	Submit Dissertation Committee Appointment
Candidacy	Summer	Fulfill requirements and take Comprehensive Exam
Dissertation		Choose Dissertation Committee
Fees		\$135 following comprehensive exam submitted to the Bursar
Symposium	Spring	Participate in planning and attend Immunobiology Symposium
YEAR THREE and BEYOND		
Research		Apply intense focus to research and manuscripts Consider applying for graduate fellowships
Courses	Fall and Spring	IMB 696A Research Seminar Journal club
Symposium	Spring	Participate in planning and attend Immunobiology Symposium
GRADUATION YEAR		
Courses	Fall and Spring	IMB 696A Research Seminar 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 Provide you Advisor and Department with bound copies of thesis

Course Section Numbers for Professors

Needed for research, independent study and dissertation

012	Ahmad	Nafees
014	Ampel	Neil
028	Boitano	Scott
029	Bommireddy	Ramireddy
042	Campos	Samuel
026	Doyle	Kristian
056	Fane	Bentley
010	Frelinger	Jeffrey
017	Friedman	Richard
018	Galgiani	John
027	Goodrum	Felicia
054	Gruessner	Rainer
020	Halonen	Marilyn
021	Harris	David
050	Hastings	Karen
023	Katsanis	Emmanuel
051	Kiela	Pawel
058	Koshy	Anita
057	Knox	Kenneth
053	Kuhns	Michael
052	Larmonier	Nicolas
025	Lybarger	Lonnie
016	Nikolich-Zugich	Janko
207	Riggs	Michael
022	Schenten	Dominik
040	So	Magdalene
209	Sterling	Charles
	Vedantam	Gayatri
024	Vercelli	Donata
	Viswanathan	V.K.
041	Wu	Joyce (Hsin-Jong)

RESEARCH ROTATIONS

Student rotations will be conducted during the first year under the ABBS program.

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 thesis laboratory, the role of the First Year Advisory Committee will be assumed by the students Dissertation Committee and secondarily by the GPIMB Director. 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 and formed a Dissertation Committee (with at least four members) with guidance from their graduate mentor and approved by the GPIMB Director.

The Dissertation Committee will ultimately consist of four faculty members. Three of the four members must be members of the GPIMB (one of these must hold a primary appointment in IMB). One of the three GPIMB members will be the graduate mentor. One of the four members may be from the minor department or outside departments as approved by the graduate mentor and Director GPIMB. For Students who have declared a minor (in program outside of IMB), one committee member must be from the minor department. A fifth committee member will be appointed in time for a final committee meeting. The fifth member may be appointed from an outside department or institution by the graduate mentor with approval from the Dissertation Committee or GPIMB Director. Three of the committee members for the final defense must be considered by the Graduate College to be tenure-track or the equivalent.

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. At least four committee members must be present for the final defense.

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 progression toward completion of degree requirements.

Dissertation Committee Meeting Requirements:

The student is responsible for scheduling one committee meeting every year beginning with the second semester of study to discuss possible research paths, review coursework and approve plan of study. Committee meetings must be documented. Documentation consists of completion of the [*Student Milestone Assessment Form*](#) (Appendix D, check Committee Meeting) by Chair of the committee and the student and filed with the Graduate Program Coordinator.

COMPREHENSIVE EXAMINATION

The Comprehensive Examination is to be completed by the end of the second year. 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.

Contact Information: Any questions or concerns about any aspect of the preliminary exam process should be directed to the Graduate Program Director, Dr. Felicia Goodrum at fgoodrum@email.arizona.edu or 626-7468, or, the Graduate Student Advisor, Dr. Jeffrey Frelinger at jfrelin@email.arizona.edu or 520-626-6437.

A. Written Examination

Topic approval: Students will develop a proposal on or closely aligned to their dissertation research for the Comprehensive Exam toward the end of the *Spring semester of the second year*. The students can and are strongly encouraged to seek the advice of faculty (including their mentor), postdocs, other experts in the field, and other students in developing their topics. The topic is submitted as a specific aims page (limit one page). The Aims page should include a title for the project, enough background information to support ideas proposed, a clearly stated hypothesis and two to three specific aims. Each aim should have a brief description of the rationale and an indication of the general experimental approach. It is not necessary to have every detail worked out, but the topic must be defensible and developed well enough for a review committee to have a clear idea of what is being asked and the general approaches being proposed. The topic must be submitted electronically to the Graduate Program Coordinator by *May 5th of the second year*. The Aims page will be reviewed by the Comprehensive Exam Committee (CEC), consisting of the DGP and GSA, and 1 core or joint IMB faculty member chosen by the DGP. The students will be notified if their Aims were approved for the progression to the full proposal within ten days. If the committee identifies issues with the Aims that could result in the proposal being indefensible, feedback will be provided to the student (within 10 days of submission) and the student will have two weeks to revise the Aims or create a new topic. Regardless of the outcome of the Aims evaluation, the full proposal is due June 30th.

Format of the Written Exam: The written preliminary exam consists of a research proposal, written in a format similar to a NIH grant proposal similar to an F31 fellowship. This format has been selected with the hope that each student will be able to submit his/her written exam as a fellowship application with a little extra work. Guidelines for fellowship submission 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 12 page limit; be sure to make them large enough to be legible. Use Arial font, 11 point or larger, for the text and for figure legends. 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. 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 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. 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 should constitute most of the proposal (typically 6 pages).

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 judge the ability of the student to engage in critical thinking, and the student's knowledge of experimental techniques. The student must be entirely responsible for the proposal, from posing the hypothesis to be tested, to the design of experiments to test this hypothesis, to the writing of the text. However, scientists do not function in a vacuum, and PIs

often seek advice from their peers when writing grant applications. The student is therefore allowed (and strongly encouraged) to consult fellow students, post-docs, the major advisor, other faculty and outside experts with regard to preliminary data, hypothesis formation, experimental details, presentation/articulation of ideas, and English usage. Feedback or guidance on the written proposal is strictly restricted to the specific aims page alone. No other portion of the written document can be read or commented on by others. The committee has zero tolerance for plagiarism.

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 be pursued through the Honor System of the University.

Cautionary Tale: Avoid computer problems. Be sure to make a backup copy of all your relevant files (text, figures, references, etc.) on a separate memory device 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.

Submitting your exam: The due date for the completed exam is June 30th, regardless of what day of the week the 30th falls on from year to year. Submit an electronic pdf and one hardcopy to the Graduate Program Coordinator. The due date set 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 Student Advisor as soon as you know there is a problem.

Written Exam Evaluation: The written examinations for all students will be reviewed by the CEC and one additional faculty member chosen by the DGP. Exams will be given a grade of Pass, Fail or Conditional Pass. 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 thought out proposal.

- **PASS:** Students who pass the written examination will proceed to the oral examination to be completed by September 15. It is the student's responsibility to schedule their oral exam with the CEC committee.
- **FAIL:** Students who fail the written exam will retake the examination the next year with the next cohort of students. 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 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—give your best effort on the first submission). Students who fail will retake the written exam the next year with the next cohort of students.

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 out 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 for all students by the CEC and one additional faculty member chosen by the DGP. It is the responsibility of each student to schedule the comprehensive

exam with the CEC prior to September 15. During the oral exam, students will defend their written proposal and answer questions on general knowledge posed by the CEC. Students will be given the grade of pass or fail at the time of the Exam. Students who fail the oral exam may retake it **within two months**. The oral exam can be retaken only once. Students failing the second oral exam will be academically disqualified from the program.

Following completion of the Comprehensive Examination, the student will submit the Advancement to Candidacy to the Graduate College (GradPath). The student and the CEC must also complete the [*Student Milestone Assessment Form*](#) (Appendix D, check Oral Comprehensive Exam) and submit to the Graduate Program Coordinator.

At the time you submit your application for Advancement to Candidacy your bursar account will be billed fees for candidacy, dissertation processing, microfilming. This is a one-time fee and you will not be billed again if you change your anticipated graduation date. Copyrighting is optional and carries an additional fee.

CHANGE OF DEGREE: From Doctoral to Master's Degree

The Master's degree is offered by the department to students who are unable to complete the doctoral program (for personal or academic reasons) but have completed their course work (Core, Electives and Minor) and successfully passed their Comprehensive Examination. The student must submit a change of degree form through GradPath.

DISSERTATION and FINAL DEFENSE

All PhD students must write a dissertation that meets the 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 and all data figures will represent work of the student. 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 web site:

<http://grad.arizona.edu/degrecert/formattingguide>

When the Dissertation Committee has made the decision that student is ready to write and defend the Dissertation, a one-page summary of the student's qualifications and accomplishments towards the PhD degree must be submitted to each member of the Dissertation Committee, the Department Chair, Graduate Program Immunobiology Director and the Graduate Student Advisor for approval. While this must be done prior to submitting the dissertation, the student is urged to submit this as soon as possible. This measure is to ensure equity of standards across the Department.

The Dissertation must be submitted one month prior to the scheduled final defense. 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. Four of five committee members must vote affirmatively in favor before the final defense can be scheduled. If two or more committee members cast a dissenting vote, the student must revise and resubmit the dissertation. The oral defense will take place three weeks after approval of the dissertation. The student will defend the dissertation orally. 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*.

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. 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. Four of five 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 thesis 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). It is the responsibility of the student following the successful defense to submit the dissertation to the Library of the University of Arizona and to University Microfilms, Inc. The student is required to provide the Immunobiology Department with a printed/bound AND electronic copy of the dissertation. Dissertations can be bound for a nominal fee at the Copy Technology Services (3rd floor AHSC). The Department will gladly cover the cost for binding for the department copy and a copy for the student. Please submit the bound copy and the electronic copy to the Graduate Program Coordinator within 2 weeks of the defense or final approval of the dissertation. 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.

MECHANISMS of FINANCIAL SUPPORT

Financial support in the form of a graduate research assistantship is available to eligible students admitted into the program. Support is provided by the student's graduate advisor in the form of a research assistantship. Outstanding students are encouraged to apply for independent predoctoral fellowships from sources outside the University. Limited teaching assistantships are available to partially support students, if necessary, during their graduate studies. Graduate students hired as Research or Teaching Assistants, at half time will receive 100% remission of their base in-state tuition (aka: registration fees). Students who are not residents of the State of Arizona will also receive a waiver of their nonresident tuition fees. Graduate Assistants will also have individual health care coverage paid by The University of Arizona. Graduate Assistants will also be eligible for a 10% discount at all ASUA Bookstores. Please contact the Graduate Program Coordinator if you need further details.

See also Graduate College web site for more financial aid resources: <http://grad.arizona.edu/financial-resources>

FORMS

Required forms important for various stages of your comprehensive exam to submitting and defending your dissertation are now submitted on line through GradPath. Please visit <https://grad.arizona.edu/gcforms/academic-services-forms> to submit pertinent forms.

In addition, the Department of Immunobiology requires some documentation of student activities for both student and programmatic assessment. Please visit <http://immunobiology.arizona.edu/graduate-program/forms> to submit pertinent GPIMB forms.

FACULTY CONTACT INFORMATION FOR THE IMMUNOBIOLOGY GRADUATE PROGRAM

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APPENDIX: ASSESSMENT CRITERIA FOR GPIMB STUDENT EDUCATION

The Department of Immunobiology at the University of Arizona strives to educate top-level scientists who will address the challenges facing human health, understanding the microbial world and the balance between infection and disease. Immunobiology addresses fundamental problems in the host-pathogen interaction. The progression of medicine relies on an understanding of infectious agents and the immunological response to infection. In addition, there are many non-infectious diseases with an immunological basis, including autoimmune disease, allergy, and cancer. 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 Immunobiology assessment, please visit our assessment page:
<http://assessment.arizona.edu/med/immunobiology>

Information regarding our faculty and their research can be found at the departmental website:
<http://immunobiology.arizona.edu>