

# Graduate Program in IMMUNOLOGY



## STUDENT AND FACULTY HANDBOOK

**2016-2017**

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## GENERAL INFORMATION

The Immunology Program offers a Ph.D. degree through the Rackham School of Graduate Studies. Students are admitted through the Program in Biomedical Sciences (PIBS) at the University of Michigan. The Immunology Program will give a foundation that will enable students to pursue a broad range of career choices spanning from academics to industry and from the theoretical to the translational.

This handbook outlines the steps necessary to complete the requirements for the Ph.D. degree in the Immunology Program.

## TIMETABLE

A provisional timetable for completion of the program is provided, although each student will be guided through the program individually.

Milestone	To be completed by
<b>PRE-CANDIDATE:</b>	
Lab rotations (2 mandatory; additional possible)	August 31 of year 1 (within PIBS)
Choice of Ph.D. Program	End of year 1 in PIBS (usually by June 1)
All course work	End of year 2 COMMENT: Journal Club/Research Student Seminar (Immuno 815) is taken for credit in Fall and Winter semesters of year 2. Special Topics in Immunology (Immuno 851) is taken for credit in Fall semester of year 2. After year 2, Journal Club attendance is required every semester.
Selection of thesis advisor (mentor)	By the end of year 1 for most students, with occasional exceptions
Preliminary Exam, oral and written, after which candidacy is achieved	End of year 2; Generally scheduled by March of the second year.
<b>CANDIDATE:</b>	
Completion of degree requirements	Usually about 5.5 years from time of entry into the PIBS-1 year

A major asset of the Immunology Program is its flexibility. The Immunology Graduate Student Affairs Committee may on occasion consider petitions to alter any requirement of the training program outlined here when petitioned by an individual student.

## **IMMUNOLOGY ADVISORY COMMITTEE**

The Immunology Advisory Committee consists of representatives from the founding departments of Surgery, Pathology, Microbiology and Immunology, and Internal Medicine. The charge of this committee is to meet with the Program Director as needed to discuss and/or resolve issues affecting the Program's progress or direction.

## **IMMUNOLOGY GRADUATE STUDENT AFFAIRS COMMITTEE**

The role of the Immunology Graduate Student Affairs Committee is to advise students, address student concerns, facilitate Immunology admissions, approve thesis committee selections, and resolve issues concerning the Program's curriculum.

## **IMMUNOLOGY PROGRAM FACULTY**

Immunology faculty from the School of Medicine, Dental School and the School of Public Health represent a broad range of expertise in basic, translational, and clinical immunology in transplantation, inflammatory diseases, infectious diseases, allergy, autoimmunity, aging, and cancer. Faculty members within the interdepartmental Immunology Program also have appointments in other centers. This allows pre-doctoral students additional exposure to cutting-edge immunological research. These include the Cancer Center, the Geriatrics Center, the Rheumatic Disease Core Center, the Transplant Center, Thyroid Eye Disease Center, the Center for Stem Cell Biology, the UM Multiple Sclerosis Center, the Center for Gene Therapy, and the Michigan Institute for Clinical and Health Research.

## **REQUIREMENTS OF THE IMMUNOLOGY PROGRAM**

1. A minimum of 18 credit hours in didactic graduate-level course work (\*course numbers designated 500 and above with the exception of Immuno 440), excluding seminars and research, with not more than one grade of "B-" or below. Courses must be re-taken if a grade of "C" or lower is obtained, or if more than one B- is earned.
2. The course requirements outlined in the next section.
3. At least two laboratory research rotations.
4. Successful completion of the preliminary examination.
5. Successful completion of a research project and defense of a dissertation.
6. Students must have a first-author publication in press in order to defend. A waiver of this policy may be granted only under exceptional circumstances. To request a waiver, a student's dissertation committee must unanimously petition the GSAC for permission of a waiver. The student must have completed a body of work substantial enough and of high enough quality to warrant publication; however, if a publication is delayed due to an unavoidable circumstance. A majority vote of the GSAC committee will decide whether a waiver will be granted or not.

## **COURSE REQUIREMENTS**

Immunology Program students take formal graduate level courses in immunology, biochemistry, genetics and cell biology. Many of these courses will be completed during the first (PIBS) year. Required student seminars involve participation of both students and faculty members. At the end of coursework, the preliminary examination contains both written and oral components, providing students an important opportunity to hone critical presentation skills.

### **CREDIT HOURS**

All students who have not achieved candidacy enroll for a minimum of 9 units in each of the Fall and Winter terms. Candidacy students may register for only 8 units of Research 995 and are eligible for one “free class” per semester. **ADDITIONAL TUITION WILL BE ASSESSED IF THE CANDIDATE REGISTERS FOR MORE THAN 8 CREDITS.** See Rackham Graduate Student Academic Policies, Section 3, for more information – [http://www.rackham.umich.edu/policies/academic\\_policies/section3/#32](http://www.rackham.umich.edu/policies/academic_policies/section3/#32)

### **REQUIRED COURSES**

Core course requirements for completion of the Ph.D. degree in Immunology are as follows:

**PIBS 503** (1 credit) PIBS Research Responsibility and Ethics in the Fall term of the first year.

**PIBS 800** (1 credit) PIBS seminar series in the Fall and Winter terms of the first year.

Students are required to take at least two of the three PIBS Core Courses in the Fall term of their first year. Many students choose to take all three of these Core Courses, sometimes taking all three in their first term, and sometimes postponing the third Core Course until the Fall of their second year. The three PIBS Core Courses are:

**Biological Chemistry 550** Protein Structure and Function (3 credits)

**Cell and Developmental Biology 530** Cell Biology (3 credits)

**Human Genetics 541** Molecular Genetics (3 credits)

Students who take only two of the Core Courses in the first Fall term must take 3 units of electives. Elective courses may also be taken in the Winter term of the first year or the Fall of the second year. Students who need to strengthen their knowledge of fundamental immunology are encouraged to take IMMUNO 440 (see next page) for graduate credit. See next page for other suggested elective courses.

### **TRAINING IN ETHICAL ISSUES IN SCIENCE**

On entering the Graduate Program through PIBS, students are issued copies of the Rackham Graduate School “Student Handbook” and the University of Michigan Medical School “Guidelines for Responsible Conduct of Research.” The former addresses the standards of student behavior expected of all members of the graduate community. The latter discusses in depth the responsibilities of a Ph.D. mentor, appropriate methods of data collection and analysis, guidelines for manuscript authorship and issues pertaining to relationships between industry and academic institutions. During the first year, graduate students attend an 8 session seminar series in Ethics in Research prepared and presented as part of PIBS 503. Per NIH Policy, trainees are required to retake the course every 4 years.

### **Immunology:**

**Microbiology and Immunology 640** Molecular and Cellular Immunology (3 credits). Fall term of first year.

**Microbiology and Immunology 641** Advanced Immunology (1 credit). Fall term of first year.

**Immunology 850** Experimental Immunology (3 credits). Winter term of first year.

Literature based immunology techniques course aimed at providing first year students with an understanding of the theory and application of common tools used in immunology.

**Immunology 851** Special Topics in Immunology (2 credits).

Students enroll in this course during Fall of the second year. This is a literature based course consisting of didactic overview lectures on special topics not covered in Micro 640. The focus is on guided discussions of recent research papers in immunology. The goal of the course is to provide graduate students with practice and guidance in the explication of original research papers in Immunology, as well as with in-depth looks at selected research questions of current interest. Additionally, to provide the students (and faculty) an opportunity to discuss and question the fundamental immunologic concepts thought to explain disease, the course will discuss literature on immunologic disease. The course will have faculty led didactic/literature based sessions intercalated with journal club sessions led by students. Faculty led sessions will last 1:30 hours, journal club sessions will be one-hour long. Topic and instructors vary each semester.

**Immunology 815** Journal Club and Research Seminar (2 credits - 1 credit for 2 semesters).

First year students are encouraged to attend this course if they are rotating in an Immunology Program laboratory. **Second year and later students are required to attend this course every semester, but will ordinarily only register for the two semesters of their second year.** The Journal Club is aimed at increasing the students' awareness of current areas of research in immunology and providing students with an opportunity to practice and improve their oral presentation skills. Students present the experimental findings of one or two recent scientific reports on a contemporary topic in immunology. The Journal Club Director and/or the student's mentor, as well as 2 Immunology Faculty reviewers (alphabetically assigned) will provide the student with verbal feedback of the presentation. Student presentations are critiqued on the basis of 1) style and clarity of the presentation 2) general knowledge of the topic as reflected by presentation of relevant background information and discussion of questions and 3) data interpretation. Senior graduate students are expected to present their own thesis research rather than recent literature. **The student's lab mentor (and thesis committee for research presentations) MUST BE PRESENT to provide support and feedback on the student's performance. It is expected that the student's mentor will introduce the student. It is the student's responsibility to ensure that the mentor (and committee) be present at the presentation. Each Immunology Program faculty member is alphabetically assigned to give a verbal critique to one-two trainees per academic year.**

## ELECTIVES

**Immunology 440 Human Immunology** (3 credits). This course will provide a broad overview of the rapidly advancing field of modern immunology in both the basic and clinical sciences. Lectures will emphasize experimental and clinical observations to highlight key concepts.

Other suggested elective courses include but are not limited to:

- Micrbiol 504 – Cellular Biotechnology (3 credits)
- Cancer Biology 553 – Cancer Biology 2 credits)
- Micrbiol 607 – Microbial Pathogenesis (2 credits)
- Micrbiol 615 – Viral Pathogenesis (2 credits)
- Path 581 – Tissue, Cellular and Molecular Basics of Disease (3 credits)

**Total minimum didactic credits:** excluding seminars (i.e. IMMUNO 815) and research (i.e. Immuno 990/995): 18

## COURSE REQUIREMENTS FOR MSTP STUDENTS

MSTP students come into the Program with 18 credits toward their Ph.D.

Once in the Program, the following courses are **required**:

**Immunology 815** - Journal Club (2 credits - 1 credit for 2 semesters) Offered in the Fall and Winter.

**Immunology 850** – Experimental Immunology (3 credits) Offered in the Winter semester.

**Immunology 851** - Special Topics in Immunology (2 credits) Offered in the Fall semester.

**PIBS 503** - Research Responsibility and Ethics (1 credit) Offered in the Fall semester.

**Microbiology and Immunology 640** - Molecular and Cellular Immunology (3 credits)

Offered in the Fall semester.

**Microbiology and Immunology 641** – Advanced Immunology (1 credit) Offered in the Fall semester.

Since MSTP students have had coursework in human genetics, microbiology and cellular biology, the following courses are **waived**:

**Biological Chemistry 550** - Macromolecular Structure and Function (3 credits)

**Cell and Developmental Biology 530** - Cell Biology (3 credits)

**Human Genetics 541** - Molecular Genetics (3 credits)

## TRANSFER STUDENTS

Graduate students who wish to transfer to the Immunology Program from other Departments/Programs within the University's Horace Rackham School for Graduate Studies should first contact the Immunology Program Director, who will then discuss the matter with the Graduate Student Affairs Committee. The Program Director will also request that the student's academic file be provided for review. If the transfer is approved, the student will be responsible for completing all Immunology Program requirements, as detailed in the Program's Handbook, including enrolling for the required credits in the Immunology Journal Club (IMMUNO 815; 2 semesters), Special Topics in Immunology Course (IMMUNO 851, 1 semester) and Experimental Immunology (IMMUNO 850, 1 semester).

## IMMUNOLOGY SEMINAR SERIES

<http://immunology.medicine.umich.edu/immunology-program-seminar-series>

The Immunology Seminar Series, held during the Fall and Winter terms, include formal presentations by Immunology Program faculty members as well as invited guest speakers from outside the University. Invited speakers for the 2016-2017 academic year included:

[George Dubyak, Ph.D.](#), Case Western Reserve University, 09/07/16

[Daniel Stetson, Ph.D.](#), University of Washington, 09/21/16

[Alyssa Hasty, Ph.D.](#), Vanderbilt University, 10/12/16

[Claudia Jakubzick, Ph.D.](#), National Jewish Health, 10/26/16

[Ichiro Taniuchi, Ph.D.](#), IMS Riken Center for Integrative Medical Sciences, 11/09/16

[Floyd Wormley, Jr., Ph.D.](#), University of Texas at San Antonio, 11/30/16

[Robert Clark, MD](#), UConn Health, 12/07/16

[Stefanie Sarantopoulos, MD, Ph.D.](#), Duke University, 1/18/17

[Michael Caligiuri, MD](#), Ohio State University, 2/1/17

[Steffen Jung, Ph.D.](#), Weizmann Institute of Science, 3/15/17

[Bruce Levy, MD](#), Harvard Institute of Medicine, 3/29/17

Immunology students are expected to attend these Wednesday noon seminars, as well as to participate in selected luncheons with speakers throughout the academic year.

### **“i-club”**

The Graduate Program in Immunology hosts “i-club” 4-6 times per year. This will be an opportunity to provide programming and to build stronger faculty-student interactions. Most events will be social, some will be journal clubs and others will be career development programming. Attendance is encouraged, but not mandatory.

## **THE MILLER FUND AWARD FOR INNOVATIVE IMMUNOLOGY RESEARCH**

The Miller Fund is a philanthropically endowed fund at the University of Michigan Medical School dedicated to the support of innovative research in immunology. Up to 2 awards are available for the period of July 1, 2016 - June 30, 2017. Each year's recipient will be announced at the Annual Immunology Program Retreat in the spring. This is a one-year non-renewable award. Recipients are ineligible to apply again. Only applications from pre-doctoral students in the Immunology Program who have achieved Ph.D. candidacy will be considered for this award. Applications must be electronically submitted by the Immunology Program student. All applicants, including the awardee, will submit an abstract and give an oral and/or poster presentation of their work at the annual Immunology Retreat.

The Awardee will be required to submit an abstract and to give an oral presentation of their work at the Annual Immunology Retreat.

### Format

A one-page single-spaced description of the research project is required. A second page should be devoted to presentation and justification of the budget. Since the funds are to be used to support a pre-doctoral student, the budget can include funds to defray part of the cost of student tuition, stipend, laboratory supplies or equipment needed for the dissertation project, and educational funds for journals, other educational materials, and travel to scientific meetings. At least \$1,000 must be budgeted for the student's travel to a scientific meeting. The mentor must also provide a statement outlining the student's qualifications for this award and an explanation of how these funds would enhance the student's training and dissertation work. In addition, applicants should provide an annotated CV (i.e. stating the nominee's role/contribution to each manuscript listed), and a one paragraph explanation of their research project designed to be read and understood by a layperson. All applicant trainees, including the awardee, will be required to submit an abstract and give an oral presentation of their work at the Annual Immunology Retreat. Applications must be electronically submitted by the student.

Review and rating of the applications will be conducted by the Immunology Program's Graduate Student Affairs Committee, based on the following points:

1. Scientific originality and strength of the proposal
2. Qualifications of the applicant, including scientific progress on the student's dissertation work.
3. Anticipated impact of the awarded funds on the student's training experience

### Deadline

Applications must be electronically submitted by the applicant by **Friday, March 24<sup>th</sup>**.

### Award Requirements

By the end of the funding period, June 30, the faculty and awardee of this award will be required to submit a report describing progress on the project. The report must be written in layperson's language. Additionally, the Herman and Dorothy Miller Award must be acknowledged as a source of support in generated works presented and published from use of the funds.



## THE MONTE V. HOBBS STUDENT AWARD

The Monte V. Hobbs Student Award was established through the generous contributions of friends, family and colleagues to honor the memory of Monte V. Hobbs, a leader in research of the aging process in immunology and a pioneer in the development and implementation of the RNase protection assay to study cytokines.

Abstracts will be reviewed and rated by the Immunology Program's Graduate Student Affairs Committee. Only graduate students in the Graduate Program in Immunology are eligible to apply. Previous recipients are ineligible to apply. Up to two cash awards of \$500 each (before taxes) will be given to students who have presented abstracts at scientific meetings during the 2016-2017 academic year. The awards will be presented at the Immunology Annual Retreat in the spring. All applicants, including the awardees, will give an oral and/or presentation of their work at the retreat.

The student should submit:

- One-page abstract
- Cover letter indicating the name and date of the meeting where the abstract was presented, and whether it was an oral or poster presentation
- Annotated CV (i.e. the applicant should state what role s/he played in each publication)

### Deadline

Applications must be submitted electronically by the student by **Monday, April 3rd**.

## STUDENT ADVISORS

During the student's first year in PIBS, the academic advisor for the Immunology Program is Dr. Beth Moore ([bmoore@umich.edu](mailto:bmoore@umich.edu)) for the 2016-17 academic year. After the first year, the student's mentor will serve as advisor, in conjunction with the Immunology Program Graduate Office. Any questions or problems regarding funding or course requirements can be directed to Immunology's Administrator, Zarinah Aquil.

Beth Moore – [bmoore@umich.edu](mailto:bmoore@umich.edu), 734-647-8378      Zarinah Aquil – [zaquil@umich.edu](mailto:zaquil@umich.edu), 734-615-4846

## LAB ROTATIONS

During the first year, under the auspices of PIBS, each student participates in research by completing at least two laboratory rotations (Fall and Winter terms). The two laboratory rotations should be completed during the first 12 months of enrollment and must be completed prior to the selection of a mentor. For the Fall and Winter rotations, students enroll in PIBS 600. Students may also do a lab rotation in the Summer term prior to their first year in the PIBS program, and students who have not yet selected a mentor following their Fall and Winter rotations may also wish to do a rotation in the Summer following the PIBS-1 year (with special permission). PIBS students have the option of doing two shorter rotations per term in the Fall and Winter (subject to permission of the mentor). Full term rotations are still strongly encouraged. See PIBS for details.

MSTP students entering the program will have completed two lab rotations, with a possible third, during the summers.

New students are urged to become acquainted with the research interests of the Immunology Program Faculty before they arrive in the Fall of their first year. These are detailed in the Immunology Program brochure and at the Immunology website ([www.med.umich.edu/immprog/](http://www.med.umich.edu/immprog/)).

## IMMUNOLOGY TRAINING GRANTS

Second year graduate students are usually funded from a NIH T32 Training Grant, “Research Training in Experimental Immunology” (Project co-directors Drs. Bethany Moore and Steven Kunkel).

### SELECTION OF A MENTOR

Each student will select a mentor from the Immunology Faculty to guide his or her dissertation research. As soon as possible after completion of the laboratory rotations, the student should submit his/her choice of mentor to the Program in Biomedical Sciences (PIBS) and the Immunology Program Director and Student Services Coordinator. The selection of a mentor should generally occur by the end of the first year of study.

### PRELIMINARY EXAMINATION

The student must pass the preliminary examination before achieving candidacy. Generally, the preliminary examination is to be completed by the end of the student’s second year (see page 1, Timetable). Preliminary examination guidelines follow:

#### **A. Timeline and Checkpoints**

Students will be assigned 2 primary literature articles to read and understand. Students can work together to read and study the articles. Each student will be expected to explain the rationale, background information, hypothesis, experimental design, results and conclusions of the studies. They will be quizzed on this during the oral examination. In addition, students will be asked questions related to general Immunology knowledge. Students should work independently to design a specific aims page related to the data or a concept presented in the primary literature articles. The specific aims page should be 1 page in NIH-style format. Students should provide rationale, hypothesis and 2 specific aims which encompass work that would be a logical next step. Students will defend this proposed project as part of the oral examination as well.

	<b>Time Line</b>
Primary Papers Assigned	By Jan. 6th
Specific Aims Page Due	February 22nd
Oral Exam	Mid-March: March 13th

#### **B. Composition of Individual Exam Committees**

The Preliminary Exam Committee consists of 10-12 faculty members who serve as potential examiners for a two-year period. Individual Exam Committees consist of 5 faculty who are selected by the Program Director. If possible the same committee will examine more than one student.

#### **C. Timeline for MSTP Students**

MSTP students entering the Immunology Program are considered to be at the same level as students entering the Program after 1 year in PIBS. It is encouraged that MSTP students take their prelims in their first year of PhD training alongside the PhD class. Mentors should be aware that tuition support for pre-candidates is costlier than for candidates, especially for non-Michigan resident students. Therefore, we strongly recommend that the preliminary exam be completed in the spring of the student’s 2<sup>nd</sup> year.

## D. Oral Exam

### 1. Focus

The oral exam tests the student's ability to reason analytically and to develop ideas and defend them in front of others. Thus, the emphasis is on hypothesis testing and experimental design, as well as general knowledge in the field of Immunology. The student should be familiar, however, with the key past experiments performed that led to the hypothesis and the important basic concepts of the approaches to be used. The committee members will expect students to be familiar enough with each technique proposed to understand its theoretical basis, as well as its appropriateness and limitations in addressing the hypothesis being tested.

However, detailed knowledge of such things as buffer ingredients and incubation times are less important, unless they are vital to the interpretation of the results. For example, if one proposes to use ELISPOT technology to measure cytokine levels, one should know how the assay works, whether the necessary starting materials are available, whether ELISPOT is the best approach to address the question being asked, and the limitations of using ELISPOT measurements. One does not need to know things like the exact ions needed for the ELISPOT buffers or the incubation time of a particular step (unless it is a critical parameter for the assay in question). In contrast, if one were studying ion channels, one would be expected to know the ion concentrations in the buffers to be used to measure ion transport.

### 2. Format

At the start of the examination the student will be asked to leave the room for a few minutes while the examining committee has a chance to discuss the student's record, how they wish the examination to proceed, and to bring up any potential problems. The student will then be asked questions on the primary literature papers for approximately 40 minutes. Clean copies of the papers will be provided to the student in the room. Following this, the student will defend the specific aims proposal. This presentation should focus on the hypothesis, specific aims, and the significance of the proposal. Emphasis should be on the experimental approaches to be taken to address the hypothesis. The members of the committee may ask for points of clarification during the student's presentation, but should allow the student to complete his/her overview prior to in-depth questioning. **While questions will likely center around the proposal, questions pertaining to general knowledge of the field of Immunology should be anticipated by the student. Hence, the student should have a good grasp of immunology in general.** It is highly recommended that the student be familiar with all topics listed in the Immunology Review Outline, which is provided by the program. Approximately 30 minutes of the 2-hour exam will be devoted toward questioning of the student's understanding of immunologic principles. When all committee members have had the opportunity to ask all the questions they wish, the student will be asked to leave the room while the committee reaches a consensus opinion.

### 3. Evaluation

The committee can decide to pass the student unconditionally, to fail the student unconditionally, or something in between. The committee may allow a student to retake the examination with the same problem, with a different problem, or rewrite all or part of the written proposal. In addition, the committee may also recommend other remedies for a less than satisfactory performance (e.g., assign additional class work). For example, should a student perform poorly on the general immunology portion of their exam, the committee will likely recommend that the student take IMMUNO 440. The committee and student should remember that the oral examination is primarily a learning experience and that students who are asked to retake the examination usually improve immensely the second time. If there is a serious question as to whether the student should pass, it is recommended that the student be asked to retake the examination. A student will be dismissed from the Immunology Program if he or she fails either the written or oral portion of the examination a second time.

### 4. Summary

After the examination, the chair of the individual student's committee will advise the Student Services Coordinator and the Program Director of the results. Upon successful completion of the exam, and assuming all other requirements are met, the Program Director will approve the student's Advancement to Candidacy form, which will be electronically sent to Rackham.

## SELECTION OF DISSERTATION RESEARCH TOPIC

Students and their respective mentors are expected to design research projects related directly to questions in basic or applied immunology. There may be instances where an Immunology Program mentor also serves as a faculty member in other Programs/Departments as well. Research directions in the laboratories of these particular mentors may include scientific projects unrelated in scope to basic or applied immunology. For this reason, students who are concerned that their planned project might not meet the topic requirement should discuss the matter early on with the Program Director, who may at his or her discretion refer the question to the Graduate Student Affairs Committee for resolution. The responsibility for choosing a dissertation research topic rests jointly with the mentor and student, and it should be their priority to see that a project(s) is selected that meets the topic requirement.

## DISSERTATION COMMITTEE

The dissertation committee guides the research project of the student. This committee will supervise dissertation activities and will serve as a resource throughout the period of research and writing. The committee also reviews the thesis progress. Frequent interactions with these committee members are designed to assess efforts toward thesis research as well as forge informal collaborations that mature throughout the student's future professional career. It is required that the committee meet within six months after the student passes the qualifying exam, and at least once each year thereafter until the defense.

Upon a student's satisfactory completion of the preliminary examination, the student and mentor should provide to the Program's Graduate Student Affairs Committee, via the Immunology Program's Student Services Coordinator, a **paragraph describing the thesis proposal. The description must include a title as well as a central hypothesis or question to be addressed.** The student should also provide a list of potential faculty members to serve on the student's dissertation committee along with a brief explanation of why each committee member was selected (e.g. expertise on topic). The dissertation committee is to be comprised of at least 5 members, including the chair. At least 3, and preferably more, members must be Immunology Program faculty. The proposed members should be tenured-track faculty chosen by the mentor in consultation with the student and they should reflect appropriate expertise in the areas covered by the dissertation research. A student may select an Immunology Program Research Professor (i.e., Research Professor, Research Associate Professor, and Research Assistant Professor) to serve as their co-Chair, but only if the other co-Chair is a tenured-track Immunology Program faculty member. If a committee member is not affiliated with a Ph.D. granting program, a copy of his/her CV should be submitted for consideration. The Graduate Student Affairs Committee will review the list and contact the mentor, via the Immunology Program's Student Services Coordinator, about the proposed selections. Mentors are encouraged to review the Rackham Graduate School policy on "Guidelines for Dissertation Committee Service", which can be obtained through Rackham's website: (<http://www.rackham.umich.edu/downloads/oard/forms/disscommittee guidelines.pdf>). The Graduate Student Affairs Committee may choose to edit the dissertation committee members to ensure appropriate expertise and rigor on the committee.

Students should be sure to email their committee a copy of the data they'll be presenting at least three working days in advance of the committee meeting. Not at their first committee meeting, but in subsequent meetings, they should also include in the email to their committee a brief self-assessment of the progress they've made since the last meeting. Students and their mentors are responsible for ensuring that their Ph.D. progress report is completed, signed by the student and each member of their committee, and returned to the Immunology Student Services Representative within 7 days after the meeting.

## **RESEARCH OPPORTUNITIES**

Due to the broad range of expertise of the Immunology Program faculty, a wide array of basic, translational/applied/clinical research opportunities are available for Ph.D. students:

### **Basic studies:**

- Adhesion Molecules
- Antigen Processing/Presentation
- Apoptosis
- Cell Homing/Trafficking
- Cell Signaling
- Cytokine Networks
- Hematopoiesis
- Imaging
- Immunoglobulin Switching
- Immune Suppression
- Innate Immunity
- Macrophage Biology
- MHC Class I and II Molecules
- T Cell Activation
- T Cell Biology

### **Translational/Applied Immunology:**

- Animal Models of Disease
- Ex Vivo Cell Expansion
- Gene Delivery
- Vaccine Development

### **Conditions:**

- Aging
- Allergy
- Arthritis
- Autoimmunity
- Bone Marrow Transplantation
- Cancer
- Diabetes
- Inflammation/Tissue Repair
- Lupus
- Multiple Sclerosis
- Organ Transplantation
- Pulmonary
- Viral Infections

## **TRAINING IN ETHICAL ISSUES IN SCIENCE**

On entering the Graduate Program through PIBS, students are issued copies of the Rackham Graduate School “Student Handbook” and the University of Michigan Medical School “Guidelines for Responsible Conduct of Research.” The former addresses the standards of student behavior expected of all members of the graduate community. The latter discusses in depth the responsibilities of a Ph.D. mentor, appropriate methods of data collection and analysis, guidelines for manuscript authorship and issues pertaining to relationships between industry and academic institutions. During the first year, graduate students attend an 8 session seminar series in Ethics in Research prepared and presented as part of PIBS 503. Per NIH policy, trainees are required to retake the training every 4 years.

## **STUDENT FINANCIAL AID**

All students in good standing will be provided with a monthly stipend, comprehensive health care benefits, and coverage of tuition and fees. For the first year, PIBS will cover all expenses. In year two, the student will be supported by a combination of individual fellowships, pre-doctoral training grant funds, institutional funds and research grants. Once a mentor has been selected and the student has passed the preliminary examination at the end of year 2, funding will be provided by the mentor’s laboratory unless training grant support or other fellowships are available. Immunology faculty members who accept Immunology students must complete and submit the Financial Commitment Form listing the source(s) of funding (including the grant number) that will support that student in the years that the graduate student is a member of their lab.

Should the mentor not be able to meet the financial responsibility for any Immunology student in his or her lab, the financial obligation for the student falls on the mentor’s primary department. The chair of the mentor’s primary department must sign and date the letter of financial responsibility before an Immunology student is formally accepted in a mentor’s lab.

## **STUDENT EMPLOYMENT OUTSIDE THE PROGRAM**

The faculty of the Immunology Program believes that Ph.D. training is a full-time endeavor. Outside employment subtracts from the time and mental energy a student can devote to his or her research. In addition, it is an NIH policy that students who are supported by a PHS training grant may not be employed outside their training program. For this reason, students are forbidden to engage in outside employment.

## **RESPONSIBILITIES OF STUDENTS FOR THEIR PROGRESS THROUGH THE PROGRAM**

In addition to fulfilling the above requirements of the Immunology Program, students are responsible for:

1. Ensuring that the preliminary written proposal and oral exam are completed in a timely fashion.
2. Ensuring that the thesis advisor and dissertation committee are chosen in a timely fashion and according to the guidelines of the program. The first committee meeting must be held within 6 months of achieving candidacy.
3. Scheduling thesis committee meetings at least once a year and submitting progress reports following each committee meeting.
4. Making timely progress toward completion of the Ph.D. and giving careful and timely consideration to further career goals (post-docs, jobs, etc.).
5. Ensuring that Rackham requirements for the dissertation, defense and graduation are met.
6. Actively participating in the weekly Journal Club/Research Seminar Series, Annual Program Retreat, the PIBS annual recruitment weekends, and the Fall Program Student Reception.
7. Serving as a student representative for the Immunology Program.

## **RESPONSIBILITIES OF IMMUNOLOGY FACULTY**

1. Serving on committees as asked, particularly on preliminary examination committees, which calls for mandatory participation for a term of two years (on a rotating basis), and on dissertation committees.
2. Should a faculty member lose their funding or for any reason is unable to support their student, the student's financial support will be the responsibility of the faculty member's primary department.
3. Monitoring and assuring timely progress through the Immunology Program of students in their laboratories. Should the mentor, for any reason, leave the University or be unable to continue to serve as a student's mentor, it is the responsibility of the mentor to resolve and document the following issues for Immunology students in the lab:
  - A. What experimental aims must be completed to finish the student's thesis, and what is the anticipated time frame for completion of these studies?
  - B. How frequently will the student's Committee meet?
  - C. What will be the source of the student's individual financial support, and how will the student's research be supported?
  - D. In which lab will the student's research be performed?
4. Submitting required reports in a timely fashion (rotation evaluations, term lab reports, thesis progress evaluations).
5. Ensuring timely scheduling of the organization of dissertation committees for their trainees, and scheduling of thesis committee meetings and dissertation defenses.
6. Active participation in the weekly Journal Club/Research Seminar Series (each faculty member is alphabetically assigned to give a verbal critique to one trainee after their presentation), the Special Topics in Immunology course, the Annual Program Retreat, the PIBS annual recruitment weekends, Fall Program Student Reception, and i-Club.
7. Serving as a faculty representative for the Immunology Program.
8. Taking on needed roles in administering the Program.

## USEFUL ON-LINE RESOURCES

The following on-line resources will be invaluable for students during their time as Ph.D. students in the Immunology Program.

### **Rackham Resources for Students**

Graduate Student Handbook Policies and Procedures [http://www.rackham.umich.edu/policies/academic\\_policies/](http://www.rackham.umich.edu/policies/academic_policies/)

Dissertation Handbook: A Guide to Preparing and Submitting your Doctoral Dissertation  
<http://www.rackham.umich.edu/downloads/oard-dissertation-handbook.pdf>

Gradtools - Rackham ([www.gradtools.umich.edu](http://www.gradtools.umich.edu))

This is a special set of on-line tools in the CTools environment to help Rackham doctoral students as they work toward their degrees. Included is a Dissertation Checklist. Students are encouraged to make use of this helpful resource.

### **Academic Resources**

PIBS Curriculum Guide

<https://sites.google.com/a/umich.edu/pibs-students/academics>

### **American Association of Immunologists**

<http://aai.org/>

### **Center for Research on Learning and Teaching**

<http://www.crlt.umich.edu/index.php>

### **Disability Resources**

<http://ssd.umich.edu/>

### **Dissertation Resources**

[http://www.rackham.umich.edu/dissertation\\_information/](http://www.rackham.umich.edu/dissertation_information/)

### **Diversity at Michigan**

Association of Multicultural Scientists at U-M

<https://maizepages.umich.edu/organization/ams>

### **Students of Color of Rackham**

<http://www.umich.edu/~scorweb/about.html>

### **Funding Resources**

Rackham Funding

<https://secure.rackham.umich.edu/Fellowships/support/list.php>

<http://www.rackham.umich.edu/funding/>

<http://www.med.umich.edu/pibs/prospective/fund/index.html>

### **NIH F31 Fellowships**

<http://grants.nih.gov/grants/guide/pa-files/PA-11-111.html>

Scientific Grants and Funding - <http://sciencecareers.sciencemag.org/funding>

National Science Foundation - <http://www.nsf.gov/index.jsp>



**GRADUATE PROGRAM IN IMMUNOLOGY  
2016-2017**

**PROGRAM DIRECTOR:**

**Bethany Moore, Ph.D.**

Galen B. Toews,  
MD Collegiate Professor of Pulmonary and Critical Care Medicine  
Professor of Internal Medicine,  
Division of Pulmonary and Critical Care Medicine  
Professor of Microbiology and Immunology  
[bmoore@umich.edu](mailto:bmoore@umich.edu)

**FACULTY:**

**Shannon Carty, MD**

Assistant Professor of Internal Medicine  
Division of Hematology/Oncology  
[scarty@umich.edu](mailto:scarty@umich.edu)

**Marilia Cascalho, M.D., Ph.D.**

Associate Professor of Surgery  
Associate Professor of Microbiology and Immunology  
[marilia@umich.edu](mailto:marilia@umich.edu)

**Maria Castro, Ph.D.**

R C Schneider Collegiate Professor of Neurosurgery  
Professor of Cell and Developmental Biology  
[maricas@umich.edu](mailto:maricas@umich.edu)

**Cheong-Hee Chang, Ph.D.**

Professor of Microbiology and Immunology  
[heechang@umich.edu](mailto:heechang@umich.edu)

**Grace Chen, M.D., Ph.D.**

Assistant Professor of Internal Medicine,  
Division of Hematology/Oncology  
[gchenry@umich.edu](mailto:gchenry@umich.edu)

**Stephen W. Chensue, M.D., Ph.D.**

Professor of Pathology  
Chief, Pathology and Laboratory Medicine  
Ann Arbor Veteran Affairs Healthcare System  
[schensue@umich.edu](mailto:schensue@umich.edu)

**Kaushik Choudhuri, D.Phil.**

Assistant Professor Microbiology & Immunology  
[kchoud@umich.edu](mailto:kchoud@umich.edu)

**Kathleen L. Collins, M.D., Ph.D.**

Professor of Internal Medicine, Division of Infectious Diseases

Professor Microbiology & Immunology  
[klcollin@umich.edu](mailto:klcollin@umich.edu)

**Jeffrey L. Curtis, M.D.**

Professor of Internal Medicine, Division of Pulmonary and Critical Care Medicine  
Veteran Affairs Ann Arbor Healthcare System  
[jlcurtis@umich.edu](mailto:jlcurtis@umich.edu)

**Colin S. Duckett, Ph.D.**

Professor of Pathology  
Professor of Internal Medicine  
Director of Program Development North Campus Research Complex  
Co-Director, Cancer Cell Biology Program  
Director, Molecular Mechanisms of Disease Program  
[colind@umich.edu](mailto:colind@umich.edu)

**David A. Fox, M.D.**

Professor of Internal Medicine  
Chief, Division of Rheumatology  
[dfox@umich.edu](mailto:dfox@umich.edu)

**Daniel Goldstein, MD**

Eliza Maria Mosher Collegiate Professor in Internal Medicine  
Research Professor, Institute of Gerontology Director,  
Michigan Biology of Cardiovascular Aging  
[drgoldst@umich.edu](mailto:drgoldst@umich.edu)

**Irina Grigorova, Ph.D.**

Assistant Professor of Microbiology and Immunology  
[igrigor@umich.edu](mailto:igrigor@umich.edu)

**Joseph Holoshitz, M.D.**

Professor of Internal Medicine,  
Associate Chief for Research  
Division of Rheumatology  
[jholo@umich.edu](mailto:jholo@umich.edu)

**Gary Huffnagle, Ph.D.**

Professor of Microbiology and Immunology  
Professor of Internal Medicine  
Professor of Molecular, Cellular & Developmental Biology  
Associate Director, T32 Multidisciplinary Training Program in Lung Diseases  
Research Professor, Mary H. Weiser Food Allergy Center  
Nina and Jerry D. Luptak Professorship  
[ghuff@umich.edu](mailto:ghuff@umich.edu)

**David Irani, M.D.**

Associate Professor of Neurology  
Holtom-Garrett Program in Neuroimmunology  
[davidira@umich.edu](mailto:davidira@umich.edu)

**J. Michelle Kahlenberg, M.D., Ph.D.**

Assistant Professor of Internal Medicine, Division of Rheumatology  
[mkahlenb@umich.edu](mailto:mkahlenb@umich.edu)

**Venkateshwar G. Keshamouni, Ph.D.**

Associate Professor of Internal Medicine, Pulmonary & Critical Care Division  
[vkeshamo@umich.edu](mailto:vkeshamo@umich.edu)

**Philip D. King, Ph.D.**

Professor of Microbiology & Immunology  
[kingp@umich.edu](mailto:kingp@umich.edu)

**Iłona Kryczek, Ph.D.**

Research Assistant Professor, Surgery  
[ilonak@umich.edu](mailto:ilonak@umich.edu)

**Steven L. Kunkel, Ph.D.**

Senior Associate Dean of Research  
Endowed Professor of Pathology Research  
[slkunkel@umich.edu](mailto:slkunkel@umich.edu)

**Yasmina Laouar, Ph.D.**

Associate Professor of Microbiology and Immunology  
[ylaouar@umich.edu](mailto:ylaouar@umich.edu)

**Yu (Leo) Lei, DDS, PhD**

Assistant Professor of Dentistry, Department of Periodontics and Oral medicine,  
Assistant Professor of Otolaryngology - Head and Neck Surgery  
Translational Oncology Program and Distributed Health Technologies  
[leiyuleo@umich.edu](mailto:leiyuleo@umich.edu)

**Qiao Li, Ph.D.**

Research Associate Professor, Department of Surgery  
[qiaoli@umich.edu](mailto:qiaoli@umich.edu)

**Pedro Lowenstein, M.D., Ph.D.**

Richard C. Schneider Professor of Neurosurgery  
Professor of Cell and Developmental Biology  
[pedrol@umich.edu](mailto:pedrol@umich.edu)

**Nicholas W. Lukacs, Ph.D.**

Godfrey Dorr Stobbe Professor of Research  
Professor of Pathology  
Assistant Dean for Research Faculty  
[nlukacs@umich.edu](mailto:nlukacs@umich.edu)

**Gary D. Luker, M.D.**

Associate Professor of Radiology  
Associate Professor of Microbiology & Immunology  
Associate Professor of Biomedical Engineering  
[gluker@umich.edu](mailto:gluker@umich.edu)

**Carey Lumeng, M.D., Ph.D.**

Associate Professor of Internal Medicine, Division of Pediatrics & Communicable Diseases  
Associate Professor of Molecular and Integrative Physiology  
[clumeng@umich.edu](mailto:clumeng@umich.edu)

**Steven K. Lundy, Ph.D.**

Research Associate Professor of Internal Medicine,  
Division of Rheumatology  
[sklundy@umich.edu](mailto:sklundy@umich.edu)

**Ivan Maillard, M.D., Ph.D.**

Associate Professor, Life Sciences Institute  
Associate Professor of Internal Medicine, Division of Hematology-Oncology  
Associate Professor of Cell and Developmental Biology  
Center for Stem Cell Biology, Life Sciences Institute  
Director, Leukemia Program  
[imaillar@umich.edu](mailto:imaillar@umich.edu)

**Peter Mancuso, Ph.D.**

Associate Professor of Environmental Health Sciences  
[pmancuso@umich.edu](mailto:pmancuso@umich.edu)

**Yang Mao-Draayer, M.D., Ph.D.**

Associate Professor of Neurology  
Multiple Sclerosis Center/  
Holtom-Garrett Neuroimmunology Program  
[maodraay@umich.edu](mailto:maodraay@umich.edu)

**David M. Markovitz, M.D.**

Professor of Internal Medicine,  
Division of Infectious Diseases  
[dmarkov@umich.edu](mailto:dmarkov@umich.edu)

**James Moon, Ph.D.**

John Gideon Searle Assistant Professor  
Department of Pharmaceutical Sciences  
Department of Biomedical Engineering  
[moonjj@umich.edu](mailto:moonjj@umich.edu)

**Thomas A. Moore, Ph.D.**

Research Assistant Professor of Internal Medicine, Division of Pulmonary and Critical Care Medicine  
Director, U.M. Flow Cytometry Core Facility  
[tmoore@umich.edu](mailto:tmoore@umich.edu)

**Gabriel Nuñez, M.D.**

Paul deKruif Endowed Professor of Pathology  
[bclx@umich.edu](mailto:bclx@umich.edu)

**Asma Nusrat, M.D.**

Aldred S. Warthin Professor  
Director of Experimental Pathology  
[anusrat@umich.edu](mailto:anusrat@umich.edu)

**Michal A. Olszewski, D.V.M., Ph.D.**

Research Biologist, Veteran Affairs Ann Arbor Healthcare System  
Associate Professor of Internal Medicine, Pulmonary Division  
[olszewsm@umich.edu](mailto:olszewsm@umich.edu)

**Mary O’Riordan, Ph.D.**

Associate Professor of Microbiology & Immunology  
Associate Dean, Graduate and Postdoctoral Studies  
[oriordan@umich.edu](mailto:oriordan@umich.edu)

**John J. Osterholzer, M.D.**

Associate Professor of Internal Medicine, Division of Pulmonary and Critical Care Medicine  
Veteran Affairs Ann Arbor Healthcare System  
[oster@umich.edu](mailto:oster@umich.edu)

**Charles Parkos, M.D., Ph.D.**

Carl V. Weller Professor and Chair, Mucosal Inflammation and Epithelial Pathobiology,  
Dept. of Pathology  
[cparkos@umich.edu](mailto:cparkos@umich.edu)

**Marc Peters-Golden, M.D.**

Professor of Internal Medicine, Division of Pulmonary and Critical Care Medicine  
[petersm@umich.edu](mailto:petersm@umich.edu)

**Sem H. Phan, M.D., Ph.D.**

Professor of Pathology  
[shphan@umich.edu](mailto:shphan@umich.edu)

**Jeffrey Platt, M.D.**

Professor of Surgery  
Professor of Microbiology and Immunology  
[plattjl@umich.edu](mailto:plattjl@umich.edu)

**Ling Qi, Ph.D.**

Professor of Molecular and Integrative Physiology  
Professor of Internal Medicine,  
Division of Metabolism, Endocrinology & Diabetes  
[lingq@umich.edu](mailto:lingq@umich.edu)

**Malini Raghavan, Ph.D.**

Professor of Microbiology & Immunology  
[malinir@umich.edu](mailto:malinir@umich.edu)

**Pavan Reddy, M.D.**

Moshe Talpaz M.D. Professor of Translational Oncology  
Professor of Internal Medicine  
Associate Division Chief, Hematology/Oncology  
Co-Director, Hematological Malignancies and BMT  
[redypr@umich.edu](mailto:redypr@umich.edu)

**Bruce C. Richardson, M.D., Ph.D.**

Professor of Internal Medicine, Division of Rheumatology  
Chief, Section of Rheumatology,  
Ann Arbor Veteran Affairs Hospital  
[brichard@umich.edu](mailto:brichard@umich.edu)

**Amr H. Sawalha, M.D.**

Marvin and Betty Danto Research Professor of Connective Tissue Research  
Professor of Internal Medicine, Division of Rheumatology  
[asawalha@umich.edu](mailto:asawalha@umich.edu)

**Benjamin Segal, M.D.**

Holtom-Garrett Professor of Neurology  
Director, U-M Multiple Sclerosis Center  
[bmsegal@umich.edu](mailto:bmsegal@umich.edu)

**Kanakadurga Singer, M.D.**

Assistant Professor, Pediatric Endocrinology  
[ksinger@umich.edu](mailto:ksinger@umich.edu)

**Theodore J. Standiford, M.D.**

Professor of Internal Medicine, Division of Pulmonary and Critical Care Medicine  
Division Chief, Pulmonary and Critical Care Medicine  
Program Director, T32 Multidisciplinary Training Program in Lung Diseases  
[tstandif@umich.edu](mailto:tstandif@umich.edu)

**Lloyd M. Stoolman, M.D.**

Professor of Pathology  
Director, Flow Cytometry  
[stoolman@umich.edu](mailto:stoolman@umich.edu)

**Joel Swanson, Ph.D.**

Professor of Microbiology and Immunology  
[jswan@umich.edu](mailto:jswan@umich.edu)

**Peter A. Ward, M.D.**

Godfrey D. Stobbe Professor of Pathology  
[pward@umich.edu](mailto:pward@umich.edu)

**Christiane Wobus, Ph.D.**

Associate Professor of Microbiology & Immunology  
[cwobus@umich.edu](mailto:cwobus@umich.edu)

**Raymond L. Yung, M.B., Ch.B.**

Professor and Chief, Division of Geriatric and Palliative Medicine  
Department of Internal Medicine  
Director, Institute of Gerontology  
Co-Director, Geriatrics Center  
[ryung@umich.edu](mailto:ryung@umich.edu)

**Weiping Zou, M.D., Ph.D.**

Charles B. de Nancrede Professor of Surgery, Immunology, and Biology  
Co-Director, Tumor Immunology and Host Response Program  
Director, Translational Research  
Co-Director, Immune Monitoring Core  
[wzou@umich.edu](mailto:wzou@umich.edu)

**CURRENT IMMUNOLOGY STUDENTS:**

Zachary Benet	<a href="mailto:benetzl@umich.edu">benetzl@umich.edu</a>	<b><u>Mentor</u></b>
Peter Chockley	<a href="mailto:ramshorn@umich.edu">ramshorn@umich.edu</a>	Grigorova
Joel Crespo	<a href="mailto:jlcrespo@umich.edu">jlcrespo@umich.edu</a>	Keshamouni
Patrick Duncker	<a href="mailto:dunckerp@umich.edu">dunckerp@umich.edu</a>	Zou
David Giles	<a href="mailto:dagiles@umich.edu">dagiles@umich.edu</a>	Segal
Mikel Haggadone	<a href="mailto:haggamd@umich.edu">haggamd@umich.edu</a>	Segal
Blake Heath	<a href="mailto:heathbr@umich.edu">heathbr@umich.edu</a>	Peters-Golden
Stephanie Kim	<a href="mailto:stephkim@umich.edu">stephkim@umich.edu</a>	Lei
Giovanny Martinez-Colon	<a href="mailto:martingj@umich.edu">martingj@umich.edu</a>	Reddy
Theresa Mau	<a href="mailto:tmau@umich.edu">tmau@umich.edu</a>	B. Moore
Nisha Nagarsheth	<a href="mailto:nnagarsh@umich.edu">nnagarsh@umich.edu</a>	Yung
Mark Painter	<a href="mailto:markmp@umich.edu">markmp@umich.edu</a>	Zou
Cara Porsche	<a href="mailto:porsche@umich.edu">porsche@umich.edu</a>	Collins
Sophina Taitano	<a href="mailto:sophinat@umich.edu">sophinat@umich.edu</a>	Lumeng
Jackson Turner	<a href="mailto:turnerjs@umich.edu">turnerjs@umich.edu</a>	Lundy/Lukacs
Holly Turula	<a href="mailto:hturula@umich.edu">hturula@umich.edu</a>	Grigorova
Andrew Vonberg	<a href="mailto:avonber@umich.edu">avonber@umich.edu</a>	Wobus
Sonya Wolf	<a href="mailto:sonwolf@umich.edu">sonwolf@umich.edu</a>	Pietropaolo
Amanda Wong	<a href="mailto:aowong@umich.edu">aowong@umich.edu</a>	Kahlenberg
Julia Wu	<a href="mailto:srjwu@umich.edu">srjwu@umich.edu</a>	Swanson
Amy Yu	<a href="mailto:aiyu@umich.edu">aiyu@umich.edu</a>	Reddy
Brian Zamarron	<a href="mailto:zamarrbf@umich.edu">zamarrbf@umich.edu</a>	Chen
		Lumeng

**GRADUATE STUDIES COORDINATOR/ADMINISTRATOR:**

Zarinah Aquil [zaquil@umich.edu](mailto:zaquil@umich.edu) 734-615-4846

**ADVISORY COMMITTEE:**

Cheong-Hee Chang (Microbiology)  
David Fox (Internal Medicine)  
Steven Kunkel (Pathology)  
Bethany Moore (Program Director; Internal Medicine)  
Weiping Zou (Surgery)

**GRADUATE STUDENT AFFAIRS COMMITTEE:**

Graduate Student representatives:  
Nisha Nagarsheth and Theresa Mau

Postdoctoral Fellow representative:  
Amanda Huber

Faculty representatives:  
Marilia Cascalho  
Cheong-Hee Chang  
Jeffrey Curtis  
Venkat Keshamouni  
Philip King  
Nicholas Lukacs  
Ivan Maillard  
Peter Mancuso  
Bethany Moore  
Thomas Moore  
Michal Olszewski  
Weiping Zou

**PRELIMINARY EXAM COMMITTEE: (Year of service)**

Maria Castro	2
Grace Chen	2
Qiao Li	2
Yang Mao-Draayer	2
Beth Moore	2

**FIRST YEAR STUDENT ADVISOR:**

Bethany Moore, Ph.D. (2016-2017)

**MEDICAL SCIENTIST TRAINING PROGRAM (MD/PHD) OPERATING COMMITTEE REP:**

Carey Lumeng, M.D., Ph.D.

**JOURNAL CLUB/RESEARCH SEMINAR (IMM 815) COURSE DIRECTOR:**

Bethany Moore, Ph.D.

**SPECIAL TOPICS IN IMMUNOLOGY (IMM 851) COURSE DIRECTOR:**

Marilia Cascalho, M.D., Ph.D.

**EXPERIMENTAL IMMUNOLOGY (IMM 850) COURSE DIRECTORS:**

Michal Olszewski, D.V.M., Ph.D.

Venkat Keshamouni, Ph.D.

**Rackham Faculty Ally for Diversity**

Malini Raghavan, Ph.D.

**PIBS 503 REPRESENTATIVES:**

Wahida Ali, Ph.D.

Mirna Perusina Lanfranca, Ph.D.

Sergey Seregin, Ph.D.

Melody Zeng, Ph.D.

**GRADUATE STUDENT COUNCIL REPRESENTATIVE:**

Theresa Mau

**IMMUNOLOGY STUDENT ASSOCIATION CHAIR:**

Sophina Taitano



APPENDIX A : IMMUNOLOGY PROGRAM STUDENT FORM

Graduate Program in Immunology  
Progress Report for Ph.D. Candidates

Committee meetings must be held within six months after the student passes the qualifying exam, and at least once each calendar year thereafter until the student defends. This report is to be completed by the members of the thesis advisory committee within 7 days after the committee meeting. This report will be read and signed by the student. Please return form to the office of the Immunology Graduate Program: 2978 Taubman Health Sciences Library pdf/email ([zaquil@umich.edu](mailto:zaquil@umich.edu))

	Agree			Disagree	
1. The student has made acceptable progress since the last committee meeting.	1	2	3	4	5
2. The conclusions drawn from the research are supported by the data.	1	2	3	4	5
3. The research plan for the upcoming year as presented by the student is acceptable.	1	2	3	4	5
4. The research presented is in a state suitable for publication.	1	2	3	4	5
5. The student is finished with the research for the thesis work and should begin writing the thesis.	1	2	3	4	5

The following research aims have been accomplished since the previous committee meeting:

The research plan for the following year includes the following areas of investigation:

Discussion summary of student's milestones, goals, and future career plans:

Signed: \_\_\_\_\_ Thesis Advisor  
\_\_\_\_\_ Committee Member  
\_\_\_\_\_ Committee Member  
\_\_\_\_\_ Committee Member  
\_\_\_\_\_ Committee Member  
\_\_\_\_\_ Committee Member

I have read and agree with this progress report.

\_\_\_\_\_ Student

\_\_\_\_\_ Date

**APPENDIX B: IMMUNOLOGY PROGRAM STUDENT FORM**

**Graduate Program in Immunology**  
**SUMMARY REPORT ON LABORATORY THESIS PROGRESS**

Date:  
Student:  
Mentor:

**Semester:**

Grade Given (S/U) \_\_\_\_\_ **PLEASE NOTE: I will enter the Grade via Wolverine Access for you.**

Summary of Research effort:

- A. Time put into actual laboratory work:  
Extensive \_\_\_\_\_ Adequate \_\_\_\_\_ Little \_\_\_\_\_
- B. Reading relevant scientific research articles  
Extensive \_\_\_\_\_ Adequate \_\_\_\_\_ Little: \_\_\_\_\_
- C. Intellectual interest in the project:  
Extensive \_\_\_\_\_ Adequate \_\_\_\_\_ Little: \_\_\_\_\_
- D. Student's capacity to grasp the appropriate concepts and follow the analytical transition between concept and experimental design:  
Good \_\_\_\_\_ Average \_\_\_\_\_ Poor \_\_\_\_\_
- E. Please rank (circle) student's own intellectual input into the experimental design:  
*Total passivity with* \_\_\_\_\_ *Strong creative contribution*  
*All input from advisor*    1   2   3   4   5   *by the student*

Please comment on the student's strengths and weaknesses in research:

Are you satisfied with the student's progress?:

When did the student's Dissertation Committee last meet and what were their recommendations?  
*(Please note: The Immunology Graduate Program requires that the Dissertation Committee meet within 6 months after the student passes the preliminary exam, and at least once each year thereafter until the defense):*

I HAVE DISCUSSED THIS REPORT WITH MY MENTOR.

STUDENT SIGNATURE: \_\_\_\_\_  
MENTOR SIGNATURE: \_\_\_\_\_

Presenter: \_\_\_\_\_  
 Faculty Reviewer: \_\_\_\_\_  
 Date: \_\_\_\_\_

You may use this form as a guide so that you can communicate with the presenter after your assigned session. It is preferable that you give the presenter verbal feedback after the talk, regardless of whether you use this form.

**The Immunology Graduate Program Office does not need a copy of this completed form.**

## APPENDIX C - Immuno 815: Trainee Seminar Evaluation Form

1. Please briefly comment on the trainee's JC/research seminar:

	Suggestions:
a) Introduction/Background	
b) Experimental	
c) Conclusion	
d) Data interpretation	
e) General knowledge of topic (as reflected by presentation of relevant background information and discussion of questions)	

2. Please briefly comment on the trainee's style and clarity:

	Suggestions:
a) Ease of speaking	
b) Flow between slides	
c) Depth of explanation	
d) Level of scientific vocabulary	

3. Visual presentation:

Excellent \_\_\_\_\_ Good \_\_\_\_\_ Needs improvement \_\_\_\_\_

4. Positive aspects:

\_\_\_\_\_

\_\_\_\_\_

5. Areas needing improvement (if applicable): \_\_\_\_\_

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