

Department of Microbiology & Immunology

2019-2020 Graduate Student Handbook

We hope that your graduate training will be stimulating, your research fruitful, and your overall experience with colleagues and friends at Stanford enjoyable. This handbook is meant to be a guide for the requirements, both academic and administrative, that you will need to accomplish on your way to a Ph.D. It is by no means complete, but in conjunction with the *Stanford Bulletin*, it will guide you through your time at Stanford.

When questions arise, use the resources available in the department: Justin Sonnenburg (Director of the Graduate Program), Denise Winters (Student Services Officer), your rotation and thesis lab advisors, and your best resource, your fellow students.

Welcome to Stanford!

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Student Honor Code and Fundamental Standard

The sections below about Stanford University's Honor Code and Fundamental Standard are from the Office of Community Standards' home page

<https://communitystandards.stanford.edu/student-conduct-process/honor-code-and-fundamental-standard>.

Honor Code

The Honor Code is the university's statement on academic integrity written by students in 1921. It articulates university expectations of students and faculty in establishing and maintaining the highest standards in academic work.

1. The Honor Code is an undertaking of the students, individually and collectively:
 - A. that they will not give or receive aid in examinations; that they will not give or receive unpermitted aid in class work, in the preparation of reports, or in any other work that is to be used by the instructor as the basis of grading;
 - B. that they will do their share and take an active part in seeing to it that others as well as themselves uphold the spirit and letter of the Honor Code.
2. The faculty on its part manifests its confidence in the honor of its students by refraining from proctoring examinations and from taking unusual and unreasonable precautions to prevent the forms of dishonesty mentioned above. The faculty will also avoid, as far as practicable, academic procedures that create temptations to violate the Honor Code.
3. While the faculty alone has the right and obligation to set academic requirements, the students and faculty will work together to establish optimal conditions for honorable academic work.

Violations of the Honor Code

Examples of conduct that have been regarded as being in violation of the Honor Code include:

- Copying from another's examination paper or allowing another to copy from one's own paper
- Unpermitted collaboration
- Plagiarism
- Revising and resubmitting a quiz or exam for regrading, without the instructor's knowledge and consent
- Giving or receiving unpermitted aid on a take-home examination
- Representing as one's own work the work of another
- Giving or receiving aid on an academic assignment under circumstances in which a reasonable person should have known that such aid was not permitted

Sanctions for Violating the Honor Code

In recent years, most student disciplinary cases have involved Honor Code violations; of these, the most frequent arise when a student submits another's work as his or her own, or gives or receives unpermitted aid. The standard sanction for a first offense includes a one-quarter suspension from the University and 40 hours of community service. In addition, most faculty members issue a "No Pass" or "No Credit" for the course in which the violation

occurred. The standard sanction for multiple violations (e.g. cheating more than once in the same course) is a three-quarter suspension and 40 or more hours of community service.

Fundamental Standard

The Fundamental Standard has set the standard of conduct for students at Stanford since it was articulated in 1896 by David Starr Jordan, Stanford's first president. It states:

Students at Stanford are expected to show both within and without the university such respect for order, morality, personal honor and the rights of others as is demanded of good citizens. Failure to do this will be sufficient cause for removal from the university.

Understanding the Fundamental Standard

The Fundamental Standard is an aspirational statement of Stanford's ideal of civic and moral community. Although the spirit of the Fundamental Standard remains unchanged since 1896, these aspirational learning goals for all Stanford students elaborate its basic values today:

1. Students are expected to respect and uphold the rights and dignity of others regardless of race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, gender identity, or socio-economic status.
2. Students are expected to uphold the integrity of the university as a community of scholars in which free speech is available to all and intellectual honesty is demanded of all.
3. Students are expected to respect university policies as well as state and federal law.
4. For the purposes of clarity, students should be aware that they may be subject to discipline at Stanford University for acts of misconduct including:
 - Violation of university policy
 - Violation of a specific university directive
 - Violation of an applicable law
 - Physical assault
 - Theft of property or services
 - Threats
 - Hazing
 - Hate crimes
 - Alcohol- and drug-related violations, including driving under the influence
 - Intentional or reckless property damage
 - Seeking a university benefit to which a student is not entitled
 - Falsifying a document
 - Impersonating another
 - Computer violations
 - Knowingly or recklessly exposing others to significant danger

Sanctions for Violating the Fundamental Standard

There is no standard sanction that applies to violations of the Fundamental Standard. Infractions have led to sanctions ranging from formal warning and community service to expulsion. In each case, the nature and seriousness of the offense, the motivation underlying the offense and precedent in similar cases are considered.

Program of Study

Curriculum

At the start of their first quarter, each new graduate student may meet with Dr. Justin Sonnenburg, the current Graduate Program Director, if they desire guidance while charting the coursework needed to complete the requirements for a Ph.D. This is to ensure that all students have had appropriate undergraduate preparation for the program, and to identify gaps in basic science to be remedied during the initial period of graduate study. The required background coursework, which most individuals have already had when entering the program, is listed here:

- General Biology (2 quarters or 1 year)
- Organic Chemistry (2 quarters or 1 year)
- Physics (2 quarters or 1 year)
- Biostatistics (1 quarter or 1 semester)
- Advanced Molecular Biology (1 quarter or 1 semester)
- Microbiology, Virology or Immunology
- Organic Chemistry (2 quarters or 1 year)
- Physical Chemistry (1 quarter or 1 semester)
- Biochemistry (1 quarter or 1 semester)
- Advanced Genetics (1 quarter or 1 semester)
- Advanced Cell Biology (1 quarter or 1 semester)

Gaps are filled by identifying Stanford courses given at the advanced undergraduate and graduate level by the Departments of Biological Sciences, Chemistry, Microbiology and Immunology, Cellular and Molecular Physiology, Genetics, Biochemistry, Cell Biology, Developmental Biology.

- The core course requirements for students entering this year are given below and in **Appendix I**. Typical entering students satisfy all of these requirements within their first three to six quarters (this usually means taking three courses per quarter, two to five hours per week each). Please check Explore Courses website for day, time, and room location.

Course requirements

Quarter Offered	Subject/Course Number	Course Title	Units	Day(s)	Time(s)
Autumn	BIOS 200	Foundations in Experimental Biology	5 units	MWF	10:30am-12:20pm
	MI 250	Frontiers in Microbiology & Immunology	1 unit	Tues	5:30-6:20pm
	MI 399	Graduate Research	4 units	N/A	N/A
Winter	BIO 214/ BIOC 224/ MCP 221	Advanced Cell Biology	4 units	MWF	9:30-11:20am
	MI 215	Principles of Biological Technologies	3 units	T/TH	1:30-2:50 pm
	MI 399	Graduate Research	3 units	N/A	N/A
Spring	MI 210	Advanced Pathogenesis of Bacteria, Viruses, and Eukaryotic Parasites	4 units	T/TH	1:30-3:20pm
	MED 255	The Responsible Conduct of Research	1 unit	Varies	Varies
	MI 399	Graduate Research	5 units	N/A	N/A

Students will register for MI 250: Frontiers in Microbiology and Immunology once in their first year and once in the second year for a total of 2 units.. Although no longer a part of the required curriculum, BIO 230: Molecular and Cellular Immunology is a recommended course. In the fourth year, students will need to complete a second ethics course, please see **Appendix II** for a list of approved courses.

Take one elective from the approved list, **Appendix III**. Prior approval from the student's adviser and department Graduate Program Director is required to use a course not from the elective list.

Students register for MI 399 Graduate Research as needed to maintain enrollment in 10 units each quarter, including summer, until they complete a minimum of 135 units and are eligible for TGR status.

Masters of Medicine Students and Medical Scientist Training Program (MSTP)

The Masters of Science in Medicine (MOM) is a master's degree program that provides PhD candidates with exposure to clinical medicine with a view to fostering translational research. The Medical Scientist Training Program (MSTP) provides funding and structure for a select group of incoming MD students to train in biomedical research with a view to attaining the PhD. MSTP students generally apply and are accepted to the MSTP program through the MD admissions process and sometimes do their PhD work in M&I.

Students who are in the MOM or MSTP program and M&I PhD program should work with their respective advisers to develop a program of study.

Graduate Advising Expectations

The Department of Microbiology and Immunology is committed to providing academic advising in support of graduate student scholarly and professional development. When most effective, this advising relationship entails collaborative and sustained engagement by both the adviser and the advisee. As a best practice, advising expectations should be periodically discussed and reviewed to ensure mutual understanding. Both the adviser and the advisee are expected to maintain professionalism and integrity.

Faculty advisers guide students in key areas such as selecting courses, designing and conducting research, developing of teaching pedagogy, navigating policies and degree requirements, and exploring academic opportunities and professional pathways.

Graduate students are active contributors to the advising relationship, proactively seeking academic and professional guidance and taking responsibility for informing themselves of policies and degree requirements for their graduate program.

Expectations of faculty advisors in Microbiology and Immunology:

- actively promote a diverse and inclusive work environment
- serve as intellectual and professional mentors to their graduate students including regular meetings/interactions that focus on the student and student's project.
- provide knowledgeable support concerning the academic and non-academic policies that pertain to graduate students
- help to prepare students to be competitive for employment
- maintain a high level of professionalism and open dialogue in the relationship
- establish and collaboratively maintain expectations of the advisor/advisee relationship consistent with departmental standard

Additional details and resources can be found in the Guidelines for Advising Relationship between Faculty and Graduate Students, <https://gap.stanford.edu/handbooks/gap-handbook/chapter-3/subchapter-3/page-3-3-1>.

General Responsibilities of Faculty Advisors

The University requires that within each department or program minimum advising expectations be set for both advisor and advisee. Such minimum expectations must differentiate between master's and doctoral programs, and between different types of advisors (academic/program vs. research.) These department or program expectations must be distributed to faculty and graduate students on an annual basis at the start of each academic year and must be easily accessible on the web. Faculty are expected to affirm that they have received the advising expectations. Each faculty member has the prerogative to augment the departmental advising expectations with their specific additional expectations, while remaining consistent with the departmental advising policies.

Residency Policy

A minimum of 135 units is required for receipt of the Ph.D. from Stanford. Transfer students may receive credit for up to 45 units of appropriate graduate study elsewhere, and at least 90 units must be completed at Stanford toward the Ph.D. Transfer credit can be discussed with the Director. Please see the 2018-19 Stanford Bulletin for more information regarding the University's transfer credit policy.

Students are required to enroll in a maximum of 10 units per quarter until they have completed minimum of 135 units for the Ph.D.

Grading Policy

All courses taken to complete the degree requirements must be taken for a letter grade and a "B+/-" or better must be obtained. M&I graduate students who earn a "C+/-" in a required course must retake the course. If the course is one of the required electives, then the student may either retake the course or choose another course with the equivalent number of units.

Registering for Classes

Students can fill out their study lists through AXESS. The Preliminary Study List is due by 5pm on the first day of classes. Late fees are assessed if students are not "at status" by the deadline date. At status means a student must have a study list with sufficient units for their status, whether full-time, 10 units, or approved special registration statuses. It is advisable to register early to avoid problems on the deadline date. Students receiving fellowship or training grant stipends will not receive their quarterly funding until they are at status.

All departments offer courses for formal or informal participation. Students will need to complete certain departmental courses; many others are offered that may be of interest. Students frequently take advantage of the opportunity to enroll in dance, music, language, and physical education classes as well as other bioscience courses. Students will need to request approval from his or her advisor before registering for any non-research related courses. Students can use the Stanford Bulletin Explore Course website, <https://explorecourses.stanford.edu/>, to find complete details of courses offered for the academic year.

Rotations

All entering students complete a minimum of two and usually no more than four lab rotations; one rotation per academic quarter on a quarterly basis. The first rotation must be done in an M&I lab, but students are welcome to rotate outside the department in their later rotations.

It is advisable for students to select their first rotation with a laboratory pursuing research in an area closest to his or her initial interest. During subsequent rotations the first-year graduate student may continue in the same interest area or may go on to other areas that become of interest after s/he is exposed to various research projects in another laboratory. Through consultations with individual faculty, midway through the first quarter the student chooses a program faculty member to work with for his or her second, third and possibly fourth rotation projects. Because there is great breadth of opportunity in research training, and because of the many labs with related interests, the student's performance during rotations will be evaluated by faculty. Your lab rotation advisor will submit a Lab Rotation Assessment in the GST database at the end of the rotation. During the year, the student may continue to attend group meeting for any lab in which s/he has rotated.

Students who rotate in laboratories outside of the department and who subsequently choose to do their thesis work in these laboratories will either transfer into the relevant program or remain in the Microbiology and Immunology program. The latter route would be appropriate when the thesis work falls within the overall disciplines of microbiology and immunology. In such cases, the program maintains involvement with such students by requiring a co-advisor in the same scientific discipline.

Decisions will be made about the lab in which the student will do his or her thesis work sometime on or after **April 1** of the first year, assuming the student feels s/he has enough information to make a decision. Neither students nor faculty may make commitments as to which lab a given student will do their thesis work in before April 1. This is to ensure that only mature decisions are made and that everyone is able to utilize the rotation system to acquire all the information necessary to make this very important choice. In making the decision, students should talk to the faculty member concerned. The Biosciences website, <https://biosciences.stanford.edu/current-students/incoming-new-students/choosing-rotations-and-a-thesis-lab/>, has information about choosing your rotation and thesis labs.

Seminar Programs and Journal Clubs

Fall Quarter Faculty Talks. Microbiology and Immunology faculty will make presentations at Thursday evening seminars for new graduate students throughout the Fall quarter to explain the general aspects of their research areas. Each of the Biosciences programs offers a similar seminar series and students are encouraged to attend as many of these other seminars as they would like.

Wednesday Seminar Series

External. The external program invites well-known, cutting-edge investigators from both inside and outside the university to visit the department for the day on a Wednesday. The speakers are chosen through discussions between graduate students, postdocs and a faculty advisor early each summer. Invitees give a seminar on their recent work, followed by a departmental lunch with students. They also meet individually with faculty and specific labs through the day. This seminar program serves several purposes, including keeping graduate students abreast of the most important work going on in their fields and giving them important opportunities to meet and talk with distinguished scientists.

Internal. On Wednesdays when no external speaker is scheduled, the Wednesday Seminar is presented by individual labs within the department. A senior graduate student or post doc is chosen by her or his lab to present a half-hour talk on the current research. All senior graduate students are required to talk either at the Wednesday Seminar series or in a comparable format (Cellular & Molecular Biology Symposium, select meetings, etc.) periodically.

Journal Club. First- and second-year graduate students are required to participate in the M&I Journal Club (MI 250) held on Tuesday evening immediately preceding a Wednesday external seminar.

Each invited speaker is asked to suggest one of her or his published articles for discussion at the journal club meeting. The paper is presented by a first- or second-year graduate student, and the faculty member whose laboratory is hosting the speaker will serve as a resource during this presentation.

To facilitate the journal club discussion, the presenter is asked to prepare a list of 2-3 experiments that s/he might propose should be done next to further the work of the visitor. These should not be the very obvious immediate next experiments, but a little more ambitious in terms of where the project should go in the immediate timeframe. They certainly can be the product of group discussion at the journal club. The presenter should at least toss a few ideas out to start the discussion. Of course, some of your ideas may turn out to have been done when you hear the seminar itself; in such cases, the challenge will be to think on the fly and adjust your suggestions between the seminar and lunch!

Students are required to attend both the internal and external departmental seminar presentations, and should, therefore, be able to deal with questions relating to those talks. Students are also expected to be up-to-date on modern developments within the fields of microbiology and immunology, i.e., they should stay current with recent publications within the more relevant journals.

Other seminars available. The departments in the Stanford Medical School, Biology and Chemistry in the School of Humanities, and several Interdepartmental Programs each have their own training and research programs including advanced courses, seminars, and journal clubs. Integration with these other departments is done through attendance at seminars and courses as well as through interdisciplinary meetings held in many subject areas. Events that are open to the general public are listed on the Biosciences events calendars, <https://biosciences.stanford.edu/events/>.

Departmental Scientific Conference

In Autumn Quarter each year, the department holds a scientific conference at which faculty and students present their recent research. One to two members of each lab speak at the conference. This allows entering students to become familiar with the wide range of biological systems offered in the program while remaining close to one area that they may continue studying for their thesis research. At this departmental conference, fourth year students are required to give a presentation. At least once during their graduate careers, typically in the third year, all students are required to present a poster at the conference.

Teaching Assistantships

Teaching is an integral part of the graduate program training experience. All graduate students, regardless of support source, are required to be a teaching assistant (TA) for one course. The TAship is usually completed during the third year of training. If the student elects to do a second teaching assistantship, s/he must have the advisor's permission to do so, at least one quarter before the course begins.

The student is responsible for securing a TAship and submitting a TA form, **Appendix IV**, to the Student Services Officer. The completed form must be submitted prior to the start of the quarter of the TAship. If needed, the Graduate Program Director will assign students to TA courses based on requests from the faculty and the student's expertise.

TAs will need to attend TA orientations that are offered by the Vice Provost's Office for Teaching and Learning. The VPTL website has information about orientation sessions offered in autumn, winter, and spring quarters as well as TA resources, <https://vptl.stanford.edu/faculty-staff-student-instructors/student-instructors-postdocs>.

Terminal Graduate Registration (TGR)

Doctoral students are eligible for TGR status when they have

- been admitted to candidacy
- completed all required courses and degree requirements other than the University oral exam and dissertation
- completed 135 units
- submitted a Doctoral Dissertation Reading Committee form

TGR students may enroll in up to 3 units of course work per quarter at the TGR tuition rate. The additional courses cannot be applied toward degree requirements since all degree requirements must be complete in order to earn TGR status. This is a good opportunity to take that golf class or another course for your personal enrichment.

The Student Services Officer will contact students when they are approaching TGR eligibility. Students should then register for TGR Dissertation, MI 802 through AXESS. Do not sign up for TGR Project, MI 801, which is the Master's Project Thesis.

TGR grading is as follows: "S" for satisfactory progress, "N-" for unsatisfactory progress, and "P" for a final grade when everything has been finished. A hold on registration is placed for a student who receives an "N-" grade for more than two consecutive quarters. If a student withdraws by the deadline date specified by the Time Schedule, a "W" will appear on his/her transcript. A failing grade is "NP". Further registration following a grade of NP is contingent upon approval from the advisor, the department, and graduate program office.

Satisfactory Degree Progress

Students who are not making satisfactory degree progress will be placed on probation and will meet with the Director and Student Services Officer to discuss the factors involved and steps that can be taken to improve their situation. A copy of the results of this meeting will be kept in the student's file. Unsatisfactory degree progress can include grades below "B" in formal coursework, N- or NP grades in graduate research, or substandard performance in other department requirements (including, but not limited to, attendance at journal club, failure to have consistent committee meetings, and performance of teaching assistantships.).

In the event of a second quarter of unsatisfactory degree progress, the department steering committee may elect to dismiss a student. Procedures for the dismissal of students, and for the appeal process, can be found in the Stanford Bulletin.

Qualifying Examination

In the autumn quarter of the second year, each student orally defends a formal research proposal on a topic outside the intended thesis project.

This proposal is on a subject of the student's own choosing, but must be other than the intended thesis work. It may, however, be on a related subject, even within the same biological system. Obviously, neither another student's thesis work nor a proposal required for a course should be used as the basis of a proposal. The Qualifying Exam is intended to give the student an opportunity to carry out the first three stages of a research effort independently: the creation of an idea, the justification of that idea in terms of significance and feasibility, and the design of an experimental approach. The scope of the project should be appropriate for a single competent postdoctoral fellow who will devote three years to its successful outcome.

General goals

The goals of the exam are for the student to develop:

- a broad knowledge and understanding of the field
- an historical perspective, and identification of seminal contributions
- a knowledge of experimental procedures
- critical judgment in the evaluation of data and results
- new approaches and experiments
- an ability to draw conclusions from proposed experiments and to propose alternatives.

Before the student starts on a proposal in earnest, he or she must submit short summaries of three possible topics to the Graduate Program Director, who, in consultation with the steering committee, will approve one or more as acceptable, in principle. These summaries should be submitted by **August 1st during summer quarter of the first year**. Students should consult their advisors well in advance of this date and do sufficient background reading to ensure that the chosen topics are of interest, experimentally accessible, and offer opportunities to be examined on both microbiologic and immunologic topics. Attending seminars and general reading over the first year should provide numerous possibilities.

Format

The format of the 10-page double-spaced research proposal should follow that of an NIH grant proposal (including Abstract, Specific Aims, Background, Preliminary Results [where appropriate], Experimental Design, and References [with titles]). Sample postdoctoral fellowship proposals will be available to use as templates. The most common shortcoming of students' proposals in the past has been lack of development in the experimental design section where the planned methods are described. This is just as important as the background section and should be dealt with in reasonable detail. In most cases, there will be little if any in the preliminary results section. If you have chosen a topic in the system on which you are currently working, or perhaps as an offshoot of one of your rotation projects, then you can include any results already obtained. The written proposal must be submitted to the Graduate Program Director no later than **Sept 1st prior to start of the second year**.

The oral defense is an opportunity to explain and defend the proposal, and is usually completed by November 1st of the second year of study. Typically, the defense will be scheduled within 2-3 weeks submission of the proposal. Remember that your committee has read the proposal, so do not regurgitate what you have written. Use this time to supplement the written proposal.

Recommended structure

The exam is 90 minutes and will following the structure below:

1. Introduction (5 minutes). State the goals of the project (i.e., the hypothesis being tested and/or the question being asked), the reasons why you feel it is worthy of support from a scientific (and, perhaps, medical) view, and summarize any background information which you feel is critical to an appreciation of the subject.
2. Summarize the main experimental approach (10 min.) and expected accomplishments.
3. Give a very short discussion of where you see the line of inquiry leading in the future (i.e., beyond the three-year period).
4. Conclude with a brief recap of the most important features of your proposal.
5. An open question period will follow your presentation. You should be able to defend your choice of problem and approach to solving it as well as the technology selected.

The qualifying examination committee is composed of faculty members from the department. The Qualifying Exam form, **Appendix V**, will be used to record the results of the examination. If your topic is within the expertise of a departmental faculty member not on your committee, s/he may be asked to participate in this exam.

The committee evaluates the student's performance and gives one of three ratings: "pass unconditionally," "pass with the condition that some part of the proposal or oral defense be redone," "fail with the need to rewrite and re-defend the proposal." Where relevant, students must pass the proposal defense on the second try, in order to continue in the Program.

Because of course commitments specific to M.D. training, medical students are given the option of taking the qualifying examination in their second or third year, and most have chosen the third year.

What Reviewers Look For

Some Suggestions and Hints on Writing a Good Application (based in part on "Grant writing [and getting]," by Roland Ciaranello -- courtesy of Cancer Biology Program):

1. A good problem. This can be the most important aspect of the grant. Reviewers like to see a clear, well-stated description of the problem being studied and why it is important.
2. A clear proposal. Reviewers react badly to having to figure out what you are trying to say or do. Reviewing grants takes a lot of time, so, whereas most reviewers are willing to spend this time to give you a fair review, they are not eager to waste their time. It's your job to be clear.
3. A clear direction to the work. Focus on what you are going to do and make sure it is logical and clear. Provide sufficient information and detail that the reviewer can track your methods and logic. Use topic headings freely.
4. A doable project. As much as possible, stay within your technical limits. Often, a well-written grant with a good idea is not funded because there is no demonstration that the P.I. could actually do the work, either because they haven't trained in the area, published anything on it, or have failed to provide information under the preliminary studies section that they can perform the techniques.
5. For this particular mock grant application, imagine that you have the expertise of the senior author of the study upon which you are building. If you need techniques which are significantly outside of the area of the P.I.'s lab, then identify one or more real investigators whom, we will assume, you have persuaded to collaborate with you. Provide some real references indicating that these investigators can perform the types of studies that you want.
6. You know the literature. It is important to be familiar with the most recent literature in the field in which you are submitting a grant. Although the reviewers realize that they are reviewing the grant several months after you wrote it, it will be very damaging to the grant

if there are relevant important papers that were published before you wrote the application.

Finally, some comments overheard by a fly on the wall during an IRG (Study Section) meeting:

"This grant has no new concepts. It will not expand our present knowledge."

"It shows a lack of imagination."

"This is just a data-gathering exercise. It is a fishing expedition."

"There is an inadequate attention to statistics. How will the data be analyzed?"

"This is 'method' and not 'hypothesis'-driven."

"How are the data to be interpreted in terms of the hypothesis?"

"There is no acknowledgement of the problems that may be met and how they may be handled."

Upon successful completion of the Qualifying Examination, graduate students are required to submit the **Application for Candidacy for Doctoral Degree** form to the Student Services Officer by the end of autumn quarter of your second year. This form is available from the Registrar's Office website, <https://stanford.app.box.com/v/appcanddoct>.

Research Proposal and Committee Meetings

General Philosophy

The faculty recognizes that students admitted to the Stanford Bioscience Program are among the best prepared and most motivated scientists-in-training throughout the world. We feel that students will best explore their creative potential and develop their intellectual and analytical skills through frequent collegial interactions with faculty. In this spirit, committee and proposal meetings are designed to allow an open and exciting exchange of scientific ideas and results. Through this, the student learns to develop, organize, and present his/her ideas and results while benefiting from the experience and insights of committee members. These meetings also provide an opportunity to identify areas for students to focus on as they develop as independent scientists.

Choosing a Committee

During Autumn Quarter of the second year, a thesis advisory committee is chosen by the student in consultation with her/ his advisor. A student's thesis committee must meet university and department guidelines. Please note the department's guidelines can be more specific than the university's, <https://gap.stanford.edu/handbooks/gap-handbook/chapter-4/subchapter-8/page-4-8-1>.

The department requires a student's committee to be composed of four Stanford faculty members: three M&I faculty members and one faculty member outside of the department. The advisor is one of the four members and may be either one of the three M&I faculty members or the one out of department faculty member.

The decision as to the composition of the committee is based on the criterion of who are most able to assist in the overall advancement of the student's training with particular attention to their research direction, but its composition is subject to approval by the department. The university allows for up to five faculty members on a student's dissertation reading committee, but it is not advised that you have this many members. Students should recognize that scheduling complications may arise with a larger committee.

The faculty members are committed to direct and frequent interactions with, and mentoring of, all students within the department; such close interactions are often critical for obtaining the strongest reference letters possible at the close of one's graduate training. Nevertheless, there may be instances in which students would like to have a larger number of committee members from outside of Program and fewer from within the department. In such cases, the student should petition the Director of the Graduate Program, briefly explaining the underlying reasons.

Finally, students may invite to any committee or proposal meeting any Stanford faculty member whom they believe would enhance discussion and provide valuable feedback.

Once a student has decided on the members of their thesis committee, they must complete the Doctoral Dissertation Reading Committee Form and obtain all required signatures. The form can be found on the Registrar's Office website, <https://stanford.app.box.com/v/docdiss-reading-committee-form>. Please submit the completed form to the Student Services Officer by the end of summer quarter of the second year. A student's reading committee can be changed by submitting a Change of Reading Committee form found on the Registrar's Office website.

Research Proposal

A 10-page (double-spaced) research proposal based on the student's intended thesis topic is submitted to his or her committee no later than **May 1st** of the second year. The research proposal is discussed with the student and feedback given on the appropriateness of all aspects of the project. Students should plan on defending their proposal by the end of spring quarter of the second year.

Proposal Format

The aim of the proposal is for the student to describe and discuss his/her planned dissertation research. It cannot be emphasized too strongly that there is no expectation at this meeting for the inclusion of any initial data. Rather, the following is expected:

- A clear and compelling grasp of why the proposed research question is interesting and important.
- A thorough understanding of the literature that provides the background directly leading to the student's project and the literature pertinent to framing the dissertation question and carrying out the proposed research.
- A clear experimental plan, with contingencies, for carrying out the research. An estimated timeline should be presented.
- Generally, the student should have developed the intellectual skills required for him/her to carry out the research project in a thoughtful, well-directed, and logical manner.

The Written Proposal

The written proposal should follow the general format of an NIH grant: Specific Aims, Background and Significance, and Description of the proposed research. It should not be longer than 10 double-spaced pages. Students should consult with the Graduate Program Director for additional information.

The Oral Presentation of Proposal

Proposal meetings will be scheduled for 90 minutes, and will include time for faculty

consultation and post-meeting discussion. At the end of each meeting, the student and faculty committee members will decide together whether feedback will be given as a group or individually. Students are encouraged to take advantage of their committee members for direct responses following proposal and committee meetings, as well as any other time. It may be useful in these discussions to articulate clear goals for the upcoming year. Following the meeting, the student will submit a copy of the Record of Dissertation Committee Meeting form, **Appendix VI**, to the Student Services Officer.

How to Prepare

Starting as soon as you join a lab:

- Have frequent discussions with your advisor about your ideas and her/ his suggestions regarding the general area of your research and specific ideas for your project.
- Become familiar with other projects in the lab and how they relate to your project.
- Read at least four papers related to your research each week. If you need help, ask your advisor for suggested topics and papers. Over the months prior to the proposal presentation, this will provide initial depth and breadth in the dissertation research area and will provide the background necessary for the student to make critical decisions regarding his/her own project.

Students are not expected to be expert in all literature related to their dissertation work at the time of the proposal; this is the expectation for graduation and could not be accomplished in a 3-6 month period.

Dissertation Committee Meetings

After the oral proposal, **this committee will meet at least annually**, to receive a progress report from the student. Following each meeting, the student will submit a copy of the Record of Dissertation Committee Meeting form the Student Services Officer.

Beginning in the 4th year of study, the committee will meet twice annually. The first meeting of the fifth year will include a discussion of what additional experimental approaches are expected to be performed by the student prior to writing the thesis. In addition, postgraduate plans will be discussed.

The Student Services Officer will monitor and maintain the official records of thesis committee meetings. The primary responsibility of arranging meetings lies with the student, and the student maintains the responsibility to communicate information about his/her course schedule and other commitments rapidly to Student Services to facilitate scheduling if they need assistance.

In general:

- Proposal meetings will be scheduled for ninety minutes, and will include time for faculty consultation and post-meeting discussion. At the beginning of every meeting the STUDENT leaves the room, so that the advisor can update the committee and can ask for advice if needed. At the end of a thesis committee meeting, the ADVISOR leaves the room and the student can talk freely to the committee. At the end all will touch base and discuss any issues together. Students are encouraged to take advantage of their committee members for direct responses following proposal and committee meetings, as well as any other time.
- At the end of each meeting, the faculty will discuss the student and faculty committee

members will together decide whether feedback will be given as a group or individually. Students are encouraged to take advantage of their committee members for feedback directly following proposal and committee meetings as well as any other time. It may be useful in these discussions to articulate clear goals for the upcoming year.

- Students should treat these meetings much as they would a group meeting but presenting material over the past year.
- Students should hand out a 2-3 page outline or summary 1-2 days before the meeting.
- Students can request scheduling of an additional committee meeting at any time.
- It is the expectation of the faculty that the PhD project should be carried out and defended in five years or less under normal circumstances. **Students enrolling for a sixth year must petition to the Graduate Program Director with a timeline for graduation and a statement of post-graduation plans. This petition will be required for registration.**
- Any exceptions to the above timeline must be approved by the Program's Graduate Student Advisor.

Upon successful completion of the Qualifying Examination and first committee meeting, graduate students will submit an **Application for Candidacy for Doctoral Degree** form to the Student Services Officer by the end of summer quarter of the second year. This form is available from the Registrar's Office website, <https://stanford.app.box.com/v/appcanddoct>.

Individual Development Plan and Annual Planning Meetings

In addition to committee meetings, you will meet with your advisor to complete an Individual Development Plan (IDP) and annual planning meeting. These meetings are intended to help you:

- **Take ownership** of your training and professional development.
- **Pause and reflect!** Amidst daily research activities, it is easy to lose sight of longer-term goals.
- **Think intentionally** about your short-, mid- and long-term training and development goals.
- **Identify and use resources** to help you achieve your goals.
- **Have open and direct dialogue** with your mentor(s).
- **Establish clear expectations/steps.**

The Committee on Graduate Admissions and Policy (CGAP) adopted a policy requiring all Biosciences PhD candidates and their mentors in the Schools of Medicine and H&S to create and discuss their Individual Development Plans (IDPs) on an annual basis.

Students and their advisors share responsibility for completing the IDP, as well as the consequences of not completing the IDP by the deadlines below. Failure to comply with IDP requirements will

- negatively impact Stanford's ability to receive NIH funding; and
- incur a hold on student registration that prevents stipends from being funded.

Key Deadlines

Action	First Year Students	All Other Students
Schedule a planning and mentoring meeting with your advisor	Within 30 days of joining your thesis lab	Before June 1
Download and complete the appropriate IDP Form. (Ideally, share the completed form with your advisor in advance.)	Before your meeting	Before your meeting
Hold your annual planning/ mentoring meeting with advisor	Within 30 days of joining your thesis lab	By August 1
Verify that you and your advisor met to discuss your IDP	Within 30 days of joining your thesis lab	By August 1

See <http://biosciences.stanford.edu/current/idp/> for more information and IDP forms, including extensive FAQs and resources for both faculty and students. Questions about the IDP can be directed to somcareers@stanford.edu.

University Oral Examination

After a student has advanced to candidacy, they are expected to complete and defend their dissertation within three years. The purpose of the university oral examination, also referred to as the dissertation defense, is to test the Ph.D. candidate's command of his/her field after completion of the written Ph.D. thesis. Oral examinations are announced in the *Campus Report*. A one-hour public seminar is presented by the student, followed by the private exam.

Some of the university policies regarding the dissertation defense are listed below and it is advised that you read all the policy found here, <https://stanford.app.box.com/v/doc-orals> and <http://gap.stanford.edu/4-7.html>.

- 1) The University Oral Examination Committee consists of at least five Stanford faculty members: four examiners and the committee chair from another department. The chair may not have a full or joint appointment in the adviser's or student's department, but may have a courtesy appointment in the department.

For students in M&I, the oral exam committee is made up of their dissertation reading committee plus the outside chair.

- 2) Students must be registered in and candidacy must be valid for the quarter the defense planned.
- 3) A doctoral reading committee list must be on file.
- 4) The University Chair signs the university oral examination form after the committee votes on the candidate's defense.

Submitting the Dissertation

The doctoral dissertation advisor, reading committee, and oral exam committee provide guidance and details with regard to dissertation content and format. Also, general formatting and submission directions are published by the Stanford University Registrar at <https://registrar.stanford.edu/students/dissertation-and-thesis-submission>. All students should read these instructions thoroughly and contact the appropriate Registrar's Office staff or the Student Services Officer with any questions. Students should read the supplemental materials required for submission closely as it can be confusing.

After successfully completing the revisions recommended during the oral exam and obtaining the signatures of all dissertation reading committee members, the dissertation is ready for submission to the Office of the University Registrar.

Some important things to note:

1. Students may submit their electronic dissertation starting on the first day of the quarter, for which they have applied to graduate, through that quarter's submission deadline. Please see Stanford's Academic Calendar for the specific date.
2. Students must complete the 5 required steps in your eDissertation/eThesis center via Axess before they can upload their dissertation electronically. These 5 required steps are:
 - Apply to Graduate online through Axess by the appropriate deadline.
 - Submit one hard copy of an original signed signature page (acid-free paper) and title page (acid-free) to the Student Services Center, located on the 2nd floor of Tresidder Union.
 - Confirm the names of all reading committee members in Axess, and designate a Final Reader.
 - Confirm your candidacy is valid through your degree conferral date.
 - Confirm completion of all required University Milestones.

When a student misses the submission deadline, she or he must register and submit their dissertation the following quarter. Students must be registered for the quarter in which they plan to submit their dissertation and graduate.

Students who have completed all course work, degree requirements, and residency requirements for and only has to defend and/or submit the dissertation may be eligible for a one-time, \$150, Graduation Quarter registration status. See the Graduation Quarter section in the Stanford Bulletin.

Financial Aid

In the absence of independent fellowship support, entering predoctoral students are fully supported with a stipend, tuition, and health insurance from the university. Applicants are expected to apply for pre-doctoral fellowships such as those from the National Science Foundation. Beginning in the fifth year, the dissertation advisor is responsible for providing support for the student through completion of the Ph.D. degree.

The support used for a graduate student's tuition, stipend, and health insurance is derived from a variety of sources including government grants, fellowships, private, industrial, and philanthropic sources, and University funds. The total level of graduate student support is set annually by the School of Medicine and is generally the same (after tax) for all students regardless of the source of their support.

All M&I graduate students will follow the same program, as outlined in this handbook, regardless of the source of their support and similarly, the source of support will not impact on the rights of the student in any way (e.g., freedom to publish, etc.). Continued funding during the graduate program is subject to satisfactory academic progress toward conferral of the Ph.D. degree.

Tuition

A student's tuition is usually covered by either fellowships or research assistantships and students will receive tuition credit on their University bill.

Stipends and Salary

For students on fellowships, who are paid quarterly, the funding is disbursed at the beginning of the quarter if the student is enrolled. Student activities fee and housing charges will be deducted from the total stipend amount before the remaining funds are issued to the student.

Students who are on research assistantships are paid semi-monthly, on the 7th and 22nd of each month (or the preceding workday if these dates fall on a holiday or weekend).

Students can view their account their account activity and make payments through ePay. Automatic direct deposit is encouraged and can be set up through Axess.

Cardinal Care

Stanford's Cardinal Care plan provides medical and dental insurance for each student. Information about benefits can be found at <https://vaden.stanford.edu/insurance/cardinal-care-overview-and-benefits>. The funds for this health insurance are derived from training grants, departmental funds, advisors' grants, and/or University funds.

Miscellaneous Expenses

The department provides each student with approximately \$1,500 over the course of their graduate career for educational expenses. These funds are to be used for travel, books, computers, and similar academic incidental expenditures. These funds should not be used to purchase lab supplies, save in exceptional circumstances and with approval of Student Services. Any fellowship allowances awarded to the student will be in addition to the \$1,500 department funds.

Taxes

Graduate students receiving stipend support (fellowships from HHMI, SGF, NSF, NIH Training Grants, etc., i.e., almost all students in their first three years) will be taxed on their stipend income. Stanford does not deduct taxes from quarterly stipend checks, except for international students as noted below. Therefore, students must pay estimated quarterly taxes (form 1040ES), <https://www.irs.gov/>. Please see the Student Financial Services website for information, <https://sfs.stanford.edu/taxes>. Stanford recommends seeking professional tax counsel whenever necessary.

Graduate students receiving salary support from assistantships will have taxes withheld from their bi-monthly paychecks.

International students are subject to a 14% tax rate and may be eligible for tax exemption if their country of residence has an existing tax treaty with the U.S. Information can be found here, <https://sfs.stanford.edu/taxes/non-resident-alien-students>.

Health and Safety

Stanford is committed to providing a safe and healthy environment for faculty, staff, and students. These programs are run by the Health and Safety Office: Health Physics (Radiation Safety), Biosafety, Industrial Hygiene & Fire Safety, and Chemical Safety. The P.I. (or a designated member of the lab) is responsible for providing information and training about lab equipment, procedures and chemicals. Additionally, all new students must sign up for a lab safety training seminar offered at the beginning of each quarter; information will be provided at the Biosciences Orientation. Depending upon the type of work undertaken in your rotation and thesis labs, you may have to take additional training for blood-borne pathogens, radioactivity, human and/or animal subjects.

Nancy Magee Elkins (nmagee@stanford.edu) is Lab Manager for the department, and will help you comply with University guidelines for health and safety. Any questions about policy or concerns about the safety of your surroundings should be addressed to her.

Facilities

General

This is going to be your home away from home for the next several years. As such, it is our collective responsibility to make those many hours as enjoyable as possible. Probably the most common complaint and source of discontent is irresponsible or inconsiderate behavior. This is simple to avoid and simply requires that people conform to a common set of ethics. Namely, be considerate of others around you and follow the guidelines discussed below.

Lab Equipment and Supplies

Lab materials are incredibly expensive and often fragile or sensitive so it is extremely important that a few basic rules are adhered to by all. These are:

Never borrow anything from another lab without seeking their permission (ideally the person responsible for the material). In desperate conditions, you can usually take an item, but be sure to leave a note.

Learn a machine's proper operation before you try to use it. This means reading the directions that accompany it and check with a knowledgeable person (there should be at least one name attached to the machine). If you have questions, ask! A typical titanium ultracentrifuge rotor costs around \$10,000; a single cesium spill left unattended can ruin it. An ultracentrifuge costs about \$50,000 and one improperly attached bucket can virtually destroy it. Service for most of the equipment in our department starts at around \$400/hr.

Always sign up to use a piece of major equipment, even if it is free and you plan to use it immediately. If it malfunctions during your use but you are not there, people will know whose samples to save. If a problem occurs after your run, the service people will know who to ask to help figure out the problem. Accidents happen - we all cause a few sooner or later - but it is important to know details as soon as possible. Breakage of equipment through negligence will be charged to your lab. The cost of repairs due to wear and tear is shared by the major users, thus sign-up sheets are also used for accounting.

Handle borrowed reagents meticulously. That means keep them dry/cold/sterile, take only what you need and return the stock immediately. Never introduce anything into a dry reagent stock - tap it out; dispense liquids with clean sterile tips/pipettes.

Keep common areas orderly and labeling anything that belongs to you. Purges of the cold and warm rooms are done frequently and unlabeled items will be disposed. It is also important to be able to identify the "owner" of an item in case of problems (e.g., the flask breaks, the rotator stops, the space is needed, etc.).

Library

Lane Library, <http://lane.stanford.edu>, is the main library for the medical school (Lane Library) has an extensive catalog of journals, books, databases to support researchers in the School of Medicine. In addition to their catalog, they offer classes on research, publishing, presentations, programming, etc.

Annual Events and Holidays

Department BBQ. The department has a start of the year kick off barbeque in September. This is an opportunity for you to meet faculty, graduate students, postdocs, and staff in the department.

Departmental Scientific Conference. As mentioned earlier, our annual departmental conference is held each autumn. At this conference, each lab presents an overview of its work and what is particularly hot at the time in a relaxed and informal atmosphere. It is a great opportunity to find out what's going on around you, get to know people, hatch some project ideas, and have fun.

Holidays. Two to three weeks per year is the guideline for the amount of graduate student holiday time. This is intended to represent only a reasonable maximum and will vary according to personal work habits. The supervisor and student must judge what is appropriate on an individual basis. Be sure to inform your supervisor of any absences in advance.

The department also has an annual Halloween costume contest and holiday party. Twice a month, labs take turns hosting *M&I Happy Hour*. There are also birthdays and intra-lab events to celebrate and enjoy! In the Department, you will find groups interested in hiking, mountain climbing and other sports, and in cultural activities such as opera, concerts, etc.

Appendix I. Degree Requirements**Microbiology and Immunology Requirements 2019-20**

Quarter Offered	Subject/Course Number	Course Title	Units
Autumn	BIOS 200	Foundations in Experimental Biology	5 units
	MI 210	Adv. Pathogenesis of Bacteria, Viruses, and Eukaryotic Parasites	4 units
	MI 399	Graduate Research	1 unit
Winter	BIO 214/ BIOC 224/ MCP 221	Advanced Cell Biology	4 units
	MED 255	The Responsible Conduct of Research	1 unit
	MI 250	Frontiers in Microbiology & Immunology	1 unit
	MI 399	Graduate Research	4 units
Spring	MI 215	Principles of Biological Technologies	3 units
	MI 399	Graduate Research	4 units
	MI Elective	Approved course from Appendix II	3 units

Students will register for MI 250: Frontiers in Microbiology and Immunology once in their first year and once in the second year for a total of 2 units. Although no longer part of the required curriculum, BIO 230: Molecular and Cellular Immunology is a recommended course. In the fourth year, students will need to complete a second ethics course, please see **Appendix II** for a list of approved courses.

Take one elective from the approved list, **Appendix III**. Prior approval from the student's adviser and department Graduate Program Director is required to use a course not from the elective list.

Students register for MI 399 Graduate Research as needed to maintain enrollment in 10 units each quarter, including summer, until they complete a minimum of 135 units and are eligible for TGR status.

Other requirements

- 1st year
 - M&I Noon Seminar and speaker luncheon attendance
 - M&I Journal Club (MI 250) participation autumn, winter and spring quarters
 - Two to four laboratory rotations (commitment to join a lab is made after Apr. 1st)
 - Faculty research seminars (Thursday evening autumn quarter)
 - Short summaries of three possible qualifying exam topics due Aug. 1st
 - 10-page double-spaced qualifying exam research proposal due Sept. 1st
- 2nd year
 - Qualifying exam to be completed by Nov. 1st
 - Doctoral Dissertation Reading Committee Form due by the end of autumn quarter
 - M&I Noon Seminar and speaker luncheon attendance
 - M&I Journal Club (MI 250) participation autumn, winter and spring quarters
 - 10-page double-spaced thesis research proposal due May 1st
 - Oral defense of research proposal to be completed by the end of Spr. Quarter
 - Application for Candidacy for Advanced Degrees due by the end of Sum. quarter
- 3rd year
 - University Teaching Assistant orientation and training
 - One course Teaching Assistantship
 - Seminar attendance
 - Annual thesis committee meeting
 - Poster presentation at Department Scientific Conference and chair sessions
- 4th, etc.
 - Semi-annual thesis committee meeting
 - Seminar attendance
 - Oral presentation at Department Scientific Conference
 - One additional oral presentation (Wednesday Noon Seminar Series, CMB Symposium, National or International Meeting or Department Scientific Conference)

Appendix II. List of Ethics Courses

Students need to be familiar with current issues in research ethics and of responsible conduct of research. The department requires students to enroll in MED 255: The Responsible Conduct of Research in the winter quarter of the first year. In the third or fourth year of the program, students will need to complete another ethics course from the list below.

Please check Explore Courses for yearly course offerings, <https://explorecourses.stanford.edu>.

Subject/Course Number	Course Title	Units
BIOE 122/ EMED122/EMED 222/ PUBLPOL 122/PUBLPOL 222	Biosecurity and Bioterrorism Response	4-5 units
BIOE 131/ ETHICSOC 131X	Ethics in Bioengineering	3 units
BIOS 224	Big Topics in Stem Cell Ethics	2 units
BIOS 258	Ethics, Science, and Society	1 unit
CSB 272	Research Ethics	1 unit
HUMBIO 174	Foundations of Bioethics	3 units
MED 255C/ CHPR 255	The Responsible Conduct of Research for Clinical and Community Researchers	1 unit
NBIO 101/ NBIO 201	Social and Ethical Issues in the Neurosciences	2-4 units
PEDS 251A	Medical Ethics I	2 units
PEDS 251B	Medical Ethics II	2 units

Appendix III. List of Approved Electives

Please check Explore Courses for yearly course offerings, <https://explorecourses.stanford.edu>.

Subject/Course Number	Course Title	Units	Offered 19-20
BIOC/ BIOPHYS/ SBIO 241	Biological Macromolecules	3-5 units	Spring
BIOE 221G/MI 221	Gut Microbiota in Health and Disease	2-3 units	Not given this year
CSB 210	Cell Signaling	4 units	Not given this year
CSB 220	Chemistry of Biological Processes	3 units	Spring 19-20 Not given 20-21
DBIO 210	Developmental Biology	4 units	Spring
GENE 205	Advanced Genetics	3 units	Winter
GENE 211	Genomics	3 units	Winter
GENE/PATH/MI 218	Computational Analysis of Biological Information: Introduction to Python for Biologists	2 units	Not given this year
IMMUNOL/MCP 201	Advanced Immunology II	3 units	Winter
IMMUNOL/MCP 202	Advanced Immunology II	3 units	Spring
MCP 256	How Cells Work: Energetics, Compartments and Coupling in Cell Biology	4 units	Not given this year
STATS 141/BIO 141	Biostatistics	3-5 units	Autumn

Appendix V. Qualifying Exam

	<p>DEPARTMENT OF MICROBIOLOGY and IMMUNOLOGY</p> <p>QUALIFYING EXAM</p>
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Date:

Name:

Title:

Committee:

_____	_____
_____	_____
_____	_____

Outcome:

___ Pass ___ Pass with minor revisions ___ Pass with major revisions ___ No Pass

Comments:

Immediately following the examination, the committee should dismiss the student and briefly discuss his/her performance. The committee may choose among the following outcome options: pass, pass with minor revisions, pass with major revisions (such as rewriting an aim), or no pass. If the 'no pass' or 'pass with major revisions' grade is given, please indicate whether the student should rewrite the examination (or portion thereof) and/or re-defend it orally. Set a date for the rewrite or defense. Note any dissensions under comments. The committee should then discuss their decision with the student.

Appendix VI. Dissertation Committee Meeting Form

DEPARTMENT OF MICROBIOLOGY and IMMUNOLOGY
RECORD OF DISSERTATION COMMITTEE MEETING

Instructions: For each meeting of the committee, the principal advisor should summarize the general feeling of the committee as regards to performance and future directions. Students are required to meet with their committee at least annually. Beginning in their 4th year of study, students will meet with their committee semi-annually. Return this form to the Student Services Officer, Fairchild D338B.

Composition of Committee (please print your name and sign):

Principal Advisor: _____

Committee Member: _____

Committee Member: _____

Committee Member: _____

Committee Member: _____

Record of Meeting:

Date: _____ Student's Name: _____

Purpose: _____

Progress Report/Comments/Goals (please attach pages as needed):

Date of Next Meeting (mm/year): ____/____

Appendix VII. Faculty Research Interests

Manuel Amieva, M.D., Ph.D. Professor, Genetic variation in human immune systems: functional importance for long-term survival.

Ann M. Arvin, M.D., Professor, Molecular Mechanisms of Varicella-zoster Virus Pathogenesis.

Helen M. Blau, Ph.D., Professor, Regenerative medicine & stem cells, nuclear reprogramming, cell fate plasticity.

Mathew Bogyo, Ph.D., Professor, Small molecules to study function of proteases in cancer, inflammation, parasitic diseases

Paul Bollyky, Ph.D., Assistant Professor, Study how immune responses are regulated within injured and infected tissues.

John C. Boothroyd, Ph.D., Professor, Cell and molecular analysis of Toxoplasma's interaction with the host.

Jan Carette, Ph.D., Assistant Professor, Genetic screens in human cells to study host-pathogen interactions.

Yueh-Hsiu Chien, Ph.D., Professor, Antigen recognition and function of lymphocytes in health and disease.

Wah Chiu, Ph.D., Professor, Development of methodology for electron cryo-microscopy to determine 3D structures of macromolecules, molecular machines, organelles and cells.

Mark M. Davis, Ph.D., Professor, T cell recognition and human immunology.

Dylan Dodd, M.D., Ph.D., Assistant Professor, Study of gut microbial metabolism to improve human health.

Shirit Einav, M.D., Assistant Professor, Viral-Host Interactions by molecular and systems virology approaches.

Elizabeth Egan, M.D., Ph.D., Assistant Professor, Elucidating the role of the host erythrocyte in Plasmodium falciparum malaria.

Stephen J. Galli, M.D., Professor, The development of mast cells and basophils, and their roles in health & disease.

Jeffrey Glenn, M.D., Ph.D., Associate Professor, Molecular virology, novel antiviral strategies, and liver tissue engineering.

Harry B. Greenberg, M.D., Professor, Molecular mechanisms of viral pathogenesis.

K.C. Huang, Ph.D., Professor, Cell shape detection, determination, and maintenance in bacteria.

Juliana Idoyaga, Ph.D., Assistant Professor, Studying the targeting of antigens to dendritic cells within intact lymphoid tissues

Peter Jackson, Ph.D., Professor, Cell cycle control of DNA replication in embryonic and somatic cells.

Prasanna Jagannathan, M.D., Assistant Professor, Understanding the mechanisms of clinical immunity to malaria through field-based studies.

Karla Kirkegaard, Ph.D., Professor, Understanding RNA virus replication to thwart drug resistance and disease.

Holden Maecker, Ph.D., Associate Professor, Immune profiling; T cell response signatures to chronic pathogens and cancer.

A. C. Matin, Ph.D., Professor, New cancer therapy; Heritable MRI contrast; Bacterial antibiotic resistance.

Denise Monack, Ph.D., Associate Professor, Co-evolution of host immune mechanisms and pathogen virulence strategies.

Garry P. Nolan, Ph.D., Professor, Single cell proteomics and genomics of cancer, stem cells & autoimmunity.

Peter Parham, Ph.D., Professor, Genetic variation in human immune systems: functional importance for long-term survival.

David A. Relman, M.D., Professor, Human and animal microbiomes: ecology and genomics.

Peter Sarnow, Ph.D., Professor and Chair, Interactions of viruses with host macromolecular machines.

David S. Schneider, Ph.D., Associate Professor, Balancing tolerance and resistance of infections.

Upinder Singh, M.D., Associate Professor, Molecular basis of pathogenesis by the parasite *Entamoeba histolytica*.

Justin Sonnenburg, Ph.D., Associate Professor, Mechanistic insight into intestinal microbiota dynamics.

Taia T. Wang, M.D., Ph.D., Assistant Professor, Study the role of IgG in human immunity and susceptibility to disease

Ellen Yeh, Ph.D. Assistant Professor, Novel eukaryotic biology of the plastid organelle in malaria parasites

Appendix VIII. Current MI Graduate Students

Name	Advisor	Admit Year
Susan Brewer	Denise Monack	2014-15
Spencer Cesar	K.C. Huang	2014-15
Alicia Cygan	John Boothroyd	2014-15
Andrew Guzman	Mary Beth Mudgett	2014-15
Michelle Lissner	David Schneider	2014-15
Michael Lyons	Peter Kim	2014-15
Kali Pruss	Justin Sonnenburg	2014-15
Suchita Rastogi	John Boothroyd	2014-15
Terrence Theisen	John Boothroyd	2014-15
Will Van Treuren	Justin Sonnenburg	2014-15
Kyler Lugo	Denise Monack	2015-16
Bryan Merrill	Justin Sonnenburg	2015-16
Makeda Robinson	Shirit Einav and Holden Maecker	2015-16
Dorothy Tovar	Karla Kirkegaard and Elizabeth Hadley	2015-16
Nicole Davis	David Schneider	2016-17
Tamar Feldman	Denise Monack	2016-17
Abel Ferrel	John Boothroyd	2016-17
Jasmine Moshiri	Karla Kirkegaard	2016-17
Kimberly Vasquez	K.C. Huang	2016-17
Dylan Dahan	Justin Sonnenburg	2017-18
Rebecca Gellman	Justin Sonnenburg	2017-18
Adam Kiro Singh	David Schneider	2017-18
Christine Peters	Jan Carette	2017-18
Sarah Ruddle	Denise Monack	2017-18
Bokai Zhu	Garry Nolan	2017-18
Matthew Carter	Justin Sonnenburg	2018-19
Oscar Diaz	Denise Monack	2018-19
Meagan Hamblin	Denise Monack	2018-19
Alvin Han	Ami Bhatt and Denise Monack	2018-19
Brian Ho	Karla Kirkegaard	2018-19
Alma Mendoza	John Boothroyd	2018-19

Appendix IX. Department Administration

Name	Title	Lab	Phone	Email
Nanette Beacham	Accountant	Department	3-2753	nbeacham@
Mayumi Beppu	Assistant Director of Administration	Department	4-9920	mbeppu@
Yen Chau	Admin Associate	Boothroyd, Matin, Monack, Sonnenburg Sarnow, Schneider Labs	8-7074	yenc@
Monica Cryan	Admin Associate	Carette, Idoyaga Labs, Postodcs, Grad Students	8-8035	mcryan@
Richard Cuevas	Admin Associate	Davis Lab	5-4755	rcuevas@
Monica Fernandez-Vidal	Academic Program Professional	Department	4-6937	mfvidal@
Dorey Clayton	Director of Finance & Administration	Department	5-4756	dorey@
Poly Kavanaugh	Facilities Manager	Baxter Lab	3-9955	pollyk@
Polly Leung	Associate Director of Finance	Department	3-3744	pollyl@
Nancy Magee Elkins	Lab Manager, DPA, STAR	Department	5-3838	nmagee@
TBD	Associate Director of Finance and Administration	Baxter Lab	3-6270	
Kathleen Shaw	Admin Associate	Chien Lab and Baxter Lab - Jackson	5-5089 or 3-5035	kshaw1@
Denise Winters	Student Services Officer	Department	5-8541	denisew1@

All phone numbers have prefixes:
723-, 724-, 725- or 498-XXXX
Area Code is 650