

# **GRADUATE PROGRAM IN IMMUNOLOGY**

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Program Guide  
2021-2022

NOTE: Due to COVID-19 restrictions, some timelines, deadlines and requirements may be modified.



Graduate School of  
Biomedical Sciences

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The requirements described in these guidelines may be amended or altered by the Graduate Program. Note that GSBS-wide policies supersede program specific policies.

# WELCOME AND KEY PROGRAM CONTACTS

Welcome to the Graduate Program in Immunology. This Program Guide provides key information and guidelines on the requirements of the program. It supplements information contained in the GSBS Catalog (<https://gsbs.tufts.edu/studentLife/school-Catalogs>), which has the official degree requirements and course listings, and the GSBS Student Handbook (<https://gsbs.tufts.edu/studentLife/StudentHandbook>), which contains important information about topics such as the GSBS academic and registration policies, professional conduct guidelines, financial matters, and information about student benefits, services, and resources.

This Guide includes a listing of graduate students in the program and contact information for faculty, staff, and students. You can find information about the research interests and publications of the faculty, as well as up-to-date schedules of seminars, journal clubs and research reports on our website (<https://gsbs.tufts.edu/academics/immunology>). We would greatly appreciate any feedback from you to help us make this Guide more useful.

There are several people who can serve as valuable resources during your PhD training and are always willing to discuss any issues or concerns about the program, or direct you to the appropriate office. They are listed below, along with information on how to contact them.

The Program Director is elected by the graduate program faculty to administer the educational mission of the graduate program. The Program Director represents the interests of the program on the GSBS's Executive Council where policy matters concerning the School's programs are discussed and enacted.

The Student Advisor serves as a mentor to the first-year students, including providing specific advice on selecting appropriate sites for laboratory rotations, choosing elective courses, and identifying laboratories for thesis work.

The Student Advisor also serves as an advisor to upper level students by assisting them with the membership of thesis advisory committees, elective course selection, individual development plans, and issues arising with mentors, faculty members, staff and other students. In general, the Advisor acts as a student advocate within the faculty.

The Student Advisors are your primary go to person as advocate, but the Program Director is also available, especially when the Student Advisors are away. If either Student Advisor or Program Director are away, they will let you know how to contact them -by email or phone, Skype

## KEY PROGRAM CONTACTS

**Pilar Alcaide**, Program Director

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**Marta Rodriguez-Garcia**, Student Advisor, 1st, 2nd & 3rd year students

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**Steve Bunnell**, Student Advisor, 4th year & above

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**Andrew Plaut**, Clinical Training Director

Tupper 8	5882	<a href="mailto:aplaut@tuftsmedicalcenter.org">aplaut@tuftsmedicalcenter.org</a>
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**Shruti Sharma**, Qualifying Exam Advisor

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**Diana Pierce**, Program Coordinator

Stearns 514	6836	<a href="mailto:diana.pierce@tufts.edu">diana.pierce@tufts.edu</a>
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**Steve Bunnell**, Admissions Co-Director

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**Henry Wortis**, Admissions Co-Director

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**Sid Parthasarathy**, Graduate Student Council and Student Representative

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**Michael Rist**, Graduate Student Council and Student Representative

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*All Boston phone numbers start with 617-636-, and all Medford numbers start with 617-627-.*

or Google hangouts or WhatsApp. Or just drop into their offices at any time they are there. Please do not hesitate to contact them. They will get back to you as soon as possible and within 24 hours.

Please let them know as soon as possible if you have any concerns or issues-the sooner the better so they can address them right away. All students should contact the student advisor and the student advisor's students should contact the Program Director. They will work with you and if necessary, your advisor, committee or GSBS administrators to try to resolve these issues. No concern is too small, and there is no such thing as a stupid question!

Faculty members will respect your wish for confidentiality as far as possible, but there are situations where the law and/or university regulations require disclosure of issues.

The Qualifying Exam Advisor guides the student through the Qualifying Exam process providing advice on topic selection and approaches to constructing the written proposal and oral presentation.

# WELCOME AND KEY PROGRAM CONTACTS

The Admissions Director is responsible for recruiting high quality program candidates, identifying candidates for interview from the applicant pool, arranging for interviews of these candidates with program faculty, and selecting the best candidates (with input from the faculty and students) to be given placement offers.

The Program Coordinator assists the Program Director in the functioning of the program as needed, as well as helps students schedule rooms, complete forms, plan events, and manage program requirements.

Graduate Student Council Representatives. Two representatives are elected by the students to serve as the program's representatives to the GSBS Graduate Student Council (GSC). The GSC organizes activities, including the Annual Relays, and the GSC Officers are ad hoc members of the GSBS Executive Council.

Student Program Representatives. Elections of Student Representatives should be taken seriously and not left passively to volunteers. Students have considerable responsibility for Journal Clubs, Research Workshops, Seminars and the Annual Retreat. Representatives present the students' collective views at faculty meetings and thereby help to shape the curriculum and the entire training experience.

## *Immunology Retreat*

Faculty, students, fellows and staff participate in an Annual Immunology Retreat. Planned by the students, this one-day event typically features a student-invited speaker, and occasionally a round-table discussion with former students with different career choices. All students, except those with permission to defend, are required to attend. All attending junior students in their second and third research years are required to present a poster and all senior students to give short talks. This year's retreat is scheduled for the Fall. Travel awards are given to exceptionally strong posters and talks.

## *Leskowitz Lecture*

Once a year, the Program sponsors a seminar by a major figure in Immunology. The occasion is a memorial that honors the founder and first director of the Program, Dr. Sidney Leskowitz. There is also a Mini Symposium in which students present their research for discussion by the Lecturer and members of the Program.

# CURRICULUM OVERVIEW

## *Required Courses*

Students complete a series of required didactic courses designed to provide a strong knowledge base for their research. The GSBS Catalog for the year in which students were admitted lists these required courses (<https://gsbs.tufts.edu/studentLife/schoolCatalogs>). In addition, the Catalog contains course descriptions and progression plans for the first three years.

## *Elective Courses*

Students admitted before Fall 2016 are required to complete one elective course in addition to the required courses. Elective courses must be approved by the thesis advisor and the Program Director and should be used to explore students' interests and further their understanding of their thesis research fields. Students choose these courses from the list of electives in the GSBS Catalog.

Courses may be chosen from any GSBS program or from other schools that allow cross-registration. Those students who have been admitted after 2016 do not need to take electives. However, students in the second year are strongly encouraged to take a scientific/grant writing course and students in the third year are strongly encouraged to take a statistics/computational biology course.

## *Remediation*

Remediation mechanisms are at the discretion of program Faculty and course directors and should be clearly stated in the course syllabus. Remediation is offered only to failing students and for them to only achieve the minimum passing grade of B- or S as applicable.

## *First Year Journal Club and Advanced Journal Club*

The overall goals of the First Year Journal Club are to advance the student's skills in critically evaluating the scientific literature and to improve the student's presentation skills. Students should read the detailed course description of these courses to understand how papers are to be selected and discussed.

The overall goal of the Advanced Journal Club is to advance the student's skills in critically evaluating the scientific literature and to improve the student's independent presentation skills. Students should read the detailed course description to understand how papers are to be selected and discussed.

Attendance in journal club is required and students who do not attend regularly will receive a warning; continued absence will result in a failing grade. PhD students must register for First Year Journal Club in Fall of year one and for Advanced Journal Club for an additional three years.

MD/PhD students register for First Year Journal Club in Fall of year one and for Advanced Journal Club for Fall of year two and for an additional two years. Attendance is required for all PhD and MD/PhD students except those who have permission to defend. Attendance and participation will be

monitored by the student coordinator via a sign-up sheet which will be circulated.

## *Graduate Seminar*

The goal of attending the Graduate Seminars is to improve the student's appreciation for how research progress is obtained and to raise awareness of recent advances in the field. Seminars start at noon. Attendance is required for all PhD and MD/PhD students except those who have permission to defend.

## *Research Presentations*

Students must present an annual report of their research, except those students who have received permission to defend their theses. The Student Research Presentation schedule is provided to students at the beginning of each academic year and will also be posted on the GSBS calendar. Research Presentations are attended by students, faculty, and other interested members of the Program. Attendance is required for all PhD and MD/PhD students except those who have permission to defend.

The Thesis Advisory Committee (TAC) chair or at least one committee member (or a selected faculty member if committee members are not available) must attend the presentation and is responsible for providing oral feedback about the seminar. At the following committee meeting, the oral presentation will be further discussed and graded.

## *Evaluation of First Year Student Progress*

In the middle of the first year, after the grades for the fall classes are received and after the first two rotations are complete, the faculty evaluates the performance of each first-year student. The evaluation is based on performance in didactic courses, journal club, and laboratory rotations. A written synopsis of the evaluation is given to each student with an emphasis on feedback that will highlight strengths and identify areas where improvement may be needed.

## *Requirements for the Master of Science Degree*

A student in good standing in the doctoral program who is unable to complete the requirements for the PhD degree may be allowed to write and defend a Master's thesis.

Permission to submit a Master's thesis must be obtained in advance from the Program faculty and will only be granted if compelling reasons for leaving the PhD program are provided, if specific guidelines are followed and specific criteria are met. Master's Degree Requirements can be found in the GSBS Handbook (<https://gsbs.tufts.edu/studentLife/StudentHandbook>).

A Master's candidate may only begin writing a thesis after obtaining explicit permission to do so from the thesis advisory committee. The student's thesis must describe original research carried out by the candidate under the supervision of a faculty member and must form a coherent body of work of publishable quality, even though the scope of the work may not permit publication. The Master's thesis



# CURRICULUM OVERVIEW

must be presented in the same format as a PhD thesis, as required by the GSBS. The suitability of the Master's thesis will be determined by the thesis advisory committee after an oral defense of the thesis by the candidate and is subject to ratification by the program faculty.

# LABORATORY ROTATIONS

## *Purpose*

Laboratory rotations are designed to acquaint students with some of the research projects of current interest in the program, to allow students to assess the suitability of several labs for their thesis research, and to allow faculty members to assess the suitability of individual students for work in their labs. A minimum of four lab rotations must be completed during the first academic year.

## *Rotation Matching Process*

Students choose rotations based on their interests and the willingness of the rotation mentor to accept a student. Students are strongly encouraged to choose rotations that expose them to areas of research with which they are not already familiar. In the Fall semester students must rotate with members of the Immunology Faculty. Only one student at a time may rotate in a particular laboratory except under special circumstances with the approval of the Program Director.

The GSBS Laboratory Rotation Policy is published in the Handbook (<https://gsbs.tufts.edu/studentLife/StudentHandbook>) and the dates for laboratory rotations are posted on the GSBS website in the Academic Calendar (<https://gsbs.tufts.edu/student-life/academic-calendar>).

First year students are required to contact the Student Advisor in the summer to discuss possible rotation choices. Several weeks before rotations begin the GSBS Dean's Office emails students a list of available faculty laboratories. This email contains a link to a survey in which students are to enter their first, second, and third choices for rotations. The Program Student Advisors meet with students to discuss their possible matches. Information regarding the research areas of program faculty members can be found at the GSBS website (<https://gsbs.tufts.edu/facultyResearch/faculty>). In addition, students should meet with potential mentors during the last three weeks of the immediately prior rotation, but no commitment can be made about whether or not the student may rotate in a lab or whether the mentor will accept a student, before all rotation matches are announced. Students should share their interests and mentors discuss the possible projects available in the lab. All students will be notified of their matches simultaneously by their Student Advisors.

Each rotation is evaluated by the rotation mentor. Evaluations should be submitted by the mentor as soon as possible after the rotation and should include the signature of the student. Grades given should accurately reflect the student's activity. At the end of each semester the student adviser, will assign a letter grade based on two individual rotation evaluations per semester. In case of discrepancies between the grades, the student advisor will call a meeting with the 2 rotation mentors and the program director, to discuss the final grade.

# QUALIFYING EXAMINATION

## *Purpose*

A Qualifying Examination is given to all doctoral candidates. The purpose of the examination is to determine whether a student: 1) has in-depth general immunological understanding and expert knowledge of their chosen field of research, 2) can formulate and test relevant, biological hypotheses with appropriate experimental approaches, 3) can critically analyze and extend experimental results, 4) has the ability to communicate effectively both orally and in writing; and 5) displays creativity and critical thinking skills.

## *Timing of Qualifying Exam*

For PhD students, the Qualifying Examination may be held in the Fall or Spring Semester of the second year and must be completed by the end of the Spring Semester of the second year. For the 2020-21 academic year, the qualifying exam will take place sometime between November and March of 2022. MD/PhD students take this exam during the Fall of 20-21. The final proposal must be submitted to the selected qualifying exam committee at least one week prior to the oral defense.

## *Selection of Qualifying Exam Committee*

The Qualifying Exam Committee will consist of a group of 3 faculty members with interests and expertise in the area of the student's proposal, with potential to be the student's thesis advisory committee and is chosen by the student with or without consultation with their advisor, where appropriate. The thesis advisor is encouraged to be part of the committee.

## *Overview of the Qualifying Exam Process*

For the Qualifying Examination, students are required to write and orally defend an original research proposal. The subject of the research proposal can in fact be the student's future thesis project. Alternately, it may be a topic relevant in the field of expertise of their chosen thesis advisor and may be an extension of previous published work. Research projects that are ongoing and/or are the work of another lab member are not acceptable as qualifying exam proposals. Final determination of the qualifying exam proposal topic rests in a joint decision by the student, advisor and qualifying exam committee. Students are strongly encouraged to take the elective grant writing course (NRSC 0220) in the Fall of their 2nd Year.

The Qualifying exam will require two meetings with the committee. The first meeting can take the place of the 1st TAC meeting and must take place in the Fall Semester of the second year. This will constitute a pre-exam meeting to discuss the scope, breadth and hypothesis upon which the proposal rests. A one-page "Specific Aims" style summary is a requirement of this first meeting so as to aid the committee in critically evaluating the precepts of the proposed work and should be handed in to the committee one week before the meeting. Handing in the one-page specific aims summary on time is part of the requirement for an accept-

able proposal. The committee chair will be selected by the committee members at this meeting.

The Qualifying exam committee and TAC committee will remain the same for graduate students presenting "on topic" projects, the faculty advisor may be present for the overlapping TAC meeting and first qualifying exam meeting. However, their involvement is restricted to elaborating/confirming that the project/direction chosen by the student is arrived at in joint agreement between them and is a viable project for his/her expertise and lab. Additionally, their comments as relevant to completing the TAC form will be sought. In the situation that the qual/TAC meeting is an in-person meeting, the faculty advisor is invited into the

meeting for the initial assessment of project parity and TAC form completion but is then expected to leave the room for the remainder of the meeting. In the case that the meeting is held in Zoom format, the faculty advisor is encouraged to participate as in the "in-person" setting, however, the advisor may choose to stay the duration of the meeting as long as their call is muted and video turned off. This latter is to ensure that any questions for the advisor that arise during the meeting can be answered and the advisor can be present to assess growth and status of student's ability to understand their science

Students are encouraged to discuss the scientific merits of their initial proposals with their advisor, Program faculty or anyone else in the scientific community prior to this meeting. Sharing of funded or in-process/submitted, topic-relevant NIH grants (R01, R21, R03, etc.) by thesis advisors is prohibited, as this may unfairly skew the students' short-term performance and also impact their ability to develop key critical thinking skills. Links to view funded NIH F31 and other grants (**Resource links 3 and 4**) are provided below for students to gain an objective understanding of a well written proposal.

The timing of the second meeting, which constitutes the oral exam, will be decided upon the conclusion of the first meeting and should account for adequate time to prepare and write a NIH F30/F31 style proposal (detailed below and **Resource links 1 and 2**). The second meeting may take place in the Fall or Spring Semester of the 2nd year but must be completed by the end of the Spring Semester. In the scenario that the initial proposal is not considered a viable option, a timetable will be implemented to allow the student to formulate an alternative qualifying proposal. Ideally, the alternative proposal's specific aims should be arrived at within 2 weeks of the first meeting. However, this timeline is left to the discretion of the committee, as is the need for another joint, full-session meeting to discuss the proposal's merits before the exam.

Not meeting the agreed upon deadline is grounds for receiving a failing grade.

Students should feel free to ask for help in finding specific information from their support network of peers and faculty but should not ask faculty to suggest a proposal or to play any kind of active role in the development of the proposal.

# QUALIFYING EXAMINATION

## *Format of the Written Qualifying Exam*

The format of the written proposal is based on an NIH F30/F31 grant application's research strategy section (Resource link 2) and should be as follows (typed, double spaced, half inch margins, and 11-point Arial, Helvetica, or Times New Roman font). Failure to adhere to the page limits will result in the proposal being returned unread. Be sure to number every page. Refer to Resource link 2 and specific pages referenced to include all the relevant material in the research strategy section. Use Resource link 3 for examples of well-executed NIH F31 applications.

1. Title page – A brief but descriptive title for the project.
2. Summary - 1 page

The project summary is a succinct and accurate description of the proposed work and should be able to stand on its own (separate from the proposal). This section should be informative to other persons working in the same or related fields and understandable to a scientifically literate reader. Avoid both descriptions of past accomplishments and the use of the first person. Please be concise.

3. Specific Aims - 1 page
4. Research Strategy - no more than 6 pages.

A clear research strategy should have:

- A well-defined research project (hypothesis-driven)
- Background leading to and significance of the proposed research

5. Research approach (design and methods) for achieving the Specific Aims, the rationale for the proposed approach, potential pitfalls, and expected/alternative outcomes of the proposed studies

The approach section should not involve an overly detailed description of routine technical matter unless atypical but should emphasize the order of experimentation with potential pitfalls and alternative approaches. Methods should only be described in sufficient detail to provide convincing evidence that you appreciate the demands and difficulties of the proposed techniques.

Six pages is an absolute page-limit. No extensions, including appendices, supplements, additional figures, or other devices will be allowed – these limitations mimic those of NIH submissions and instruct the students in the importance of adhering to guidelines for a fair and balanced review. If the total number of pages (excluding section 5) exceeds 9, the proposal will be returned without being read.

6. Bibliography – Include relevant citations only. The use of a reference manager software is strongly advocated.

Students may have any willing member of the faculty, peer student group, postdoctoral fellows, etc. review their proposals but be forewarned that these reviews constitute personal opinions that may not coincide with the views of the exam committee.

## *Resources:*

1. F31 funding opportunity announcement (2019): <https://grants.nih.gov/grants/guide/pa-files/PA-19-195.html>
2. F31 guidelines (pdf): <https://grants.nih.gov/grants/how-to-apply-application-guide/forms-e/fellowship-forms-e.pdf>
3. Sample F31 Applications: <https://www.niaid.nih.gov/sites/default/files/nicoleputnamapplicationF31.pdf>  
[https://www.niaid.nih.gov/sites/default/files/F31-sample-summary\\_nico\\_contreras.pdf](https://www.niaid.nih.gov/sites/default/files/F31-sample-summary_nico_contreras.pdf)
4. Sample alternate NIH applications: <https://www.niaid.nih.gov/grants-contracts/sample-applications#f31>

## *Evaluation of the Qualifying Exam*

Thesis advisors are strongly discouraged from being part of the oral qualifying exam committee. Students are asked to leave the room for 5 to 10 minutes at the beginning of the oral defense so that the attending faculty can discuss the format of the exam. Students are then asked to present their proposal as a presentation (time limit allotted 30min). The presentation should have any relevant background, working models, hypotheses, data, methods and the highlights of their proposals. There is no limit to the range of the topics to be included in the discussion and can cover the material covered in classes as well where relevant. However, students are not expected to know everything; rather they will be assessed for their ability to speculate based on existing knowledge framework and form an opinion. "I don't know" is a valid answer but may not result in a pass if over exercised. The format will be that of an informal scientific discussion.

At the end of the exam the student will be requested to leave and wait outside during the discussion of the proposal. The student will be informed of the grade immediately upon the conclusion of this discussion.

The written and oral parts of the exam are graded separately. Grade options are Pass, Incomplete, and Fail.

- Pass: No additional work is required.
- Incomplete: Some aspect of the work is not satisfactory and needs to be redone or completed before passing.
- Fail: A failing grade carries with it a recommendation to the full faculty that the student not continue in the program.

If a student is deemed to have failed the qualifying exam by the Qualifying Exam Committee, the issue is referred to the full faculty. The faculty reviews the student's complete record at GSBS. The faculty may decide to give the student another chance and create an appropriate course of action consistent with the program's requirement that a student pass the qualifying exam before beginning full-time thesis research. The final decision about passing on to the second year will be made at that faculty meeting.

The faculty may also decide, after careful review, that the grade for the Qualifying Exam be reported as a failure. This



# QUALIFYING EXAMINATION

can either occur after the first attempt or after a retake of the examination. Failure to pass the Qualifying Exam will result in dismissal from the School.

# RESEARCH, CAREER PLANNING, AND THESIS

## *Selection of a Thesis Advisor*

Students are matched with thesis mentors in May of their first year after completing their laboratory rotations. The centralized matching system is designed to maximize the chances that students are matched with one of their top choices. Starting in mid-April students should begin to discuss with potential thesis advisors the range of research projects that may be open to a student. No such discussions should occur at any earlier time. At no time should a student expect, or faculty members provide, any guidance or commitment as to the likelihood that the student would be accepted into the lab. At this stage, all students are afforded an equal opportunity to discuss potential projects with all faculty members who have indicated a willingness to accept one or more students.

During a predetermined period in May, each student will submit a list of his/her first, second and third choices of thesis labs. The student advisor will make known to relevant faculty members the names of students who have listed the faculty member as a first choice. Each faculty member will then have the option to accept the student(s) or to decline. When more than one student asks to be accepted into the same lab and only one space is available, the faculty member has the option of choosing which student to accept. If a student is not accepted into his/her first lab choice, every effort will be made to assure that that student's second choice is successful. In summary, faculty members do not recruit students into their labs and students should not make commitments to faculty members or ask for commitments from faculty members except through the process described above.

MD/PhD students usually select a thesis advisor after completing two summer rotations during medical school and upon entering the program.

A student who chooses a faculty thesis mentor in a research lab that is not part of the Immunology Program must decide whether to switch graduate programs or stay within the Program. In the latter case, the student would be required to meet all the requirements of the Program, the thesis advisor would have to be approved by the Immunology Program Faculty, and the student's thesis project would have to be judged appropriate for a degree in Immunology.

## *Selection of the Thesis Advisory Committee*

PhD students select their Thesis Advisory Committee (which may be the same as the Qualifying Exam Committee) in the fall semester of their second graduate year, and MD/PhD students do so during fall of their first graduate year. Students are responsible for holding their first TAC meeting before the end of this semester. The initial Qualifying Exam meeting may take the place of this meeting.

- The thesis committee should consist of the thesis advisor and at least three additional Immunology faculty members who may be the same as the Qualifying Exam committee. The chair will be selected by

# RESEARCH, CAREER PLANNING, AND THESIS

the members of the committee and may be the same as that of the Qualifying Exam committee. The membership of the Committee must be approved by the Student Advisor. Additional non-Immunology faculty may be invited to join in order to provide particular expertise. After the first committee meeting the Student Advisor and Program Coordinator should be informed about who the chair and members of the committee are.

## *Merge Inflammation Continuing Clinical Program*

The continuing clinical program starts with and is required for incoming PhD (not MD/PhD) students beginning in 2018. All other students who participated in the Summer Merge-INF Program are highly encouraged to participate.

After a student enters a thesis lab and decides on a thesis project early in the second year, s/he will choose a clinical advisor. The clinical advisor should specialize in infectious or inflammatory disease/s, preferably, but not necessarily related to the student's thesis topic. He/she may be from Tufts Medical Center or another Boston area hospital.

The thesis mentor should be consulted about existing or planned clinical collaborations in which case the student may select the involved clinician as a clinical advisor. If there is no existing or planned clinical/translational collaboration, the student advisor, in consultation with the Clinical Training Director, can assist with identifying potential clinical advisors. Clinical advisors should be selected, and students should meet with them before their first committee meeting in the Fall of the second year. Clinical activities are not expected to occur while first year students are engaged in rotations. Clinical advisors are welcome to attend student's thesis committee meetings but are not required to do so. Students should meet with their clinical advisors at the beginning of each semester (and more if the student desires and the advisor is willing). Students should discuss with their clinical advisors what clinical activity they would like to participate in. Clinical advisors will advise them about the availability and suitability of relevant clinical activities.

Activities can include, but are not limited to, the following which should occur at least once a month or 4 times a semester:

- Shadowing the advisor on rounds or in clinics
- Attending grand rounds (usually on Fridays at noon for the Department of Medicine). Speakers and subjects will be provided to students
- Attending and participating in a clinical journal club related to infectious or inflammatory diseases- Speakers and subjects will be provided to students
- Attending and participating in MD, PhD journal club
- Attending Clinical Microbiology or similar Rounds
- Reviewing Pathology slides on infectious/inflammatory diseases

- Speaking with pharmacists about inflammatory disease-related drugs or biologics-e.g. anti-TNF $\alpha$  mAbs
- Attending global health/epidemiology/CTSI seminars related to infectious/inflammatory diseases
- Attending ID or other case conferences

Students should include a bullet point list of clinical activities they have engaged in on their TAC reports. Committees should monitor and approve clinical activities in terms of frequency. The clinical activities should continue through year four (third research year) or until the student has permission to defend.

To help implement this program, the student advisor will provide first year students and their thesis mentors at the time of entering the thesis lab a list of potential clinical advisors at Tufts Medical Center. Beginning in the second year, the student advisor will provide all students (and their thesis mentors) information about Department of Medicine Grand Rounds on Fridays, Clinical Journal Clubs, ID Case Conference on Tuesdays and any other relevant information.

## *Career Planning*

All PhD research trainees must have an Individual Development Plan (IDP) to help them develop their career paths. Tufts has created two forms to assist students in identifying their career goals and the current activities they participate in to achieve them. These forms are available at <https://gsbs.tufts.edu/studentLife/currentStudents/forms>.

- The IDP form is intended help students consider their career aspirations as well as the types of skills and attributes that may affect these aspirations and students' ability to attain their goals. It is not intended to predict or identify careers that match their skills. The document is for students' personal use only. Students are not required to share this document with anyone or provide anyone at Tufts with a copy of the completed document. Students may, however, choose to share the document with mentors who may suggest ways to improve skills that are appropriate to the career path(s) being considered. This document should be a living document and one that is updated as students advance in their training.
- The Training and Career Goals Progress Report form is designed to help students think about what they are learning and how to develop professionally. Students are asked to complete this form with a reflective assessment of their current progress and the plans for reaching both short- and long-term career goals. Note that some questions on the form may not apply depending on a student's stage of training. This annual progress report is designed to provide ongoing documentation of progress made towards career goals. Once a year, students complete this form and submit it to their thesis committee along with their research reports for discussion at a TAC meeting. It is the responsibility of the thesis committee to provide advice on the

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resources that will help students achieve their goals at Tufts and beyond.

IDPs have proven so valuable that NIH has mandated that every trainee that it supports have one. Students can learn about IDPs at this very valuable site, <http://myidp.sciencecareers.org/>. They may also talk with their mentors, Student Advisors, the Program Directors, or the Associate Dean about career planning, in addition to their Thesis Advisory Committee.

## *Thesis Advisory Committee Meetings and Assessment of Research Progress*

Immunology students are responsible for holding their first Thesis Advisory Committee (TAC) meeting before the end of the fall semester of their second graduate year. MD/PhD students must hold their first TAC meeting in the fall semester of their first graduate year.

In most circumstances, two meetings a year, one in the fall semester and one in the spring semester, will be adequate to evaluate the student's progress in the graduate research course. If the TAC deems it necessary, however, they may require interim meetings to ensure that the student receives proper guidance and support. Failure to hold meetings in a timely fashion will result in an Incomplete grade for research for the semester which will become a failing grade if not completed by the end of the subsequent term.

Students should summarize their research progress and plans on the most up to date TAC Evaluation form on the GSBS website (<https://gsbs.tufts.edu/studentLife/current-Students/forms>). After the Committee meeting, the TAC Chair enters the Committee's assessment on the TAC Evaluation form and assigns a grade (S/U) for Graduate Research. The form is signed by all members and an electronic copy is sent to the GSBS Registrar who records the grade on the student's transcript.

Students must submit a written thesis project proposal and present preliminary data to their Thesis Advisory Committee at their first thesis committee meeting. The project and the student's progress must be acceptable to the thesis committee. TAC meetings must ideally be held within the four-week period after the student's workshop talk and again in the following semester. Students presenting in the spring semester need to have a meeting in the fall semester within the four-week period beginning six months earlier than their scheduled talk. Details concerning all aspects of the thesis committee procedure are distributed to each PhD student at the beginning of the second year and to MD/PhD students soon after they enter the program.

Beginning with the third meeting of a thesis committee, a portion of the progress report, discussion, and the committee report should be devoted to the status of work leading to a manuscript for submission. Depending on the status of experimental work, this might focus on such matters as the possible main point of a paper, an outline of a manuscript, additional experimental work needed for a manuscript, discussion of the journals under consideration, or drafts of

a manuscript.

At each TAC meeting, the committee, PI and student should discuss and decide on expectations to be met prior the next meeting and set a date for that meeting. Interim committee meetings for any reason other than granting permission to defend may not be scheduled any sooner than two months since the last meeting. The TAC can choose not to provide a grade at an interim meeting as long as a regular meeting is held within the term's timeframe. However, at the discretion of the TAC, a grade may be assigned at an interim meeting. Only one grade will be permitted each term.

A student's progress report should be considered as an opportunity to practice and develop writing skills. Thesis advisors are encouraged to take the time to mentor writing as opposed to correcting it. The student gains from such experiences. Further, it does not help the student to have a thesis committee evaluate a progress report that is largely written by the mentor. Thesis committees must include comments on writing skills in each report. Students must send their thesis advisors their committee reports at least 2 weeks before the committee meeting and to their committee at least 1 week before the committee meeting.

## End of Third Laboratory Year Committee Meeting

At the end of the third laboratory year, the committee will communicate its confidence or lack thereof in the student's project. All committee members must attend this meeting.

The student progress report for the end of third laboratory year committee meeting should contain a clear and concise summary of the work completed so far and of the remaining goals of the project. The experiments that are projected to fulfill these goals should be outlined briefly. The report, as all other student progress reports, should be given to the committee at least 1 week before the meeting.

The committee will rigorously evaluate the overall progress in achieving the goals of the thesis project and the likelihood that remaining goals can be achieved. As part of the end of the third research year evaluation, the thesis committee must determine if the student has made at least one novel observation that would provide the basis for a thesis and a publishable paper.

In the case of a positive evaluation, the committee will be acknowledging that, barring unforeseen developments, it is confident that the project will lead to successful completion of the dissertation research. It is important to note that a positive committee evaluation at the end of the third laboratory year does not guarantee a degree.

In the case of a negative evaluation, the chair of the committee will draft a report detailing the committee's objections to the project. The student and advisor will have one month to respond in writing to the evaluation. The following responses are possible: 1) the student and advisor disagree with the committee and have decided to proceed with the project and have formed a new or altered commit-

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tee to guide the work, 2) the student and the advisor have decided to pursue a different project and interact with the same or a different thesis committee as appropriate, or 3) the student has decided to pursue a different project in a different lab. The faculty will be apprised of the outcome of the evaluation at the final faculty meeting of the academic year.

In addition, it is extremely important to understand that a negative evaluation at this point does not rule out the possibility that the student can successfully complete the dissertation with the project in which the committee does not have confidence. The goal of a negative evaluation is to send a clear danger warning about the project to the student and the advisor.

The thesis committee monitors student progress and also determines when a student has completed sufficient work to prepare their thesis. The following is a suggested format for committee meetings. Before the start of the meeting—the student steps out for 5 min so the advisor can bring up any concerns. After that, the advisor steps out for 5 min so the student can talk freely with the committee about any issues. The committee meeting then proceeds per usual. The student should have all the data available in a Power-Point presentation, if a committee member has questions.

The Committee chair completes the TAC report at the end of the meeting (including interactions with the clinical advisor) and sends to committee members for approval/signatures. The Chair submits the TAC report to the GSBS Dean's Office, the Student Advisor and the Program Coordinator.

The following is a suggested format for TAC reports. These are only suggested guidelines. **If the thesis advisor or committee chair wants more or less information, that is fine.** At the first committee meeting, the student should summarize his/her general research topic and define initial hypotheses. Subsequent meetings will refine (or re-define) hypotheses and/or serve as research updates for the committee. The following format is suggested.

- Introduction to the research topic (1-5 pages). The first report should include an initial introduction to the research topic. Subsequent reports can include updates from the literature or Introduction sections to new topics or approaches as needed. Previous Introduction sections need not be repeated. Optionally, the initial Introduction section can be included as a separate Appendix or a short, bulleted version of the Initial Introduction can be included. The first report should include a brief initial thesis proposal.
- Specific Aims section (1 page or less) listing and describing the specific aims of the research.
- Research Progress section (up to 5 pages including figures) describing the progress made towards each specific aim. This should start with a short-bulleted section on "Progress made since last committee meeting". Next, for each specific aim the student should:
  - a. State the hypothesis.

- b. Succinctly describe progress
  - c. Methods and approaches should be mentioned but not described in detail.
  - d. Figures (with legends) can be embedded in the text or appended at the end of the document. Include methods used and results obtained for statistical analysis in the Figures and legends. Legends should be understandable without the need to reference the text. Mention how many times the experiment was done and whether the figure is representative of a number of experiments or is an average of these experiments. Include numbers of biological and technical replicates.
  - e. Statistical method used for analysis should be mentioned. A statement saying whether the results are preliminary or complete should be included. A statement explaining how the size of "n" and the number of repeats was decided upon.
- Outline of Expected Manuscript. If a manuscript is expected to be submitted before the next TAC meeting this section should include an outline of the paper including figures and tables. The complete manuscript if available should be included as an Appendix.
  - Goals for next 6 months. Should be included as a bulleted list.
  - Publications resulting from work (include those submitted).
  - Meetings attended (or which are planned to attend) during the current academic year.
  - Interactions with the clinical advisor during the semester should be included.
  - A timeline for completion of studies can be included in the progress report when the student is close to finishing their thesis research, i.e. in the latter years of the research project.

To obtain permission to defend the thesis, a student, after consultation with the advisor, must present the TAC committee with the following information.

- Outline of the thesis Results Section. The outline should be organized in chapters, delineate the major findings, highlight their significance, and be accompanied by a list of figures and tables.
- An abstract. The abstract of the thesis work should be approximately 250 words.
- A list of remaining experiments. If any experiments remain to be completed, these should be described and a timeline for their anticipated conclusion should be given. It is anticipated that very little bench work will remain once the committee gives permission and that no experiments critical to an acceptable thesis will remain to be completed.
- Choice of outside examiner. The student also needs to inform the committee as to the choice of outside examiner.

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The student and advisor should make every effort to reach an agreement concerning the material to be in the thesis prior to the committee meeting. In the event that the student and the advisor are not in full agreement concerning the thesis content, the work remaining, or a schedule for experimentation or writing, these issues should be laid out clearly for the committee to evaluate.

Upon evaluation of the outline and the timetable, the committee will decide whether to grant permission. In granting permission, the committee is not guaranteeing the degree but merely stating that they feel the body of work presented to them is sufficient for the thesis.

All committee members, including the thesis advisor, must be present at meetings where permission to defend is considered. It is important to note that many students elect to write large sections of their thesis before their final committee meeting. Often this is to the student's benefit because it expedites the process of preparing the thesis. The defense date must occur within three months of receiving permission.

## Selecting an Outside Reviewer

A student, after consultation with the advisor, should propose an individual as an outside examiner at the final committee meeting. The outside examiner may not be from Tufts University or Tufts Medical Center. If the student is uncertain about the willingness or availability of the first choice, several names may be proposed. The committee can approve all or some of the choices and offer additional suggestions. The TAC members decide whether the outside examiner proposed by the student is suitable. This decision should be made unanimously, and the committee needs to consider potential conflicts of interest.

Either the student or the advisor may make the initial contact with the outside examiner. Once a person has agreed to serve as the outside examiner, he or she will be contacted by the chair of the committee concerning the mechanics of the defense procedures. If a person from outside the Boston area is identified as an outside examiner and you wish to seek support for travel/lodging for this individual, prior approval by the Program Director is required. Any costs for an out of town outside examiner are the responsibility of the thesis advisor, not the Immunology Program, unless the examiner has been invited by the Program to give a seminar.

## *Thesis Format and Defense*

When a student receives permission to defend, he/she should make an appointment to meet with the Associate Dean. Students will receive instructions on all aspects of the process used to complete the degree, thesis formatting guidelines and information about Commencement Ceremonies at Tufts University.

In order to receive a PhD in Immunology a student must have completed a substantial body of work, demonstrate a thorough mastery of his/her subject and have achieved the ability to work independently. When the thesis committee

determines that the aims of the project have been met, the thesis is prepared and defended in an oral examination.

Students distribute their thesis to their Thesis Defense Committee members (which includes the thesis advisor, the outside examiner and all committee members approximately two weeks before their scheduled defense. The chair of the thesis committee will contact all committee members, including the outside examiner, 48-72 hours prior to the defense to determine if the thesis is generally acceptable to the committee.

The oral thesis defense is the culmination of the thesis process and consists of both a public presentation of approximately 45-60 minutes, followed by a closed discussion period with the committee and outside examiner. The public presentation is the opportunity for the student's lab and the GSBS community at large to hear the research. Consequently, the ideal format is for in-person public presentations is as follows:

- In Boston for students in Boston or Medford labs
- In Portland for students in Maine Medical Center Research Institute Labs
- In Bar Harbor for students in Jackson Labs

However, a fully remote (via Zoom) public presentation is acceptable.

For those students who may be working at affiliated (non-Tufts/MMCRI/JAX) labs, the defense should take place at the location the student was originally placed. In-person public presentations should also be available via videoconferencing for faculty and students on different campuses.

It is preferable that all members of the Thesis Advisory Committee (TAC) plus the approved outside examiner be physically present at both the public presentation and closed discussion. However, if necessary and unavoidable, one or more committee members may be remote for the presentation and discussion. During the deliberations of the thesis examination committee, the committee should determine what revisions need to be made to the thesis document and the amount of time needed to complete those particular revisions. The GSBS Time-from-Thesis-Defense-to-Completion Policy, governing thesis revisions and continued receipt of a stipend, is in the Student Handbook (<https://gsbs.tufts.edu/studentLife/StudentHandbook>).

## *Publication*

Because writing and publishing results and conclusions is a critical part of the life work of scientists, the Program requires that all students have at least one first author publication or manuscript published or in press at the time a thesis is defended.

If the TAC believes that there are extenuating circumstances, the group can request that the full faculty consider making an exception to the requirement for publication before the defense.



# LIST OF PROGRAM FACULTY

\*Not accepting new students

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Zeng, Li	2107	<a href="mailto:li.zeng@tufts.edu">li.zeng@tufts.edu</a>

All Boston phone numbers start with 617-636-, and all Medford numbers start with 617-627-.

# LIST OF STUDENTS

## 1st Year

	Kimberly Carroll		
	Max Lee		
	Brandon Theall, MD/PhD	3951	Pilar Alcaide
	Tianmou (Tony) Zhu		
	Maria Zambrano		

## 2nd Year

	Abraham Bayer, MD/PhD	3951	Pilar Alcaide
	Tyler Colson	3889	Xudong Li
	Mac Sawden	6612	Shruti Sharma
	Ali Setaro	0318	Marta Gaglia
	Chris Wells	7613	Linden Hu
	Alex Werner	2726	Marta Rodriguez-Garcia

## 3rd Year

	Sid Parthasarathy	2726	Marta Rodriguez-Garcia
	Michael Rist	6528	John Coffin
	Valentina Studentsova	0906	John Leong

## 4th Year

	David Jetton	3945	Alexander Poltorak
	Zoie Magri	3945	Alexander Poltorak
	Sasha Smolgovsky	3951	Pilar Alcaide
	Linda Xu	0906	John Leong

## 5th Year

	James Cameron	3889	Xudong Li
	Talia Greenstein	0919	Bree Aldridge
	Machika Kaku	6526	John Coffin
	Kate Sulka	6612	Shruti Sharma/Phil Haydon

## 6th Year

	Jacob Hopkins	6612	Shruti Sharma
	Hymlaire Lamisere	8437	Honorine Ward
	Urmila Powale	7613	Linden Hu