Table of Contents

**Welcome and Key Program Contacts** .......................................................... 3
**Curriculum Overview** .................................................................................. 4
  - Required Courses ......................................................................................... 4
  - Elective Courses .......................................................................................... 4
  - Graduate Seminar and Journal Club .......................................................... 4
  - Teaching ....................................................................................................... 5
  - Summary of Important Dates ...................................................................... 6
**Qualifying Examination** .............................................................................. 6
  - Purpose ........................................................................................................ 6
  - Timing of the Qualifying Exam ................................................................... 6
  - Selection of the Qualifying Exam Committee ........................................... 7
  - Format of Written Qualifying Exam .......................................................... 7
  - Evaluation of the Qualifying Exam .............................................................. 9
**Research and Thesis** ..................................................................................... 10
  - Selection of the Thesis Adviser ................................................................. 10
  - Selection of the Thesis Advisory Committee ............................................ 10
  - Thesis Proposal Preparation ....................................................................... 10
  - Assessment of Research Progress ............................................................. 12
  - Thesis Format and Defense ........................................................................ 13
**List of Biochemistry Students** ................................................................. 14
**List of Biochemistry Program Faculty** ....................................................... 14
Welcome and Key Program Contacts

Welcome to the Graduate Program in Biochemistry. We hope that this Program Guide will provide helpful material on the requirements of the program. It supplements information contained in the Sackler School Catalog (http://sackler.tufts.edu/Student-Life/Sackler-Catalogs) that has the official degree requirements and course listings, and the Sackler School Student Handbook (http://sackler.tufts.edu/Student-Life/Sackler-Student-Handbook) that contains important information about topics such as the Sackler academic and registration policies, professional conduct guidelines, financial matters, and information about student benefits, services, and resources. We would greatly appreciate any feedback from you to help us make this Guide more useful.

On our website (http://sackler.tufts.edu/Academics/Degree-Programs/PhD-Programs/Biochemistry-Welcome), you can find more information about the research interests and publications of the faculty, as well as up-to-date schedules of seminars, journal clubs, and research reports.

The primary goal of the Graduate Program in Biochemistry is to train graduate students to achieve research excellence. Biochemistry participates with the Cell, Molecular, and Developmental Biology (CMDB) and the Cellular and Molecular Physiology (CMP) Programs in the Integrated Studies Program (ISP) to provide a coordinated first-year curriculum. Students who matriculate in the ISP in Fall 2014 will be the last class to have the option of completing their graduate degrees in the Biochemistry or CMP Program. Starting Fall 2015, students who wish to pursue research in biochemistry, cancer biology, cell and developmental biology, and molecular medicine will do so as part of the newly-restructured CMDB Program.

There are several people who can serve as valuable resources during your PhD training and are 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.

<table>
<thead>
<tr>
<th>Name and Position</th>
<th>Location</th>
<th>Phone</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Larry Feig, Program Director</td>
<td>Jaharis 613</td>
<td>6956</td>
<td><a href="mailto:larry.feig@tufts.edu">larry.feig@tufts.edu</a></td>
</tr>
<tr>
<td>Andrew Bohm, Student Advisor</td>
<td>M&amp;V 615A</td>
<td>6994</td>
<td><a href="mailto:andrew.bohm@tufts.edu">andrew.bohm@tufts.edu</a></td>
</tr>
<tr>
<td>Larry Feig, Andrew Bohm, Alexei Degterev, Journal Club Mentors</td>
<td>Jaharis 613 M&amp;V 614 Jaharis 915</td>
<td>6956 6994 0491</td>
<td><a href="mailto:larry.feig@tufts.edu">larry.feig@tufts.edu</a> <a href="mailto:andrew.bohm@tufts.edu">andrew.bohm@tufts.edu</a> <a href="mailto:alexei.degterev@tufts.edu">alexei.degterev@tufts.edu</a></td>
</tr>
<tr>
<td>Larry Feig, Andrew Bohm, Qualifying Exam Topic Advisors</td>
<td>Jaharis 613 M&amp;V 614</td>
<td>6956 6994</td>
<td><a href="mailto:larry.feig@tufts.edu">larry.feig@tufts.edu</a> <a href="mailto:andrew.bohm@tufts.edu">andrew.bohm@tufts.edu</a></td>
</tr>
<tr>
<td>Karen Hatch, Program Coordinator</td>
<td>Jaharis 512</td>
<td>2108</td>
<td><a href="mailto:karen.hatch@tufts.edu">karen.hatch@tufts.edu</a></td>
</tr>
<tr>
<td>Christina McGuire, GSC Representative</td>
<td>M&amp;V 719</td>
<td>6922</td>
<td><a href="mailto:christina.mcguire@tufts.edu">christina.mcguire@tufts.edu</a></td>
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Curriculum Overview

Required Courses

The didactic portion of the Program begins in Year 1 as an Integrated Studies Program student and is described in detail in the Sackler Catalog (http://sackler.tufts.edu/Student-Life/Sackler-Catalogs). A list of the Biochemistry required and elective courses can also be found in the Catalog. In addition, the Catalog contains course descriptions and progression plans for the first and second year.

MD/PhD students in the Biochemistry Program have slightly different course requirements. These requirements are listed in the Biochemistry section of the Sackler School Catalog.

Students need to have passed Year 1 courses before standing for the Qualifying Exam. Exceptions require the approval of the Program Director.

Elective Courses

Elective courses should be used to explore your interests and further your understanding of your thesis research fields. Electives must be approved by your thesis advisor and the Program Director. In addition to the required electives, students are welcome to take additional electives, especially when relevant to their thesis research, and with their advisor’s approval.

Graduate Seminar and Journal Club

Biochemistry Graduate Seminar:

The goal of attending the Biochemistry Graduate Seminars is to improve the student’s appreciation for how research progress is obtained. Attendance is required for all years.

Biochemistry Journal Club:

The overall goal of the Journal Club (JC) is to advance the student’s skills in critically evaluating scientific literature as well as improve the student’s presentation skills. The Journal Club mentor group includes Larry Feig, Andrew Bohm, and Alexei Degterev.

Students will be given a date for their JC presentations sometime between September and June. Second year students will get dates in the Spring Semester. MD/PhD students give their first JC presentation during the 2nd PhD year and are only required to make two JC presentations, during the 2nd and 3rd years.

Students are welcome to trade dates with other students so long as both parties agree and Karen Hatch, the Program Coordinator, is informed. Students who switch a research presentation date with a journal club date must be sure to also email the journal club mentors regarding this change.

You are welcome to consult with any of the JC mentors about papers you are considering. When you choose a paper, you must first check with any one of them to get his/her approval. The topic of the paper should not be too closely related to your thesis work or
work going on in your advisor’s lab, but may be in the same general research area or field.

Be sure to email a PDF of the paper to Larry, Andrew, or Alexei a week before your presentation. Also, email a PDF copy of your file to Karen so she can email it out to all students and faculty in the program.

You are allowed to practice your presentation and get input from your advisor and friends. Of course, the background research and work on the presentation has to be all your own. You are also encouraged to ask the JC mentors for pointers on how to prepare your presentation.

The JC mentors will give comments and suggestions after your talk. While Journal Club presentations are graded pass/fail, they are an important part of the program. Thus, try to make your presentations as good as possible.

Suggestions:

- Choose a paper that is interesting to you and that you think will also be interesting to others (topical, novel, important but overlooked, etc.). It need not be from Cell to be good, and being in Cell doesn't automatically make it a good JC paper.

- Provide an introduction that explains the hypotheses tested and rationale for the experiments in the paper. Provide enough methodological details that everyone in the room can understand what was done. Don't assume "everyone knows that"- a brief refresher is almost always welcome. Note that providing this background will often mean reading all or part of several papers that came before the one you're presenting.

- You do not have to present every figure. Present the ones that make up the most important story in the paper and only briefly mention or omit others that are tangential.

- You don't have to defend the paper. Ideally it should be a paper that, on the whole, you like and agree with, but if you disagree with an argument or think the authors failed to do an important control, you should say this. In fact, almost all papers have weaknesses, and you should know about and discuss major weaknesses that you find.

- Wrap up with a summary of the most important points and why you think the paper represents an advance in its field, medicine, or both.

- Practice by saying everything out loud (at least once) to make sure your presentation flows smoothly and you can finish in time.

- Be prepared to be interrupted with questions. If the question is about something that is addressed in later slides, feel free to say “I'll get to that in a bit.” Also, don't be afraid to say, “I don’t know,” and move on.

Teaching

The goal of participating in teaching of the Medical Biochemistry course is to enhance student’s teaching technique. In the Fall of the third year, graduate students assist in conference and tutorial group teaching of medical students as part of their training as teachers in universities and professional schools. As preparation, second year
Biochemistry graduate students sit in on Medical Biochemistry conference sections. There are also opportunities for tutoring both professional and graduate students for those who wish to get additional teaching experience.

Summary of Important Dates

- Attend Tuesday noon student talks and journal clubs.
- Teaching preparation – Sit in on Medical Biochemistry conferences.
- Attend Tuesday afternoon (4-5 pm) outside speaker seminars (2nd year and up): schedule available soon. See board for announcements.
- 1st thesis committee meeting – Before December 15th of the 2nd year.
- Subsequent thesis committee meetings each spring and fall semester.
- Discuss your Training and Career Goals Progress Report form once a year with your thesis committee.
- Qualifying exam topics – Due February 15th of the 2nd year.
- Qualifying exam writing – generally the month of February/March (28 days).
- Biochemistry Journal Club presentations – Spring semester of the 2nd year and once per year thereafter until the year you plan to graduate.
- Biochemistry research presentation – 3rd year (generally in the Spring semester) and then once per year until the year you plan to graduate.
- Medical Biochemistry Conference teaching – Fall semester of the 3rd year, preparation sessions on proceeding Thursdays at 1:30.

Qualifying Examination

Purpose

A goal of the Qualifying Exam is for the student to demonstrate the ability to create a logical research plan based on data already present in the literature. Another goal is to give the student experience in scientific writing in the form of a research grant proposal.

Timing of the Qualifying Exam

All students are expected to take the Qualifying Exam in the second year. Students should start thinking about qualifier topics in the summer of their 1st year and in the fall of year 2 as they encounter interesting papers and think about the next experiments one could do to follow up on those findings. Short descriptions of two possible qualifier topics are due by the end of January. After approval of one of these topics, students are given 28 days to complete the written portion of their qualifying exam. The proposal should be given to the committee at least a week before the oral defense date. The oral examinations are typically administered in February of year 2.

If a conflict exists, the date to begin writing the exam can be postponed or the period for writing extended somewhat, but in all cases the written proposal should be completed by the end of March in the second year. The exam is not intended to become a "time sink," but should be your principal focus for these four weeks.
Selection of the Qualifying Exam Committee

Each examination will be overseen by a committee of three faculty members who should not include the thesis advisor. A Chairperson of the committee will be assigned by the Program; the other two members will be chosen by the Chairperson and Program Director as appropriate for the topic proposed. Students may ask for the replacement of one of the examiners.

Format of Written Qualifying Exam

Initial Abstract

The qualifying exam topic must not be directly related to thesis work or to topics in which the student has significant prior research experience. For example, a student working in a lab whose main focus is signal transduction should choose a topic that, at most, only peripherally relates to signal transduction.

Choosing good topics requires delving deeply into the research literature, so you should start well in advance of the deadline. Note questions that interest you when you read papers and when you attend seminars.

After some investigation of the literature, two topics should be selected, and a short (one half to one page) proposal outline prepared for each. Give yourself a solid week or more to work on your topics. You are welcome to talk with members of the Qualifying Exam Topic Advisors, which are likely to be Larry Feig and Alexi Degterev, while preparing your topics to help troubleshoot different ideas and design good proposal aims.

Topic proposal outlines should include: 1) a brief statement of the outstanding question(s) and how answering it would advance scientific knowledge and, if appropriate, a working hypothesis, and 2) an outline of the experiments or sets of experiments (aims) that you would use to address the stated question(s) or test the hypothesis.

While a detailed bibliography is not necessary at this stage, you should provide a few key references that establish the gap in current knowledge or hypothesis and that establish the feasibility of key methods.

The initial topic proposal should be submitted to the Topic Advisors by February 15\textsuperscript{th} (or the following Monday, if this date falls on a weekend). Within a few days after receiving the proposals, the Topic Advisors will evaluate them and then one or more Advisors will meet with you to discuss your proposals. At this point, one of the outlined topics will be chosen as the Qualifying Exam topic, or (if necessary) additional time will be given to amend or add to the proposed topics for resubmission to the Topic Advisors.

Research Proposal

Once a topic is approved, each student will be given 28 days to complete the written portion of their qualifier exam. The Qualifying Exam proposal should be less than 25 pages double spaced (excluding specific aims page and references) and structured as follows:
1. **Title Page**: The title page should include the project title, student’s name, date submitted, and names of the Qualifying Exam Committee members.

2. **Specific Aims (1 page)**: This should contain 1) a brief statement of the outstanding question(s) and how answering it would advance scientific knowledge and 2) an outline of the proposed aims. Each aim should describe a distinct set of experiments that test part of a hypothesis, or address a specific question or a conceptually-separable aspect of a larger question. Aims should be numbered, followed by a title in bold and a very short description of the question or hypothesis addressed, approaches to be used, and how the completion of the aim is expected to advance scientific knowledge.

3. **Background and Significance (~ 8 pages)**: Briefly lay out the essential background for the proposal. After a brief introduction, zero in quickly on describing the gap in the knowledge that you will be specifically addressing. If appropriate, describe a specific hypothesis to be tested. Describe why filling this knowledge gap or testing this hypothesis will provide a significant advance in scientific understanding and/or medicine. Use this section to provide an account of any preliminary studies (from the literature) that demonstrate the effectiveness of the proposed experiments in answering the outstanding questions you have identified. Be sure to provide full references for any figures you use from other sources.

4. **Experimental Design (~ 16 pages)**: Describe in greater detail the experiments to be done in each Aim. Begin with a paragraph that summarizes the question/sub-question to be addressed in the aim and outlines the approach. Next, describe the proposed experiments concisely, but in sufficient detail to be understandable to all of your Qualifying Exam Committee members who may or may not be well versed in the field of your proposal. From the description it should also be clear 1) that you understand the fundamental aspects of the experimental approaches and 2) that there is good evidence that the approaches you have chosen are likely to work and are well suited to your studies (e.g., describe and cite examples from the literature). When appropriate, provide figures (experimental flow charts, sequence alignments, examples of similar experiments from the literature, etc.) to illustrate your approach. Be sure to indicate appropriate controls. Do not catalog details of procedures (i.e. buffer conditions, PCR conditions, cloning procedures) unless these details are of particular significance to the work. Finally, you should describe the expected results and show that you understand what conclusions can or cannot be drawn from the expected data. If there are multiple likely outcomes, describe the ramifications of each to understanding the questions addressed and/or to the design of experiments in this and other aims. Where there is a significant chance that your approach will fail, state this and either provide a justification for why the potential benefit outweighs the risk or, ideally, briefly describe an alternative strategy to take if the first one fails.

5. **Future Studies (~1 page)**: Briefly describe the future research and/or scientific advances that the successful completion of your aims will lead to. Will you have developed a technique that can be used to answer other important questions? Will your results lead to advances in prevention, diagnosis, or treatment of a disease? What new questions will your research bring up and how, in general terms, might they be addressed?
6. **References:** List all literature references. Each reference must include the title, names of all authors, book or journal, volume number, page numbers, and year of publication. The reference should be limited to the most relevant literature. While there is not a page limitation, it is important to be concise and to select only those literature references pertinent to the proposed research. Cite references either by number or by First Author and Date. Managing your references will be much easier if you use a program like Endnote.

It is OK if results from research similar to your proposal are published while you are preparing your exam. You should, however, not read beyond the abstract of any such publications until after you have passed your exam, so as to avoid copying techniques or biasing the a priori expectations of your proposal.

The written document should be your work alone. However, as in grant writing, it is acceptable and encouraged to discuss, in a general way, experimental approaches with colleagues including members of your Qualifying Exam Committee and advisor. These individuals may not, however, review the written proposal.

**Evaluation of the Qualifying Exam**

The Qualifying Exam Committee will judge the exam based on the quality of the research written proposal, and the ability of the student to present his/her ideas and respond to constructive criticism in an oral presentation. Failure to complete the Examination successfully is grounds for dismissal from the Sackler School.

Once the written proposal has been handed in, the Qualifying Exam Committee will give it a preliminary reading to determine if the proposal is suitable for oral defense. If there is a serious problem, two weeks will be allowed to correct it. This initial correction will not be counted as one of the revisions described below. If it is acceptable, then the oral defense will be scheduled as soon as possible. Scheduling the oral exam does not mean that the Committee is necessarily entirely satisfied with the written proposal.

For the oral presentation, students should prepare a 30 minute presentation with appropriate slides or overheads to briefly present the experimental goals and methods. The committee may have you go through the whole presentation, or ask you to jump around to different sections while discussing the proposal. It is often useful to prepare supplemental slides for important figures that were not included in your written proposal or oral presentation such as details of prior studies that form the basis for your proposal, flow charts, or diagrams explaining complicated experiments, alternative directions, and other things that you think your committee may ask about.

When the committee has discussed the proposal with the student, it may decide that both written and oral presentations are acceptable so that student has passed the Qualifying Exam. However, the committee may also require that the written document be amended and/or that the oral defense be repeated. Part of the goal of the Qualifying Exam is to improve grant writing skills, so it is anticipated that revisions will be expected with some frequency. If revisions are required, the Qualifying Exam Committee will provide the student with a description of the problems that they perceive. The Committee will also set the ground rules, including deadlines, for the revisions.
If the first revision is still unsatisfactory, the student will have one final opportunity to correct the deficiencies. The Qualifying Exam Committee and Thesis Advisory Committee may meet to discuss the remaining problems and advise the student on how to proceed.

In the event the second revision remains inappropriate, the entire Faculty will meet to determine whether or not to assign the student a failing grade for the Qualifying Exam.

**Research and Thesis**

*Selection of the Thesis Adviser*

Students are matched with thesis mentors in May of their first year after participating in four laboratory rotations. The centralized matching system is designed to maximize the chances that students are matched with one of their top choices. Neither students nor faculty may make thesis lab commitments before the official matching process takes place. However, students are strongly encouraged to meet with potential mentors to share their interest in the laboratory and to ascertain what types of projects are available to students.

*Selection of the Thesis Advisory Committee*

The overall goal of a Thesis Advisory Committee is to help guide a student through his/her thesis research in a timely manner. This involves providing expert advice on the design and implementation of a research plan formulated by the student and his/her mentor. The committee will also evaluate and grade the progress a student is making throughout the graduate research.

The Thesis Advisory Committee should consist of three members of the Biochemistry Program faculty in addition to the thesis advisor. The student and the advisor should work together to form the committee. The expertise needed for the thesis project and the probability of forming good working relationships should be considered as the members of the committee are selected.

Occasionally, committees may consist of the advisor, two Biochemistry Program members, and one Sackler faculty member who is not in the Biochemistry Program. A committee of this composition should be approved by the Program Director, Larry Feig. Also, the thesis committee may be larger than three members and include faculty who do not belong to the Biochemistry Program. However, it is sometimes challenging to find times for committee meetings, a problem made more difficult if the committee is large. Individuals should be invited to participate only if their advice is of central importance.

The student should ask each member if he/she is willing to serve on the thesis committee. Faculty members may decline if they feel they do not have adequate expertise, or if they have too many committee responsibilities.

*Thesis Proposal Preparation*

The goal of generating a thesis proposal is to advance the student’s ability in scientific writing and organizing research plans in a logical manner. This proposal should be given to your committee at least one week prior to your first committee meeting, and should be 4-6 pages single spaced.
It is important that you put thought and effort into the writing of your research proposal. Try to convey your ideas (and preliminary results, if available) clearly. You also should use this report as an opportunity to hone your writing skills. While the writing should be yours, you should work closely with your advisor in laying out an initial proposal that is likely to succeed and is expected to develop into a complete body of publishable thesis work. You’re also welcome to have your advisor edit drafts of your proposal.

The proposal should contain the following parts:

1. **Title page**: Name, title, committee members, date of meeting, place of meeting.

2. **Summary (1/2 to 1 page)**: Summarize Background, Significance, Aims, and Design.

3. **Background (1 - 2 pages)**: Do not review the entire field. Focus quickly on the issue your work is trying to address. Provide just enough detail so that your committee members will understand the most relevant aspects of the system in which you are working. If you have copied a figure from another paper, be sure to credit the original source.

4. **Significance (1/2 page)**: Why should other people care about this work? Identify the gap in existing knowledge and why it is important to fill it. What benefits in science and/or medicine will come from the successful completion of your work?

5. **Specific Aims (about 1 page)**: List the major goals of the project. Provide a few sentence explanation of why you are doing each aim (to answer a biological question or set up a system to answer one). Focus on the initial aims (first year or two of work), but also sketch out how initial work will lead to later aims, with a rough plan for the entire project. Don’t think that you have to describe exactly what you will do for the next four years. In fact, you should expect that your plans will change dramatically over the years. The point of sketching out the whole project is, instead, to make sure you and your advisor have identified and considered a reasonable overall project. Note also, that you need not have a single established project from the outset. It’s quite acceptable to say you will do founding work to establish the viability of more than one project and continue on the one that works out best. If you do so, though, be sure to describe how and when you will decide on the viability of each project.

6. **Experimental Design (2 - 4 pages)**: This section should emphasize the order in which the experiments are to be conducted, with pitfalls and branch points clearly identified. Identify important landmarks that will establish the feasibility and value of your proposed experiments, and suggest alternative directions you could take if your initial aims prove too difficult. The general approaches to be used should be stated, but detailed methodology should not be given unless the experiments involve major departures from techniques that are commonly used.

7. **Relevant Preliminary Data**: Your preliminary data can be included if you have it (or you can present it at your committee meeting). This material is not counted in calculating page limitations.

8. **References**: The few that are most relevant, it is not necessary to be all-inclusive.
Assessment of Research Progress

For each Thesis Advisory Committee (TAC) meeting, students must prepare a 2-3 page (single spaced) summary of research goals and recent results. Students must also complete their portions of Thesis Advisory Committee Report Evaluation form (http://sackler.tufts.edu/Student-Life/Student-Forms) prior to the Committee meeting and email the form as well as the proposal or thesis committee report to their committee members. Each report must be distributed to the committee members at least one week before each meeting.

The first meeting of the committee must occur before the end of the fall semester of the second year. Because of the more intensive course schedule, MD/PhD students must schedule their first thesis committee meeting by mid-May. It is important to schedule the meeting in a timely fashion and not wait until mid-December when it may prove difficult to schedule. When you have scheduled the first (and all subsequent) committee meetings, send an e-mail to Andrew Bohm (andrew.bohm@tufts.edu) letting him know the date of your meeting. Also, when you get this information, send Andrew the names of committee members and chairperson. To ensure that everyone shows up, send an e-mail to remind your committee a few days before the meeting.

At the first committee meeting, a chairperson will be selected (this cannot be the advisor). The chairperson enters the committee’s assessment on the Thesis Advisory Committee Report form after each meeting that is sent out (usually by e-mail) to all committee members. The report should include a brief summary of major issues discussed, any specific requests or instructions by the committee for the next semester’s research, and a grade for the Graduate Research course. All members of the thesis committee should preview the report and agree to it before it is emailed to the student and the Sackler Registrar. Copies of the report should also be sent to the Program Coordinator, Karen Hatch (karen.hatch@tufts.edu).

The thesis committee will meet at least once during the Fall semester and once during the Spring semester. One of these two meetings should occur as soon as possible after the student’s Tuesday research presentation. Note that committees may meet more frequently at their discretion or at the request of the student or the advisor. In addition, students are encouraged to meet with any of their committee members for input and advice, from topics ranging from how to troubleshoot specific methods they have expertise in to advice on the overall thesis plan.

Progress Summary Report

Your progress report should include the following information.

- A summary of the background, significance, and aims (why you are doing this work, what outstanding questions your research is expected to answer, and why this is important).
- A brief summary of the project up to the last committee report.
- A summary of your recent results and progress (including figures illustrating major points). Note how these results further progress towards your aims. If your committee identified specific tasks or goals to be addressed in the 6 months since
your last meeting, discuss the progress made on each of these. This section can be shortened for committee meetings that take place immediately after your Research Seminar presentation, however, be sure to include important data that you did not present in your seminar. This section can also be longer if you have a lot of data you would like to discuss with your committee. Alternatively, you might choose to present a few representative figures in your report, and prepare slides for others that can be discussed at your meeting.

- A summary of your research plans for the next 6 months and how these plans will get you to your research aims. Note any possible or expected changes to your research aims.

Common mistakes made in preparing committee reports include failure to include figure legends; failure to provide comprehensible descriptions of experiments; failure to remind readers of important background material or diagrams; failure to describe immediate plans with an accompanying rationale; failure to distribute the report in a timely fashion.

Committee Presentation

For your committee meeting, prepare a short (~20 minute) slide presentation which covers essential background information and research rationale, summarizes existing data, and outlines planned experiments. You don’t need go over all the details from your report. However, make sure to have slides available for data figures in your report, as well as for other important new results you did not show in your report (or in your Tuesday noon Research Talk, if you had one before the meeting). This will allow your committee to discuss the fine details of your results and plan with you, and provide more helpful suggestions. Similarly, have slides to explain complicated research designs or non-standard techniques.

Thesis Format and Defense

When the thesis advisory committee is satisfied that the aims of the research project have been met, the student is given permission to defend his or her thesis. When a student has reached this point in their training she or he is not required to hold additional committee meetings, but should still attend program seminars and journal club. The student’s research is then presented in a written thesis and defended orally before a committee of faculty consisting of the Thesis Advisory Committee plus an outside faculty member. A successful thesis defense; completion of thesis revisions, required forms, and surveys; and uploading the thesis to the ProQuest are the final requirements for the degree. Detailed instructions on preparing your thesis are available on the Sackler website (http://sackler.tufts.edu/Student-Life/Student-Forms).
List of Biochemistry Students

Phone numbers that begin with a “7” indicate they are on the Medford Campus.

<table>
<thead>
<tr>
<th>Year in School</th>
<th>Student</th>
<th>Phone</th>
<th>Advisor</th>
</tr>
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<tbody>
<tr>
<td>2nd Year</td>
<td>Surendra Sharma</td>
<td>4082</td>
<td>Karl Munger</td>
</tr>
<tr>
<td></td>
<td>Nicole Sjoblom</td>
<td>7-0450</td>
<td>Rebecca Scheck</td>
</tr>
<tr>
<td></td>
<td>Tate Tabtieng</td>
<td>3586</td>
<td>Marta Gaglia</td>
</tr>
<tr>
<td>3rd Year</td>
<td>Matthew Butnaru</td>
<td>3586</td>
<td>Marta Gaglia</td>
</tr>
<tr>
<td></td>
<td>Christine McGuire</td>
<td>6922</td>
<td>Mike Forgac</td>
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<tr>
<td>4th Year</td>
<td>Sarah Hwang</td>
<td>7-3470</td>
<td>David Walt</td>
</tr>
<tr>
<td></td>
<td>Emily Michael</td>
<td>8486</td>
<td>Athan Kuliopulos</td>
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<td>Athan Kuliopulos</td>
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<td>Nil Vanli</td>
<td>7585</td>
<td>Guo-fu Hu</td>
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<tr>
<td>5th Year</td>
<td>Mike Freeman</td>
<td>6526</td>
<td>John Coffin</td>
</tr>
<tr>
<td></td>
<td>Claire Metrick</td>
<td>0474</td>
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<td>Cecile Rouleau</td>
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<td>Brian Schaffhausen</td>
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List of Biochemistry Program Faculty

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