Biomedical Informatics Training Program Student Handbook

Updated 11/3/2022

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1. Introduction and overview of Stanford resources

This handbook contains policies, procedures, and advice for the Biomedical Informatics (BMI) program, and augments other information from the School of Medicine's Biosciences Program, and Stanford University. Relevant information can be found on the following webpages, which are listed here for reference.

1.1. BMI

- [Stanford Bulletin section on BMI](#) (including curriculum requirements)

- [BMI home page](#)

- [BMI Forms and Downloads](#)

- [Department of Biomedical Data Science](#)

1.2. Academics

- [Information for new graduate students](#)

- [Current Students | Stanford Biosciences PhD Programs](#)

  - [Graduate Student Tracking system](#)

- [Graduate Education | Stanford University](#)

- [Graduate Academic Policies and Procedures](#)

- [Students | Registrar's Office](#)

- [Information for Current Students | Office of the Vice Provost for Graduate Education](#)

- [Office of Community Standards | Student Affairs](#) (Honor Code and Fundamental Standard)

1.3. Stanford Catalog

- [Stanford University Explore Degrees (a.k.a. Bulletin)](#)
- [Stanford University Explore Courses](#)

1.4. Computing

- [University IT](#)
- [Stanford Research Computing Center (SRCC)](#)
- [Information Resources & Technology | Stanford Medicine](#)
- [Cloud Account Management](#)

[Compute clusters](#):

- [Nero](#): Cluster for high-risk data - PHI compliant
  - Hosted in Google Cloud.
- Carina: New cluster for high-risk data – PHI Compliant
  - On prem; in beta and expected to be more available in early 2023
  - Will offer same experience as Nero - same s/w stack, all the programming languages
- [SCG](#): Cluster run by Genetics – has hundreds of tools. Moderate/low risk data
- [Sherlock](#): Very large cluster run by SRCC. Moderate / low risk data. For sponsored research.
- [Farmshare](#): Smaller cluster run by SRCC. Low risk data. For non-sponsored research and classes; smaller size jobs.
- For other Data Science / translational resources, see https://med.stanford.edu/sdsr.html
      (for example, access to large population health and clinical repositories)

Cloud Computing:

- Google Cloud Credit request form: https://forms.gle/9o7FpRp8mYZiJnn76
- Cloud Account Management service page: https://uit.stanford.edu/service/cloudacctmgmt
  (for access to Google Cloud Platform (GCP), AWS and Microsoft Azure services and support.)
- Other discounts available: https://uit.stanford.edu/cloud-vendor/reduce-cost

1.5. NLM / NIH

- NLM-funded training programs: https://www.nlm.nih.gov/ep/GrantTrainInstitute.html
- NIH public access policy: https://publicaccess.nih.gov/

- Track your publications (and check their compliance status) in https://www.ncbi.nlm.nih.gov/sites/myncbi/
- NIH-funded peer-reviewed articles, publicly available on PubMed Central
- NIH Manuscript Submission System (NIHMS)

2. For students

If you are new to Stanford (or newly admitted to the program), check out the Gateway for New Graduate Students by the Office of the Vice Provost for Graduate Education. It has a wealth of information.

In addition, the BMI program has an annual retreat just before the start of the fall quarter. Attendance is required for all students who are local to Stanford; others are welcome to attend if so able. During the retreat, you meet students, faculty, staff, and some alumni in an informal setting and learn about the students' research and labs. In addition, there is an orientation session for new students as well as lots of opportunities to learn about one another, the program, and Stanford.

2.1 How to get a computer

BMI loans laptop computers to first-year PhD students, and, when there are sufficient computers, Academic MS students. If you borrow a laptop, you should return it at the end of your first year. Your research supervisor is responsible for your computing resources from then on.

2.2 How to get ergonomic equipment

First year student: contact BMI Student Services. Others: this is the responsibility of your research supervisor. General information can be found on Stanford's Environmental Health & Safety webpage

2.3 How to stay updated on DBDS/BMI events

To stay informed of DBDS and BMI related events, students will receive the weekly DBDS Digest and be invited to join the BMI Student Slack Channel. The DBDS Weekly Digest contains information on the latest happenings within the program, including research opportunities, news, and upcoming events. You can also subscribe to the digest here. Once matriculated in the program, students will also receive an invitation to join the BMI Student Slack Channel from one of our student representatives. The Slack Channel is a valuable community building tool, where resources and information are shared informally between peers within the BMI program.

2.4 How to reserve a conference room

QR codes are posted at the entrance of each conference room in MSOB Suite 300. You can scan

the code to view availability. To make a reservation, email the BMI Student Services Officer which room, date, and time you would like to reserve. Larger rooms (such as MSOB x303) and other spaces can be requested through [Medscheduler](#).

2.5 How to send BMI email

- The following are the key BMI-related email lists. Send to *listname*@lists.stanford.edu. If you send from a non-Stanford email address, your message will be held for moderation.

- If you need to find all the lists you are on, subscribe, or need help, check https://uit.stanford.edu/service/mailinglists/tools

- Most of these use the Mailman tool (mailman.stanford.edu is a shortcut to the above)

Listname	Description
bmi-contact	Student services team (a good address to give to people wanting info about BMI
bmi-program-exec	BMI Executive Committee
bmi-students	All BMI Students
bmi-coterms	Coterminal MS Students
bmi-honors-coop	HCP: Honors Cooperative MS Students
bmi-phdms-students	PhD & Academic MS students
bmi-phd-students	PhD students only
bmi-ms-students	Academic MS students only
dbds-all-people	Everyone affiliated with the Department of Biomedical Data Science
dbds-events	Department of Biomedical Data Science events
bmi-job-openings	Job Openings in Biomedical Informatics
bmi-colloquia-tu	Announcements for BMI colloquia
bmi-other-seminars	Other seminars of interest

2.6 How to submit a help request

You can submit a help request on a wide variety of topics through Stanford Services (formerly HelpSU). This includes computer/information technology issues, and those involving the registrar, finance, and other administrative offices. You can contact the UIT Service Desk at 5-HELP or (650) 725-4357, or submit a Help request.

- SU Services - Services Portal Home

The BMI student services team can also help with many issues, including working with the Registrar's Office.

2.7 Personal wellness

Stanford has many resources to promote student health and wellness. If you need help, feel free to reach out to the BMI student services team at any time. Here are a few pointers:

- Counseling & Psychological Services (CAPS) https://vaden.stanford.edu/caps - including the ability to get urgent help now

- General well-being resources at Stanford: https://vaden.stanford.edu/well-being

- Biosciences health and wellness resources: https://biosciences.stanford.edu/current-students/resources/health-and-wellness-resources/

- Stanford's Office of Accessible Education, which provides support for those with disabilities, including providing letters of accommodation to instructors and programs: https://oae.stanford.edu/

2.8 What to do in a personal emergency

- Graduate Life Office | Student Affairs

2.9 What to do in a Stanford emergency

- Emergency Information | Stanford University (In the event of a disaster or emergency affecting the Stanford community, this site will provide up-to-date information and important instructions pertaining to the situation)

- Stanford Emergency Resources | Emergency Information (general "what to do if")

- Emergency Information | Stanford University EH&S (contact info, preparedness, hotlines, etc. Also resources for your out-of-town relatives in case Stanford is unreachable)

- AlertSU FAQs - SUDPS AlertSU is Stanford University's emergency notification system used to communicate time-sensitive information during an emergency event affecting campus. Be sure to keep your information up to date in Axess to receive alerts.

2.10 What to do in a non-emergency

- Gateway for New Graduate Students | Office of the Vice Provost for Graduate Education Information about health and wellness, housing, finances, student life, support, etc.

2.11 How to receive and send US Mail

BMI students have mailbox space in the MSOB 3rd floor Department of Biomedical Data Science suite (3 West). BMI-related U.S. outgoing mail requires either adequate postage affixed or a departmental postage code, available through Student Services. The BMI campus mail code for interdepartmental mail is MC 5464.

The USPS mailing address is:

Biomedical Informatics Training Program
Stanford University School of Medicine
1265 Welch Rd, MSOB, X-343, MC 5464
Stanford, CA 94305-5464

2.12 How to use Cardinal Print

Cardinal Print multifunction devices (MFD) have been installed at the Administration cubes (between x3C57 and x3C59) and x397 in the DBDS suite. Printing costs are $0.05/page for color

and $0.008/page for black and white.

Learn to use Cardinal Print

There are several ways that you can learn how to use a Cardinal Print MFD:

1. **Check out the Quick Reference Guides.** These will be posted by all Cardinal Print devices with instructions on how to print, copy, and scan.

2. **Visit the** [Cardinal Print website](#). Review the [short videos, User's Guide, and FAQs available online](#).

3. **Watch an on-demand training.** A [recorded training session](#) is available on the Cardinal Print website. More details about upcoming Zoom training sessions will be coming soon.

Ensure you have the required print driver
The Cardinal Print service named **CardinalPrint-SU** should now be installed on your device. If it is not, simply download it yourself at the [Cardinal Print website](#). If you need help, contact your local IT support staff.

Get help or report an issue

For help with a Cardinal Print device, contact the UIT Service Desk at 5-HELP or (650) 725-4357, or [submit a Help request](#). If you report a service issue, remove the Device Identification Label card from the pouch and turn it over so others know the issue is being addressed.

3. Academics and Research

3.1. Monday Talks: Research in progress/journal club

BMI has a regular seminar series that meets each Monday, 12:15 pm–1:15 pm. **All PhD and Academic MS students are required to attend. All Coterminal and HCP students are encouraged to attend.**

You can get one unit of course credit by signing up for BIOMEDIN 201. You may enroll up to 3 times.

Each session has two 30-minute student talks. Second-year and later students present their research-in-progress. First-year students can do that, or present a journal club. During the Summer Quarter there is a special format in which BMI faculty lead a discussion of a paper of their choosing.

- Journal Club. The purpose of a journal club presentation is to gain practice in oral presentation skills, and to learn to present and fairly critique a published paper in some area of biomedical informatics.

    1. Pick a paper.

    2. Clear it with your Academic Advisor.

    3. Prepare your talk/slide presentation.

    4. Practice that with either your Academic Advisor or your Research Advisor, usually the week before the scheduled presentation.

5. Give the presentation.

The paper should reflect your own interests, and engage other students. A paper about biomedical informatics methods published in the last couple of years with at least a moderate number of citations is ideal; you might want to look at Russ Altman's Translation Bioinformatics year-in-review talks (on his blog, https://rbaltman.wordpress.com/) for suggestions. Please avoid papers that are very long or that require excessive background in some niche area of biology or medicine. Drafts or papers in press are not acceptable. There is more Journal Club advice on our website: http://med.stanford.edu/bmi/biomedical-informatics-students/presentations.html .

- Research-in-Progress. The purpose of a research-in-progress talk is to gain more practice in presentation skills, to present your work to the BMI community, and to get useful feedback on both your presentation and your work. You should:

  1. Prepare your talk/slide presentation in consultation with your PI.
  2. Practice it with your Academic Advisor or your Research Advisor, usually the week before the scheduled presentation.
  3. Give the presentation.

Because this venue is open the public, it is important that you discuss issues about disclosure of intellectual property with your research supervisor prior to giving the talk. The talk title and abstract are viewable by the outside world, and anyone may attend the talk. This is different from presentations at lab meetings, which are considered to be closed meetings. You may include a slide at the beginning of your talk, saying: "This is research in progress and not for public disclosure. Please do not take photos of the slides or discuss outside of this venue."

For either format, if you use or adapt figures or tables from the work of others, please make sure there is an appropriate citation to that source on the relevant slide.

3.2. Advisors

- **Academic Advisor**: Each incoming student is assigned an academic advisor. If you later join the lab of your academic advisor, a new academic advisor will be assigned. You make an appointment and meet with your academic advisor 1-2 times a year to review your course flowsheet and make sure that you are on track for graduation. Your academic advisor can also give you curriculum advice as needed, of course. Note that you are ultimately responsible for ensuring your progress through the program; the advisor is just giving advice.

  If you are considering submitting a course waiver request (for curriculum requirements that correspond to courses you have already taken), you should discuss this with your academic advisor before submitting waiver requests. Please get their approval before submitting your waiver request form to BMI student services.

  Feedback on the effectiveness and engagement level of the student-advisor relationship is appreciated. Usually, the academic advisor serves for the duration of the student's study, but there may be a need or desire to change advisors. The process is to notify Student Services, explaining the reason for the change and (optionally) requesting an alternative advisor. You may request that this be kept confidential. Student Services will assign a new advisor, in consideration of the student's request as well as other program

and faculty constraints.

- **Research Advisor**: Each student in the Academic MS and PhD degree programs will have at least one research advisor, chosen by mutual agreement by end of the student's first year in the program. **This research advisor should be on the Core Faculty or Advising Faculty** list on the BMI website. If your research advisor is on the Collaborating Faculty list, then you will need to choose a co-advisor from the advising faculty list. You may also choose to have a co-advisor for other reasons as well.

- **Co-Advisors:** If you have more than one advisor, there's a university requirement to identify one or the other of your advisors as the primary mentor, and the other as the co-mentor. The primary mentor/advisor should be on the BMI Core Faculty or Advising Faculty list. By default, the primary advisor will be in charge, but other plans are possible as long as everyone agrees. This needs to be discussed ahead of time, that is, when the advisors are agreeing to be advisors, not later. BMI is not responsible for setting this up -- you and your advisors are. You should make sure that they discuss who is ultimately responsible for monitoring your research progress, and the details of your financial support. Please send all updates to BMI Student Services and cc the Executive Director.

    To add new members to the BMI Advising Faculty, please send your request to BMI Student Services for consideration by the BMI Executive Committee.

3.3. Course registration

3.3.1. Study list

By 5 pm on the first day of class each quarter you must submit a study list in Axess to register for classes. Note that there is a late fee.

3.3.2. Grading basis and minimum GPA

Refer to the BMI section of Explore Degrees for details of which courses must be taken for a grade, and which can be taken Credit/No Credit. If you sign up for the Credit/No Credit option in a course that should have been taken for a letter grade, you should email the instructor to ask what the letter grade would have been, then forward the response to the Student Services Officer to be included in your file.

Students must maintain an overall GPA of 3.0. If your GPA does not meet the minimum requirement, the BMI Executive Committee may require that you submit a plan that explains how you will remediate any deficiencies, resolve any incomplete grades, and bring your GPA back above the threshold.

3.3.3. Units

All funded BMI students are required to enroll in 10 units every quarter. If you enroll in more than 10 units, you will be responsible for paying the additional unit rate charged by the Registrar's Office.

With Research Assistantships (RAships), the 10-unit rate is considered half time (20 hours per week), meaning that for 20 hours per week you are working on the research project, and for 20 hours per week you are taking classes towards your degree requirements. This is called a 50%

RAship. Note that this can be adjusted proportionally: a 25% RAship would pay for 10 hours per week of research.

3.3.4. Cross-listed courses

When taking a course that is listed in both BMI and another department (such as Computer Science), please sign up for it under the BIOMEDIN number. This is especially important for BIOMEDIN 299 Directed Reading and Research.

3.4. Waivers and exemptions

Students who have been adequately trained in a particular area through graduate-level coursework at another institution may be permitted to waive courses and substitute more advanced work. First-year students (MS and PhD) may petition the BMI Executive Committee for waivers for specific courses or domain unit requirements. **These course waiver requests are due in early November of your first year**. Waiver requests after your first year in the program will not be reviewed. Student Services will send detailed instructions to you by email early in the Autumn Quarter of your first year. Please complete that paperwork, and discuss with your Academic Advisor before submitting it for final approval by the BMI Exec.

For PhD students: Note that there is a [residency requirement](#) of 135 units (of which a maximum of 45 may be transferred from outside or from a Stanford M.A. or M.S. degree), and a requirement for 52 units of formal coursework (meaning a classroom-based course, not research units).

For MS students: Note that prior coursework from outside Stanford cannot reduce the 45 unit residency requirement for the MS degree.

3.5. Course flow sheet

The BMI MS and PhD course flow sheets are available on the [BMI Forms and Downloads webpage](#).

When submitting a course flow sheet:

1. Make sure you put your name and the date on it.
2. List the course number in the column on the left. List all courses, past, present, and future. Put one course per line.
3. Put the number of units for the course in main part of the grid.
4. Waived courses and units should be noted in the "Course" column, but zero units should be attributed to them.
5. BIOMEDIN 299 research units need to be included in the "unrestricted section".
6. Enter the grade (A+, CR) in the grade column near the right. For the January report, make sure it includes grades from Autumn Quarter.
7. If you don't see meaningful row and column sums, and the flowsheet does not compute your GPA, then you have done something wrong.

3.6. Progress reports

The progress report system has been greatly simplified and streamlined. You should meet with

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your Academic Advisor according to the frequency in the following table. You should review with them an up-to-date flow sheet: include grades for completed courses, and all projected coursework. Note that you are responsible for making sure you are on track to meet the degree milestones.

The BMI Exec will automatically review grades every quarter. The Exec will also directly solicit comments about research progress for all research students, including first-year PhD students doing research rotations.

All PhD students are required to complete the Individual Development Plan (IDP) annually; this is a separate requirement from the BMI Progress Reports.

Degree program, status	To do
MS, co-term	Meet with Academic Advisor as needed
MS, HCP	Contact Academic Advisor as needed
MS, Academic	Meet with Academic Advisor twice per year
PhD, year = 1	Meet with Academic Advisor twice per year
PhD, year >= 2, still in classes	Meet with Academic Advisor twice per year
PhD, year >= 2, done with classes	Meet with Academic Advisor as needed

3.7. Teaching Assistant (TA) requirements and guidelines

There are four kinds of student teaching positions in BMI:

1. Assigned. The BMI Executive Committee determines the TA assignments once a year, typically in July. Typically, the assignments that satisfy the BMI requirement are to BMI core courses. PhD students are required to TA two (3+unit) courses. Academic MS students receiving fellowship support through BMI are required to TA one (3+unit) course. Others, including HCP and co-term MS students, are exempted from this requirement unless they receive fellowship support from the BMI program at any point while in the program. The TA requirement is usually completed after your first year in the program. TA's are expected to review and understand the TA Guidelines (below).

2. Voluntary. The instructor and student agree that the student will help with course development or serve as course assistant. We refer to these positions informally as TAs, but they are **not** formal (e.g. 25% or 50%) TAships. This may be for pay ("moonlighting''). For BMI courses, such pay will be in the form of stipend that depends on the expected workload (e.g. the number of units of the course). If not for pay, the student can petition BMI Executive Committee to have this count towards the BMI TA requirement. Typically, these moonlighting TA positions go to senior graduate students who have passed their

Quals, and completed their coursework and TA requirements.

3. Formal TAship. Some departments (such as CS, but **not BMI**) offer students formal TAship positions, which may cover most or all of your stipend and tuition. Sometimes these are offered to BMI students.

4. Assistance with seminar series. For some seminar series, such as BMI 205 and 208, a trainee or fellow may assist the course director with logistics, scheduling, and administration. Arrangements for these courses are between the instructors, the BMI program, and individual trainees or fellows, and do not satisfy the BMI TA requirement.

3.7.1. TA Guidelines

The purpose of the teaching assistant (TA) requirement is to help students understand the process of organizing and delivering a course as an intellectual academic exercise, and learn about course administration. Students should consider their unfunded teaching partly as a contribution back to the program and their fellow students, as well as an opportunity to learn pedagogical methods.

Each course may have different specific requirements, but these are general guidelines for faculty and TA to use as a starting point for discussion. These should be reviewed before each course begins to set common expectations.

1. The time commitment is intended to be roughly 10 hours per week during the TAship. We will make sure the instructors are clear about the ballpark hours per week. Also we recommend that you inform your research advisors that you will be TA'ing for one quarter so they can scale back expectations during that period. If you find that you are doing way more than 10 hours per week, ie 20 hours a week and no time for research, please don't hesitate to discuss with the instructor of the course as that is not the intent.

2. It is expected that a course will have administrative personnel (often the administrative assistant of the instructor) who will handle routine administrative issues such as room reservations, copying, logistical coordination of guest lectures and procurement of supplies for the course.

3. TAs may be assigned in-class logistical support tasks, such as in-class homework logistics (distribution/accepting assignments), videotaping, information dissemination, and communication with the administrative support personnel.

4. TAs should have regular office hours for interaction with students.

5. Unless specifically exempted, TAs should attend all classes. Vacations should not be scheduled during the quarter, unless it is pre-arranged with the Instructor.

6. TAs may create and grade assignments and exams. Instructors should examine and approve these, and must take overall responsibility for them.

7. TAs are encouraged to give at least one lecture during the course, in order to have the experience of preparing a course lecture and to appreciate the differences from research talks.

8. TAs may be asked to maintain a course website, with relevant materials. Routine administration of these sites should be shared with the administrative support personnel.

9. TAs may be asked to create class newsgroups or email lists, and to monitor activity on these, and respond appropriately.

10. Decisions about final grades rest with the faculty, but they are encouraged to consult with the TAs to learn of extenuating circumstances, particularly if the TAs have had the major responsibility for grading homework assignments and/or examinations.

Special challenges may arise in supporting the distance education students who take BMI courses via SCPD, the Stanford Center for Professional Development. These students have the task of following the class without the benefit of live interaction with faculty, TA or other students. Often these students do not know where to look for information that might be considered common knowledge.

1. TAs should familiarize themselves before the course with SCPD policies and procedures. SCPD offers orientations to faculty and TAs. You can contact SCPD at http://scpd.stanford.edu.

2. TAs should arrange a procedure for talking with SCPD students on the phone or by email during office hours. The hardest part about TA-ing an SCPD course is figuring out when SCPD will support the student and when you have to step in. Mainly, your job is to cover the material in the class, not provide technical assistance to the student.

3. SCPD handles student registration and tuition.

4. The students should know the difference between an incomplete and a withdrawal. They should know if a crisis occurs they can request an incomplete.

5. Many SCPD students are unaware of the difference (if any) between the SCPD course description and the course description in the Stanford Bulletin. Most of the time, the course descriptions on the SCPD webpages are adequate.

3.8. Publishing a paper and NIH Public Access Policy

3.8.1. Review of Publications by Stanford faculty

All papers and abstracts submitted to journals, conferences, books or other publications must be reviewed by a Stanford faculty member. This policy applies to any publication, regardless of authorship, that describes work done at Stanford, has research support through Stanford, or that mentions a Stanford affiliation. It is the responsibility of the first author to ensure that sufficient time is allocated for this review process. No publication may be mailed to a journal or conference without final approval from the faculty member.

3.8.2. NIH Public Access Policy and PMCIDs

If you or your work has been supported by NIH (*even if you are 17th author on a manuscript*), then you are required to comply with the NIH Public Access Policy. In particular, each publication must be submitted to PubMed Central (PMC), and get a PMCID assigned within 3 months of submission. **This is extremely important. Follow the instructions on their webpage. NIH Policy**: To advance science and improve human health, NIH makes the peer-reviewed articles it funds publicly available on PubMed Central. This applies to all students funded

through our T15 (NLM) training grant at any time while working on any part of such papers or the research reported on in them (as well as to anyone else receiving NIH funding). The NIH public access policy requires scientists to submit final peer-reviewed journal manuscripts that arise from NIH funds to PubMed Central **immediately upon acceptance for publication** through the NIH Manuscript Submission System ([NIHMS](#)). This also affects any publication agreement / copyright transfer agreement you (or the first author) might have to sign when submitting papers, so make sure you read the policy and act accordingly.

We are required to report all publications by trainees, and the publication tracking system automatically flags as **non-compliant** publications not submitted for open access in PMC. It is your responsibility as an NIH-supported researcher, not ours, to "catch" and submit them.

ACTION:

1. You can track your publications (and check their compliance status) in https://www.ncbi.nlm.nih.gov/sites/myncbi/

2. If you are a co-author (not just first author or senior author) on any published paper, and you were funded by the NLM T15 training grant at any time when you did work on the paper – then **you** MUST ensure that the paper is submitted – see https://publicaccess.nih.gov/

3. ADVISORS – also please watch this as your trainees let you know about their submissions and publications.

Please do not be sloppy, late, or lackadaisical about this, as it can potentially put our funding for you and for all other trainees at risk.

3.8.3. Issues about authorship

It is best to discuss the scope and ownership of a project at the beginning; this includes who will be an author and in what order they will be listed. It is important to include all who have contributed in some non-trivial way to the research. The first author (or co-first authors) usually take primary responsibly for drafting the paper, and the mechanics of submitting it. All of the coauthors may contribute to the writing as appropriate, and all should review the paper prior to submission. The senior author (listed last) is usually the project's principal investigator. If problems arise over authorship, first raise them with the PI; if issues remain then considering asking your Academic Advisor, or Stanford's [Office of The Ombuds](#).

1. Whom to acknowledge:

The NIH requires that each publication, press release, or other document about research supported by an NIH award must include an acknowledgment of NIH award support and a disclaimer such as:

> *Research reported in this publication was supported by the National Library of Medicine of the National Institutes of Health under Award Number T15LM007033. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.*

Anyone involved in the work described in a paper and not listed as an author should be included

in the acknowledgments section, as should those who provided other financial support or gifts of equipment. The primary author of the paper should confer with all co-authors to make sure that all appropriate grant support is listed.

    2. Mailing costs:

The BMI program will pay for regular mail charges, but not Express Mail or Federal Express costs, unless specifically approved by a member of the senior staff. Please take this constraint into consideration when working against a deadline for mailing an abstract or other publication.

3.9. MS degree

3.9.1. Curriculum

The MS curriculum is described in full detail in the [Stanford Bulletin](#). The curriculum consists of four main components:

1. Core BMI classes
2. Electives from Computer Science, Statistics, Mathematics, and Engineering. The complete list of allowable courses is listed at [BMI Electives](#).
3. Social and Ethical Issues. A complete list of allowable courses is listed at [Explore Courses](#) by entering "bmi::ethics". Note that MD's and current medical students are exempted from this requirement; replace this requirement with the equivalent number of Unrestricted Graduate Electives.
4. Unrestricted Graduate Electives. Any course at the level 100 or greater may count.

Note that there are additional rules in the [Stanford Bulletin](#) about the number of P/F courses, and the number of 100-199 courses that may be counted.

There is more on the BMI website for [Coterminal MS](#) and [HCP MS](#) students.

3.9.2. Milestones

During their first quarter in the program, all MS degree students must submit their [Course Flowsheet](#) by degree .

3.9.3. HCP MS Details

The HCP MS degree is designed primarily for the working professional. There are some special considerations for HCP students:

- Although many classes necessary for the degree are available online, some requirements may be fulfilled through implementation of an alternative plan to be approved by the program. Example:
  - Stats 200 was not offered remotely before Spring 2020 – suggested alternatives: MS&E 226 or EPI 259 and EPI 261
  - BMI 212 requires special arrangements with the instructor

  Students should consider the availability of courses online before requesting to switch from full-time to part-time, especially if this may interfere with their ability to

satisfy the requirements of the degree.

- HCP students who live locally may attend their courses on campus.

- All HCP students are strongly encouraged to attend Monday Talks (in person or remotely), as they provide a critical opportunity to get to know others in the program.

- Students have up to five years to complete the program (rather than three years for the Academic MS degree).

- Typically, students enroll in one course per quarter. Not enrolling for any courses during a quarter (without taking a formal leave of absence) will result in the student's program being discontinued. Reinstatement requires a petition to Graduate Admissions - https://stanford.app.box.com/v/appgradreinstate

- Research projects are optional; if interested, the student must make arrangements with program faculty.

Requests to transfer from part-time (HCP) to full-time (Academic MS) are reviewed by the BMI Exec on a case-by-case basis. Final decisions are at the BMI Exec's discretion. Please note the following limitations (for students enrolling in the HCP program starting Fall 2020)**:**

- Students must <u>complete</u> a minimum of two (2) quarters in the part-time program excluding summer quarter or enrollment as a non-degree option student, before requesting to transfer to full-time. Therefore, the soonest the transfer can be discussed and approved is during the first BMI Exec meeting of the third quarter of the student in the HCP program

- Students must complete a minimum of 10 units of letter-graded courses that meet requirements for the BMI MS degree before commencing their first full-time (Academic MS) quarter

- GPA will be considered as part of the request

- Students can make a maximum of two (2) transfers during the program (e.g. transfer from part-time to full-time and back to part-time)

3.9.4. Academic MS research rotation and research paper (Practicum)

All students in the Academic MS program should be engaged in biomedical informatics-related research under the supervision of a BMI Advising Faculty member. Officially, you are not required to do one-quarter research rotations, but you are welcome to do so. You should pick a lab by mutual agreement between you and the research supervisor. Please notify the BMI Student Services Officer when you have done so.

Before graduating from the Academic MS program, you are required to write a research paper, sometimes called a research practicum. This paper should be publishable, although it is not required that it be submitted or published. It is required that this manuscript be reviewed and approved by two faculty members; typically, these would be the senior author of the manuscript who is your research supervisor, and one other Advising Faculty. Please send this information to the Student Services Officer well in advance of your graduation so that it is not delayed.

If you transfer from the Academic MS program to the HCP MS program, this requirement no longer applies. However, if you did significant research while in the Academic MS program, we

strongly encourage you to complete and publish it.

3.9.5. Funding Support for MS students

We have funding through the NLM training grant for those who have postdoctoral status (MD, or PhD). You can apply for the post-doctoral MS before your doctoral degree has been awarded, but you cannot be placed on postdoctoral NLM funding until your doctoral degree has been conferred, so there may be problems if your graduation is delayed. Note that NLM training grant funds can only support US citizens or permanent residents. Others will need to consider alternative sources of funding.

For students enrolled for the MS degree who do not already have a PhD, MD, or similar doctoral degree, some information about aid and loans is available through https://financialaid.stanford.edu/

Some MS students find Research Assistantship support at Stanford by directly contacting professors. Coterminal MS students are eligible for RAships as well, after they have switched to the Graduate Tuition Group (typically after completing 180 units).

Many of the core and advising faculty in the BMI program have research funds supporting RAships. Please contact the Student Services team for access to the google doc with updated information regarding BMI and DBDS affiliated faculty lab projects. Some faculty are open to having an MS student on RAship.

3.9.6. Terminal Graduate Registration and Part-Time Enrollment

1. Terminal Graduate Registration

Students enrolled in master's programs with a required project (such as BMI post-docs funded by the NLM training grant) should apply for Terminal Graduate Registration Status upon completion of all required courses and completion of 45 residency units at Stanford. You then enroll in BIOMEDIN 801.

2. Graduate Petition for Part-Time Enrollment

If you need only 3-7 units in the last quarter before qualifying to go TGR, or in the last quarter before graduation, discuss the "Graduate Petition for Part-Time Enrollment" with the Student Services Officer prior to the first day of the quarter.

If the petition is granted, you may enroll in 3-7 units. Co-terminal students with an active undergraduate degree program and international students are not eligible for this petition. Before registering at less than the regular full-tuition rate, consider the effects of that registration on your degree progress and on eligibility for financial aid and awards, visas, deferment of student loans, and residency requirements. Submit the form prior to the Preliminary Study List deadline (5 pm first day of classes) of the effective quarter.

3.10. PhD degree

3.10.1. Curriculum

The PhD curriculum is described in full detail in Explore Degrees. The curriculum consists of five main components:

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1. Core BMI classes

2. Electives from Computer Science, Statistics, Mathematics, and Engineering. The complete list of allowable courses for this component appears at [BMI Electives](#). Note: you can have no more than 9 units in courses below the 200 level.

3. Social and Ethical Issues. A complete list of allowable courses is [listed at Explore Courses by entering "bmi::ethics"](#). Note that MD's and current medical students are exempted from this requirement; replace this requirement with the equivalent number of BMI-Related Graduate Electives.

4. Unrestricted graduate electives. Any courses at the level 100 or greater may count.

5. Biology/Medicine Electives

If you were admitted before August 1, 2016, you may follow this curriculum, or the old curriculum, listed on the [BMI website](#).

3.10.2. Academic milestones overview

An informal overview of the major milestones by year:

- Year 1: Take classes, do lab rotations, pick a lab.

- Year 2: Take classes, TA, do research, take the Qualifying Exam.

- Year 3: Finish up classes, TA, do research, pick Reading Committee, give Pre-Proposal talk, submit applications for outside funding.

- Year 4: Do research, meet with Reading Committee.

- Year 5: Finish research, defend and submit Dissertation, graduate.

3.10.3. Research rotations

Research rotations are critical for students in choosing their research lab or project. In addition, rotations broaden a student's research experience and familiarize students with ongoing research projects. Rotations are set up by mutual agreement between the student and the faculty member.

Please contact the Student Services team for access to the google doc with updated information regarding faculty who are interested in having BMI PhD students in their lab for research rotations. Students should contact faculty directly to determine if there is a rotation spot available.

PhD students should do three research rotations, except for in extenuating circumstances. Rotations are typically one quarter in length, but the student can arrange shorter rotations, or end early if the lab is not a good fit. Rotations longer than one quarter are discouraged, as the primary purpose of the rotation is to find a suitable thesis lab, not to obtain publication quality results. Students are strongly encouraged to make their lab choice by the end of spring quarter. Students **must** choose their lab and research advisor by the end of their fourth quarter in the program. Typically, this is the end of the summer quarter of first year. There is some advice here: [Choosing Rotations and a Thesis Lab | Incoming Students | Stanford Biosciences PhD Programs](#)

When you and a PI have reached a mutual agreement about you joining their lab, let BMI Student

Services know.

Please also review the information in the section below on setting up a reading committee with respect to the committee membership, and who can be a primary advisor.

3.10.4. Graduate Student Tracking System

Biosciences is now using a web-based system for tracking some important milestones. You enter information directly into that system. You can read more about it on the GST page. It was designed to provide information about each student's academic progress, and to aid with the accomplishment of certain academic milestones in a Ph.D. career — lab rotations, qualifying examinations, and both thesis committee and Individual Development Plan (IDP) meetings.

3.10.5. Required Committee Meetings

The following is a list of the required number of reading committee meetings for each year of graduate study.

Years	Requirement
2, 3, 4	One meeting per year
5 and up	Two meetings per year

Note that required milestone meetings can count, so, for example, the Pre-proposal would satisfy the requirement for your third year. Note that the committee meetings start in your SECOND year; the combination of the Oral Qualifying Exam and the Written Research Proposal, taken together, is sufficient for this milestone after you pass BOTH sections of the Exam. Please enter your meeting dates in the Graduate Student Tracking System.

3.10.6. Individual Development Plan (IDP)

The IDP is an annual process to review your professional development with your research advisor. It is important and required for all PhD students. Failure to comply with IDP requirements will negatively impact Stanford's ability to receive NIH funding, and create a hold on your registration. The IDP is separate from any BMI progress report.

The details, including deadlines and forms are at the Biosciences Individual Development Plan page.

When you have completed your IDP for a given year, please record that you have done so using the Graduate Student Tracking System. The forms and the content of your discussions remain private.

3.10.7. Funding support and finances

Thanks to strategic support from the School of Medicine and Stanford Biosciences, as well as generous support through training grants from the National Library of Medicine, and various fellowships, assistantships, endowment and philanthropy, and faculty funds, we aim to fully fund our PhD students for 4 years. We do not base the funding plan for incoming PhD students

on Research Assistantships, as such assistantships restrict a student to a particular faculty member and lab. Our training grants from the National Institutes of Health cover only US Citizens or permanent residents, so the funding plan for international students typically depends on external fellowship support (including fellowships from their government which guarantees their ability to support their entire studies).

3.10.7.1. Applying for outside funding:

All BMI PhD students are admitted with a funding plan in place. However, you are required to apply to internal and external funding for which you are eligible. Receiving such funding provides validation of your research ideas, and also allows us to support more students. There is more general information on our [funding webpage](#).

The rest of this section describes the process for applying for NRSA fellowships. You do not need to apply for NRSA F31 funding if:

- you are an international student, or

- if you have both SGF and NSF funding, or

- if you have SIGF, HHMI or other funding that will carry you through the 5th year.

Details and Timing:

- Please let BMI Admin know about your plans early. The process is a bit complicated and you will need help.

- The F31 program is described here:
  https://researchtraining.nih.gov/programs/fellowships/F31.

- You should apply sometime between the summer of your second year and the summer of your third year. You should start thinking about this even earlier: the skills you learn in BMI 212 about proposal writing and your written Quals are both valuable in constructing a strong NRSA application.

- You must take a 3-hour class at Stanford, "NRSA F Series Computer Lab Session," before you apply. The fellowship application requires a lot of forms, so you should take the class several months in advance of applying, perhaps even for an earlier cycle. You register for the class using this website:
  https://doresearch.stanford.edu/training/national-institutes-health-nih

- Grant applications are submitted through Stanford's Research Management Group (RMG), which requires submission at least 5 full working days before the NIH deadline.

- You must ask for a start date in your grant application; these depend on the cycle and are listed in the table. Generally, **we recommend that you apply for Cycle III**.

What you should do	Cycle II	Cycle III
Take required class	June/early July or earlier!	Oct/early Nov or earlier!
Application due at Stanford RMG	August 1st	December 1st

What you should do	Cycle II	Cycle III
Application due at NIH	August 8th	December 8th
Start date if awarded	Ask for July 1st	Ask for Sept 1st

3.10.7.2. Terminal graduate registration (TGR):

When PhD students have completed the University's residency requirement, been admitted to candidacy, completed 135 units of coursework, and submitted the Doctoral Dissertation Reading Committee form, they should apply for Terminal Graduate Registration Status. TGR greatly reduces the tuition rate. Typically, you are eligible for TGR status in the Spring of your fourth year. When enrolling under TGR status, a student may only enroll in only 1-3 units of non-required coursework (with PI's knowledge), in addition to the zero-unit TGR course (BIOMEDIN 802). It is the student's responsibility to be aware of when he/she is eligible for TGR. To be considered on TGR status, the student must submit the TGR form to the Registrar prior to the beginning of the quarter for which the request is being made. If your fellowship requires that you be enrolled in one or more units even during the course of an internship, you should sign up for Curricular Practical Training (BIOMEDIN 390A, BIOMEDIN 390B, BIOMEDIN 390C).

3.10.7.3. Graduate Petition for Part-Time Enrolment:

If you need only 3-7 units in the last quarter before qualifying to go TGR, or in the last quarter before graduation, discuss the "Graduate Petition for Part-Time Enrollment" with the Student Services Officer prior to the first day of the quarter.

If the petition is granted, you may enroll in 3-7 units. Before registering at less than the regular full-tuition rate, consider the effects of that registration on your degree progress and on eligibility for financial aid and awards, visas, deferment of student loans, and residency requirements. Submit the form prior to the Preliminary Study List deadline (5 pm first day of classes) of the effective quarter.

3.10.8. Qualifying Examination (Quals)

The goal of the Qualifying Examination is to evaluate the suitability of a student to advance to PhD candidacy. The examination consists of two components: (1) the informatics content exam, and (2) the research proposal.

The informatics content exam tests the student's broad foundation in the field and the ability to synthesize and communicate that foundational knowledge. It is the student's responsibility to build this foundation through coursework, attending seminars, engagement with faculty and peers, research activities, and independent study. The BMI core curriculum courses are designed to contribute to such a solid and broad foundation. While the curriculum requirements allow PhD students to take less than the full set of these core courses, students having taken only a subset of the BMI core course offerings may need significantly more independent study to prepare for the Quals. Preparing for the

qualifying exam will take significant time, typically during the 2ⁿᵈ year of the PhD program. You should consider setting up study groups to prepare.

The instructions, process, and Content Outlines for the informatics content exam can be found in the Box folder: [Quals Exam Information for Students](#)

The possible outcomes of a qualifying exam are:

- Qualifying Examination Overall PASS (both elements): Student is invited to advance to candidacy.

- Informatics Content Exam FAIL: Student may be offered a partial exam (in focused areas of weakness) or complete retake of exam within 2-4 months.

- Research Proposal FAIL: Student may resubmit Research Proposal within 1-2 months.

Students who either fail or do not complete either component a second time will have their performance reviewed by the BMI Executive Committee for the suitability of continuing in the graduate program.

After passing the Qualifying Exam, students must submit the required [Application for Candidacy for Doctoral Degree](#) form to BMI Student Services.

- [4.6.1 Doctoral Degrees, Candidacy: Policy | Graduate Academic Policies and Procedures](#)

3.10.9. Pre-Proposal

The pre-proposal is a work-in-progress talk that you give during your third year. It occurs roughly 6 to 9 months after the Quals exam. The purpose is to show preliminary results, modifications to the specific aims, and to get feedback on your methodological approach and innovations. The pre-proposal talk counts as one of the required committee meetings.

The talk, which should last about 45 minutes, is public, and is followed by a private session with your committee. It is important that the student should invite those faculty members whom he or she is planning to have as readers of the dissertation. Some advice: [Pre-Proposal Talk Guidelines](#)

Please send copies of the slides ahead of time to your committee, and supply them with paper copies at the talk. Make sure your slides have slide numbers for easy reference.

3.10.10. Setting your reading committee

Each PhD candidate is required to establish a reading committee for the doctoral dissertation by late 3rd year-early 4th year. Students should consult frequently with all members of the committee about the direction and progress of the dissertation research and are required to meet annually with their whole committee. Students must have at least three faculty members:

- the principal dissertation advisor,

- two other readers serve on their Doctoral Dissertation Reading Committee, to read

and certify their dissertation.

At least two members must be on the Stanford Academic Council. If the faculty member with whom you work most closely is not on the Academic Council, then you will need to add another advisor who is. You are responsible for checking this, and for making sure that everyone on the committee understands their role.

It is not necessary that the committee include a member of the BMI Exec. The Doctoral Dissertation Reading Committee Form should be completed and filed with BMI Student Services before scheduling a University oral examination that is a defense of the dissertation. On occasion, the department chair may approve the appointment of a reader who is not on the Academic Council, if that person is particularly well-qualified to consult on the dissertation topic and holds a Ph.D. or equivalent foreign degree. Approval is requested on a Petition for Doctoral Committee Form.

One reading committee member, who must be a current member of the Academic Council (typically the principal dissertation advisor), reads the dissertation in its final form and certifies on the [Certificate of Final Reading](#) that department (BMI Program) and university specifications have been met. This is the "final signature".

3.10.11. University Oral Examination (Dissertation Defense)

You are required to defend your thesis research in a public oral examination with a committee. The University oral examination committee has at least five members: at least four examiners (including your primary advisor) and a University chair.

You are responsible for following Stanford policies, listed at:

- [Graduate Degrees | Stanford University](#)
- [4.7.1 Doctoral Degrees, University Oral Examinations & Committees: Policy | Graduate Academic Policies and Procedures](#)
- [4.7.2 Doctoral Degrees, University Oral Examinations & Committees: Implementation | Graduate Academic Policies and Procedures](#)

1. Prepare the dissertation draft:

The primary advisor should read and approve your draft dissertation before it is sent to the rest of the committee. All of the committee should have an opportunity to read and provide comments on the draft. This should happen at least THREE WEEKS (not days or hours) before the oral examination. All of the committee must be satisfied with your draft before you proceed to the defense.

It is a courtesy to provide your orals committee chair with a copy of your dissertation and the Orals Guidelines, and to offer to meet with them before the event.

2. Structure and content of the dissertation:

Its acceptability is judged by your advisor and your committee. In general, you should write a complete document (text, figures, tables, references) that makes a scholarly case

for the problem being addressed, includes relevant previous work, and presents your methods and results in a logical way.

3. Schedule the exam:

Start at least two months before your desired date. Plan on one hour for a public presentation, including time for questions from the audience, followed by up to 90 minutes of closed session with your committee, leading to a vote. This means that committee members should set aside 2-1/2 to 3 hours.

4. Find a chair:

When a date and time for the oral exam is identified, then work with the BMI Student Services Officer to identify the exam committee chair. The chair of the examining committee may not share a department or joint appointment with your primary advisor, nor may the chair of the examining committee be on the BMI Executive Committee.

Once the full committee is chosen, fill out the University-mandated paperwork and provide the form along with your title and abstract to Student Services Officer **at least three weeks prior to the Defense.**

5. Meet with the committee:

Make sure that you meet with all members of the committee (and optionally, the chair) as needed in the months leading up to the exam. Be sure that they understand what you are doing, and agree that what you are defending is worthy of a Stanford PhD.

6. Plan your presentation:

Dissertation defenses should be serious scientific presentations of your dissertation research.

Please send copies of the slides ahead of time to your committee, and provide them with paper copies at the talk. Make sure your slides have slide numbers for easy reference.

7. After the exam:

You should work with your primary advisor on a plan to submit the final dissertation, which may require some revision as a result of the exam.

Under the new system, there is no Final Talk. The Department of Biomedical Data Science holds a special event to celebrate all graduates during graduation weekend. Your PI and lab may also schedule a celebration.

3.10.12. Old Thesis Proposal Defense (entered PhD program before July 1, 2018)

If you entered under the old system, you may follow these rules or choose the new rules with just the Thesis Defense, described above. Under the old system, you present a Thesis Proposal Defense, and then about 6-9 months later, you give your Final Talk. The rest of this section contains the old rules.

3.10.12.1. Thesis Proposal Defense (University Oral Examination)

The BMI Thesis Proposal Defense is the University Oral Examination and represents the last major milestone for completion of the PhD degree. In most other departments, the final defense is the final talk. For BMI, this is split into the Thesis Proposal Defense (occurring earlier than final defenses), and the Final Talk.

Stanford's requirements are listed at [Graduate Degrees | Stanford University](#) and [4.7.1 Doctoral Degrees, University Oral Examinations & Committees: Policy | Graduate Academic Policies and Procedures](#)

The University oral examination committee has at least five members: at least four examiners and a University chair.

1. Schedule the exam:

Start at least two months before your desired date. Plan on one hour for a public presentation, including time for questions from the audience, followed by up to 90 minutes of closed session with your committee, leading to a vote. This means that committee members should set aside 2-1/2 to 3 hours.

2. Find a chair:

When a date and time for the oral exam is identified, then search for the exam committee chair. The chair CAN be from another department that is represented on the committee by one of the examiners other than the thesis advisor. For Interdisciplinary Degree Programs (IDPs), the chair of the examining committee may not have a full or joint appointment on the BMI Executive Committee. Once the full committee is chosen, fill out the University-mandated paperwork and provide the form along with your title and abstract to Student Services Officer at least two-three weeks prior to the Defense.

3. Meet with the committee:

Make sure that you meet with all members of the committee (and optionally, the chair) as needed in the months leading up to the exam. Be sure that they understand what you are doing, agree with your thesis statement and evaluation plan, and believe that what you are proposing is worthy of a Stanford PhD.

4. Plan your presentation:

Develop your oral defense in consultation with your thesis advisor. Decide in advance what points you need to make, what background needs to be provided to the audience, and what you can leave out or save for questions.

Practice the talk. Go over the slides with your advisor. Avoid glibness, or excessive informality; this is one time when a presentation needs to be rather formal. You are trying to demonstrate that you are already master of a field and are striking out to break new and important ground of some kind. Even though you will have shared your proposal with your committee and often with other members of the audience, do not assume that everyone will have digested it in detail.

Dissertation defenses should be serious scientific presentations of a student's dissertation research, similar to a postdoc interview talk, rather than a talk aimed at a lay audience.

State your goals clearly; make sure people understand the motivation for what you are doing, as well as the technical details. The defense should close with a summary of what remains to be done before your dissertation will be complete, including a detailed time line of tasks, milestones, and their anticipated completion dates. Students should limit acknowledgements to one slide and a couple of minutes, saving more extended acknowledgements of friends and family for the Final Talk.

Please send copies of the slides ahead of time to your committee, and supply them with paper copies at the talk. Make sure your slides have slide numbers for easy reference.

5. Prepare the written proposal:

The proposal document is supposed to be a complete and compelling document that presents the problem, reviews the literature, and then describes your plan for completion. It should be polished and have a full set of references, figures etc. It is NOT a draft dissertation but should be a compelling and complete proposal for work to be done. Although this document may yield significant fragments that end up in the final dissertation, it should present a defendable proposal. Its acceptability is judged by the oral defense committee, using their judgment. In general, you should write a complete document (text, figures, tables, complete references) that makes a scholarly case for the problem being addressed, relevant previous work, and presents a scientifically logical plan for how it will be approached. One possible outline would be:

- Ch. 1: Introduce the problem you are addressing, why it is important, why it may be solvable, and what you consider to be the key things you will investigate and try to make contributions to.

- Ch. 2: Deep, critical and scholarly literature review of the relevant areas.

- Ch. 3: Preliminary work that has been completed. You can use papers that you have written (as first author), each in its own chapter. The key thing there is that the writing should be your own, and so your full draft is better than something that was heavily edited by co-authors.

- Ch. 4: Proposed work to be done in detail with validation, possible problems, and backup plans, along with a schedule/timeline.

- Ch. 5: Summary of anticipated contributions to biomedicine and biomedical informatics.

The document should be fully referenced, with figures, tables, complete sentences, and no sections that are empty. There is no length requirement (or limit) but most proposals are between 30-50 1.5-spaced typed pages.

The primary advisor should read and approve the proposal document before it is sent to the committee. This is to ensure that the student and the advisor have a clear and shared understanding of the proposed work plan, and that it has been captured by the student in the written proposal document.

In the case where one or more committee members is not satisfied by the written proposal, there are several options:

- The oral defense can be postponed, but this would be an extraordinary event based on conversations with the advisor and program director, and would have to be considered well in-advance of the scheduled date of the oral defense.

- The oral defense can go on, and if the oral defense and Q&A is an otherwise passing performance, the committee can either: (1) provide informal feedback about how to improve the document, or (2) grant a "conditional pass" conditioned on submission within a designated time of an acceptable proposal document.

Work out an arrangement with your thesis advisor to assure that he or she has read all chapters of your proposal and has agreed that they are adequate no later than THREE WEEKS PRIOR TO YOUR EXAM. If your advisor has not seen drafts of all chapters by this time, and agreed that everything is on track, it is his or her responsibility to notify Student Services Officer that the scheduled exam should be cancelled; you will need to reschedule it at a time when the 3-week window is likely to be achievable.

Incorporate comments from your advisor and generate a final thesis proposal for delivery to your committee no later than TWO WEEKS PRIOR TO YOUR EXAM. This provides your committee with enough time to have a reasonable chance of reading the document prior to your oral defense. Failure to meet this deadline will also trigger a cancellation of the oral exam by your thesis advisor so that the exam can be rescheduled for a time when the committee will have had adequate time to read the proposal.

It is a courtesy to provide your orals committee chair with a copy of the proposal and the Orals Guidelines, and to offer to meet with him/her before the event. They will generally not require that you do this, but make the offer. Also, be sure they understand that you will be defending a proposal and not a completed dissertation.

The University Oral Examination form should be submitted to the Student Services Officer at least three weeks prior to the examination date.

6. Thesis Proposal Defense Oral Presentation Guidelines

   1. What is the scientific problem in the biological/medical domain that motivated your research?

   2. Why is that problem important to solve?

   3. What other research has been previously attempted to solve the problem described in Question 2 above?

   4. What are the limitations of the existing approaches described in Question 4 above?

   5. What are your hypotheses about how to overcome the limitations in Step 5, and how well do you predict it will resolve the problems described in Step 2?

   6. In a few minutes describe the underlying computational approach that you have taken to address a biological/ medical data analysis problem.

7. Describe in depth the details of your research aimed at the level of expertise of your committee.

8. How will you show that the research described in Question 7 resolves the problems described in Question 2?

9. How do you propose to complete your research and evaluation during the time remaining before you graduate?

10. What are the contributions to Biomedical Informatics and what are the contributions to the biological/medical domain?

3.10.12.2. Final talk:

The Final Talk is a summary of the work accomplished on the PhD research, and should occur when the student is still matriculated. The final talk should primarily emphasize the research that has been completed since your thesis proposal defense presentation. It lasts about an hour, including time for questions. Extended acknowledgements of family and friends are appropriate in this celebratory venue.

The student's Final Talk must be scheduled during the regular academic quarter, and may not be scheduled during finals week or during the break between quarters. There is no mandatory attendance by the committee (although this is encouraged) and therefore there should be no particularly onerous scheduling constraints.

3.10.13. Submitting your dissertation

University regulations specify the composition of the examination committee and the format of the dissertation defense. See the [Registrar's Dissertation and Thesis Submission page](#).

A thesis draft should be submitted to your thesis committee four weeks before the deposit deadline. The thesis committee should have no less than two additional weeks to read the final dissertation before the deadline for signing off and deposit with the registrar's office.

Once your thesis has been submitted to the Registrar, the Stanford University libraries will provide electronic access through the SearchWorks Web catalog in the ProQuest Digital Database. Bound copies of dissertations can be purchased through the HF Group Thesis on Demand in contract with the University to provide the standard red binding. Please check the Registrar's website for current information and instructions.

3.10.14. Getting an MS while in the PhD program

3.10.14.1. Getting an MS from BMI:

There is no tradition in the Biosciences of routinely offering MS degrees on the way to a PhD, although our program has awarded them in the past under special circumstances at the request of the student. The BMI Executive Committee will consider requests to be awarded an MS degree. Upon completion of MS coursework requirements, students must submit a Master's Program Proposal, submit a [Graduate Authorization Petition](#) ($125), and (if approved) apply for graduation, selecting the MS (not PhD) program.

Note that there are *major* financial consequences of PhD students obtaining a *second* MS degree along the way. Typically, this would occur if you request the BMI MS, and then add an MS in statistics or CS. Generally, you shouldn't do this; please discuss with the Student Services at the earliest opportunity.

3.10.14.2. Getting an MS from another program:

Some students choose to pursue an MS in another department, typically Statistics or CS, while they are a PhD student in BMI. Note that you should only pursue a MS in another department if you have not received an MS from BMI. To complete a MS in another department students may use courses that fulfill requirements for both programs towards their MS degree and replace those courses with unrestricted electives. For example: STATS 200 is a BMI requirement but also fulfills a requirement for the STATS MS. Students pursuing a STATS MS would take STATS 200 for their STATS MS and replace those units with unrestricted electives to meet the BMI requirement. Students need to petition the BMI Executive Committee to add the outside MS and should do this in advance of applying to the other department. This requires planning ahead. Please submit to the Exec:

1. A cover letter from you about why this is academically a good idea for you,

2. Your BMI flowsheet showing how you fit in coursework from both programs,

3. A letter of support from your PI. This should indicate that they are aware your MS could lengthen the time to degree, and that they may need to pay the tuition differential between regular full-time tuition and TGR tuition if you take longer than Spring quarter of 4th year to reach TGR. This can vary depending on what fellowships and scholarships support you; please involve BMI Students Services early in your planning.

3.10.15. Applying to the PhD program while enrolled in the MS program

There have been cases where a student already enrolled in the MS program (Coterm, HCP, or Academic MS) has expressed an interest in changing to the PhD program. There are two pathways to pursue such an application:

1. Through the normal [Biosciences PhD application](#) (typically with an early December deadline)

2. Through a [Graduate Authorization Petition](#) (any quarter)

Regardless of the pathway pursued, applicants will be evaluated with the same rigor as other applicants to the PhD program, and (if admitted) will be subject to the expectations, curriculum and other requirements of the PhD program. Although in principle a Grad Auth may be submitted any quarter, the BMI Program Exec has limited availability to pursue full evaluation and interviews of applicants "out of cycle." Please check with Student Services before filing a petition.

4. Travel

The official Stanford travel rules and policies for students are described on the Fingate webpage: [Fingate - When Students Travel for Stanford](#).

Once you are affiliated with a lab, you should expect some travel support from that lab, particularly to present research results from that lab, so discuss this with your PI. BMI can also provide financial support for conference travel for our PhD and full-time MS students, including co-terminal students engaged in research. Funding is obviously limited and priority is given to those who are invited to present or have a paper or a poster accepted, as well as for participation in strategic activities such as travel to meetings where we want to have Stanford BMI representation (for example, AMIA, SACNAS, ABRCMS, and the NLM conference). As a general guideline, we have budgeted about $1,000 per student.

4.1. NLM Travel Funding and conference

Our NLM training grants provide a limited amount of travel support for students funded through those grants (including to the NLM meeting). A year for the NLM Training Grant runs July 1-June 30. Travel dollars must be spent during the grant year and cannot carry over.

NLM-supported students *must* attend the annual NLM meeting, usually held in early June. We will fund this travel. The NLM conference includes poster sessions and research presentations, and having rigorous, compelling presentations by our trainees helps confirm and strengthen Stanford's reputation as well as your visibility in the national informatics community, and potentially benefits future funding opportunities.

4.2. How to request support for travel

You need to request support for travel ahead of time, using the procedure described below. If you first travel, and then request payment for the travel, your request will be denied.

Co-terminal students: if you had a presentation or poster accepted, let us know; we may be able to support your travel.

Procedure:

1. Submit a [Travel Request Form](#) to BMI Student Services. You should do this ahead of time (weeks to months, not days). Failure to submit the travel request form **before** the travel will mean that the student is responsible for the entire cost of the trip.

2. Submit a [Student Certificate for Authorized Expense](#) form so that the travel reimbursement will not be considered taxable income to the student.

4.3. How to make travel arrangements

Students are responsible for making their own reservations for approved travel to conferences. (BMI Student Services will make the arrangements for the annual NLM

Informatics Training Conference.) Use Egencia through [Stanford Travel's Online Booking Tool](). All students are expected to arrange for the lowest, restricted fare, using a US air carrier under the Fly America Act. Tickets can be purchased with the BMI Travel card or the student's personal credit card. If the student uses a personal credit card reimbursement will be issued to the student upon completion of the travel. **Travel insurance and seat upgrades are not covered by BMI travel funds.**

Students should complete the required travel request forms and certification as well as registration forms for meetings well in advance, and attempt to qualify for early registration discounts whenever possible. Normally only the Early Bird registration amount will be reimbursed. The registration fee, if it is an approved expense, is often charged directly to the grant supporting the travel and therefore is not a liability to the student. Membership fees will be reimbursed if required for an early registration discount.

It is also the student's responsibility to arrange for lodging at most conferences (except the NLM conference). Again, frugality is encouraged, both because there is a maximum per diem that the University will pay for living expenses away from Stanford, and because the ability of other students to travel in the future will depend on each student working to keep travel costs low. Students should ordinarily stay two to a room, and should not expect reimbursement for items such as dry cleaning, room service, telephone calls, pay-per-view movies, and other sorts of entertainment. Students should carefully consider if a car rental is really necessary. Since the travel policies can be confusing, please ask the Student Services Officer for clarification.

If you plan other trips around business travel please check with Student Services in advance of your booking to discuss the potential cost adjustment. Subsequent changes could result in you being responsible for change fees.

If there is a problem with the travel itinerary such as cancelled flights, fees for changing dates or times of travel, or change of date of the conference, you must contact the Student Services Officer or your academic advisor to get guidance about changing the flights and/or hotel and still maintain the requirements of the travel guidelines. Failure to get approval for these types of changes may mean that you will be responsible for the expenses.

4.4. Receipts

Please save all original receipts! It is almost impossible to reimburse you if we do not have the original receipts of all expenses (food, lodging, registration, etc). Yes, please keep your receipts for purchases under $25. When purchasing the airline ticket online, the student MUST provide proof of payment for the ticket. If the receipt from the vendor does not clearly state how the ticket was paid for, the student needs to provide a copy of the credit card statement for proof of payment. Travel and Reimbursement have strict rules about reimbursements and they will not reimburse a student unless they have the required back up paperwork. If a group of students are eating together, it is preferred that each student receives his or her own bill or that one student pays the entire bill. Each student's name should be written on the back of the receipt. This will not be counted against the student's overall travel budget if one student pays for the whole bill for 8

students, for example. Students are encouraged to take turns at each meal, however, when paying for the entire bill. We do not reimburse for alcoholic beverages.

4.5. Reimbursement after you travel

Submit to BMI Student Services:

1. Spreadsheet of daily costs, including amounts
2. Electronic or print of airline receipt, including proof that you paid for it (Copy of credit card statement, Expedia receipt, etc., showing the amount with your name and method of payment.)
3. Boarding passes from the airline (to be revisited, this is a bit dated)
4. Registration receipt, including proof that you paid for it
5. Lodging receipt
6. All original receipts for other purchases
7. Program of the conference

It takes 2 weeks for Stanford Financials to issue the reimbursement deposit. Students should enroll in direct deposit through [Axess](#).

You may be reimbursed for the registration fee as soon as it is paid (prior to travel) and you submit the appropriate documentation. You may not be reimbursed for the other expenses until your return from the trip. Submit all documentation promptly. If submission is completed more than 60 days after travel, the reimbursement is taxable income.

4.6. Local Travel

Stanford policy is that conference or other travel to San Francisco, San Jose or other local cities less than 50 miles from Stanford does not qualify for overnight stay or for reimbursable meals. Students may be reimbursed for mileage and parking or train fare with a receipt. Consult with the Student Services Officer before you travel if you have questions about reimbursement policy. We are not able to reimburse students for gas mileage to the annual BMI retreat. We encourage carpooling.

4.7. Foreign travel

Contact BMI Student Services. In most cases, permission is given if the student purchases the airfare from an approved American carrier or their foreign partner. Refer to the Fly America Alliances Policy before booking a flight.

5. Time away

5.1. Leave of absence

The leave of absence policy is described in [5.3.1 Leaves of Absence: Policy | Graduate Academic Policies and Procedures](#)

5.2. Family leave

The pregnancy, childbirth, and adoption policy is described in [5.9.1 Pregnancy, Childbirth and Adoption: Policy | Graduate Academic Policies and Procedures](#)

5.3. Internships

Internships can be a great learning opportunity, but also can cause delays in your research or potential conflicts of interest. Note that there are some time constraints, so you need to plan ahead.

- Internships for PhD students are recommended during the 3rd and/or 4th year. In general, the BMI Executive Committee has a very strong preference that internships happen after you pass the Qualifying Exam, in order to ensure that you pass the Exam by end of second year, and to ensure that you have sufficient scientific knowledge and maturity to get the most out of your internship.

- Internships for MS students are highly encouraged during the summer following the first year.

- Career Resources can be found on the Stanford School of Medicine [BioSci Careers](#) website.

- Talk to your research and academic advisors to see if an internship makes sense given your status in the program. Also consider what period of time and its relationship to your BMI milestones to minimize delays in your progress.

- While internships should be related to Biomedical Informatics, make sure that the specific area of proposed internship research is distinct from your Stanford research, so that there are no intellectual property issues, such as who owns your work product and whether it is publishable. This issue can lead to very large problems. The topic of the internship project should be reviewed by your primary research advisor, who will be able to evaluate for potential overlap. Ask your research advisor to send an email to the BMI student services officer supporting your plan at least 1 full quarter before the start of the internship. This is important to getting approval from your funding source.

- Notify the BMI Student Services Officer well in advance your plans.

- If you are on an NIH training grant, you will have to go off the grant for the time you are away, and permission will need to be obtained in advance from the NLM or NIH. This may take more than 1 quarter, so best to ask for permission with the student services officer ASAP. The NLM allows this for only one summer during your degree program. You might be eligible to extend your NLM support for one extra quarter if you do an internship, with prior approval.

- If you are supported on any other type of fellowship or grant, such as the NSF, SGF, NDSEG, etc., you need to verify the rules for internships.

- You cannot receive payment from the internship and your Stanford sources for the same time period. You are taking a break from full-time registration in the BMI

program and will not be funded by the BMI program while participating in a full-time internship. Internships may affect your University benefits, such as health insurance and Vaden services. International students: see the next section.

- If your proposed internship is not during summer quarter, then you need to make special arrangements. Please see the section about [taking a leave of absence](#).

5.3.1. Special Notes for International Students

International students with internships in the US need to sign up for Curricular Practical Training (BIOMEDIN 390 A, B or C) and receive authorization through Bechtel International Center to maintain their visa status. Carefully read and follow the instructions at: [Curricular Practical Training (CPT) | Bechtel International Center](#)

Special case: When a TGR student engages in summer Curricular Practical Training, they must enroll for at least one unit in the designated CPT course (BIOMEDIN 390 A, B or C) and should not enroll in TGR or pay TGR tuition.   Bechtel International Center approves the student's CPT request and notifies the Registrar's Office, who then temporarily deactivates the TGR tuition group for tuition assessment purposes, so tuition is charged for only one unit.

International students who have already completed all course/unit requirements for their degree are not eligible for curricular practical training. CPT may not be used as a reason for delaying graduation. International students who are offered internships outside of the US will need to allow significant lead time to consult with Bechtel and multiple embassies. The conditions for visas and internships will depend on individual treaties signed between nations.

WARNING   Working without a CPT endorsed I-20 is a serious violation of your legal status which could forfeit your ability to remain in the U.S. and bar you in the future from re-entry to the U.S.

6. External employment

Past experiences with our program have taught us that external work commitments, especially in areas that overlap with research interests in the lab, essentially always lead to problems, especially with respect to intellectual property. Such involvements are not in your best interest, and they can significantly delay the completion of your training.

If you do take part-time or hourly positions outside the university, you are required to inform the BMI Exec. A maximum of eight hours per week is allowed for outside work. Failure to get approval before doing work off campus is a cause for concern about progress towards degree. Students must register for all quarters and be on campus, unless specifically approved otherwise.

The University restricts students on fellowships to no more than 8-10 hours per week of on-campus assistantships (such as a paid Teaching Assistantship in a different department). International students also have strict limits on work hours—please check with the Student Services Officer or Bechtel International Center.

7. Finances

7.1. Fellowship Stipends

Students on fellowships (NLM, SGF, SIGF, NRSA, NSF, etc.) receive stipend payments at the beginning of each quarter for the entire quarter. If you are living in campus housing, the system is set up to automatically subtract the housing fees from the stipend amount. Stipends for living expenses usually are taxable but income taxes are not withheld.

7.2. Assistantships (Salary)

Students being paid on any type of assistantship, usually a Research Assistantship funded by the PI, or students paid on any other type of hourly appointment that requires submission of hourly time sheets, are paid on the same schedule as the staff and faculty: work completed on the 1st-15th will be paid on the 22nd of the month, and work completed on the 15th through the end of the month will be paid on the 7th of the next month.

- The I-9 form must be completed before assistantship checks can begin. Make an appointment to see the Student Services Officer and bring appropriate identification to complete this mandatory paperwork.

- Please note that housing and other fees are not automatically deducted from your salary.

- Your salary is taxable and taxes will be withheld as you request on the W-4 Tax Data form, submitted through Axess.

Switching between the two payment systems requires careful budgeting. For example: Switching from a fellowship (SGF, NLM) stipend to an assistantship salary: If the fellowship ends after Summer Quarter, and you have an RA appointment for Fall Quarter, you will receive your Summer stipend payment at the beginning of that quarter in June. You will not receive your first paycheck until October 22, as the Fall Quarter does not begin until October 1 (in Payroll terms), and you are paid for the first half of the month (October 1-15) on October 22nd and for the second half of the month (October 16-31) the following month on November 7th.

7.3. Direct Deposit

Fellowship stipends and assistantships payments are best handled through direct deposit to your bank account. To set up your direct deposit, login to Axess and follow these directions: https://studentservices.stanford.edu/my-finances/refunds-and-direct-deposits

7.4. Holds

Checks and other types of payments to the student will not be issued if the student has unpaid fees from previous quarters (housing, activity fee, etc.), has not submitted the federal employment eligibility form (I-9 for employee Payroll only), federal and state tax withholding certificate, and patent agreement form (SU-18, done online in Axess). Outstanding bills from the library, University, or Vaden Health Center will also result in

holds. Holds must be cleared with the originating office before stipend checks will be issued. Please pay your housing and other miscellaneous fees.

If you owe money for tuition or health insurance and receive funding from BMI, please see Student Services Officer. If another department is responsible for your funding, please contact the appropriate department. The BMI Student Services Officer is happy to help in those situations too. Check your account in Axess often! Please see Student Services Officer if you need help resolving any issues.

7.5. Taxes

Unfortunately, BMI Student Services cannot give tax advice. Here are some useful resources.

- Start here: [1098-T FAQ's & Resources | Student Financial Services](#)

- According to this site you do NOT have to pay income taxes on Vaden Health Services Fee, Health Insurance, or Required Fees (such as 1st year student Document Fee or ASSU Fee).

- Stanford issues an annual tuition statement, IRS Form 1098-T, to provide information necessary for students or parents to claim educational tax credits (http://www.irs.gov/uac/Tax-Benefits-for-Education:-Information-Center). It has come to our attention that some online accounting programs (i.e., Turbo Tax) inappropriately refer to Form 1098-T as an income form. Using the 1098-T form to determine income rather than claim educational tax credits can cause misunderstanding and errors. Do NOT use the 1098-T form to determine fellowship/scholarship income.

- International students may contact Bechtel International Center

- Also, IRS website: http://www.irs.gov/

8. Graduation

8.1. Graduation Photo

All PhD students should have their photograph taken before they defend their thesis. Full-time academic MS students should have photos taken the quarter before graduation. Student Services will reach out to graduating students with a list of photographers and the BMI program will pay for the photography session and print. The portrait sitting should be around $180-$220 plus tax/shipping fees (to be sent to the BMI office) for (2) 5x7 professional portraits in black and white.

See the Student Services Officer for additional information and to provide your name as you want it to appear on the brass plate.

HCP MS and Coterminal MS students will have their names added to plaques as well. Please inform the Student Services Specialist how you would like your name to appear on the brass plate.

8.2. Degree Conferral

In order to have your degree conferred, you must have completed all of the University and Department requirements, and submitted all work before the deadlines. The University imposes requirements such as residency, submission of official scores and transcripts, payment of fees, and return of library books, that the BMI program has no control over and sometimes no knowledge of. You should make sure that these have been addressed.

8.3. Notice of Intention to Graduate

You must file a Notice of Intention to Graduate ("apply to graduate") through AXESS for the quarter you complete the degree requirements. If you do not finish in time, you will need to annul the initial Intention to Graduate and submit a new one for the quarter in which you intend to finish. Please refer to the University calendar for deadlines. There are no exceptions for missed deadlines. This is a University rule. The deadlines are listed in AXESS and on the academic calendar.

8.4. Graduation Quarter

If you have completed everything except for depositing the report, thesis or dissertation, you may submit that and graduate while registered for a Graduation Quarter your very last quarter. This Graduation Quarter option is only available for one quarter. You must be an Active student registered the quarter prior to this or on an approved Leave of Absence and you must have filed TGR papers and defended your thesis before this. You will still need to file an Intention to Graduate for that last quarter in AXESS. A small tuition fee will be charged and you will be considered a full-time student for various administrative purposes. Your degree will not be conferred until the official conferral date for that final Graduation Quarter.

8.5. Commencement

BMI students from all degree programs are encouraged to participate in Medical School Commencement, which is coordinated by the Office of Student Services in the School of Medicine. If you complete your degree in June or in a previous quarter during that academic year, you will be encouraged to attend the ceremony.

9. Change log

- 2017 September: entirely new format with heavily revised content, including description of Written Qualifying Examination for PhD students.

- 2017 October: updated description of international travel.

- 2017 November: added note that your PI should approve of you applying to take the informatics content part of the written qualifying exam.

- 2018 January: added Biomedical Data Science suite mail code. Minor textual changes to section on written quals.

- 2018 February: added text about preparing slides for preproposal and thesis proposal defense.

- 2018 April: removed most of the text about the PhD Qualifying Exam because that text and the corresponding content outlines are available in a Box folder.

- 2018 April: added text about noting source of figures/tables in your slides.

- 2018 May: replaced old Thesis Proposal Defense + Final Talk with Thesis Defense.

- 2018 May: clarified ergonomics equipment section.

- 2018 October: rewrote the Progress Report section to reflect current (greatly simplified) procedure.

- 2019 May: Minor updates to Flowsheet/Program Proposal Instructions

- 2019 August/September: Updated stale URLs. Clarified Waiver process. Updated computing environment section. Clarified TA requirement. Clarified Quals section. Added a section on funding support for MS students. Expanded the students section including links for new students and information about the retreat and orientation. Updated emergency information.

- 2019 November: Clarified advisor change procedure per CGAP requirements. Updated Quals procedure for 2019-20. Added section on applying to the PhD program while in the MS program

- 2020 January-March: PhD funding plan clarification. Travel clarifications. Reordered portions of Section 2. Added wellness resources. Further Quals clarifications. Temporary reference to document related to public-health crisis situation.

- 2020 Spring: Clarified NIH public access policy. Added links and resources. Rearranged a few sections (e.g. on mailing lists) for formatting. Expanded discussion of TA requirements and types. Added details for HCP program and switching policy

- 2020 August. Slightly modified the Academic MS description to reflect the text in ExploreDegrees about research rotations and the required research paper. Removed description of funding for international students because it is only relevant during application process.

- 2020 September. Reverted the curriculum description to remove "BMI-relevant" and replace with "Unrestricted". Cleaned up the email lists. Add to explanation of 50% RAship. Fixed description of advice on Quals. Clarified no need to complete research project if student transfers out of the Academic MS program. Updated description of current course waiver procedure to remove requirement of approval of academic advisor.

- 2020 October. Added link to Office of Accessible Education (OAE).

- 2021 May. Removed Walkthrough INFO for graduation.

- 2021 August. Added info on Internships and adding an MS degree

- 2021 September. Lots of minor wording changes. Clarified role of co-advisors, and reading committee.

- 2021 November: Clarify second-year committee meeting for PhD students.

- 2022: Oct/Nov Updates:

  - Section 1.4 compute resource links have all been updated
  - Section 2.3 How to stay updated on BMI/DBDS events new section
  - Section 2.4 How to reserve a conference room
  - Section 2.12 Cardinal Print instructions
  - Section 3.1 Tuesday talks changed to Monday talks
  - Section 3.2 More clarification on Co-Advisors
  - Section 3.4 Waivers and Exceptions – clarification ie 52 units of formal coursework required
  - Section 3.7.1 TAships item #1 added to help clarify expectations; also removed mention of TA reviews being attached to student records
  - Section 3.9.2 Removed mention of MS progress reports 3.9.2, which are no longer required.
  - Section 3.9.5 Mentioned the Google doc with potential research opportunities
  - Section 3.10.1 Added a reminder that for the CS/Stats/Math/Eng electives that you can have no more than 9 units in courses below the 200 level.
  - Section 3.10.3 Mentioned the Google doc with potential research opportunities
  - Section 5.3 Internships –added verbiage for MS students
  - Section 8.1 Graduation Photos – updated information
  - Also: Updated many links, and a few typos