Department of Microbiology and Environmental Toxicology
University of California, Santa Cruz

Graduate Student Handbook

version **Fall 2025**

For PBSE Track Ph.D, METX PhD, and METX MS students

Table of Contents

Table of Contents

Table of Contents

Table of Contents

Welcome to METX!

Dear Graduate Students in Microbiology and Environmental Toxicology,

Welcome to UCSC! We are excited and proud to have you as members of our department.

This handbook is your guide to our graduate program as well as to other services on campus. It contains answers to many of the questions that arise when planning a graduate career and beginning at a new university. You will find additional useful information at our department's website at https://science.ucsc.edu/department/metx/, the PBSE website at https://pbse.ucsc.edu/metx/ and UCSC's website at https://www.ucsc.edu/.

If you have any questions or need assistance during your time here at UCSC, **your first contact is Sandra Pomeroy**. Sandra is available to assist you with questions pertaining to the rules and regulations of the university. The Department office can provide university forms and general information about university procedures, or will refer you to the appropriate office for further information.

Additionally, please feel free to contact any of us regarding advising matters, or any other concerns. Our contact information is listed below.

Good luck with your research and studies!

Sincerely,

Prof. Karen Ottemann, Chair
Office: Biomed 238
ottemann@ucsc.edu
(831) 459-3482

Prof. Jacqueline Kimmey, Graduate Program Director
Office: Biomed 246
jkimmey@ucsc.edu
(831) 459-4095

Sandra Pomeroy, Graduate Program Coordinator/Advisor
Office: PSB 430B
metx-gradadvising@ucsc.edu
(831) 502-0414

OVERVIEW OF THE METX GRADUATE PROGRAMS

The Microbiology and Environmental Toxicology Department (METX) at UCSC sponsors undergraduate and graduate courses in microbiology and environmental toxicology. METX grants PhD and MS degrees through several tracks. Our courses provide a strong foundation in multiple areas of microbiology, toxicology, and pharmacology to provide the breadth and depth of perspective required for interdisciplinary science.

Graduate training in the METX Department prepares students to solve important problems in the field of environmental health by providing (i) stimulating coursework, (ii) extensive scientific presentation training, and for the research-oriented PhD and MS degrees, (iii) in-depth research that culminates in a thesis. Our program educates students to appreciate the interplay between microbes, chemical toxins, and health, providing the training students require to work effectively in a complex world. Graduate training prepares students to become leaders in the field, following career paths in academia, teaching, industry, and government. [https://science.ucsc.edu/department/metx/]

PhD students in METX matriculate in either the METX PhD or the PBSE METX track. Requirements for these programs are nearly the same, with the exception that the PBSE track students complete three rotations upon admission, while METX PhD students enter directly into their thesis lab.

MS students in METX matriculate into either a research-based thesis MS (Plan I and 5th year MS) and complete a thesis, or matriculate into the course work (Plan II) MS and complete a capstone project.

METX PROGRAM LEARNING OUTCOMES (PLOs)

What is expected of someone who has a MS or a PhD? We have described these as program learning outcomes (PLOs). They are basically expectations of what a METX student will be able to do upon completion of their degree. We evaluate how well students are meeting these PLOs throughout their career. The most common way is via the evaluation rubrics for many of our degree milestones, including qualifying exams and theses (see Appendices for these rubrics).

PLOs for Research-based (Plan I) MS Students

MS graduates will demonstrate:

1. Proficiency with the fundamental knowledge in either microbiology or environmental toxicology.
2. Ability to conduct independent research in either microbiology or environmental toxicology.
3. Ability to communicate scientific concepts and results in both written and oral forms.
4. Be equipped with interdisciplinary skills needed for success in microbiology and environmental toxicology fields, where there is a great need for scientists who have broad, interdisciplinary training.
5. Knowledge and understanding of ethical standards in proposing and executing professional scientific research.

PLOs for Coursework-based (Plan II) MS Students

Coursework MS graduates will demonstrate:

1. Proficiency with the fundamental knowledge in either microbiology or environmental toxicology.
2. Ability to understand independent research in either microbiology or environmental toxicology.
3. Ability to communicate scientific concepts and results in both written and oral forms.
4. Be equipped with interdisciplinary skills needed for success in microbiology and environmental toxicology fields, where there is a great need for scientists who have broad, interdisciplinary training.
5. Knowledge and understanding of ethical standards in proposing and executing professional scientific research.

PLOs for PhD Students

PhD graduates will demonstrate:

1. Mastery of the fundamental knowledge in microbiology or environmental toxicology.
2. Ability to conduct independent research and manage a research project in either microbiology or environmental toxicology.
3. Ability to communicate scientific concepts and results in both written and oral forms.
4. Be equipped with interdisciplinary skills needed for success in microbiology and environmental toxicology fields, where there is a great need for scientists who have broad, interdisciplinary training.

5. Knowledge and understanding of ethical standards in proposing and executing professional scientific research.
6. Ability to effectively teach science in a classroom environment.
7. Ability to perform in leadership roles among peers that engage fellow students and promote the success of the departmental graduate programs. Students report annually at their advising meeting (with the Grad Advisor) how they met this requirement.

GETTING STARTED: FIRST STEPS IN METX

Department Orientation

The Department & PBSE Orientations occur during or just prior to the first week of Fall quarter. New graduate students must attend all orientation events--if you must miss some, let the Grad Program Advisor know. During orientation you will be provided with an overview of the department and the campus. You will have several opportunities to meet and speak with the METX graduate students throughout the orientation. You will also meet with your Graduate Advising Committee for academic advising and an outline of the required coursework during your first year. Plan on being in town and available that week, before classes start, for other department activities.

E-mail Account

Virtually all information will be communicated to you via an electronic mail account set up for you in the standard format of @ucsc.edu. You must use this email for all business related communications, therefore please be sure to have this email forwarded to your main email address so that you do not miss important notices. In addition, you will be added to the department email aliases for local announcements and postings. The graduate student list will include housing opportunities that might interest you. Please get in the habit of checking your @ucsc.edu e-mail frequently throughout the summer and responding as needed.

Campus Mailing Address

Your Name
METX
UC Santa Cruz
1156 High Street
Santa Cruz, CA 95064

Mailboxes will be assigned to METX students in the alcove outside PSB 430B. All campus mail addressed as above will be delivered here. Students may use that address for outside mail related to their student career.

Seminar Series

METX runs a weekly seminar series with presentations each Tuesday at noon. METX Graduate students are automatically enrolled in the email list (metxseminars-group@ucsc.edu), but any one else can contact metxadmn@ucsc.edu to request to be added. METX graduate students present every year in the seminar, as described in the requirements section.

Other science departments also have seminar series, and the best way to access these is to sign up via the sponsoring department.

Getting the most out of your graduate education

You will be learning many new things, as well as developing your skills for balancing classes and other commitments. A big difference between grad school and undergrad is that now you are in charge and making your own success. This means you should be prepared to take initiative and ownership of your project. Here are some suggestions: (1) Make sure you read all the suggested background material plus a bit more to be sure you have a strong grasp on your project and can start to contribute ideas; (2) Ask questions--of your supervisor, lab mates, and professor. Everyone knows you are learning, and asking questions is a highly valued skill in science; (3) Work hard to master the techniques and material. Your rotation is a chance to show your potential, so make sure you represent yourself as a hard worker who is engaged in the lab's projects; (4) Be a good lab citizen. That means asking about other people's projects, helping out if needed, making buffers, and asking before you use other people's stuff; (5) Professors know that you are balancing classes, so be realistic about your time. It often works well to identify blocks of time where you can work in an uninterrupted fashion; (6) Try to meet regularly with your PI (Principal Investigator, i.e. primary PhD mentor/advisor). Ask questions, and admit mistakes. Show him or her your lab notebook.

Rotations are a particularly important time when you are figuring out if a lab is a good fit.

There are many good pieces out there on this topic, here are just a few:

Conducting Successful Lab Rotations - UCSF Office of Career & Professional Development

Five Things I Wish I Knew Before Starting My Rotations - Emory University, Ellen Woon

Lab Rotations 101 - Saya Sedighi, University of Toranto

METX COMMITTEES AND PROGRAMS

Graduate Advising Committee

2025-2026 GAC: Prof. Jacqueline Kimmey (head), Prof. Chad Saltikov, and Prof. Raquel Chamorro Garcia

At all times during their degree, students have an advising committee. This committee changes in composition during the student's career. At first, students meet with the department **Graduate Advising Committee (GAC)**. GAC consists of three METX faculty members, with the Graduate Program Director serving as the head of GAC. The role of the GAC is to (1) provide advice on courses, (2) to answer questions on program requirements, and (3) to generally "check-in" with the student to monitor their progress. **GAC is responsible for evaluating any and all exceptions to program policy (class substitutions, altered deadlines etc.)**, any challenges or conflicts that arise during the degree, or requests for leaves of absence. Any private or sensitive information discussed with GAC will be kept confidential unless otherwise discussed. *If a challenging situation arises between a student and their PI, and that PI also is on GAC, the student should feel free to contact one of the other GAC members for advice. If appropriate, a GAC meeting can be held without the PI present and confidential details will not be shared with the PI without the student's consent.*

All students meet with GAC yearly at the fall advising meeting, during which time we will check on academic progress, course completion, and help advise on what to expect for the following year. Students should fill out their progress form (all forms linked here) to document where they stand in their degree and to address any concerns the student might have.

The GAC serves as the student's primary advisory committee until the student has a Dissertation Reading Committee (DRC) - *aka your Thesis Committee, formed by winter of year 3*. At this point, PhD students are required to meet with their DRC at least annually to ensure progress, and no longer have individual fall advising meetings with GAC.

In addition to advising by the faculty committees, students also meet yearly each spring with the METX Grad Advisor to check in about well-being, milestones, funding, and other issues as needed.

To contact the METX GAC, email metx-gac-group@ucsc.edu

Graduate Student Liaisons

2025-2026 student liaisons: Catherine Palmer and Juliet Ellenbach

The METX Faculty value and regularly seek input from graduate students. METX has two student liaisons who (1) serve as information conduits between the graduate students and faculty and (2) organize departmental social events. These are volunteer positions that are expected to take no more than 5 hours per month. Students in these positions benefit by developing leadership skills and becoming more familiar with the workings of academic departments, and this fulfills PLO 7. *Note: students are recommended to not serve in multiple leadership positions at the same time.*

There are two Grad Liaison positions, with one student typically from PSB and one from Biomed. Grad Liaisons serve a term of two years. The terms alternate so there is always one seasoned liaison and one new liaison, providing continuity.

Liaison Duties

- Grad Liaisons elicit feedback from students about the program, and relay that information to faculty. The feedback can be collected by official meetings or surveys, but should endeavor to capture the experiences of all METX students.
- Grad Liaisons attend ~ one faculty meeting per quarter to relay information and provide input on graduate student related issues. Grad Liaisons may request to be put on a faculty meeting agenda when needed.
- Grad Liaisons plan the fall quarter What I Wish I Knew panel
- Grad Liaisons help with the Fall Welcome BBQ and the Fall Alumni career panel
- Grad Liaisons plan one additional department social event, typically a summer hike or beach event.
- Grad Liaisons do NOT serve as mediators or facilitators for grad student conflicts. Conflicts should be directed to the student's PI, GAC, the department chair, or staff grad advisor.

Students: Please remember you can utilize your Grad Liaisons if you have any agenda items, issues, or ideas to bring to the faculty's attention.

Peer-Mentor Program

2025-2026 Peer-Mentor Program Coordinators: TBD.

METX has a program in place to pair new and experienced students to provide peer mentoring. Third and fourth year grads meet with and advise incoming grads. First year grads will be paired with someone outside their lab. This program aims to provide the older grads with mentoring experience and give the new grads a peer to ask questions of and get advice from. Mentor commitment is two years. Information will be provided about this exciting and important program.

ROTATION PROGRAM: PBSE PhD STUDENTS

Overview

Students in the PBSE program carry out three 6-7-week rotations that occur during fall and winter quarters of the first year. The purpose of rotations is to provide students with diverse research training, and to allow students and faculty to determine whether they can establish a productive working relationship. Shortly before the beginning of each rotation, students submit a list of faculty that they wish to rotate with. The PBSE Executive Committee then matches students with rotations, striving to give every student their first or second choice, and not assigning too many students to one lab.

All primary METX faculty are affiliated with PBSE: https://science.ucsc.edu/department/metx/people/

Complete list of PBSE Track faculty are listed here: https://pbse.ucsc.edu/faculty/index.html

Rotation Program Schedule

The PBSE program requires all students to complete 3 rotations prior to joining a thesis lab. You cannot join early. After each rotation, students give either a 5 minute talk or a poster presentation. For each type, students should practice with their rotation lab to get feedback on giving an excellent presentation.

The 2025-2026 rotation schedule is as follows:

Rotation 1: September 29 - November 7

Rotation 2: November 17 - January 16
(Rotation 2 is longer to accommodate Thanksgiving and Winter Breaks)*

Rotation 3: January 26 - March 6

Rotation students meet with faculty to discuss joining labs after the poster session on **March 13,** and should start in their permanent labs around March 16.

**The nature of the break is up to the 2nd rotation PI, but a good guideline is that you can take about a week off over the campus closure / December holidays. The campus operations slow way down from ~ Dec. 24-Jan. 1, so that is a logical time to be away. If you do make plans, tell your 2nd rotation PI as soon as you start the rotation.*

Assignment of Rotation Labs

METX students can rotate with any PBSE faculty (METX, Chem, BME, MCD) but note that priority placement is always given to students from that faculty's primary track (i.e. you get priority for METX labs over other PBSE students). You do not need permission if selecting any faculty within the PBSE program. If you are interested in rotating in a lab outside of PBSE (e.g. Ocean Sciences, EEB), you must first get approval from the Graduate Director.

Prior to the first rotation students should:

1. consult 25-26 PBSE Rotation and Lab Availability to identify available labs
2. meet with the Principal Investigator (PI) to discuss rotation options, your interests and experience.
3. submit a ranked-list of their **top 5** choices to the staff Grad Advisor. Students must meet with at least the top 3 PI's listed.

After obtaining all the ranked lists, the PBSE Executive Committee matches students with labs, striving to give as many students as possible their first or second choices. Students are then notified of their rotation lab. **Note, PI's fill out the rotation availability sheet to denote the number of slots for each rotation. They have no input on which students get assigned to the lab.*

The same process repeats for rotations 2 and 3. You are free to change your list / rankings each rotation to fit your interests as they evolve. If you are listing the same faculty in a subsequent rotation, and have already met with them, you do not need to meet with them again.

Graduate students may perform summer research prior to the start of the Fall quarter, but this is not a formal component of the PBSE program. The student must make arrangements with a PI directly.

Faculty Responsibility to Rotation Students

While rotation students may work closely with one or more members of the laboratory, the primary responsibility for supervision lies with the faculty member. Faculty are encouraged to meet regularly with the rotation student to discuss their progress. Faculty should also attend the rotation talk. If unable to do so, another METX faculty member should be asked to attend the talk and provide an evaluation.

Feedback on Rotation Performance

Performance in each rotation is graded in the METX 297 class as satisfactory / unsatisfactory and summarized in a narrative evaluation by the rotation supervisor. This evaluation becomes part of the student's record. The goal of the feedback is to help students improve as scientists. For PBSE students, the evaluation will consist of the following points: (1) description of the project; (2) strengths: The student should keep doing the following… (3) areas to improve: To become a better scientist, students should start or stop doing the following… (4) based solely on performance in this rotation, whether the PI would or would not accept the student into the lab. (*Note, this ranking does not constitute a commitment, which understandably must also consider space and funding*.)

Selection of a Thesis Laboratory

After completion of the third rotation presentation, all students initiate discussions with faculty members of the labs they are considering joining. Students may elect to join a laboratory in which they have not rotated if the PI is supportive (typically only occurs for students that formerly worked in that lab). Faculty members have full discretion of whether or not to accept a student into the lab for thesis research. PBSE, GAC, etc has no role in this process.

Faculty are not permitted to make any promises to students regarding permanent positions in their lab, officially or unofficially, until after the third rotation.

Students who are unable to secure a thesis laboratory should contact the METX Graduate Advising Committee to seek assistance in scheduling a possible 4th rotation. Options for 4th rotations are typically more limited, as many labs will have just accepted a student. If after this 4th rotation students are unable to secure an advisor to sponsor their thesis research, they are considered to be in unsatisfactory academic standing, and will not be allowed to continue in the program.

Co-Advisors for METX Graduate students

Students require a METX Faculty Co-Advisor if they have as their Primary Advisor a scientist who is not in the Professor series at UCSC ("Ladder Rank"), e.g. adjunct professors or scientists at other institutions. The Co-Advisor serves to help the student and Primary Advisor understand and adhere to METX requirements. The Co-Advisor may be the Graduate Director or a faculty member who collaborates on the student's research. In either case, clear documentation must be provided to the METX GAC and Grad Program Director about who is fulfilling this role.

What does the co-advisor do?

1. The main function of the Co-Advisor is to help the student and Primary Advisor understand and adhere to the METX graduate student requirements as outlined in the Student Handbook.
2. The Co-Advisor will be part of the students advising committee before a thesis committee forms. As such, they will join the annual advising meeting. Although additional meetings are not required, it is recommended to have one additional meeting per year to make sure the student is on track
3. After the advising committee is formed, the Co-Advisor will check in with the student on an ad hoc basis. This checking in would entail being available for conversations (via email, phone, in person, etc.) for the student and/or the co-advisor.
4. The Co-Advisor can serve on the student's qualifying exam committee and dissertation reading committee, but does not have to.
5. The Co-Advisor is part of communication from the METX advisor to the student's Primary Advisor about milestone and the student's progress

What is typically not provided by a Co-Advisor (but may be, if agreed upon)

1. Provide space or funding to the student
2. Advise on day-to-day experiments
3. Meet more frequently than 2x per year
4. Read student's literature review and QE proposal

METX REQUIREMENTS APPLICABLE TO ALL PhD and RESEARCH-BASED MS DEGREES

1. Courses

All graduate students take a series of graduate courses which ensure a foundational knowledge in relevant METX fields and the development of critical thinking and writing skills. The required courses for each program are outlined in the UCSC Academic catalog which is updated yearly. Students **must complete all requirements in the catalog** published the year they matriculated in the program, or can opt to follow any subsequent catalog published during their graduate degree. See section on Catalog Rights for more information.

Throughout this handbook and in advising forms you may find examples of common class schedules. These are simply to help you plan, but do not replace the catalog requirements. In the case of discrepancies between the handbook and the catalog, **you must follow the catalog requirements.**

The current METX course catalog can be found here, while all former years of UCSC catalogs are linked here: https://catalog.ucsc.edu/en/

All research thesis track MS and PhD students must take the following courses, and any additional courses as recommended by GAC. These classes should be taken for a letter grade (unless explicitly instructed otherwise by the instructor). *Note that the coursework based MS track has additional requirements not listed here - see course catalog.*

A. Core courses:
- METX 200, Interdisciplinary Approaches to Problems at the Interface of Microbiology and Environmental Toxicology
- METX 245A: Scientific communication (Lit Review) or METX 205 (Grant Writing)

B. Field specific courses (pick 1)
- METX 202, Cell and Molecular Toxicology
- METX 206A, Advanced Microbiology

C. At least one METX advanced department course
- METX 201, Sources and Fates of Pollutants
- METX 210, Molecular and Cellular Basis of Bacterial Pathogenesis
- METX 238, Inflammation and Pathogenesis: Molecular Mechanisms of Disease
- METX 250, Environmental Microbiology

D. Additional requirements for PhD students
- METX 200B, Developing and presenting scientific projects (QE prep course - Winter Yr 2)
- BIOL 289, Practice of Science: Scientific Ethics

Additional elective(s) are recommended as appropriate for your thesis, but not formally required unless advised by GAC or your PI. For example, many pathogenesis focused PhD

students take both METX210 and METX238, while students focusing on chemistry may consider CHEM200A, CHEM200B, or CHEM200C.

E. Academic Research Units

Each quarter, students must enroll in research units via METX297A, B or C, or METX299A, B, or C. METX policy is that these classes are taken S/U. These classes have specific codes based on your PI, so the METX Graduate Advisor (Sandra Pomeroy) will provide the actual class number each quarter.

- METX 297 is for MS and PhD students who are rotating or who do not have a permanent lab
- METX 299 is for MS and PhD students who have a thesis lab.

For either 297 or 299, you must choose the number of units to reflect the hours of academic effort per week which may include in lab research, data analysis, working on your QE or lit review, etc. *1 unit is equal to about 3 hours of academic hours / week*, so you'll need to enroll properly depending on your other courses or employment / funding situation. You must enroll in at least 10 units total per quarter to be considered a full time graduate student.

TAships and GSR are both 20 hours per week – this time does not count towards 299 efforts as this is employment, not "school". For example:

	Units	Academic effort	Select this for quarters when you have	Example workload
299 **Z**	2	~6 hr/week	**three** other obligations such as TAing and two 5 unit classes	20 hr (TA or GSR) 24-30 hr (courses) 4-6 hr (299Z) 48-56 hr total / week
297 **A** or 299 **A**	5	~15 hr/week	**two** other academic obligations such as 1) TAing or GSR appointment and 2) taking a 5 unit course. In these quarters, you have significant obligations such that your in lab research effort will be part time	20 hr (TA or GSR) 12-15 hr (5 unit course) 12-15 hr (299A) 44-50 hr total / week
297 **B** or 299 **B**	10	~30 hr/week	**one** other obligation such as a TA or GSR appointment or a 5 unit course. These other requirements require 15-20 hours/week commitment, so in a B quarter, you are working on research about ⅔-time.	20 hr (TA or GSR) 24-30 hr (299B) 44-50 hr total / week
297 **C** or 299 **C**	15	~45 hr/week	**no** other classes or employment appointments (no GSR or TA). In a C quarter, you are working on research or academic requirements full time. *(rarely used)*	*Student has no obligations other than thesis research (self-funded or on fellowship)*

At the beginning of each quarter, you should meet with your PI and make a research plan for the quarter that takes into account your other academic commitments and appointments and select the proper number of units. At the end of the quarter, a student will earn a satisfactory (S) if they meet their research plan, or an unsatisfactory (U) if the student did not complete the research plan. A student may earn an incomplete (I) if they were unable to complete their research plan due to extenuating personal circumstances that hindered their progress. In this case, the student will initiate a meeting with their PI and make a plan to complete the missing work in a timely manner, and file that plan with the METX GAC and Grad Advisor.

F. Lab Meeting (2 units)

Each quarter you should enroll in the lab meeting for your thesis lab, METX 281_. Students in non-METX labs will enroll in the lab meeting for your PI, which will likely have a non-METX code. Rotation students do not need to enroll in a lab meeting. Recommended grading: S/U

METX 281 codes			
281A	Audrie Lin	281P	Michael Patnode
281C	Chad Saltikov	281R	Raquel Chamorro-Garcia
281J	Jacqueline Kimmey	281S	Don Smith
281M	Manel Camps	281V	Vicki Auerbuch-Stone
281O	Karen Ottemann	281Y	Fitnat Yildiz

G. Seminar (0 units)

Each quarter, students must enroll in and attend the **METX 292, Introductory Graduate Seminar.** METX seminar is Tuesday at 12 - 1pm (in spring, there are some weeks with double seminars on Tuesday and Thursday 12 - 1pm). Seminar is 0 units and is graded based on attendance, Recommended grading: S/U.

Example Course Overview.

Subject to change, check the UCSC catalog to ensure all requirements are completed based on your matriculation year.

1st Quarter (Fall): Evaluating and Presenting Scientific Literature.

METX 200. PhD and MS.

- Gain competency at literature and data quality evaluation, identify gaps in knowledge
- Begin mastering methods and experimental design used in METX
- Develop skills at oral presentations and ability to work in teams
- Develop and present research proposals

2nd Quarter (Winter): Field and Methodology Competency, experimental design, multidisciplinary tools, improve research project design

METX 206A OR METX 202. Track specific topic foundation. PhD and MS.

- Gain foundational knowledge of microbiology or env. toxicology
- Continue building understanding of methodological approaches
- Continue mastering experimental design

BIOL 289. Ethics course. required for PhD only

Can be taken anytime yr 1-3, but recommended in year 1 if possible. **Offered Winter 2026**

- Instruction in responsible conduct of research, including keeping accurate and durable records, forms and consequences of fraud, plagiarism, and other forms of academic misconduct, honest reporting of data, authorship, collaboration and competition, what constitutes a publishable body of work, what determines the order of authorship on publications, and humane and appropriate use of animals in research.

3rd or 4th Quarter (Spring, Fall year 2): In depth field and methodology competency, project design, written communication, research ethics

METX 245A or METX 205. Graduate Writing Course. MS and PhD

- Develop ability to summarize large bodies of information
- Develop student's ability to write clearly

METX 210, METX 238, METX 201, METX 250. Advanced topic course. MS and PhD

- Additional topic-related content and methodology

5th Quarter (Winter year 2): Research project development

METX 200B. QE Preparation course. PhD students only

- PhD students develop their thesis research proposal, guided practice for QE.

2. Literature Review.

All graduate students write a literature review of the current state of the field of the proposed dissertation research, under direction of the student's advisor. Students are advised to take METX245A in spring of year 1 to begin work on this, and then complete the review over the summer. The review is due to the student's advisor no later than the first day of fall quarter of the student's second year.

5th Year MS Grads will conduct their review over the summer between earning their BS and officially entering the MS program, and submit it to their advisor no later than the first day of fall quarter of the student's 5th (MS) year.

Lit Review Guidelines

1) The purpose of the Literature Review is to (1) ensure you are familiar with the current state of knowledge relevant to your thesis work; (2) provide a solid foundation that can be used for the introduction to your thesis.

2) There is a rubric in Appendix V that also gives a good timeline and expectations.

3) You should start your literature review no later than the beginning of the summer after your first academic year.

4) The first step is drafting and agreeing upon an outline and a timeline with your PI. Your PI will continue to be involved throughout the literature review writing process.

5) The literature review should be written in the format of a review article, such as you would find in the "Trends in …" series (e.g. Trends in Microbiology), "Nature Reviews" or "Annual Reviews of...". Ask your PI to supply a format.

6) The literature review should include at least 50 literature citations.

7) Your completed literature review must be approved by your PI and submitted to the department by the first day of fall quarter of your second year. Failure to do so will result in falling out of good academic standing and may jeopardize funding support.

3. Department Seminar.

All METX students must present their research publicly to the department each year. Rotating PhD students in their first year give two 5 minute rotation talks and 1 poster presentation. All other students (all MS and PhD students who have joined a lab) give a ~15 minute talk in the departmental seminar series each spring, with the exception of 3rd year PhD students, who give a 50 minute seminar prior to advancing to candidacy. Students with a thesis defense date *confirmed* in the Spring should let the seminar coordinators know as they do not need to speak in the seminar series (their thesis defense will satisfy the requirement).

Additional PhD SPECIFIC REQUIREMENTS

4. Teaching assistantship.

Doctoral students are required to work as teaching assistants (TA) for at least one quarter. Priority for TA positions is given to doctoral students who have not yet worked as a teaching assistant. See TA assignment and training section for more details.

5. PhD Qualifying Examination.

The qualifying examination consists of a written description and defense of the PhD thesis. This exam

is taken in Spring Quarter of the 2nd year and must be completed by **May 15**. Students and PIs are expected to discuss the student's project, but the PI should not provide specific feedback on the student's written proposal or oral defense. Additional details and tips for the exam are provided in Appendix I and a timeline is listed below.

Qualifying Exam Timeline (year 2 of PhD track)

Date / Deadline	Item
Early October	METX Advisor will send out a call for QE abstracts
Dec 15 (deadline)	Students submit QE Abstract and recommend possible committee members to METX GAC using the committee request Google form (all forms linked here)
Winter Quarter	Students take METX200B to help with QE project development
Early January	GAC will inform students of proposed QE membership. Students should **immediately** contact the faculty and ask them to serve on the committee. If a member is unavailable in spring, contact GAC about an alternative.
February	Students should schedule a 3 hour time slot for their QE exam for early spring - the exam must be completed by **May 15**. Faculty schedules can be very hard to coordinate, so do not procrastinate on this. *Recommended: first ask faculty if there are any dates they are out of town / unavailable, then use a whentomeet poll to narrow down times. Once a date has been secured, create a google calendar event and invite the faculty so they hold this on their calendar. You can update the location later if needed.*
Early March	Once you know the date, formally nominate the committee to the Grad Division. This must be submitted *at least* 1 month before the exam date. *Recommended: add the below deadlines to your calendar based on your exam date.*
8 weeks before exam	Meet with your QE committee chair to discuss overall plan
4 weeks before exam	Send a draft of your written proposal to their QE committee chair for feedback *Students are encouraged to schedule practice exams with senior students. Faculty are not allowed to attend practice exams.*
2 weeks before exam	Send the **final draft** of your written proposal to the entire QE committee via email. *Include a reminder of the date, time, and location of the exam.* Once the final draft is submitted, students may optionally meet with committee members (see details below)

Date / Deadline	Item
May 15 (deadline)	Final deadline - QE must be completed before this date

Selection of the PhD Qualifying Exam Committee

The Qualifying Exam committee is composed of 4 faculty members, usually 3 members of the METX program plus 1 tenured faculty who is not a member of the METX department. The student's research advisor (PI) will not be a member of the exam committee. The student and their advisor propose committee members to the METX GAC, who approve the composition, making modifications based on topic area and distributing assignments fairly among faculty. The chair must be a tenured UCSC faculty member, and will be assigned by GAC. The outside member is chosen in consultation with the student and advisor and must be either a tenured faculty member (either an Associate or Full Professor) from a different department at UCSC or a tenured member of the same or a different discipline from another campus. Tenured UCSC faculty from other departments who are affiliated with our METX Graduate Program may serve as outside Qualifying Exam committee members. Scientists from a non-academic environment require a petition for exception.

After the committee is provisionally set by the department, the student contacts the proposed faculty to ask them whether they will be on their committee. If a faculty person cannot serve, the student should let GAC know, so another faculty member can be proposed. After the faculty agree, the student files the Committee Nomination of PhD Qualifying Examination form. The committee must be approved by the Vice Provost and Dean of Graduate Studies before the exam can take place.

Once your committee membership is confirmed, you should begin scheduling an exam date. The exam must be completed by May 15, so start with the first two weeks of May. If you cannot find a time that works for all members, you will need to work backwards (i.e. try dates in mid / end of April). **GAC will not approve extensions due to scheduling conflicts resulting from procrastination.**

Role and Interactions with the QE Chair

The chair is responsible for overseeing the process to ensure a fair exam. Once the QE process has begun, your chair is your primary point of contact and typically is the only faculty member who can provide feedback, guidance, or assistance during the writing phase. During the QE, the chair runs the exam, keeps track of time, participates in the evaluation, and ensures the QE process is being upheld. Once the QE is complete, the chair communicates the QE outcome to the student. The chair also writes the QE summary and fills out the rubric with input from the committee. The chair submits the summary to the student, department administrator, and the student's thesis mentor.

Approximately two months before your QE, contact your QE chair to set up an initial meeting. During this meeting, you should go over the timeline for your exam preparation and proposal due dates, and ask any questions you have about what to expect from the qualifying exam process. You should also be prepared with general information on your proposed aims and obtain preliminary feedback. Generally, you will have one meeting with your Chair, but you may follow up with specific questions throughout the process. The chair has full discretion to decide appropriate next steps (e.g., if additional meetings are needed, or in rare cases, consultation with other committee members)

Four weeks before your QE, you should send an advanced draft of your written proposal to your chair to obtain feedback on any necessary changes (e.g., sufficient experimental design detail, rationale, etc.). This deadline is set two weeks before the written document is due to allow sufficient time for editing and changes. Your chair will provide general advice on your written proposal (e.g., increasing clarity of your hypotheses, adding figures), make suggestions and ask questions, but they will not edit your writing.

Role of the QE Committee Members

The QE committee member (non-chair) role is to assess if the student is ready to embark upon their thesis research after the oral exam. METX students should not meet with or seek feedback from other committee members prior to submitting their written proposal. During the writing phase, the only faculty member that can give feedback is your QE chair. **This policy differs from other PBSE tracks, so it can be helpful to inform non-METX members of our policy.**

After submitting the final written proposal, students may optionally schedule a brief (~30 min) meeting to meet their committee members within the two weeks leading up to the QE. The purpose of this meeting is simply to meet your committee members and provide a broad overview of the project. Committee members may choose to give you general feedback or raise any concerns about the proposal, in which case you should be prepared to address these topics during the oral exam. However, committee members are not *required* to have this meeting or tell you what they will ask in advance. If a member has *major concerns* about the aims, consult with your QE chair.

During the QE, committee members will evaluate the student's research readiness by asking questions about foundation knowledge, experimental design, and expected outcomes. Upon completion of the QE, all committee members provide feedback on the QE summary and rubric.

Written Proposal

Due Date: Due to entire committee two weeks prior to your exam date

Format: 0.5" margins, single spaced, 11 pt Arial or 12 pt Times New Roman font. Max 4 pages (3 pages text and 1 page figures is OK). References do not count towards the page limit. The proposal should be on the student's thesis project and may include preliminary data generated in the lab.

The proposal should state the question being addressed or the hypothesis being tested, summarize the factual and conceptual basis for the proposal, and briefly describe the experimental approach. Details are provided in Appendix I. The project should address a significant research question and have a scope consistent with the normative time for PhD training. Students are provided with examples of written proposals in METX200B which is taken in the winter of 2nd year.

Students may consult with faculty members in discussing general ideas for the proposal, but the writing must be entirely the student's. **Faculty (including your PI) are not allowed to edit the written document.** The two exceptions to this are: 1) Anything submitted as part of METX200B is allowed and will be read by the instructor and 2) the QE committee chair is allowed to read and provide feedback on the written document. You are free to seek unlimited feedback from any non-faculty (senior

graduate students, postdocs, staff scientists etc).

Upon completion of the exam, the student receives evaluation in the form of completion of rubric in Appendix II. This evaluation is included in the material sent to the grad division in the Report on Qualifying Examinations, which is completed by a student's qualifying examination committee and forwarded on to the Division of Graduate Studies.

Qualifying Exam Preparation

Preparing for your qualifying exam takes time. METX200B is a 3 unit class designed to assist students with project development and preparation for the QE. All PhD students take this in the winter of their 2nd year. Students should expect to spend 9-12 hours/week on the class during that quarter. In addition, students will need focussed writing time and exam practice set aside during spring quarter. You should expect to take some time away from bench work during this process to prepare, and are encouraged to discuss expectations with your PI (i.e., how much time should you be dedicating?).

Format of the Oral Exam

The oral exam is held privately (student and the committee only) and is scheduled for up to 3 hours (typically 2-3 hrs). The exam is in “chalk talk” format (i.e., hand written on the whiteboard during the exam). Students may have a copy of their written proposal with them and can reference it during the exam. Students are not allowed to bring any other notes, prepared overheads or PowerPoint presentations.

At the beginning of the exam, the student will be asked to step outside. The committee will meet for 5-10 minutes to review the student's file and discuss any specific issues relevant to the examination. The student is then called in and will be asked to give a short (~10 minute) introduction / overview to the proposal, followed by discussion of the proposed aims in depth. They may be interrupted at any time during this presentation and asked to elaborate on or clarify approaches, expected outcomes or interpretations. The examination may also cover important scientific areas that form the basis for the research proposal (i.e., foundational knowledge). The committee will evaluate the student’s performance based on the QE rubric (see Appendix II).

The quality of the written proposal alone is not sufficient to merit passing. A passing performance requires demonstration of the ability to design and execute an independent research project and to orally defend ideas during the discussion with the examining committee. Students are generally expected to show proficiency in scientific literature relevant to their project, formulate and evaluate hypotheses, and design experiments to test those hypotheses.

At the end of the exam, the student will again be asked to leave the room. The committee discusses the performance and comes to a consensus on the rubric. The student is invited back in and informed of the outcome of the examination. Students pass or fail - there are no conditional passes. A written summary of the Qualifying Exam outcome is prepared by the chair of the Qualifying Exam committee and edited and signed by all committee members. A copy is provided to the student and a copy placed in their file.

If the student passes, they may nevertheless be advised to take further coursework or complete a

written review on a particular area where foundational weaknesses were shown. If the student fails, they must schedule an advising meeting with the METX GAC. A second QE attempt is allowed and should be scheduled within six weeks of the initial exam. Students retake the examination with the same committee, unless an alternative committee is approved by GAC. **If a student fails twice, they must leave the program.** A terminal Master's degree may subsequently be awarded, provided that the student has satisfied the requirements for the Master's degree.

6. Third Year Seminar.

The student will present a 50 minute seminar on their dissertation research proposal no later than the end of spring quarter in the third year.

7. Advancement to Candidacy.

The student advances to candidacy after completing all coursework, completing the literature review, giving the third year seminar, passing the PhD qualifying examination, and forming a Dissertation Reading Committee (see below). Students typically advance at the end of their third year.

8. Forming a Dissertation Reading Committee (also called a thesis committee*).

The Dissertation Reading Committee (DRC) consists of at least three members, of which half must be members of the Santa Cruz Academic Senate. METX policy is that the DRC contains at least two METX faculty members. The third member may be from METX, another department, or university. Many students have four faculty on their committee (very common for students in non-METX labs). Typically this committee contains some of the same members as were on the QE Committee. The DRC must be approved by the Graduate Division with this form in order to advance to candidacy. **Students should form their committee and hold their first thesis meeting by Winter of Year 3.**

Exceptions to policy to allow only one (1) METX member may be made in cases with a *scientific need for three (3) outside members with expertise not found in METX*. In that case, the student should explain the scientific rationale for the desired committee members and **submit the request for evaluation by GAC via email (metx-gac-group@ucsc.edu).** If you are following standard policy (at least two (2) METX members), GAC approval is not needed.

*UCSC Graduate Division uses the abbreviation DRC on formal paperwork for the Dissertation Reading Committee, however this is confusing because DRC also refers to the DIsability Resource Center. Because of this, METX may use RC (reading committee) or simply call this a thesis meeting.

9. Annual Meetings with the Dissertation Research Committee (Thesis committee).

The Dissertation Reading Committee (RC) functions to help the student progress through the dissertation. Students must meet at least annually with their Dissertation RC, and additionally can contact members with specific questions as the need arises. You should think of your RC as your advisory board, and the RC meetings as an opportunity to get feedback and ensure your thesis is progressing smoothly. Do not avoid scheduling a meeting because your experiment “didn’t work” - if

something isn't working, your RC can often help with new suggestions or perspectives!

The RC holds primary responsibility for evaluation of whether the student is making good progress towards the degree and should evaluate student progress using the RC Rubric (Appendix VII). The RC also determines when you are ready to graduate (they sign off on the thesis). The committee remains standing until the student has completed all requirements for the doctoral degree.

Meeting schedule

Meetings must be held annually starting year 3 and must occur **before the end of Winter quarter each year (i.e. plan to have a meeting in Fall or Winter every year)**. Students should schedule their meetings 1-2 months in advance, as extensions are not granted for last minute scheduling conflicts. Meetings should be scheduled for at least 1.5 hours. The student steps out of the room at the beginning and end of the meeting for the committee to discuss progress (and fill out the RC meeting rubric). At the end of the meeting, the PI leaves to give the committee an opportunity to have a confidential check in with the student.

Written and oral presentation

Students must provide their committee with a written update document sent to the full committee at least 72 hours prior to the meeting. Documents should be proof-read and free of typos, but there are no firm requirements on format since this will change as your thesis progresses. Commonly, this document will include a brief background (what is your thesis question and aims / chapter plans), progress (what are the main findings / aims completed; include relevant data as needed), and a timeline of your future plans (at least until the next committee meeting). Students nearing publication may opt to instead present the draft / figures of their manuscript for committee feedback prior to submission.

During the meeting, the student will present their research progress (new data and conclusions) and future plans using a powerpoint presentation. Background should be kept to a minimum unless necessary to understand the conclusions, and the majority of time should focus on interpretations and future plans. Extensive information and guidelines for meetings are given in Appendix VI.

Missed meetings

Students who fail to hold a thesis meeting by Winter quarter will be placed on METX Review, and must immediately schedule a meeting in order to remain in good standing. Students that hold their meeting late (for instance, in Spring quarter) must still hold their subsequent meeting in Winter or Fall (in less than 12 months). Additionally, committees may require additional meetings if they deem satisfactory progress has not been made.

Students who are unable to hold a committee meeting by winter quarter must request an extension in advance from GAC by emailing METX-GAC-group@ucsc.edu. Valid reasons for extensions include: time away from campus (study abroad, leaves of absence, etc). Not having enough data yet is **not a valid** excuse.

10. Dissertation Defense.

The student's Dissertation Reading Committee grants approval for the student to commence writing their thesis, upon the recognition that the student has completed a significant body of work. Typically this is defined as a quality and quantity worthy of at least two publications, but this decision is at the discretion of the Dissertation Reading Committee. After approval, the student should discuss the format for the dissertation with the committee and review the guidelines provided by the UCSC Graduate Division.

After writing, the student submits their doctoral dissertation to the Dissertation Reading Committee for tentative approval at least one month before presenting a formal, public doctoral research seminar. All of the Dissertation Reading Committee members should be in attendance at this seminar. After the seminar, the Dissertation Reading Committee meets privately with the student to discuss her/his dissertation. The candidate must defend the work to the satisfaction of the Dissertation Reading Committee at the post-seminar session. Objections raised or deficiencies noted in this session must be met and corrected to the satisfaction of those concerned before the Committee signs the cover sheet, signifying acceptance of the dissertation.

RESEARCH MS SPECIFIC REQUIREMENTS (PLAN I)

See items 1-3 above for detailed descriptions

1. Courses

2. Literature Review

3. Annual Seminar

4. Master's Comprehensive Examination

The Master's Comprehensive Exam (sometimes called the Master's QE) is a presentation and defense of the student's master's research proposal, including relevant background knowledge. The examination will not be specifically course-based, but will draw on knowledge from courses. This examination is taken in the fall quarter of the final year. More details are provided in Appendix I and a timeline in Appendix I-A.

Committee membership: The exam is given by the Master's Thesis Reading Committee. This committee consists of at least three faculty, two of whom must be UCSC Academic Senate members, and two of whom must be within the METX Department. In contrast to the PhD track, **your PI is on your committee, will serve as chair, and is allowed to help guide and edit your proposal as it develops.** This is because the exam also typically serves as your only thesis meeting, and then you should graduate in June.

Students should discuss appropriate committee membership with their PI and then reach out to potential members. In contrast to the PhD track, you do not need GAC approval - only your PI's

approval. Students should submit the Master's Thesis Reading Committee form to Sandra Pomeroy by the first week of Fall quarter so that she can submit this to Grad Div. Students must have their committee nominated to Grad Div by **Oct 15** of their 2nd MS year (if in the 4+1 program, this is Oct 15 of the +1 year).

Interactions with your committee: In contrast to the PhD track, you are free to interact with any and all of your committee members while preparing for the exam, as this is also your thesis committee. Typically, most students will only be interacting with their PI during this time, but there are no restrictions on interacting with other members if appropriate.

Format of the exam. The actual exam follows a similar format as the PhD QE (same written format requirements, and oral exam rules). Key differences are the committee membership, how you interact with them, and the rubric used to evaluate the exam (Appendix III). In addition, the scope of the aims proposed for the MS exam should be more limited in line with the target graduation date. Preliminary data generated in Year 1 of the MS should be included as progress towards the aims in order to ensure graduation by June. See APPENDIX I: QE summary and Guidance for more information.

Written Proposal: 0.5" margins, single spaced, 11 pt Arial or 12 pt Times New Roman font. Max 4 pages (3 pages text and 1 page figures is OK). References do not count towards the page limit. The proposal should be on the student's thesis project and may include preliminary data generated in the lab. The written proposal is due to the entire committee two weeks prior to your exam date.

Oral exam: The oral exam is held privately (student and the committee only) and is scheduled for up to 3 hours (typically 2-3 hrs). The exam is in "chalk talk" format (i.e., hand written on the whiteboard during the exam). Students may have a copy of their written proposal with them and can reference it during the exam. Students are not allowed to bring any other notes, prepared overheads or PowerPoint presentations.

Deadline: The exam must be completed by **Dec 15.**

5. Thesis (Plan I/Research-Based MS and 5th Year MS).

Students are required to submit a thesis for fulfillment of the degree requirements. The thesis should be submitted to the student's Master's Thesis Reading Committee one month before the due date.

COURSEWORK MS DEGREE REQUIREMENTS (PLAN II)

The Plan II coursework MS degree may be of interest to students interested in interdisciplinary graduate training in microbiology and environmental health-related fields, but with career goals other than research, such as government service, non-profit NGOs, and private sector biotech and environmental health companies.

1. Required courses

The required courses for each program are outlined in the UCSC Academic catalog which is updated yearly. Students must complete all requirements in the catalog published the year they matriculated in

the program, or can opt to follow any subsequent catalog published during their graduate degree. The current METX course catalog can be found here, while all former years of UCSC catalogs are linked at https://catalog.ucsc.edu/en/.

2. Capstone

Plan II MS students will also complete a capstone writing project (METX 245A and METX 245B) to be completed under the guidance/mentorship of a faculty member in the department.

KEY MILESTONES IN THE PhD AND MS DEGREES

Bolded* text indicates milestones that need to be met on time in order for a student to remain in good standing. If a student is not in good academic standing, s/he will be ineligible for GSR support and be the lowest priority for receipt of TAships. In addition, the change in standing will be reported to his or her fellowship agency, if appropriate. **Linked forms** must be submitted to Grad Division in order to complete that milestone.

PhD

1. First Year Graduate Advising Committee Meeting *(1st year, beginning of fall quarter)*
2. **Graduate Coursework*** *(3rd year, end of fall quarter)*
3. PBSE ONLY: COMPLETE THREE ROTATIONS *(1st year, end of spring quarter)*
4. **Literature Review*** *(1st day of fall quarter of student's 2nd year)*
5. Second Year Graduate Advising Committee Meeting *(2nd year, beginning of fall quarter)*
6. PhD QE Committee *(2nd year, end of fall quarter)*
   Committee Nomination of Ph.D Qualifying Examination
7. **Graduate Oral Qualifying Exam* (QE)** *(2nd year, end of spring quarter)*
8. Third Year Graduate Advising Committee Meeting *(3rd year, beginning of fall quarter)*
9. Identify and Nominate Dissertation Reading Committee *(3rd year, fall quarter)*
   Nominations For Dissertation Reading Committee
10. First thesis committee meeting *(3rd year, winter quarter)*
11. **Third Year Seminar*** *(3rd year, spring quarter)*
12. **Advancement to Candidacy*** *(3rd year, end of spring quarter)*
13. Second thesis committee meeting *(4th year, fall quarter)*[#]
14. Third thesis committee meeting *(5th year, fall quarter)*[#]
15. Fourth thesis committee meeting *(6th year, fall quarter)*[#]
16. **Graduate Dissertation Seminar and Defense*** *(by 6th year, spring quarter)*
17. Application for Ph.D
18. **Graduate Dissertation*** *(by 6th year, spring quarter)*

[#] Or more often as dictated by the Dissertation Reading Committee.

METX Plan I (Thesis-based) MS

1. First Year Graduate Advising Committee Meeting *(1st year, beginning fall quarter)*
2. **Graduate Coursework*** *(2nd year, end spring quarter)*
3. **Literature Review*** *(1st day of fall quarter of student's 2nd year)*
4. Second Year Graduate Advising Committee Meeting *(2nd year, beginning fall quarter)*
5. Master's Thesis Reading Committee approved *(2nd year, Oct 15)*
   Three members--thesis advisor plus two additional. Majority must be members of the UCSC academic senate.
6. **Master's Qualifying Exam*** *(2nd year, Dec 15)*

This is exam is conducted by the Thesis reading committee

7. **Graduate Master's Seminar*** *(2nd year, beginning spring quarter)*
8. Application for Master's degree
9. **Thesis*** *(2nd year, end of spring quarter)*

5th Yr MS

1. First Year Graduate Advising Committee (GAC) Meeting *(4th BS/MS year, fall quarter)*
2. **Literature Review*** *(1st day of fall quarter of student's 2nd year [MS year])*
3. Master's Thesis Reading Committee *(Oct 15 of the 2nd year [MS year])*
   Three members--thesis advisor plus two additional. Majority must be members of the UCSC academic senate.
4. Second Year Graduate Advising Committee Meeting *(2nd year [MS year], beginning fall quarter)*
5. **Master's Qualifying Exam*** *(no later Dec 15 of 2nd year [MS year])*
   This is exam is conducted by the Thesis reading committee
6. **Graduate Coursework*** *(end spring quarter of 2nd year [MS year])*
7. **Graduate Master's Seminar*** *(2nd year [MS year] beginning spring quarter)*
8. Application for Master's degree
9. **Thesis*** *(2nd year [MS year], end of spring quarter)*

Plan II (Coursework) MS.

1. First Year Graduate Advising Committee Meeting *(1st year, beginning fall quarter)*
2. Application for Master's degree *(1st year, beginning of spring quarter)*
3. **Graduate Coursework*** *(1st year, end of spring quarter)*
4. **Capstone Completion*** *(1st year, end of spring quarter)*

TARGET TIME AND NORMATIVE TIME FOR PhD STUDENTS

METX students should aim to complete their PhD within 5 years. However, the normative time for the PhD degree within the University of California is six years, and students who fail to complete their thesis within this time must request an extension from the Graduate Division. A written request signed by the student and advisor detailing the timetable to finish should be countersigned by the thesis committee chair prior to submission to the Graduate Dean. If the PhD degree is not awarded within seven years from the date of advancement to candidacy, the student's candidacy shall lapse and the student will be required to pass a new oral qualifying exam prior to submitting the dissertation or undergo such other formal review as the student's department shall direct, and the result of this examination or review shall be transmitted in writing to the Graduate Council (Academic Senate Manual, Appendix D, Section VII.I.).

Normal Course Loads

1. METX graduate students are expected to work full-time towards their degrees. The minimum load for a full-time student is 10 units of graduate and/or upper-division undergraduate course work each quarter. Exceptions to policy require GAC approval.

2. Once formal upper-division and graduate courses recommended by the student's advisory committee have been completed, it is expected that the student will normally enroll in at least 10 units of METX 299 Thesis Research each quarter. This decision is reached in consultation with the student's advisor.

Part Time Status

Students may request to be part time students and take 2–8 units, which could be research units, lab meetings or classes. A part time quarter counts as half a full time quarter in terms of the number of quarters that need to be completed for a degree. MS students must have three full time graduate-level quarters, and PhD students must have six full time graduate-level quarters.

Part-time students pay one-half the Educational Fee (aka tuition) paid by full-time students, and one-half NRT for nonresident students approved for part-time status, and full campus fees including health insurance and full Registration Fee. This is ~ $1800 savings.

Students request part time status by filling out an Application for Part-Time Status and getting signatures of their thesis advisor and the METX Graduate Director for department approval. After approval, the form is submitted to the Graduate Division for final approval and processing.

Form URL: https://graduate.ucsc.edu/files/2024/09/application-parttime.pdf

Extensions and Exceptions to METX policy

All exceptions to METX policy must be reviewed by **GAC**, including extensions on any program

deadlines or substitution of coursework. If approved, ensure that you have a copy of this documented in **written form**. If an exception is granted orally and you do not receive formal written documentation, you should send a follow-up email to ensure it is recorded (e.g., *"Hi GAC, In our meeting on <date>, we discussed <xxxx exception>. For my records, can you confirm you have approved this?"*).

Leaves of Absence

Students are expected to engage in their graduate student activities continuously (including the summer) from the time of admission until completion. Students considering a leave of absence are encouraged to reach out to the Graduate Advisor (Sandra Pomeroy) or METX GAC directly to discuss options before making any decisions. Common reasons to request a leave of absence include maternity/paternity leave, medical conditions and mental health care. Leaves of absence are usually granted for no more than three academic quarters, and all requests to extend or renew a leave require substantial justification.

To initiate a leave of absence, a request should be submitted in writing to the Graduate Advising Committee and must include a justification. The Graduate Dean will ultimately approve the leave. If a leave of absence is granted, it is the responsibility of the student to be familiar with all relevant departmental and University regulations, and to file any necessary paperwork. Students on leave may be asked to report their plans to the Graduate Division at least once a year. A student who fails to enroll promptly following expiration of an approved leave of absence will be discontinued.

Please consult with the METX Graduate Coordinator (Sandra Pomeroy). International students have additional responsibilities to meet restrictions imposed by their visas and must also have approval from International Services (istudent@ucsc.edu).

For full guidance on the leave of absence/readmission policy, please refer to the Graduate Division Student Handbook:
https://graduate.ucsc.edu/academics/graduate-handbook/x-graduate-student-petitions/

Catalog Rights

Students matriculating in a given graduate program will select the UCSC General Catalog they will follow to meet their requirements. This can be either the one published the year they enter the program, or any subsequent catalog published prior to the year they are awarded the degree sought. Students who seek readmission after a break in attendance of more than two years (six regular quarters) must adhere to the graduation requirements in effect at the time of readmission or to those subsequently established for all portions of the degree requirements not already fulfilled. The readmitting program will determine which degree requirements remain to be fulfilled, and will communicate this information in the letter offering readmission. This determination constitutes a formal requirement for readmission to the program, and the student's acceptance of readmission implies acceptance of the program's written stipulation of remaining degree requirements. Should any student choose to follow catalog requirements for a year in which the catalog is not printed in hard copy, the requirements will include any online catalog update for that year. A student must follow the chosen catalog in its entirety, including both the individual degree program and general university

requirements. General university requirements may be found in the Graduate Student Handbook.

https://catalog.ucsc.edu/en/current/general-catalog/graduate-information/graduate-academic-program

CHANGING TRACKS FROM MASTER'S TO PhD AND VICE VERSA

Students on a Master's track may request to switch to the PhD program after they have completed at least two academic quarters in their current degree (Graduate Student Handbook, Section X; Petition for Transfer of Graduate Program). Students should submit a written request to the METX Grad Advisor (Sandra Pomeroy) which explains the primary reasons they would like to switch. Requests for a change in track will be reviewed by the admissions committee, which will issue a decision based on the student's performance in classes, departmental requirements, and research. If the student is allowed to enter the PhD program, they would need to complete all requirements for that degree, including passing the PhD QE exam and completing a thesis. Note: the MS qualifying exam does not substitute for the PhD QE. The applicant may use course and research work originally intended for the Master's for the PhD requirements.

Students on a PhD track may request to switch to the Master's program after they have completed at least two academic quarters in their current degree (Graduate Student Handbook, Section X; Petition for Transfer of Graduate Program). Students should submit a written request to the METX Grad Advisor (Sandra Pomeroy) which explains the primary reasons they would like to switch. Requests for a change in track will be reviewed by the admissions committee, which will issue a decision based on the student's performance in classes, departmental requirements, and research. If the student is allowed to enter the MS program, they would need to complete all requirements for that degree, including passing the MS comprehensive exam. Note: The PhD QE can be substituted for the MS exam. The applicant may use course and research work originally intended for the PhD to complete their MS

After departmental approval, the student submits a Petition for Transfer of Graduate Program to the graduate division for the final approval.

Form URL: https://graduate.ucsc.edu/files/2025/02/graduate-student-program-transfer-form.pdf

METX AND UNIVERSITY POLICIES

METX Policy on Good Academic Standing

All METX students are required to abide by UCSC campus policies including all student conduct policies. To maintain good academic standing, the student must also fulfill all policies outlined by UCSC Graduate division including (1) maintaining a passing grade in all classes, including research (METX 297/299), topical seminar (METX 281) and course work; (2) if a required course is failed (grade C+ or lower), the student must earn a passing grade upon taking the class the second time; (3) meeting departmental requirements in place when entering the program; (4) maintaining progress within UCSC's normative time of six years (see Target Time and Normative Time).

The department must notify the Graduate Division of any student who is **not in good academic standing.** This has consequences for funding priority, leave of absence requests, etc., and may lead to academic probation. METX does not take this action lightly, and leverages the GAC to work with students and students' advisors to avoid this outcome when possible. As such, we have several "tiers" of academic standing.

Level 0: "Academic Check In" - triggers GAC notification

Not a formal status. Program staff or faculty who notice any reason for concern can notify GAC that an academic "check in" may be needed. For example, this may occur if an instructor notices concerns in class or rotation, or lack of satisfactory research progress.

In these cases, GAC will evaluate and may ask to meet with the student. The purpose of this meeting is to determine if any additional resources are needed to support the student. This meeting is *informal* with the primary goal of helping students succeed.

Level 1: "Academic / METX Review" - internal designation, triggers mandatory meeting with GAC

GAC is responsible for determining if a student is not making satisfactory progress, and can place students on **METX Review.** In some cases, this happens automatically, for example if students:

- earn a non-passing grade in any course (i.e. C+ or lower or U)
- do not complete a rotation assignment
- fail to complete any requirements outlined by GAC
- miss a major program deadline without explicit written approval by GAC (lit review, QE, thesis meeting).

In these cases, the student must promptly meet with GAC. This meeting serves to 1) identify any roadblocks the student is facing, 2) ascertain if additional resources are needed, and most importantly 3) to outline a formal **Academic Support Plan,** which states how a student will return to normal standing. In many cases, the plan is straightforward (i.e. if you fail a class, you'll have to retake it). GAC may add new requirements to help you reach your goals (i.e. required follow up meetings, mini-lit

review, audit a class, etc.).

This status is formally recorded in departmental notes, but has no external consequences. **GAC will continue to work with the student as long as progress is being made.** Upon completion of the outlined plan, the student returns to normal status.

Level 2: "Recommended Academic Notice" - Grad Division is notified

Per university policy, METX must inform the Grad Division of any students who are **not in good standing and recommend they be placed on academic notice (see below).** METX does not take this action lightly, and this typically occurs when students show a continued pattern of unsatisfactory progress, for example

- failure to meet with or respond to GAC requests
- failure to complete an academic plan outlined by GAC
- failure to meet minimum standards required by UCSC Graduate Division

Academic Notice is a serious matter that has many ramifications. The METX Graduate Representative must formally recommend a student for academic probation by writing a letter to the Dean of Graduate Studies which includes: 1) written documentation that the student was notified they are not meeting program requirements and 2) specific steps or deadlines that the student must meet in order to return to good standing.

After reviewing the recommendation, the Dean may issue a Notification of Academic Notice and officially adjust their student standing to Graduate **Academic Notice**. Students on academic notice may not be eligible for merit or GSR fellowship support, and will receive lowest priority for academic appointments at UCSC (including Teaching Assistant, Teaching Fellow, etc.). In addition, the change in standing will be reported to the student's external fellowship agency, if appropriate. A student on academic notice will not be allowed to progress to the next METX department milestone until s/he returns to good academic standing. Students will remain on academic notice until s/he addresses and resolves the deficiency that led to academic notice and her/his academic progress has become satisfactory once again—e.g. s/he completes the milestone and commences normal progress to degree. The change in status must be communicated in writing to the Dean of Graduate Studies by the METX Graduate Representative. In accord with Graduate Division policies, a student whose academic progress has been found not satisfactory in two successive annual reviews will be subject to dismissal from the University.

Students on Academic Notice will return to good standing upon completion of the requirements outlined in the notice recommendation. If the student fails to complete the steps necessary to return to good standing, they will be recommended for **Academic Dismissal** and must leave the program.

Plagiarism - Definition, Guidelines and Consequences

The UCSC Code of Student Conduct states: "Plagiarism is defined as the use of intellectual material produced by another person without acknowledging its source. This includes, but is not limited to: 1) copying from the writings of works of another into one's academic assignment without attribution, or submitting such works as if it were one's own; 2) using the views, opinions, or insights of another

without acknowledgement; or 3) paraphrasing the characteristic or original phraseology, metaphor, or other literary device of another without proper attribution." In assignments for class and when writing research articles and grants, students must express ideas in their own words and must give credit to the sources of the ideas.

When cases of plagiarism are discovered, the disciplinary actions are severe. After a first incident of plagiarism, the instructor will generally assign a 0 on the assignment that contained a plagiarized portion or portions, and the Program Head and the Graduate Dean will be notified of the incident. After a second incident of plagiarism, the program will recommend to the Program Head and the Graduate Dean that the student be expelled from our graduate program.

Title IX Reporting and Training

Title IX Commitment

The Title IX Office is committed to fostering an environment in which all members of our campus community are safe from all forms of sex discrimination; including sexual harassment, sexual violence and gender based discrimination. The METX Department also upholds this commitment.

Title IX Reporting vs. Confidential Support

Please note: All UC employees are required to report incidents of sexual harassment and sexual violence to the Title IX Office. If you wish to speak confidentially, without reporting, contact CARE (https://care.ucsc.edu/) or CAPs (https://caps.ucsc.edu/).

Title IX Training

Mandatory training information will be sent to you from the Graduate Division. For more information, please visit https://titleix.ucsc.edu/.

TA TRAINING, ASSIGNMENTS AND RESOURCES

TA Assignments

At the end of each academic year, PIs and graduate students are surveyed about their student funding plans for the next academic year. Teaching assignments are made by balancing financial needs of students, requests of the instructors, past performance and assignments, and the needs of the department. TA positions are filled first with PhD students who are within the five-year University funding commitment, then PhD students who are beyond their fifth year but still within normative time to degree, and then MS students. Students may communicate with the staff Graduate Advisor about their teaching preferences, and they will be taken into account. Every effort is made to accommodate everyone's preference, but this is not guaranteed.

You are encouraged to be proactive and contact the METX Graduate Advisor to let them know you would like a TAship. Tentative TA assignments are planned annually at the end of spring quarter for the following academic year, but are subject to change based on course offerings, enrollment and TA allocations. Additional assignments may become available throughout the year to accommodate needs based on undergraduate enrollment. Assignments are finalized and **formal offers for TAships are sent out approximately 6-8 weeks before the start of each quarter.** You must promptly accept the offer in order to secure the position (or decline, so we can offer the position to another student). *If you choose to decline an offer, the department is not responsible for finding a new placement for you.* In that event, you will need to find an alternative appointment that will cover your tuition and fees that quarter, or you may choose to pay your tuition and fees yourself. This only applies to the quarter for which you declined the offered TAship, and your funding will resume the following quarter as long as you remain in good standing and within the 5 year funding commitment.

You can also seek TAships in other departments by contacting the grad advisor in that department (e.g., Chemistry, Alissa Nolan aldnolan@ucsc.edu; MCDB, Carrie Nibblet cniblett@ucsc.edu) and by looking at the Assignment Posting for open TA positions (https://groups.google.com/a/ucsc.edu/g/tajobs-group). Be sure to copy your Graduate Student Advisor on communications with other departments.

In addition to attending and assisting in lectures, TAs are generally expected to lead discussion or laboratory sections, hold weekly office hours and grade homework and exams.

TA Training

Required: "*Teaching as an Ethical Practice*"

New teaching assistants must complete the course **during their first quarter of teaching assistantship** at UCSC. Completing the course will be an expectation of overall TA duties and will be included as part of the overall assigned workload for the term (220-hour maximum for 50% appointments). See here: https://tlc.ucsc.edu/programs/teaching-as-an-ethical-practice/

New teaching assistants will be automatically enrolled in *TA Ethics* in the learning management system Canvas. Enrollees use their CruzIDs and Gold passwords to access Canvas, where they will find the *Teaching as an Ethical Practice* course on their Dashboards.

The course introduces new teaching assistants to campus resources that they will commonly interface with and refer students to, including:

- Disability Resource Center (DRC)
- Counseling and Psychological Services (CAPS),
- Title IX Office
- Center for Advocacy, Resources and Empowerment (CARE)
- Teaching Assistants Union UAW 4811,
- The Resource Centers.

More broadly, the course aims to support teaching assistants to understand the distinct TA role, how to set up more accessible and equitable learning environments, how to communicate effectively in a teaching team, how to respond to students in distress, how to promote academic integrity, and more.

It is estimated that the course takes up to 7.5 hours to complete.The following timeline to complete the course is recommended. To best prepare to apply the content of the course to the TA's teaching context, it is recommended that the first two modules be completed by the end of Week 2 of the academic quarter in which a graduate student is completing the course.

Recommended Timeline for Completion

- By end of Week 2: Modules 1 and 2 (estimated 2.5 hours)
- By end of Week 4: Module 3 (estimated 2 hours)
- By end of Week 6: Module 4 (estimated 1 hour)
- By end of Week 8: Module 5 (estimated 1 hour)
- By end of Week 10: Module 6 (estimated 1 hour)

Other campus community members, such as continuing graduate students with TA experience, faculty, and departmental staff, may also find it a useful resource and can self-enroll in a copy of the Canvas course to view the content.

Additional resources may be found on the Teaching & Learning Center site and the TLC Guide Remote Instruction: A Guide for TAs.

FINANCES AND BENEFITS

Payroll Information

Three separate offices manage different types of payments:

Payment system	1) Financial Aid / Student Business Services	2) Payroll	3) Accounting (FAST Office)
Type of payments	Fee/tuition remission, fellowships, loans	TA and GSR salary, any other payment for employment (tutoring, GSA rep, etc.)	Reimbursements (travel, research, etc.), fellowship stipends for international students, research grants/misc. fellowships
Where to access payment system	Authorize direct deposit and keep your mailing address updated on your MyUCSC Portal	Authorize direct deposit and keep your mailing address updated on UCPath	Complete vendor set up form (204) and authorize direct deposit on that form. You can work with your grad adviser to get signed up.
Check payments / find forms	Log into MyUCSC: https://my.ucsc.edu/ Check financial aid and account activity for up-to date info	UC Path: https://ucpath.ucsc.edu/	Financial Affairs: https://financial.ucsc.edu/Pages/Forms_Directory.aspx
When payments are processed	Fellowships are paid in one lump sum per quarter. Payments and tuition are posted around the beginning of each quarter. The dates are posted each year at https://financialaid.ucsc.edu/next-steps/disbursement-of-aid.html	Checks are disbursed the month after you work and paid the 1st of the month: Fall: Nov, Dec, Jan Winter: Feb, Mar, Apr Spring: May, June, July Summer: Aug, Sept, Oct	Check write schedule posted here: https://financial.ucsc.edu/Pages/checkwrite_schedule.aspx Payment date depends when the direct pay is processed and when payment is requested.
For help	Student Business Services – email sbs@ucsc.edu or call 831-459-2107	Contact your divisional payroll specialist or emai payhelp@ucsc.edu	Email aphelp@ucsc.edu, call 831-459-4488, or contact your grad adviser for help

You must sign up for direct deposit in each system – unfortunately they don't talk to each other. Please reach out to your graduate adviser if you have any questions!

All payments use your address information from your student portal and UC PATH, therefore it is extremely important to keep your student portal information up to date on a quarterly basis.

The department strongly urges all students to sign up for direct deposit with SBS and through At Your Service Online (TA/GSR).

****Important Tax Information****
The default withholding allowance for all new hires is: Single, 0.
Employees wishing to change their withholding status from Single with zero allowances to any other status, may do so at AYSO.

If you have any questions about your TA/GSR checks or direct deposits please contact Tracy Tirrell, ttirrell@ucsc.edu.

Pay Dates

These depend on the funding source, so, if you are switching funding sources, please plan ahead accordingly.

GSR and TA pay dates:

- Fall Nov 1, Dec 1, Jan 1
- Winter Feb 1, March 1, April 1
- Spring May 1, June 1, July 1
- Summer (GSR only) Aug 1, Sep 1, Oct 1

Quarterly regents fellowship (Cota Robles, Chancellor's Fellowship, Dean's Fellowship, and Regents Fellowships) pay dates **are on or just before the first day of each quarter**.

Fellowships awarded for less than the full academic year will be paid in equal installments fall and/or winter quarter (if the award is larger than one quarter of fellowship) unless you contact the Graduate Division requesting a change in this payment schedule.

If you are on fellowship, please discuss summer funding with your PI, the Grad Representative, or the Graduate Advisor at the start of the academic year. Some fellowships may be distributed in full at the beginning of the year or over Fall, Winter, and Spring quarters, yet are meant to cover Summer as well.

If you are waiting for a check, it is always a good idea to check with the correct office to confirm the status of your account (outstanding bills, address information, correct setup). Incorrect mailing addresses and outstanding bills can cause unexpected delays and minimize disbursement payments.

UCSC Graduate Student Health Insurance

The University of California Regents mandate that all students be covered by a health insurance plan. Because having an insurance plan is required, all full and part time undergraduate and graduate students are automatically enrolled in and charged for the University of California Student Health

Insurance Plan (UC SHIP) unless they submit an online insurance waiver confirming they have acceptable health insurance coverage. Read the University of California's insurance mandate letter.

UC SHIP is an affordable health insurance plan tailored to the health care needs of UCSC students. The medical plan features year-round, worldwide coverage using the Anthem Blue Cross network, and includes prepaid access to care at the UCSC Student Health Center for illness or injury. To directly access the UC SHIP website please see http://ucop.edu/ucship. UC SHIP is a comprehensive insurance plan which has Medical, Vision, Dental, and Pharmacy.

If you have other health insurance, you may be able to waive UC SHIP.

https://healthcenter.ucsc.edu/billing-insurance/#waive

https://healthcenter.ucsc.edu/billing-insurance/faqs/index.html#waiver

USEFUL LINKS

Graduate Division (UCSC Graduate Handbook, Information, Forms): https://graduate.ucsc.edu/

Direct link to UCSC Grad Division Grad Handbook:
https://graduate.ucsc.edu/academics/graduate-handbook/

Campus information technology services (email, computer accounts, software, internet connections):
http://its.ucsc.edu/

Parking Permits and Information: https://taps.ucsc.edu/parking/index.html

Residency: http://registrar.ucsc.edu/fees/residency/

Registrar's Office: http://registrar.ucsc.edu/index.html

On and Off Campus Housing: http://housing.ucsc.edu/

Grad Student Housing: http://housing.ucsc.edu/gradhsg/

Student Health Services: https://healthcenter.ucsc.edu/

Counseling and Psychological Services (CAPS): https://caps.ucsc.edu

Disability Resource Center: https://drc.ucsc.edu

Health Insurance: https://myucship.org/uc-santa-cruz/

Student Business Services: http://sbs.ucsc.edu/

My UCSC: https://my.ucsc.edu/

UC Path: https://ucpath.ucsc.edu

Academic and Administrative Calendar: https://registrar.ucsc.edu/calendar/academiccalendar.html

Slug Support (great resource if you need help including financial assistance):
https://deanofstudents.ucsc.edu/slug-support/program/

UCSC Food resources including food and snack pantries:
https://basicneeds.ucsc.edu/food/on-campus-food.html

APPENDICES

APPENDIX I: QUALIFYING EXAM SUMMARY AND GUIDANCE

A. METX Qualifying Exams (QE) Overview.

All METX PhD students take a qualifying exam that is a dissertation proposal, taken in spring quarter of the 2nd year. The exam committee and date are set in winter quarter.

All METX MS students take a comprehensive exam in the fall of their final year. The exam committee and date are set in early fall quarter.

All qualifying exam written proposals should use the format of a research proposal (see below). All exams are oral, and are given as chalk talks. Students are allowed to use their proposal but no other materials.

B. PhD Qualifying Exam.

Overview:

This proposal is your PhD thesis topic. Preliminary/supporting data are expected and the proposal should have input from the advisor and other members of the student's laboratory. The goal is to examine both the student's ability to articulate their project as well as to evaluate the impact and chances of success of the project itself. See also the QE section above for more detailed info.

Logistics and timeline (see Appendix I-B for timeline in chart format):

- Early in the second year, the student and their advisor propose committee members to the METX Graduate Advising Committee for review and approval. The student's research advisor will not be a member of the exam committee. GAC may modify the composition based on topic area and distributing assignments fairly among faculty. The committee conforms to Graduate Division rules: (1) four people total, two of which must be METX faculty; (2) the Chair must be tenured; (3) must have a person from outside the department who is tenured or has the equivalent of tenure.
- The student will work with the committee members to set an exam date for Spring Quarter of the second year. The oral exam must be completed prior to **May 15**.
- The committee and exam date must be approved by the Department and the Graduate Division with submission of this form at least 30 days prior to the exam date.
- The complete written proposal is due to the QE committee **2 weeks** before the scheduled date of the oral defense.
- Mock qualifying exams involving 3-4 other students are also strongly encouraged for feedback as the student prepares for their QE.
- The PI's role is to guide the intellectual development of the student and guide their research. During the QE, the PI should not write, read, and/or edit the student's thesis proposal. Students should work with their PIs in developing their project ideas.
- Students should write their QE proposal, prepare for the exam and complete the exam within

one quarter. During that time the student should expect to spend 50% of their time on the QE and 50% on their research and/or TAship.

Format: 0.5" margins, single spaced, 11 pt Arial or 12 pt Times New Roman font. Max four (4) pages (three pages text and one page figures is ok). References do not count towards the page limit. The proposal should be on the student's thesis project and typically includes preliminary data generated in the lab.

The oral exam is a chalk talk, but you may refer to the figures in your written proposal. The exam will be no more than three hours.

You should write your proposal with the following sections:

- Abstract (200 words)
- Specific aims (2-3 aims are typical; no more than half a page)
    - You should propose several years' worth of work, e.g. PhD thesis
- Background and Rationale (no more than one page)
- Research plan
    - Include outcomes, possible pitfalls and alternative approaches for each aim.

Words of advice:

- Remain FOCUSED. Do NOT be overly ambitious and try to do everything.
- For the Rationale, be very aware of supportive and conflicting data in published literature that support (or not) your experiments. These data (or lack thereof) should be used to substantiate your Aims and your Research Design.
- Be organized. Use numbering, headings, and subheadings to organize the major and minor sections. Use sub-headings that are self-explanatory and informative.
- Identify and acknowledge WEAKNESSES in your research approach, if any, and how you will overcome/address these weaknesses. You want to communicate that you have fully thought this through, you are aware of all possible approaches to achieve your aims, including the strengths and weaknesses of each, and that you have chosen the ones you did because you think (and argue) that they are the most appropriate, though they may not certainly be foolproof.

Common flaws include:

- Descriptive proposals that would fail to produce significant mechanistic information.
- Proposals that are based on an incompletely understood model.
- Disconnect between objective and aim: proposals that describe "interesting" experiments but that fail to systematically address the stated objective.
- Proposals that are too dependent on a specific model or hypothesis. You always need to consider what you would do if you obtain unexpected results.
- Failure to think through all possible experimental outcomes and what those would mean, including follow up experiments.

C. Master's Comprehensive Exam (some faculty call this the Master's QE)

Overview:

The Master's Comprehensive Exam is a presentation and defense of the student's Master's research proposal. The exam will not be specifically course based, but will draw on knowledge from courses.

The exam is similar to PhD Qualifying Exam described above, in both format and evaluation criteria, with the following differences:

- Timing is by the end of Fall Quarter of second year.
- Scope: you should propose aims that can be completed within a MS timeline (remaining work should be achievable by the graduation date i.e. June of that year)
- Committee: Three members who will also serve as the student's Master's Reading Committee. The student's PI is a member of the MS exam committee. This committee will be established by the student at least one quarter before the exam. See, https://graduate.ucsc.edu/files/2024/09/ms_read-2.pdf.

Format:

- The entire proposal should be no more than three pages of text plus one page of figures (single-spaced, not including references or figures).
- You should write your proposal with the following sections:
    - Abstract (200 words)
    - Specific aims (2 aims are typical; no more than half a page)
        - Your overall research project should encompass about 2 years of research, but at the point of your exam, you should have completed more than half of the work. See "Preliminary Data" below for more detail.
    - Background and Rationale (no more than one page)
    - Research plan.
        - Include outcomes, possible pitfalls and alternative approaches for each aim.

Students should submit the written proposal to their Master's Thesis Reading Committee at least two weeks before the exam.

Preliminary Data:

Preliminary data are expected, and are essential in order to graduate on time (typically ~6-7 months after the exam). Relevant results generated in year 1 of the MS should be included as progress towards your aims. Depending on the project structure, students may have completed the majority of one aim (and will focus entirely on the other aim in year 2) OR will have made significant progress on both aims (and have a clear plan for completion of both).

It is rarely practical within the MS timeline to use preliminary data as rationale and propose two brand new future aims unless leveraging approaches that yield very fast results (e.g. computational or bioinformatic analyses may be exceptions). Speak with your PI to ensure proposed aims are achievable with your remaining timeline.

D. Outcomes of PhD QE and the Master's Comprehensive Exam.

The outcome can be pass or fail — there are no conditional passes. In case of failing the exam, the committee will spell out the deficiencies and make specific recommendations. The student can then retake it once within a time frame the committee sets - typically within two months of the original exam.

PhD Students who fail to pass a QE retake may either withdraw from the program or switch to the METX MS track within the next quarter. The latter option will require a review of the student's record by the admissions committee. If the student enters the MS program, they would need to complete the requirements for that degree, including passing the MS Comprehensive Exam and completing a thesis, within three quarters of switching to the MS program.

MS Students who fail to pass the Master's Comprehensive Exam retake will be withdrawn from the program.

APPENDIX I-A: Master's Comprehensive Exam (QE) Timeline and Procedures Outline

To be completed in Year 2 as a MS student

Date / Deadline	Item
September	Literature Review: Your literature review is due by the first day of fall quarter of your second year (4+1 students are considered second year MS students after admission) and ensure that the literature review rubric is completed by your PI.
Fall Qtr Week 1	Thesis Reading Committee: Consult with your PI on potential reading committee members, fill out the Nominations for Master's Thesis Reading Committee form and return it to the METX Department (graduate adviser) for submission to Grad Div.
By October 15	Exam Date: After committee approval, schedule the date and time of your QE. Your QE should be completed no later than **December 15**. Inform the METX Department (graduate adviser, GAC, and department manager) of your QE date.
Fall Quarter	Proposal: Students submit their proposals to their QE committee no later than **2 weeks prior to the exam date**. Practice exams: we recommend students host 1-2 practice exams in the weeks leading up to their QE. Note, faculty are not allowed to be present at practice exams
Before Dec 15	Exam: Qualifying exam must be completed by December 15, and the QE Rubric submitted to the METX department by the QE committee chair by the beginning of Winter quarter.

APPENDIX I-B: PhD Qualifying Exam (QE) Timeline and Procedures Outline

To be completed in Year 2 of the PhD program

Date / Deadline	Item
Early October	METX Graduate Advisor will send out a call for QE abstracts
Dec 15 (deadline)	Students submit QE Abstract and recommend possible committee members to METX GAC using the committee request Google form
Winter Quarter	Students take METX200B to help with QE project development
Early January	GAC will inform students of proposed QE membership. Students should **immediately** contact the faculty and ask them to serve on the committee. If a member is unavailable, students should contact GAC about an alternative.
February	Students should schedule a 3 hour time slot for their QE exam for early Spring - the exam must be completed by May 15. Faculty schedules can be very hard to coordinate, so do not procrastinate on this. *Recommended: first ask faculty if there are any dates they are out of town / unavailable, then use a whentomeet poll to narrow down times. Once a date has been secured, create a google calendar event and invite the faculty so they hold this on their calendar. You can update the location later if needed.*
Early March	Once you know the date, formally nominate the committee to the Grad Division. This must be submitted *at least* 1 month before the exam date. *Recommended: add the below deadlines to your calendar based on your exam date.*
8 weeks before exam	Meet with your QE committee chair to discuss overall project plan and ideas
4 weeks before exam	Send a draft of your written proposal to their QE committee chair for feedback *Students are also encouraged to hold practice talks with senior students. Faculty are not allowed to attend practice talks.*
2 weeks before exam	Send the **final draft** of your written proposal to the entire QE committee. *It is wise to include a reminder of the date, time, and location for the committee in this email.*
May 15 (deadline)	All QE exams must be completed

APPENDIX II: RUBRIC FOR PHD QE

EVALUATION RUBRIC: Qualifying Exam

This rubric serves two purposes: it (1) collects data on each of the program learning outcomes for program assessment and improvement, and (2) helps faculty provide students with supplemental feedback.

Collection of the program assessment data: The committee members should evaluate the student's achievement of each outcome as described in the rubric. Highlighted in the appropriate box under each category.

Program Learning Outcome	"Primary traits" that are evaluated	**Does not meet expectations**	**Partially meets expectations**	**Meets expectations**	**Exceeds expectations**
PLO1: Mastery of fundamental knowledge in either in either microbiology or environmental toxicology	Student exhibits reasonable knowledge of subject matter	Knowledge of background and project is not adequate in many areas	Knowledge of background and project is adequate in most areas, but not all	Knowledge of background and project is adequate in all areas, with few gaps	Knowledge of background and project is exceptional

Comments

Program Learning Outcome	"Primary traits" that are evaluated	**Does not meet expectations**	**Partially meets expectations**	**Meets expectations**	**Exceeds expectations**
PLO2: Ability to conduct independent research, and manage a research project in either microbiology or environmental toxicology	Research plan contains novel work that tests a reasonable hypothesis	Research plan hypothesis is not clear or does not flow logically from the current knowledge; experiments do not adequately test the hypothesis	Research plan has a hypothesis which has some logical gaps, and/or experiments will provide only modest information about hypothesis	Research plan hypothesis is clear and flows logically from the current knowledge; experiments will adequately test the hypothesis	Research plan hypothesis is clear and flows logically from the current knowledge; experiments will adequately test the hypothesis and provide important new data

Program Learning Outcome	"Primary traits" that are evaluated	**Does not meet expectations**	**Partially meets expectations**	**Meets expectations**	**Exceeds expectations**
	Familiarity with possible outcomes and interpretations	Student is unable to describe outcomes and interpretations	Student can describe some outcomes and interpretations	Student is able to describe all experimental outcomes and interpretations, with only minor gaps	Student is able to describe all experimental outcomes and presents highly- thought out interpretations
	Selection of and understanding of experimental approaches appropriate to the proposed work	Student does not understand experimental approaches, and/or chooses approaches that are not appropriate	Student partially understands experimental approaches, and/or chooses approaches that are only partially appropriate	Student understands experimental approaches, and chooses approaches that are appropriate	Student shows a superior understanding of experimental approaches, and chooses approaches that are appropriate
	Student demonstrates ability to perform research accurately and to generate quality data	Student has generated no quality data that supports the aims	Student has generated a modest amount of preliminary data that supports the aims	Student has generated adequate preliminary data that supports the aims	Student has generated a significant amount of high quality data

Comments

Program Learning Outcome	"Primary traits" that are evaluated	**Does not meet expectations**	**Partially meets expectations**	**Meets expectations**	**Exceeds expectations**
PLO3: Ability to communicate scientific concepts and results in both written and oral forms	Organization	Written document and/or oral presentation lack organization in many aspects	Written document or oral presentation have occasional organization problems	Written document and oral presentation are well organized	Written document and oral presentation show superior attention to detail with regards to organization

Program Learning Outcome	"Primary traits" that are evaluated	**Does not meet expectations**	**Partially meets expectations**	**Meets expectations**	**Exceeds expectations**
	Content	Written document and/or oral presentation lack important information, or use terminology incorrectly	Written document or oral presentation have occasional lapses in content or description	Written document and oral presentation contain all necessary content	Written document and oral presentation show superior level of content
	Delivery/Clarity	Written document and/or oral presentation lack clarity, or are delivered in unprofessional manner	Written document or oral presentation have occasional lapses in clarity	Written document and oral presentation are clear	Written document and oral presentation are clear and easy to follow

Comments

APPENDIX III: RUBRIC FOR MS QUALIFYING EXAM

EVALUATION RUBRIC: MS Qualifying Exam

This rubric serves two purposes: it (1) collects data on each of the program learning outcomes for program assessment and improvement, and (2) helps faculty provide students with supplemental feedback.

Collection of the program assessment data: The committee members should evaluate the student's achievement of each outcome as described in the rubric. Highlighted in the appropriate box under each category.

Program Learning Outcome	"Primary traits" that are evaluated	**Does not meet expectations**	**Partially meets expectations**	**Meets expectations**	**Exceeds expectations**
PLO1: Proficiency with fundamental knowledge in either microbiology or environmental toxicology	Student exhibits reasonable knowledge of subject matter	Knowledge of background and project is not adequate in many areas	Knowledge of background and project is adequate in most areas, but not all	Knowledge of background and project is adequate in all areas, with few gaps	Knowledge of background and project is exceptional

Comments

Program Learning Outcome	"Primary traits" that are evaluated	**Does not meet expectations**	**Partially meets expectations**	**Meets expectations**	**Exceeds expectations**
PLO2: Ability to conduct independent research in either microbiology or environmental toxicology	Research plan contains novel work that tests a reasonable hypothesis	Research plan hypothesis is not clear or does not flow logically from the current knowledge; experiments do not adequately test the hypothesis	Research plan has a hypothesis which has some logical gaps, and/or experiments will provide only modest information about hypothesis	Research plan hypothesis is clear and flows logically from the current knowledge; experiments will adequately test the hypothesis	Research plan hypothesis is clear and flows logically from the current knowledge; experiments will adequately test the hypothesis and provide important new data

Program Learning Outcome	"Primary traits" that are evaluated	**Does not meet expectations**	**Partially meets expectations**	**Meets expectations**	**Exceeds expectations**
	Familiarity with possible outcomes and interpretations	Student is unable to describe outcomes and interpretations	Student can describe some outcomes and interpretations	Student is able to describe all experimental outcomes and interpretations, with only minor gaps	Student is able to describe all experimental outcomes and presents highly- thought out interpretations
	Selection of and understanding of experimental approaches appropriate to the proposed work	Student does not understand experimental approaches, and/or chooses approaches that are not appropriate	Student partially understands experimental approaches, and/or chooses approaches that are only partially appropriate	Student understands experimental approaches, and chooses approaches that are appropriate	Student shows a superior understanding of experimental approaches, and chooses approaches that are appropriate

Comments

Program Learning Outcome	"Primary traits" that are evaluated	**Does not meet expectations**	**Partially meets expectations**	**Meets expectations**	**Exceeds expectations**
PLO3: Ability to communicate scientific concepts and results in both written and oral forms	Organization	Written document and/or oral presentation lack organization in many aspects	Written document or oral presentation have occasional organization problems	Written document and oral presentation are well organized	Written document and oral presentation show superior attention to detail with regards to organization
	Content	Written document and/or oral presentation lack important information, or use terminology incorrectly	Written document or oral presentation have occasional lapses in content or description	Written document and oral presentation contain all necessary content	Written document and oral presentation show superior level of content

Program Learning Outcome	"Primary traits" that are evaluated	**Does not meet expectations**	**Partially meets expectations**	**Meets expectations**	**Exceeds expectations**
	Delivery/Clarity	Written document and/or oral presentation lack clarity, or are delivered in an unprofessional manner	Written document or oral presentation have occasional lapses in clarity	Written document and oral presentation are clear	Written document and oral presentation are clear and easy to follow

Comments

Program Learning Outcome	"Primary traits" that are evaluated	**Does not meet expectations**	**Partially meets expectations**	**Meets expectations**	**Exceeds expectations**
PLO4: Be equipped with interdisciplinary skills needed for success in microbiology and environmental toxicology fields, where there is a great need for scientists who have broad, interdisciplinary training.	Knowledge and integration of concepts or approaches used in different disciplines	Student lacks knowledge of concepts or approaches in different disciplines relevant to the project	Student has some knowledge of interdisciplinary concepts or approaches, with occasional gaps in content or under-standing	Student demonstrates knowledge and integration of interdisciplinary concepts and approaches relevant to the project	Student shows superior knowledge and integration of interdisciplinary concepts and approaches

Comments

APPENDIX V: RUBRIC FOR LITERATURE REVIEW

EVALUATION RUBRIC: Literature Review

Literature Review Evaluation Rubric. Covers PLOs 1, 3, and 5. Fill out and include comments as needed on individual items or at the bottom.

Requirement	Met (date)	Did not meet
Student and PI agreed on the scope and plan for the literature review well ahead of the due date (e.g. early summer)		
Student read and organized the agreed upon literature		
Student crafted and submitted a clear outline		
Student developed and submitted a writing timeline that allowed time for edits and review		
Student submitted multiple drafts as planned		
Student incorporated feedback from edits and suggestions		
Final document was clearly written, free of typographical and grammatical errors, and in the correct format		
Final document summarized the data in the full set of references (~ 50) on the topic		
PI reads and approves final document		

Comments

APPENDIX VI. PhD THESIS COMMITTEE MEETINGS

See also: Annual Meetings with the Dissertation Research Committee

Overview

Your Dissertation Reading Committee (RC; or thesis committee) serves to guide your research progress and ensure timely progress towards degree. Thesis committee meetings are a great way for you to get feedback from your committee about your project and career goals, as well as a venue to raise any concerns. It is your time to get valuable feedback from faculty other than your PI and is not meant to be a stressful experience or an "exam." During the thesis committee meeting, you will typically give a brief overview of how each chapter of your thesis is progressing, roadblocks, alternative approaches, and discuss your future plans. Your thesis committee will complete the RC rubric to provide feedback on your scientific development. You are encouraged to build a strong relationship with your thesis committee — they will most likely serve as references or letter writers (recommendations for jobs, fellowships etc), so it helps if they have a good sense of your scientific accomplishments!

UCSC provides a 5 year funding commitment for PhD students, so you should aim to complete your thesis in that time. We recognize that no two PhD's are the same, nor are the timelines to publication and degree completion - this can vary widely depending on the research topic and methods used. You are encouraged to speak with your PI about what is reasonable - in some fields, students complete 2+ first author manuscripts prior to graduation, while other projects may not have a submission ready manuscript until Year 5. Many METX students also publish a literature review prior to graduation. The **following is provided as a rough guide, you should modify to suit your needs.**

Year	Focus
Year 1	Identify thesis lab, complete courses, begin research
Year 2	Develop thesis project / questions, optimize assays Generate preliminary data → Complete QE in Spring
Year 3	Formulate plan for thesis (chapters / planned manuscripts) Work towards first data chapter / manuscript → First RC meeting by Winter
Year 4	Draft and submit 1st author manuscript by end of year (*goal)* Work towards second data chapter / manuscript
Year 5	1st author manuscript accepted (revisions complete) / published Complete remaining thesis chapters (if applicable, draft / submit second manuscript). Write your thesis and request approval to graduate.
Year 6	*If needed - but note that you are beyond the 5 year funding guarantee.*

Timing of RC meetings

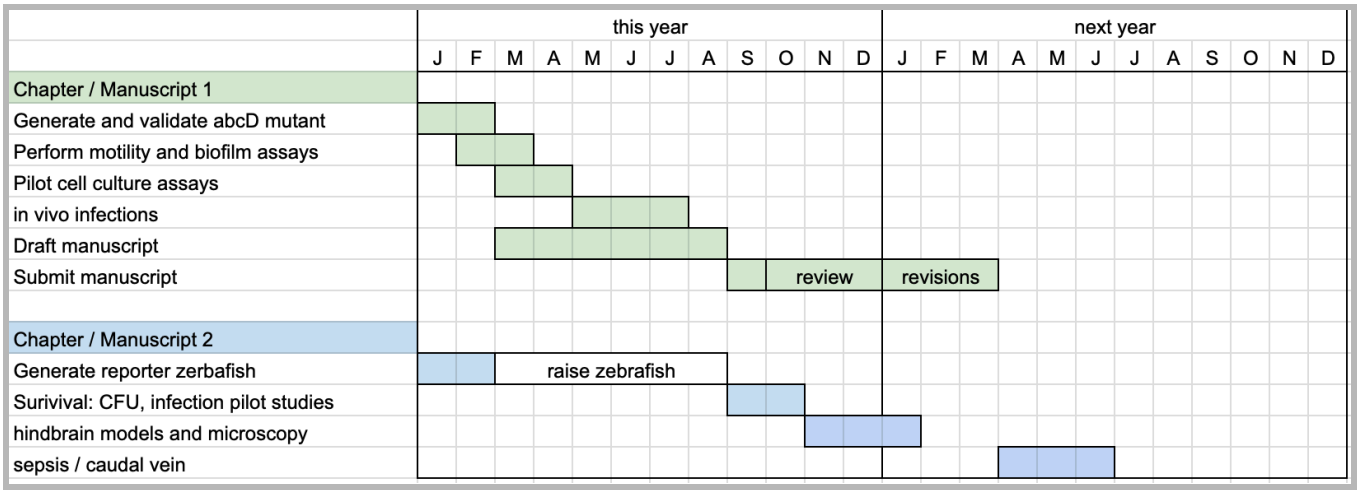
Starting in Year 3, you must have a Dissertation Reading Committee Meeting every year in Fall or Winter Quarter to remain in good standing. At the start of each year, decide when you will hold your committee meeting (Fall or Winter). Email your committee to set a meeting at least 1-2 months in advance; schedule 90 minutes for the meeting. Email the METX Grad Advisor with the date of your meeting once it is scheduled.

	Fall	Winter	Spring	Summer
Year 1	*Identify thesis lab, complete courses, begin research*			complete lit review
Year 2	*Optimize assays, generate prelim data*		complete QE	*generate prelim data*
Year 3	*finalize thesis plan*	RC meeting		
Year 4	RC meeting (Fall or Winter)		*Submit first author manuscript*	
Year 5	RC meeting		RC meeting or graduation	

Meeting Format

Prior to the meeting, prepare a written update document and send that to your committee prior to the meeting **at least 72 hours before the meeting** (ideally 1 week before).

The **written document** should briefly summarize the main thesis question, the proposed thesis chapters, updates in progress / new data / completed aims, and future directions. Relevant new data may be included as figures in the written document as appropriate - it is helpful to put key pieces of data for the committee to review, but you should focus mostly on conclusions and future directions. You should include a timeline or Gantt chart until the next planned meeting (see example below).



You should also prepare a **powerpoint presentation** with *new* data, conclusions, future plans / timeline until the next meeting to facilitate discussion during the meeting.

Meeting timeline (hh:mm):
0:00 - 0:05: Student steps out, committee / PI discusses any status updates with the committee
0:05 - 1:05: Student leads thesis meeting / update discussion
1:05 - 1:15: Student steps out, committee completes RC rubric
1:15 - 1:25: Student returns, committee provides feedback
1:25 - 1:30: PI leaves, student has confidential discussion with committee

Students should ensure the RC meeting rubric (Appendix VII) is completed by your committee. You have access to this in your student file. If you run out of time, send it to them after the meeting as this is used by GAC to ensure you have made satisfactory progress at the end of each year.

RC outcomes

The RC meeting is not an exam, and thus the only outcome is "completed." However, the dissertation RC should complete the RC rubric to provide feedback to students on how their progress has been and identify any areas that need improvement. If a student receives "Does not meet expectations" on the RC rubric, the committee must provide suggestions to improve in this area. The student should treat this as an Academic Support Plan and demonstrate improvement in this category at the next meeting. The RC also makes a recommendation to the student about when the next committee meeting should be held. The default option is to meet next in the subsequent academic year, but the committee can suggest a shorter timeframe, for example, if progress has been slower than expected or if an area does not meet expectations.

GAC will review all RC rubrics at least annually to confirm all students are making satisfactory progress. *Repeated* evaluations of "does not meet expectations" by the dissertation RC indicates the student is not making good progress towards the degree may result in being placed on Academic Notice.

Year 3 - First Dissertation RC Meeting

You must hold your first RC meeting in Fall or Winter Quarter of Year 3. The purpose of this meeting is to establish a plan for your thesis - your written document should include an outline for the thesis. Graduate Theses are organized into chapters. PhD thesis typically have 2–3 data chapters, though this can vary so speak with your PI about what makes sense for your project. Your committee will weigh in on whether this is achievable within your timeline (no one wants a never-ending PhD!).

Chapter 1	Background and Introduction many students use large portions of their literature review
Chapter 2	Data Chapter 1 usually published before graduation = manuscript 1
Chapter 3	Data Chapter 2 may be part of manuscript 1, or manuscript 2 submitted prior to departure
Chapter 4	*Data Chapter 3 - depends on project, not all students have this* may be strong preliminary data or side quests, maybe not a complete story
Chapter 5	Conclusions

Your written RC document should include the overarching question / hypothesis, your experimental plan, and preliminary data for at least one data chapter (is this likely to work?). The format of the document varies, but is typically **~2 pages single spaced.**

Background information should be minimal and focus on key information needed for the committee to understand the project (about 1 paragraph, similar to a specific aims page). **Preliminary data** for your first manuscript / data chapter should be presented (pilot studies, assay optimization, etc.), as well as a detailed **proposed plan to complete the story**. Include specific experimental details similar to a specific aims page. (What are your controls? If using biologic reagents such as cell lines, antibodies etc., do you have them? Are they validated? What if they don't work?)

You should **include an experimental timeline** or Gantt chart which should cover at least until the next committee meeting. The next meeting, in Year 4, occurs in 9–12 months after this meeting, and you should aim to have a *completed draft* of your first manuscript. Be sure to account for "start up time" — it can take 1–2 weeks to optimize a western blot but 1–2 months to optimize an *in vivo* model. Ideally, optimization / proof of principle that your approach will work will already be completed and presented at this meeting.

Unlike the QE, which is an exam, your RC meetings are to *help you figure out how to do the best science and complete your publications.* Your committee will provide feedback and suggestions — they may offer reagents from their lab or alternative experimental approaches. If you are facing a roadblock or technical challenges, present that as preliminary data so they can help you find solutions.

The committee will evaluate your academic development and progress using the RC rubric, so be sure to look over that document. Note that negative results are still valuable data and will meet expectations if well planned! However, negative results due to lack of reading the literature (it is known that would not have work), lack of controls (unable to interpret), or lack of interpretation (got data, did not analyze) will not meet expectations.

Year 4 Dissertation RC Meeting

The Year 4 RC meeting must occur in Fall or Winter Quarter and serves as the first update for your committee. Some students will find that their thesis focus has shifted since the Year 3 meeting, particularly if something without preliminary data was proposed and did not work out. This is okay, just explain the new plan and carry on. By this point, you should be thinking seriously about your first (1st author) manuscript.

If possible, students are encouraged to present a manuscript draft / figures to the committee for feedback. Your committee can help anticipate reviewer comments, or might suggest a different organization which makes the story flow better. In this case, students should attempt to organize data into polished figures (i.e. Figure 1A, 1B, Figure 2A, 2B, 2C, 2D etc., with consistent labeling, formatting, and axes) and accompanied by figure legends. Figures that are not yet completed may have a place holder with a brief plan (i.e. Figure 4 - Western Blot analysis of xxxx. Status: *mutant strains have been validated, xx assay in progress, estimated completion: 1 month)* or multiple outcomes (i.e. Figure 4 - *experiment plan* - if result A is obtained, then it suggests x and I will do y,z…. vs. if result B is obtained

then….).

A fully written manuscript is not necessary — your committee can evaluate a lot based on figures alone. Instead, include a brief narrative outline to ensure you have the data necessary to support the "story." For example:

- Figure 1: Here we establish phenotype x (Fig 1A-D) and complete controls to show it's not an artifact in Fig 1E,F.
    - Based on this, it suggests Y, leading us to question….
- Figure 2: we test this possibility (Fig 2A,B) but that is not changed. We also test x, y, z (Fig 2C,D) and show a clear effect.
    - ***I am missing a control for x, so that is in progress and will become Figure 2E***
    - Regardless, it's known in the literature that Z is regulated by factor 1, so we got knockout mice and tested the mutant there.
- Figure 3: …. (etc.)

Many times, putting your data in this format can help expose gaps or controls which require additional experiments. You are encouraged to start drafting your manuscript early, so you have time to complete these! If you hold a meeting in Fall, planned submission in April / May gives you 6 months to complete experiments and write the manuscript, and then you can submit by summer. The average manuscript takes 6–12 months to get published after initial submission (review, completion of experiments for revision, resubmission, etc.)

In this case, the RC document should have a brief summary of the thesis and state that the meeting will focus on your manuscript (perhaps ⅓ page: My overall question is X. I've made substantial progress on Chapter 2, see manuscript figures attached. Chapter 3, 4 status (1–2 sentences each). The end of the document should still include a future experimental plan and timeline until the next meeting, as well as your expected submission date.

Some projects may not yet be at this advanced stage; **do not** use this as a reason to postpone this meeting — a manuscript draft is a goal, not a requirement. This is especially common if your project was high risk, uses longer experimental timelines, relies on external samples that had delays, or had more extensive start up time (i.e. generating animal mutants or slower model systems). This is okay, but students in this situation must be thinking very realistically about their timelines for completion. *Students in this situation should have the 4th year meeting sooner rather than later (i.e. in Fall) to allow sufficient time for experimental pivots if needed.*

If you spent a lot of time developing a model / assays / etc., which are now validated (preliminary data complete), and are now cranking on the experiments, you are likely in a good spot. You may be able to include a short, rough manuscript / figure plan or have a pretty clear idea of your timeline of how you'll get there. In this case, you may optionally consider scheduling an extra meeting in ~6 months to review your early manuscript draft.

If you do not see any clear plan for publication (still waiting on samples or model development, experimental approach is simply not working, etc.), then use this meeting to evaluate your plan for your thesis chapters. If your project plan is promising but completion is still very high risk, you may continue working on it, but should develop a plan for a low-risk, side project. Alternatively, if things are simply not

working (despite meaningful attempts), you may need to shift the focus of your project.

Year 5+ Dissertation RC Meeting

Students in Year 5 should start thinking about graduation and their next steps! It is recommended that you hold this meeting in Fall Quarter, but it can be in Winter. In this meeting, you will present an update on your thesis chapters and status (completed/published, or if in progress, what is left to be done) **with a clear timeline until graduation.** Students requesting permission to graduate should have their first manuscript nearing publication (ideally accepted or *in revision*) and should outline what remains to be done for the remaining data chapters and whether you plan to submit them prior to graduation.

Your thesis committee must give you permission to schedule your dissertation defense and graduate. Depending on the state of the project, your committee may have already given approval to schedule at your last committee meeting. If not, it is recommended that you provide your committee with a short update via email and ask if they will allow you to schedule, or if they would like to hold an additional meeting to evaluate the data. Students who do not have a clear plan for graduation are encouraged to hold an additional meeting in Spring Quarter to ensure they are on track to graduate in Year 6.

Final Dissertation RC Meeting (aka your thesis defense)

The final dissertation RC meeting occurs after a one hour public seminar in which you present the entirety of your thesis work (your dissertation defense). METX students are expected to have at least one manuscript in submission prior to graduation. Students should not be in a position where they might “fail” the dissertation defense (i.e. get permission from your committee before you schedule this public seminar). Note that the deadline to file for graduation occurs quite early each quarter, so you will want to have this date set at least one quarter ahead of time.

You must send your thesis committee a complete draft of your thesis (including all chapters, methods sections, conclusions, etc.) **one month before your defense**. Your PhD thesis is a *single author document.* Your committee signs off on your cover page, but your PI or collaborators are not co-authors on the thesis or any chapters and the writing must be entirely yours. If your manuscript has been published, you may use excerpts or append the publication as part of your thesis, but be sure to check the journal’s copyright policies. The thesis should adhere to UCSC Graduate Division formatting guidelines.

Please note, UC open access policy means that your thesis will be freely available on Proquest (you can set an embargo for 1–2 years) but this may pose a conflict for unpublished data that is not close to publication. **Speak with your PI about what can go in your thesis at least two months before your defense.**

The RC meeting immediately follows the defense, and remains a private, closed door session with you and the committee. This meeting is typically ~20 minutes — your committee will ask final questions and may give you feedback on your thesis. Assuming your committee has had sufficient time to read your thesis, you can ask them to sign your cover form at your defense, in which case once this is complete you can start calling yourself a doctor!!

APPENDIX VII. DISSERTATION READING COMMITTEE RUBRIC

Reading Committee Assessment of Student Progress				
	Assessment Criteria			Notes / Comments. If "Does not Meet Expectations" is selected, indicate how student may improve.
Component of Presentation	**Does Not Meet Expectations**	**Partially Meets Expectations**	**Meets Expectations**	
Scientific Communication (written and oral)	Ideas are poorly communicated. Written document, figures, or presentation is unclear or confusing. Student may struggle to answer questions effectively.	Presentation is understandable but lacks polish or precision (graphs not labeled, unclear etc). Written document may have been sent last minute, has typos, etc. **automatic if written document is sent late**	Written and oral communication is clear, logical, and effective. Presentation and data presentation are polished (figures have appropriate legends, stats etc) **Written document must have been sent at least 72 hr before the committee meeting**	
Knowledge of the Field *Committee should evaluate with regard to the student's year in the program. Level of knowledge may meet expectations for a 3rd year, but be insufficient for a 5th year.*	Limited awareness of the relevant literature. Cannot clearly articulate how their work fits into or advances the field. Has gaps in fundamental knowledge.	Student demonstrates general knowledge of the field, but links to literature, methodology, or significance are superficial or outdated. May have gaps in fundamental knowledge.	Student articulates the significance of their work in context. Demonstrates command of current literature and field relevance.	
Experimental Design and Strategy *Applies to both completed and future planned experiments.*	Experiments lack clear connection to research questions. Hypotheses may be lacking, vague or unsupported. Controls or statistical considerations are missing or poorly justified.	Some alignment between experiments and research questions, but design lacks depth in rationale, controls, or statistical planning.	Experiments are well designed and clearly tied to key research questions. Controls, replicates, and statistics are appropriate and justified.	

Reading Committee Assessment of Student Progress				
	Assessment Criteria			Notes / Comments. If "Does not Meet Expectations" is selected, indicate how student may improve.
Component of Presentation	**Does Not Meet Expectations**	**Partially Meets Expectations**	**Meets Expectations**	
Data Progress *"Negative" data are still progress, and should qualify for meets expectations assuming relevance, sufficient sample size, replicates and proper controls.*	Student has made little or no progress since the last meeting. Obvious next steps have not been attempted.	Some new data have been generated, but progress is limited or inconsistent. Follow-up work may be incomplete, lacking replicates or superficial.	Student has made clear, rigorous progress since the last meeting. Data are well-controlled, analyzed, and repeated as appropriate to advance the project.	
Data Interpretation and Integration	Results are presented without thoughtful analysis or lacks integration across experiments. Conclusions may be speculative, unsupported, or ignore relevant data.	Basic interpretations are made, but lack depth or fail to connect findings across experiments. Some overinterpretation or missed caveats.	Results are thoughtfully analyzed and integrated across experiments. Alternative interpretations are considered, and final conclusions are well-supported.	
Research Ownership and Independence	Student requires constant direction, rarely initiates ideas or does not make independent decisions about the project. Student may show limited evidence of strategic thinking or creative initiative.	Student shows increasing independence but is overly-reliant on mentor for planning or troubleshooting.	Student demonstrates full intellectual ownership. Student identifies and executes logical follow-ups and contributes original thinking or creative extensions to their work.	
Future Plans and Timelines *If the plan is missing or insufficient, a followup meeting in 6 months is recommended.*	No clear plan for next steps. Timeline for thesis completion is missing or vague.	Rough plan is in place but lacks specificity or contingencies, or is over ambitious because of lack of research. Student underestimates work remaining due to lack of planning or understanding of what the "plan" requires.	Student presents a clear plan for project completion with specific goals and a feasible timeline. An overambitious plan is acceptable if it is logical and accounts for known steps. At minimum, a detailed plan until the next update (9 to 12 months) must be provided. Note that in Yr4/5 - this plan should cover until graduation!	

Reading Committee Assessment of Student Progress				
	Assessment Criteria			Notes / Comments. If "Does not Meet Expectations" is selected, indicate how student may improve.
Component of Presentation	Does Not Meet Expectations	Partially Meets Expectations	Meets Expectations	
Overall Evaluation:				

APPENDIX VIII. SAMPLE ACADEMIC PLANNERS

Sample Planner for PhD Students. Check the course catalog for requirements / offerings for this year.

			Fall	Winter	Spring	Summer
Year 1	courses	Core classes (required) Take for letter grade	METX200 - grad intro	*Pick 1* METX206A - Adv Micro or METX202 - Cell and Mol Tox	METX245 - lit review	
		Advanced / elective courses. BIOL289 + one METX course is required		BIOL 289: Ethics	METX210: Bac Pathogenesis or METX238: Pathogenesis	
		Enroll every quarter, S/US. **297 units will vary depending on load, full load is 10-12.*	METX292 - seminar METX297 - rotation	METX292 - seminar METX297 - rotation	METX292 - seminar METX299 - thesis reserach (take 297 if PI is not known)	
		Milestones	- rotation 1 and 2	-rotation 2 and 3	- join thesis lab	- complete literature review (due by first day of Fall quarter)

Notes: Core classes must be passed with a B or higher to count for credit. Seminar is 0 units and is required every FWS quarter.
Check the schedule of classes: METX202, 210, 238 are not always offered every year or in the same quarter as listed here.

Year 2	courses	Core classes (required) Take for letter grade		METX200B - QE prep		
		Advanced / elective course options	METX250: Env Micro		METX210: Bac Pathogenesis or METX238: Pathogenesis	
		Enroll every quarter, S/US	METX292 - seminar METX299 - thesis reserach METX281( ) - lab meeting	METX292 - seminar METX299 - thesis reserach METX281( ) - lab meeting	METX292 - seminar METX299 - thesis reserach METX281( ) - lab meeting	
		Milestones	- QE abstract due by end of quarter	- nominate QE committee and set exam date	- 15 min dept seminar - QE must be completed by May 15	

Notes: All METX PI's have a METX281__ course for lab meeting. The last letter refers to the PI, ask Sandra or your PI for the code. Not all students have electives remaining in year 2.

Year 3	courses					
		Advanced / elective course options	METX250: Env Micro		METX210: Bac Pathogenesis or METX238: Pathogenesis	
		Enroll every quarter, S/US	METX292 - seminar METX299 - thesis reserach METX281( ) - lab meeting	METX292 - seminar METX299 - thesis reserach METX281( ) - lab meeting	METX292 - seminar METX299 - thesis reserach METX281( ) - lab meeting	
		Milestones		- deadline to hold first thesis / dissertation committee meeting (DRC)	**- 1 hour departmental seminar**	

Notes: Core / elective classes must be completed by the end of year 3. Many students complete these within years 1-2.
Students advance to candidacy at the end of spring quarter so long as the following are all complete: passed QE, all classes and 1 hr seminar is complete.

Year 4+	courses					
		Enroll every quarter, S/US	METX292 - seminar METX299 - thesis reserach METX281( ) - lab meeting	METX292 - seminar METX299 - thesis reserach METX281( ) - lab meeting	METX292 - seminar METX299 - thesis reserach METX281( ) - lab meeting	
		Milestones	- must hold DRC meeting annually in fall or winter		- 15 min dept seminar	

Notes: Focus should be on publishing papers, and planning timeline for graduation. You have 9 quarters to finish after advancing (i.e. year 4, 5, 6) to stay in normative time. Note that grad div only offers a 5 years funding committment. Students typically attend 1 or more conferences during this time

Sample Planner for MS (plan I). Check the course catalog for updated requirements / offerings.

			Fall	Winter	Spring	Summer
Year 1	courses	Core classes (units). Take for letter grade	METX200 - grad intro		METX245 - lit review	
		Advanced Course options (pick 2)	METX250: Env Micro	METX206A - Adv Micro METX202 - Cell and Mol Tox	METX210: Bac Pathogenesis or METX238: Pathogenesis	
		Enroll every quarter, S/US.	METX292 - seminar METX299 - thesis reserach	METX292 - seminar METX299 - thesis reserach	METX292 - seminar METX299 - thesis reserach	
	Milestones		- start in thesis lab		- 15 min dept seminar	- complete literature review (due by first day of Fall quarter)

Notes: Core classes must be passed with a B or higher to count for credit. Seminar is 0 units and is required every FWS quarter.
Check the schedule of classes: METX202, 210, 238 are not always offered every year or in the same quarter as listed here.

Year 2	courses	Core classes (units) Take for letter grade				
		Advanced Course options	METX250: Env Micro	METX206A - Adv Micro METX202 - Cell and Mol Tox	METX210 or METX238	
		Enroll every quarter, S/US	METX292 - seminar METX299 - thesis reserach METX281( ) - lab meeting	METX292 - seminar METX299 - thesis reserach METX281( ) - lab meeting	METX292 - seminar METX299 - thesis reserach METX281( ) - lab meeting	
	Milestones		- QE must by done by end of quarter. (QE committee also serves as your dissertation committee)		*- 1 hour seminar* = Thesis Defense and Graduation!!	some students graduate in summer instead

Sample Planner for 4+1 MS. Check the course catalog for updated requirements / offerings.

			Fall	Winter	Spring	Summer
Year 1	courses	Core classes (units). Take for letter grade	METX200 - grad intro		METX245 - lit review	
		Senior undergrad classes	<undergrad classes>	<undergrad classes>	<undergrad classes>	
		Enroll every quarter, S/US.	METX292 - seminar METX281( ) - lab meeting	METX292 - seminar METX281( ) - lab meeting	METX292 - seminar METX281( ) - lab meeting	
	Milestones		- start graduate work	- formally apply to graduate division (MS program) due **March 1**	- 15 min dept seminar - undergrad graduation! (B.S. or B.A.)	- complete literature review (due by first day of Fall quarter)

Notes: Core classes must be passed with a B or higher to count for credit. Seminar is 0 units and is required every FWS quarter.
Check the schedule of classes: METX202, 210, 238 are not always offered every year or in the same quarter as listed here.
4+1 students may be excused from seminar (METX292) if they have a class conflict this year.

Year 2	courses	Core classes (units) Take for letter grade				
		Advanced Course options	METX250 - Environmental Micro	METX206A - Adv Micro METX202 - Cell and Mol Tox **can take in Yr 1 if you have a light course load*	METX210 or METX238	
		Enroll every quarter, S/US	METX292 - seminar METX299 - thesis reserach METX281( ) - lab meeting	METX292 - seminar METX299 - thesis reserach METX281( ) - lab meeting	METX292 - seminar METX299 - thesis reserach METX281( ) - lab meeting	
	Milestones		- QE must by done by end of quarter. (QE committee also serves as your dissertation committee)		*- 1 hour seminar* = Thesis Defense and Graduation!!	*some students graduate in summer instead*