Biomolecular Engineering and Bioinformatics
PhD Program Handbook - 2016-17

The graduate research track in Biomolecular Engineering and Bioinformatics (BMEB) accepts students from molecular biology, biochemistry, computer science, and mathematical backgrounds, and trains them in innovative, multidisciplinary bioinformatics research. The track builds upon UCSC's renowned bioinformatics program, with particular strengths in comparative and functional genomics, non-coding RNA discovery, protein bioinformatics, and structure prediction. Faculty members from four departments participate in the BMEB research track. Their research groups are internationally recognized for pioneering work on applications of Bayesian statistical methods and hidden Markov models to biological sequence data, the development of widely used computational tools for the analysis and comparison of whole genomes, protein structure and function prediction, and the discovery of non-coding RNA genes. UCSC is the primary release site for the public version of the human genome, the ENCODE project, and a focal point for archaeal, extremophile, and ancient genomics. UCSC is also a major player in protein-structure and function prediction, DNA microarray analysis, high-throughput and single-molecule sequencing, and integrative investigations of infectious disease and stem cell processes. New BMEB students undertake rigorous core coursework, conduct laboratory rotations, and are exposed to a rich environment of regular seminars and group meetings. Students interact closely with BMEB faculty members while undertaking their dissertation research, and have first-hand access to state-of-the-art computation tools and lab facilities throughout their training, including cluster computing, DNA microarray fabrication equipment, and high-throughput sequencing facilities. Students receive financial support throughout their graduate career, contingent upon remaining in good academic standing.

Core BMEB Faculty

Angela Brooks	Trascriptomoe Analysis of RNA Splicing and Cancer
Rebecca Dubois	Structure, Function, and Engineering of Virus Proteins
Russ Corbett-Detig	Population and evolutionary genomics, bioinformatics
Ed Green	Genome Sequence Assembly and Comparative Genome Analysis
David Haussler	Computational Biology
Richard Hughey	Bioinformatic Tools for Sequence Analysis and Prediction
Kevin Karplus	Protein Structure Prediction and Design
Jim Kent	Computational Genomics
Daniel Kim	Stem cell genomics, long noncoding RNAs, single cell analysis, epigenetic reprogramming, cancer
Todd Lowe	Computational and experimental discovery of non-coding RNAs, microbial genomics, extremophile biology
Josh Stuart	Computational Functional Genomics
Christopher Vollmers	DNA Sequencing Tools for the Analysis of B cells

Collaborating Faculty

Mark Akeson	Computational Tools for Angstrom-scale Control and Analysis of DNA and RNA Using Nanoscale Pores
Manny Ares	Splicing and RNA Processing
Phil Berman	Biotechnology and Infectious Diseases
Ólöf Einarsdóttir	Bioenergetics, Redox Metalloproteins, Electron Transfer, Proton Translocation, Flash-Photolysis, Time-Resolved Spectroscopy
Lars Fehren-Schmitz	Human Palaeogenomics & Molecular Anthropology
Camilla Forsberg	Hematopoietic stem cells, transcriptional regulation, chromatin, blood cell development, cell surface receptors, genomics
Doug Kellogg	Molecular Mechanisms that Coordinate Cell Growth and Cell Division
Harry Noller	Structure and Function of the Ribosome
Karen Ottemann	The Molecular Virulence Factors of *Helicobacter pylori*
Nader Pourmand	Biosensors, microarray, nanotechnology, pathogens, sequencing, genotyping, DNA fingerprinting

Jeremy Sanford	Post Trascriptional Control of Gene Expression
Beth Shapiro	Inferring the Evolutionary Dynamics of Species and Populations Using Genome-scale Data Sampled Over Time
Donald Smith	Mechanisms Underlying Responses and Adaptations of Organisms to Toxic Metal Exposures
Fitnat Yildiz	Molecular Mechanisms of Biofilm Formation in *Vibrio cholerae*
Al Zahler	Exon Recognition and Alternative Splicing

Administrative Structure

Two committees guide the BMEB Track:
Graduate Advising Committee (GAC for Advising)
The Advising Committee is comprised of three program faculty. Responsibilities include student orientation and advising, setting rotation assignments, rotation talk advising and feedback, evaluating and approving oral examination topics, assigning oral examination committees, ensuring thesis committee meetings are held, and allocating University support for continuing students.

Graduate Admissions Committee (GAC for Admissions)
The Admissions Committee is comprised of three program faculty. Responsibilities include reviewing applications, planning recruiting activities, accepting students and developing offers of support.

Application and Admission to the BMEB PhD Program

Deadlines
The application deadline is in early December for admission to the program in the fall of the following academic year. Application procedures and information are available on the PBSE web page (http://pbse.ucsc.edu/about/application.html). The on-line application is available at https://gradapp.ucsc.edu/start.html. Application files are reviewed by the Admissions Committee. Late applications are accepted only in exceptional circumstances and subject to available resources. The Admissions Committee will review no applications after April 30 of each academic year.

Admission criteria
The Admissions Committee evaluates candidates based on numerous indicators of potential, which include but are not limited to the following:
- Evidence of research potential and commitment to research in the statement of purpose
- Previous research experience
- Evidence of research potential in letters of recommendation (3 required)
- GRE scores: both general and subject (Biology, Biochemistry, or Chemistry) exams
- GPA
- Grades in relevant undergraduate courses
- Evidence of quantitative and analytical skills
- Evidence of ability to communicate in writing
- Indications of special expertise, experience, or cultural perspectives that the student may contribute to our program
- Performance in interviews

Admission process
After evaluation of each file, the Admissions Committee ranks the applicants. The number of offers made can fluctuate from year to year, depending on the relative strength and size of the applicant pool, and resources available. The BMEB program is committed to supporting all of its graduate students for the five years of a normal degree.
The top ranked applicants are invited for a formal interview visit organized by the Admissions Committee and generally held for all PBSE programs simultaneously. Prospective students meet with BMEB faculty and students and faculty and student recruits in other tracks. Feedback from the interview is used to determine offers. The Graduate Division formally notifies prospective students of the offer by March 15. Students are required to accept or decline the offer by April 15.

International students
Because of limited resources to cover out-of-state tuition, which remains in effect for the duration of the degree, relatively few international students are admitted to the program. The University will cover a significant proportion of the out-of-state tuition after a student advances to candidacy. Consequently, students are encouraged to advance after successful completion of the Qualifying Examination, to minimize tuition expenses to themselves and the department.

Getting Started

General advising
In the 1st year, the BMEB Advising Committee and the faculty who supervise rotations are responsible for providing academic and research advice. After students join their thesis lab, the thesis advisor and the student's thesis committee assumes guidance responsibilities. Students are always welcome to seek additional advice from the Advising Committee, especially concerning procedural issues.

Administrative Support
Administrative support for the BMEB program is provided by BME Graduate Advisor (currently Tracie Tucker, traciemt@ucsc.edu). Many organizational tasks, especially for first-year students, are done in cooperation with the other PBSE tracks.

Email & Computing
The @ucsc.edu account will be set up automatically for you by the time you arrive for fall quarter. As a BMEB student you will also need to sign up for a School of Engineering (SOE) account. To apply for your required SOE account go to new-accounts and follow the instructions there. Please select "Graduate" as your account type and indicate Tracie Tucker as your sponsor. In subsequent years, your PI will be your sponsor. Your SOE account should be activated within three days. This account is used to access the SOE computer resources. By signing up for the SOE account your @ucsc.edu email will be automatically added to the departmental alias, bmegrads@soe.ucsc.edu. The majority of communications with students from the department office will be done through email.

Office supplies
Graduate students should purchase their own office supplies for use in classes. The School of Engineering does not provide those supplies. Students serving as a teaching assistant (TA) for a course may obtain supplies needed to perform their TA duties from SOE Instructional Support (Engineering 2, Room 298). Such supplies might include overhead transparencies and markers for discussion sections, pens to use in correcting papers, and paper for documentation. After students join their thesis lab, they should consult with the lab P.I. about funding for supplies.

Photocopying
There are photocopiers available on the 2nd and 3rd floors of Engineering 2 for instructional and personal copying. A photo copy card can be checked out from SOE Instructional Support (E2-298), for use by the instructor and the TA(s). After students join their thesis lab, they should consult with the lab P.I. about funding for photocopying. For personal copying, students may purchase copy cards at the Science or McHenry Library.

TA assignments
BMEB Graduate Students are generally required to serve as Teaching Assistants for two to three classes during their UCSC Graduate Career. These assignments are usually done within the first two years. Students who are awarded extramural fellowships are often relieved of serving as TA's as a condition of their award. Assignments and schedule will be made by the Graduate Advising Committee and the Graduate Director in consultation with students.

The application procedure as well as other TA resources can be found here: https://ga.soe.ucsc.edu/ta. Teaching assignments are made by balancing financial needs of students, past performance and assignments, requests of the instructors, and the needs of the department. Every effort is made to accommodate stated preference. Students should feel free to communicate with the Graduate Program Advisor (Tracie Tucker) and the Graduate Director about their teaching preferences. In addition to attending and assisting in lectures, TAs are generally expected to lead discussion

sections and to hold weekly office hours. To schedule office hours in one of three locations please see https://ga.soe.ucsc.edu/ta/office-hours.

Financial support

The BMEB program strives to support graduate students for up to 5 years. Support is provided in the form of Graduate Student Researchships (GSRs), Teaching Assistantships (TAs) and a limited number of fellowships. Faculty advisors generally support their students during the summer as GSRs. Continued support is contingent on making academic and research progress.

Ph.D. Program in the BMEB Track

Predoctoral fellows in the track in Bioinformatics and Computational Biology must complete rigorous coursework in bioinformatics, chemistry, biology, and statistics. We also require new students to conduct research rotations in both computational and experimental laboratories. BMEB students also have the flexibility to craft their graduate curriculum to suit individual interests, creating a strong foundation for their independent dissertation research. Advanced graduate students work under the direct supervision of one of the affiliated faculty members, while also interacting closely with other faculty members. Training in this interdisciplinary research environment has enabled our students to lead bioinformatics efforts to understand biology and disease, advancing the frontiers of biomedical research, with graduates now in top university faculty positions and leading industrial research laboratories.

	FALL	WINTER	SPRING	SUMMER
Year 1	BME 200	BME 230	Elective	Thesis Project / Internship
	BME 205	Statistics	Elective	
	Ethics	Seminar (280B)	Seminar (280/281)	
	Seminar (280B)	BME 296 (Rotation 2/3)		
	BME 296 (Rotation 1/2)			
	*If needed, take makeup courses to fill deficits. Selection of thesis advisor in Spring of 1st year. Annual Student Review			
	FALL	**WINTER**	**SPRING**	**SUMMER**
Year 2	Elective	BME 201	Elective	Thesis Project / Internship
	Elective	Elective	Thesis Project (297)	
	Thesis Project (297)	Thesis Project (297)	Seminar (280/281)	
	Seminar (280/281)	Seminar (280/281)		
	Select thesis committee, write thesis proposal and Advance to Candidacy in Spring of 2nd Year. GAC Meeting (Fall). Annual Student Review (Spring).			
	FALL	**WINTER**	**SPRING**	**SUMMER**
Subsequent Years	Thesis Research (299)	Thesis Research (299)	Thesis Research (299)	Thesis Project / Internship
	Advanced Graduate Courses (as desired). Annual Thesis Committee Meeting (Fall). Annual Student Review (Spring).			

1st-year student Bootcamp and Orientation

Newly admitted students will be notified when Bootcamp and Orientation events will begin in the fall. Typically, this is one to two weeks before the beginning of classes. The BMEB Bootcamp includes *ad hoc* instruction, training, and a project designed by current BMEB Graduate Students. Additional training and orientation events are organized by the PBSE Program and the Graduate Division. These include biosafety training, computer resource orientation, and an introduction to our science library. A PBSE research conference and welcome dinner at the beginning of the quarter provides a great opportunity to meet faculty and continuing graduate students.

Advising interviews
Students accepted into the Ph.D. program meet individually with members of the Advising Committee during the Fall quarter to review their academic background and plan a curriculum for first year. In addition, students may meet individually with the Advising Committee during Winter and Spring quarters of their 1st year for informal feedback on their progress and to provide feedback to the Advising Committee on the program.

Language requirement
Proficiency in a foreign language is not a requirement for the BMEB/BCB Ph.D. program.

Graduate core courses
Students are expected to attend all class meetings and complete all assignments to pass. Grades are A for excellent, B for satisfactory, and C or F for unsatisfactory. The letter grade option is encouraged as students should plan to apply for NSF or other fellowships during their graduate career.

BME 205 Bioinformatics Models and Algorithms
Offered in Fall quarter. Covers bioinformatics models and algorithms: the use of computational techniques to convert the masses of information from biochemical experiments (DNA sequencing, DNA chips, and other high-throughput experimental methods) into useful information. Emphasis is on DNA and protein sequence alignment and analysis.

BME 230 Computational Genomics
Offered in Winter quarter. Genomics databases: analysis of high-throughput genomics datasets; BLAST and related sequence comparison methods; pairwise alignment of biosequences by dynamic programming; statistical methods to discover common motifs in biosequences; multiple alignment and database search using motif models; constructing phylogenetic trees; hidden Markov models for finding genes, etc.; discriminative methods for analysis of bioinformatics data, neural networks, and support vector machines; locating genes and predicting gene function, including introduction to linkage analysis and disease association studies using SNPs; and modeling DNA and RNA structures.

Rotation selection
The purpose of rotations is to provide students with diverse research training in 3 different laboratories, and to allow students and faculty to make appropriate pairings for thesis work. Before the beginning of each rotation period, 1st year students submit to the PBSE graduate coordinator, a ranked list of 3 faculty as rotation choices. Before submitting their choices, students should talk to faculty about potential projects and suitability for rotation in their lab. Rotation assignments are made by the Graduate Director. Students are generally assigned their 1st choice unless there are multiple students who list the same 1st choice. In that case, students are given their 2nd choice.

Faculty are not permitted to make any commitments to students regarding permanent positions in their lab, officially or unofficially, until the 3rd rotation period has ended. Occasionally, a student may not find a suitable laboratory at the end of 3 rotations. They may select a 4th laboratory for a rotation with the permission of the Advising Committee and the rotation advisor.

Summer rotations prior to Fall quarter enrollment
Graduate students may do a Summer rotation if they can find a faculty member who can provide financial support during the summer.

Rotation talks
In the final week of each rotation, rotating students will give a short rotation talks to the PBSE community. Typically, each talk is 6-8 minutes with an additional 2 minutes for discussion, but times may vary depending on class sizes.

Evaluation of rotation performance
Performance in each rotation is graded as satisfactory/unsatisfactory and summarized in a narrative evaluation by the rotation advisor. Performance is evaluated on the basis of research effort and progress, intellectual mastery of the project, and performance in the talk. Faculty should submit evaluations in a timely manner.

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 BMEB faculty member should be asked to attend the talk and provide an evaluation.

Seminars
The Biomolecular Engineering & Bioinformatics Department organizes a weekly department seminar. All graduate students should attend the department seminar.

Failing a course and academic probation
Students who fail any course, including an undergraduate course or rotation assignment, must meet with the Advising Committee to review their progress. At that time they may be placed on academic probation. If their progress does not improve after an additional quarter, they may be asked to leave the program. All failed courses must be made up at the next available opportunity.

2nd year advising meeting
Early in Fall quarter, the Advising Committee meets with 2nd year students to discuss their progress, 2nd year coursework, training in the responsible conduct of research, and preparation for oral exams.

Training in the responsible conduct of research
NIH recommends two Responsible Conduct of Research (RCR) training experiences in Ph.D. programs. The first RCR training experience in our program is our Research and Teaching course (BME 200), taken by graduate students during their 1st year. The course includes readings about and discussion of keeping accurate and durable records; forms and consequences of fraud, plagiarism, and other forms of academic misconduct; honest reporting of data; writing and reviewing grants; authorship; conflict of interest; working with collaborators; and humane and appropriate use of animals in research.

The second RCR training experience is generally the Ethics course requirement.

Selection of original research proposal topics for the oral examination
A qualifying examination committee is then formed in the second year, which consists of the adviser and three additional members, and which is approved by the graduate director and the campus graduate dean. At least two of the four must be members of the Department of Biomolecular Engineering. The student must submit a written dissertation proposal (thesis proposal) to all members of the committee and the graduate program adviser one month in advance of the examination. Typically, this proposal is drafted during Winter of the second year in BME201 Scientific Writing. The dissertation proposal is publicly and formally presented in an oral qualifying examination given by the qualifying committee.

Avoidance of apparent conflict of interest
Formal evaluation of a student may lead to an apparent conflict of interest for a faculty member. Such situations can include, but are not limited to, serving on an oral or thesis committee for the student of a spouse or significant other. In such situations where an apparent conflict of interest could occur, the faculty should recuse him/herself. They may, however, serve as an ad hoc advisory member of such thesis committees, but will not participate in the formal evaluation process. Informal situations are not subject to apparent conflict of interest considerations.

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 or 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 Department Chair and the Graduate Dean will be notified of the incident. After a second incident of plagiarism, the program will recommend to the Department Chair and the Graduate Dean that the student be expelled from our graduate program.

Progress Toward a Thesis

Selection of the thesis committee

After successful completion of the qualifying exam, the student should immediately assemble their thesis committee in consultation with their thesis advisor. The committee comprises the advisor plus two BME faculty members. A majority of the members must be members of the UCSC Academic Senate. While outside members specializing in the thesis research are permitted, they are not mandatory. Outside members must be tenured members of an academic institution. The student must meet with their thesis committee at least once per year until completion of the Ph.D. degree. The committee will provide continuing guidance throughout the development of the thesis, will provide ongoing assessment of the student's progress, and will evaluate the completed dissertation.

Graduate student academic progress reports

The Graduate Division requires an annual report of progress for every PhD student. At the end of each academic year, the BMEB advising committee will meet to evaluate the academic progress of each student and set out requirements due in the coming year. A summary of this evaluation will be sent to each student and will include a statement of any deficiencies in meeting requirements.

Target time and normative time

The target time for the Ph.D. is 5 years. The normative time for the Ph.D. degree within the University of California is 6 years. Students who fail to complete their thesis within this time must request an extension from the Graduate Division. The form for requesting an extension is available in the BSOE Graduate Advising Office. This petition must include a detailed timetable for completion and must be signed by the student, faculty advisor and graduate director prior to submission to the Graduate Dean. If the Ph.D. degree is not awarded within 7 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 exam or review shall be transmitted in writing to the Graduate Council (Academic Senate Regulation 18.6).

Preparation of the thesis

When the student's advisor and thesis committee have agreed that the research is ready to be submitted, the student may proceed with "writing up" according to the guidelines prescribed by the University Library and the Graduate Division. The dissertation is of critical importance, because it reflects the candidate's ability to do independent research at a high level of scholarship and creativity. The dissertation should make clear that the candidate is familiar with and able to criticize and evaluate previous work done in his or her specialty field, and that the candidate has made a significant contribution to knowledge, at least part of which is of a quality and quantity worthy of at least 2 publications. The outline of the thesis should be approved by the thesis committee prior to preparation of the thesis. The thesis should be provided to the committee no less than one month prior to the thesis defense date. The thesis defense should comprise an open seminar. After the seminar, the thesis committee will meet with the student to discuss any changes to the thesis required for completion. Upon submission of the final thesis, the committee will sign the cover page and grant the Ph.D. Formal award of the Ph.D. is made by the Graduate Division. Summer thesis defenses are discouraged, since many faculty are absent and no formal seminar series is in place during the summer.

Other BCB/BMEB/BSOE Program Policies

BSOE and Graduate Division forms are available from https://ga.soe.ucsc.edu/current/forms. All forms, applications, etc. in connection with the Graduate Division must be routed through the BMEB Graduate Program Advisor (Tracie Tucker).

UCSC-wide policies and procedures for Graduate Students are further explained in the UCSC Graduate Student Handbook.

Completion of previous degrees

1. No student may enroll as a graduate student at UCSC until a bachelor's degree has been completed.
2. Newly accepted students who are currently completing another graduate degree normally will not be permitted to enroll in the BCB/BMEB Graduate Program until the previous degree has been completed (or abandoned).

Leaves of absence (LOA)

1. Students are expected to engage in their graduate student activities continuously (including the summer) from the time of admission until completion of the Ph.D. thesis. Any LOA must be authorized in advance.
2. Approval for a LOA will be recommended to the Graduate Dean only under unusual or exceptional circumstances. Requests for LOA must be submitted in writing to the Advising Committee and must include justifications and the consent of the student's advisor or the Advising Committee, whichever applies to the individual student.
3. Time spent on leave continues to count toward all departmental and university time requirements, including, but not limited to, passing the qualifying exam, the three-year limit after advancement to candidacy, and the six-year limit on normative time for completion of graduate work at UCSC.
4. Making use of an approved LOA will not jeopardize maintaining the satisfactory academic progress that must be reported annually to the Graduate Dean.
5. If a LOA 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 both with the BSOE Graduate Advising Office and the Graduate Division. Please consult with the BMEB Graduate Program Advisor (Tracie Tucker).
6. International students have additional responsibilities to meet restrictions imposed by their visas, and must also have approval from International Student Services (istudent@ucsc.edu).
7. Re-admission to the program after a leave is contingent upon satisfying any conditions set by the department or the Graduate Dean.

Normal course loads

1. BMEB graduate students are expected to work full-time towards their degrees and, therefore, students should enroll for 15 units of credit each quarter.
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 15 units of BME 297, Independent Study, each quarter (unless taking a 5 unit graduate elective) plus 2 units of BME 280 if this is offered by the thesis advisor. Advanced students will enroll in BME 299, Thesis Research.
3. Lighter or heavier loads must be approved in advance by the Advising Committee.

Ph.D. thesis defense

The BMEB Graduate Program requires a formal thesis defense before awarding the Ph.D. degree. This requirement must be satisfied before the thesis committee signs the cover page and other forms indicating that the thesis has been accepted. The defense takes place after all members of the committee have approved the written thesis. The defense must be a public seminar, attended by a majority of the candidate's thesis committee, in which the candidate formally presents the substance of the thesis. After the seminar, the public must have sufficient opportunity to question the candidate. The thesis committee may then meet in private with the candidate for further questions, before determining whether the candidate's thesis is accepted or rejected, or whether any problems need to be resolved. If both the thesis and the defense are acceptable, the cover page and necessary forms will be signed by the committee members, and all departmental requirements pertaining to the Ph.D. thesis defense will have been satisfied.

Expected timetable for the Ph.D. degree

The BMEB Ph.D. was conceived as a five-year program. Under normal circumstances, students should plan to follow this timetable:

1. Enter at the beginning of the Fall quarter.

2. Complete all required coursework (core and background courses) in the first two years.
3. Take qualifying examination and advance to candidacy by the end of Spring quarter of the second year.
4. Complete research and finish writing thesis by end of the fifth year. Deviations from this pattern require good justification. Deviations must be approved by the student's advisory committee and by the Advising Committee. Approval is not automatic and should be sought as soon as the need is anticipated.

Leaves and qualifying examinations
1. Students must obtain written permission first from their advisor, then from the department graduate director for all leaves.
2. Students not registered or not on leave for any given quarter must turn in the required paperwork the following quarter (summer excepted) or they will be dismissed from the program.
3. Students who formally withdraw from the program without the successful completion of either a thesis or the qualifying examination must submit formal notification to the Advising Committee and BMEB Program Advisor.
4. Students must take the qualifying examination before the beginning of Fall quarter of their third year or they will not be allowed to register for courses or serve as a TA or RA. The Graduate Division will be notified, and course enrollment will be denied. Any exceptions to this policy must be made in writing by the student's faculty sponsor (or BMEB committee member) prior to the beginning of the Fall quarter.
5. If explicitly invited to do so by the examination committee, students who fail the qualifying examination have one quarter to produce a Master's Capstone Project (on current research) or retake the examination. Such cannot extend past the Fall quarter of the third year in residence without written permission from the Advising Committee.
6. For detailed guidelines on the Qualifying Exam/Advancement to Candidacy, please see: https://ga.soe.ucsc.edu/current/advancement

Checklist for Graduation

1. All candidates for a degree must submit an Application for Doctor of Philosophy Degree or Application for Master's Degree to Graduate Studies by the date stated in the Academic and Administrative Calendar for the quarter you wish to receive the degree. YOU are responsible for observing the filing dates. Failure to declare candidacy by the deadline means that you cannot be considered a candidate until the next term.

- MS Application
- PhD Application
- Thesis/Dissertation Guidelines

*The PhD Application requires a number of signatures so please plan ahead.

2. Schedule dissertation seminar with the BMEB Graduate Program Advisor (Tracie Tucker) by emailing traciemt@ucsc.edu with the date and start time of your defense. At least two (2) weeks prior to your defense please submit an announcement notification (title/abstract) here: https://ga.soe.ucsc.edu/node/401
3. At least three (3) months before graduation, meet with thesis committee to determine thesis content and format.
4. At least one (1) month before thesis defense, give all committee members a copy of thesis for review.
5. Two (2) weeks before thesis defense, meet with thesis committee again for final feedback.
6. After the defense, submit a formal copy of your dissertation to ProQuest, and an original signed cover page to the Graduate Division by the date listed on the Academic and Administrative Calendar. You must also submit the following to the BMEB Graduate Program Advisor (currently Tracie Tucker) – hard copy of the signed cover page and email a PDF of the dissertation.

Appendix: UCSC APPEALING ACADEMIC JUDGMENTS
Revisions approved by Graduate Council on April 24, 2008 and effective July 1, 2008
Students have the right to appeal various institutional judgments concerning their academic standing at UC Santa Cruz including dismissal from graduate standing, placement on probationary status, narrative evaluation or grade notation, and their academic progress. This appeal procedure applies only to current graduate students at UC Santa Cruz and is

not available to appeal denial of admission or readmission to any program. The scope of this procedure is limited to the matters listed above, and excludes complaints regarding student employment as a Teaching Assistant, student discipline, auxiliary student services (such as housing, child care, etc.), and sexual harassment, which are covered by other policies and procedures. This document outlines the four levels of complaint resolution available to graduate students at UC Santa Cruz:

1. Instructor appeal
2. Departmental appeal
3. Graduate Dean appeal
4. Graduate Council appeal

Throughout all stages of the appeal process, both parties are strongly encouraged to seek informal resolution. The Dean of the Division of Graduate Studies may be consulted for informal resolution at any stage of the process. In addition graduate students may contact the Office of the Ombudsman for assistance with informal complaint resolution. Working toward informal resolution does not preclude continuation of a formal appeal. However, unless a request for extension of a deadline is granted as provided below, informal resolution efforts shall not serve in any way to stay or extend an applicable filing deadline.

Requests for Extension of Filing Deadlines

Except as otherwise provided in this policy, any party may for good cause seek an extension of a deadline by filing a request with the Dean of the Division of Graduate Studies. Such request must be submitted in writing prior to the deadline for which an extension is sought, and must explain the reason(s) why an extension is necessary. The decision to grant or deny a request is within the discretion of the Dean and shall be final and binding.

Basis for Appeals

An appeal may be filed based upon one or more of the following grounds, provided that the action complained of has had a material impact on the student's academic standing:

1. Procedural error or violation of official policy by academic or administrative personnel;
2. Judgments improperly based upon non-academic criteria including, but not limited to, discrimination or harassment on the basis of race, color, national origin, religion, sex, disability, age, medical condition, ancestry, marital status, citizenship, sexual orientation, or status as a veteran or special disabled veteran, or any personal or arbitrary reasons;
3. Special mitigating circumstances beyond the student's control not properly taken into account in a decision affecting the student's academic progress;
4. Capricious or arbitrary application of appropriate criteria in a manner not reflective of the student's performance in relation to a course or program requirement.

Procedure for Appeals

Throughout the appeals process all time periods refer to working days1 within the academic term or during the normal working days of summer. Students should be aware that appeals begun late in spring or in summer may be delayed by the unavailability of specific faculty and/or the Graduate Council. A written appeal must be initiated within thirty (30) working days of the action being appealed. The student must seek resolution of the action sequentially as described below, unless the action complained of is not an evaluation or grade notation. In that instance, the student would begin the appeal with Step II below.

Step I. If the student is appealing an evaluation or grade notation, the appeal must be submitted to the instructor who provided the evaluation or grade notation. The term "working days" means Monday through Friday, excluding University holidays.

Step II. For all other appeals, or if the student is continuing the appeal of an evaluation or grade notation, the appeal must be submitted to the student's major department;

Step III. The Dean of Graduate Studies;

Step IV. The Graduate Council.

In all cases (Step I through IV), the appeal should indicate the action(s) being appealed, the date(s) the action(s) occurred, the grounds upon which the appeal is based, and the outcome desired.

Step I. Instructor Appeal
If a student is appealing a narrative evaluation or grade notation, the student must submit a written appeal to the instructor of the course within thirty (30) working days of the deadline contained in the campus Academic and Administrative Calendar for submittal of narrative evaluations or grade notation or, if that deadline has passed, of the actual date when the faculty member filed the narrative evaluation or grade notation. The faculty member's Department Chair should be copied on the appeal, in order to inform the student if the faculty member is unavailable. The faculty member may elect to meet with the student to discuss the appeal and determine if a reasonable compromise can be reached that is acceptable to both parties. The faculty member must submit a written response to the student with a copy to the student's Department Chair within thirty (30) working days of receipt of the Step I appeal. This deadline may be extended by the Department Chair or his/her designate should the faculty member be away from campus for research, administrative duties, sabbatical time, or personal leave. If the course in question was sponsored by a unit other than the student's home department, the appeal should be addressed to the instructor of the course and copied to the two Chairs jointly.

Step II. Department Appeal
The student may continue the appeal of an evaluation or grade notation with the Department. In addition, a student may begin the appeal of any other action at this level. Students continuing the appeal of an evaluation or grade notation must submit a written appeal to the Department Chair of the faculty instructor of the course. If the course in question was sponsored by a unit other than the student's home department, the student's home Department Chair should be copied. Review of the appeal at the departmental level should be conducted by the departmental graduate affairs committee or analogous group. This group should minimally include two or more faculty members. If a faculty member's action(s) is the subject of the appeal, s/he must recuse him or herself from the committee. Departments may also elect to establish an ad hoc committee to handle appeals filed in a given academic year. The committee will initiate a review process within ten (10) working days of receipt of the appeal. The committee will receive the written appeal from the student, all pertinent material from the faculty member and student, and any additional material considered germane to the appeal either by the student or the faculty member. The committee may request additional information, as it deems necessary. The committee or its designated members may elect to interview the faculty member and/or student involved in the appeal. The committee will render its decision in written form within seven (7) working days of the conclusion of the review process. If the action being appealed, such as probation or dismissal, was initiated by the department, the review process remains the same.

Step III. Dean of Graduate Studies
The student may elect to submit a written appeal of the department's decision to the Graduate Dean. The decision must be appealed within thirty (30) working days from the date the departmental decision was transmitted to the student. At the discretion of the Graduate Dean, the appeal may be assigned to the Associate Graduate Dean. Additionally if the Dean determines that the appeal should be submitted directly to the Graduate Council (for example, if the Dean determines that a fair and impartial hearing may be jeopardized by conflicts within the Graduate Division or other extenuating circumstances), the Dean may refer the appeal directly to the Graduate Council. The Graduate Dean will review all documents and records submitted in the departmental review. In addition the Graduate Dean may meet with the student, faculty member(s), and/or graduate affairs committee, where appropriate, and may consider additional materials as s/he deems appropriate. In most cases the Graduate Dean will seek resolution within one academic term. The Graduate Dean may suggest a resolution of the appeal in written form within seven (7) working days of completion of his/her review. After fourteen (14) working days, the suggested resolution, if not accepted, becomes null and void.

Step IV. Graduate Council
The student may submit a final appeal to the Graduate Council. The Graduate Council is a committee of the Academic Senate. There are ten Santa Cruz faculty members, plus the Dean of Graduate Studies serving ex officio. In addition, there are one Library representative nominated by the UCSC Librarians Association, no more than three Graduate Student Association representatives, and one Postdoctoral Scholars Association Representative. The student will submit a written appeal to the Graduate Council through the Academic Senate Office. The Dean of Graduate Studies will forward all pertinent documents to the Graduate Council for evaluation. The Chair may request additional information,

as s/he deems necessary. The Graduate Council Chair in consultation with the Graduate Council will review the file and determine whether sufficient cause exists to justify a formal hearing. If the Council declines to hear the case, the Council will issue a written statement to that effect. This would be the final conclusion of the appeals process.
If the Council determines that a hearing is to be held, the student and instructor or department Chair will be notified in writing at least thirty (30) calendar days in advance of the hearing date. The Graduate Council Chair may at his/her discretion constitute a subcommittee of at least four members, including at least one student representative, to hear the appeal, or s/he may convene the Graduate Council as a whole, as appropriate to the case and circumstances. At least seven (7) calendar days prior to the hearing date, each party shall provide the other with all relevant materials, including: names of all witnesses and any and all written materials to be introduced at the hearing. Copies of this material must also be submitted to the Graduate Council at least fourteen (14) calendar days prior to the hearing. During the appeal, the Graduate Council shall review the charges. At the hearing, the Graduate Council may interview such witnesses as are brought to the hearing by either party or such other witnesses as the hearing committee considers relevant. During the procedure, the graduate student members of the Graduate Council participate fully and equally with faculty members of the Graduate Council to review the issues of the case and ensure due process for the student. The graduate students are not to be viewed as a special resource or advocate for the student to any greater degree than any individual faculty member of the Graduate Council.

A formal hearing will follow these procedures and conditions:
1. The student:
a. shall be present throughout the hearing. If the student fails to attend the hearing, s/he shall be considered to have abandoned her/his appeal unless deferral was granted by the Graduate Council;
b. may be accompanied by a Senate member of her/his choice, if desired and available;
c. may be accompanied by a graduate student of her/his choice to serve in an advisory role, if desired and available;
Please note: although Graduate Council will attempt to accommodate requests, the non-availability of a requested accompanying Senate member or graduate student is not sufficient cause for delay of an appeals hearing, nor does it affect the legitimacy of the Council's findings.
d. shall have the right to present evidence, including witnesses, first; and
e. may cross-examine all witnesses presented by the instructor, department or dean. If the student desires a Senate member as an advisor and is unable to secure a Senate member to serve in this role, the Graduate Council, at the student's request, will appoint a faculty member to act in this role. This advisor may or may not be a member of the Graduate Council. A Graduate Council member serving in this capacity shall be recused from the Graduate Council deliberations of the appeal.
2. The hearings will be confidential and limited to the principals (student, Senate member selected by the student, graduate student selected by the student, and instructor or department representative or relevant administrator), and members of the Graduate Council (but see 3 and 5 below).
3. By prior arrangement, witnesses may be interviewed as part of the hearing process.
4. All witnesses other than the student and the instructor (or department representative or other relevant administrator) shall be excluded from the hearing except when testifying.
5. Evidence may be oral or written, but must be limited to issues raised in the original written complaint. Formal rules of evidence shall not apply, and evidence shall be admitted if of the type upon which reasonable people are accustomed to rely in the conduct of serious affairs. The Graduate Council may, in its discretion, exclude irrelevant or unduly repetitive evidence. At its discretion the Graduate Council may agree to hear closing arguments (either oral or written at the Council's discretion) as to the correct resolution of the matter. If the Council determines to allow written closing arguments, the hearing process shall be deemed complete upon the parties' submission of their written arguments to the Council.
6. The meeting shall be tape recorded, or, at the option of the student, a stenographer may be provided at the student's expense. The student shall have access to a copy of the tape recording and may copy the tape at her/his expense. All records pertaining to the hearing shall be kept by the Graduate Council for a period of three years. Student records shall be retained beyond that time if there is an outstanding request by a principal party to the review to inspect them.
7. The Graduate Council will reach its decision subsequent to completion of the hearing. The deliberations of the Graduate Council shall be in private. The Graduate Council shall submit a written decision to the Graduate Dean,

including an explanation of the basis of its decision and a written recommendation, within ten (10) working days of the date of completion of the hearing process.
8. Consistent with Senate authority, the Graduate Dean will make the final decision on all cases involving probation and dismissal. The Graduate Council will have final decision-making authority in all other cases.
9. The Graduate Dean will have the administrative responsibility to implement the elements of the final decision and to ensure that the instructor involved and/or Department abide by the terms of the final resolution of the appeal. In addition the Graduate Dean will take reasonable steps to ensure that the student is not subject to any form of retaliation and is further restored to good standing with the Department if so determined by the decision of the review. This may include the provision of lost wages or fellowship funds if so determined by the decision of the review.

V. Financial Support

Financial support will continue for the student for the term in which the appeal is submitted. Support beyond this term will be contingent upon approval of the Department and the Graduate Dean, and determined on a case-by-case basis.

VI. Ramifications of Appeal Process

A faculty member may request his or her name be removed from the course in the final academic transcript. No punitive actions may be taken against the instructor on the basis of these procedures. Neither the filing of an appeal by a student nor the final disposition of the appeal shall, under any circumstances, become a part of the personnel file of the instructor. The use of non-academic criteria in assigning a grade is a violation of the Faculty Code of Conduct. Sanctions against an instructor for violation of the Faculty Code may be sought by filing a complaint in accordance with CAPPM 002.015 or the relevant collective bargaining agreement. A complaint may be filed by the student or by others consistent with CAPPM 002.015. No punitive action may be taken against the complainant on the basis of these procedures. Neither the filing of an appeal by a student nor the final disposition of the appeal shall, under any circumstances, become a part of the complainant's file. The instructor may, if he or she feels that his or her record has been impugned by false and malicious allegations, file charges against the complainant through the office of the Vice Chancellor for Student Affairs.