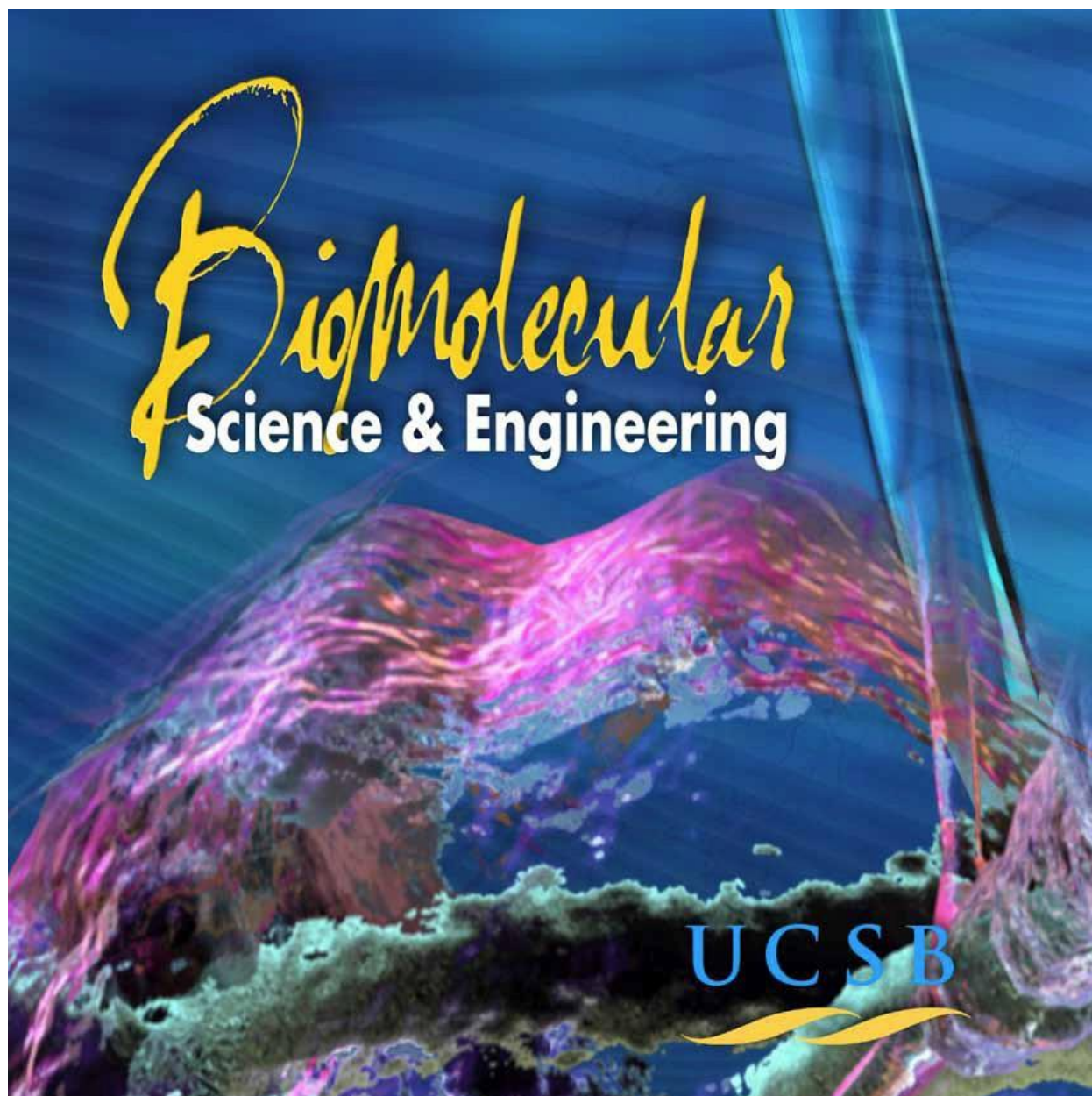


GRADUATE STUDENTS HANDBOOK



University of California Santa Barbara

2023-24

*Revised August 2023

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SPECIAL NOTE:

The program name was officially changed in June 2001 from Biochemistry & Molecular Biology to Biomolecular Science & Engineering. The degree name offered by this program remains a Ph.D. in Biochemistry & Molecular Biology with an optional emphasis in Biophysics & Bioengineering.

PROGRAM IN BIOMOLECULAR SCIENCE AND ENGINEERING

The Interdepartmental Biomolecular Science & Engineering Ph.D. Program is offered cooperatively by faculty in the following departments: Molecular, Cellular, & Developmental Biology (MCDB), Ecology, Evolution, & Marine Biology (EEMB), Chemistry & Biochemistry, and Physics in the College of Letters & Science, and Materials, Chemical Engineering, Mechanical Engineering, and Computer Science departments in the College of Engineering. The policies, procedures and requirements pertaining to the program are outlined in this guide.

PROGRAM STAFF AND FACULTY COMMITTEES

Program Manager – The BMSE Program Manager, *Ms. Stella Hahn* (location: Ellison Hall, room 2703; phone: 893-2290; email: stella.hahn@lifesci.ucsb.edu) serves as the Program Manager and administrative assistant to the Director. The Program Manager provides general administrative support to the Program and Director, including issues related to faculty recruitment, program policies and procedures, accounting, and event coordination.

Staff Graduate Advisor – The Graduate Program Advisor, *Ms. Angela Zeng* (location: Ellison Hall, room 2705; phone: 893-3011; email: zeng@lifesci.ucsb.edu) serves as the BMSE Staff Graduate Advisor. The Staff Graduate Advisor provides general graduate student support for the program: (1) providing information on admission, registration, financial support, examinations, petitions, academic policies and procedures; (2) maintaining student files; and (3) providing liaison with the Graduate Division and the Registrar.

Program Director – *Professor Cristina Marchetti* serves as Director of the BMSE graduate program.

Faculty Graduate Advisor – The Faculty Graduate Advisor represents both the BMSE faculty and the Graduate Division, and serves to implement graduate program policies. The Faculty Advisor approves enrollment plans and petitions (leaves of absence, etc.) and helps track the academic progress of students. The Faculty Advisor may refer matters to other committees or program faculty. *Professor Zvonimir Dogic* (zdogic@physics.ucsb.edu or x2815) is the current Faculty Graduate Advisor for BMSE.

Graduate Affairs Committee – The Graduate Committee acts on behalf of the program faculty in reviewing and implementing graduate program policies and graduate student affairs. The Committee may refer matters for consideration or action by the BMSE steering committee or the program faculty. The committee includes the Director, Vice-Director, and the Faculty Graduate Advisor.

Seminar Committee – The seminar committee consists of Professors Matthieu Louis and Brooke Gardner (MCDB).

CURRICULAR AND GRADE REQUIREMENTS

Registration – It is the student's responsibility to complete class registration for each quarter in a timely manner via GOLD (late registration incurs a \$50 late fee). Students associated with a research mentor are expected to consult with their mentor prior to registration. All students are expected to consult with the Staff Graduate Advisor and/or Faculty Graduate Advisor regarding their progress toward meeting program requirements. For information on registration and enrollment procedures, visit Registrar's website at: <http://www.registrar.ucsb.edu>

Undergraduate Preparation –The program welcomes students with a variety of undergraduate training, including in biology, physics, chemistry, biochemistry, computer science, mathematics through the satisfactory completion of specified courses during the first year of graduate study. Gaps in academic preparation will be identified on entrance, in consultation with the Faculty Graduate Advisor. Courses taken at the undergraduate level will not earn credit toward any unit requirement for a graduate degree.

PhD COURSE REQUIREMENTS:

It is expected that all PhD students be enrolled as 'full time' students and earn a minimum of 12 course units each quarter, and that most of the course requirements (see below) will be completed during the first year of graduate study and prior to thesis examination (see below). Upon entrance into the doctoral program students are to select one emphasis from the following two:

- Biochemistry & Molecular Biology (BCMB)
- Biophysics & Bioengineering (BIOPHENG)

PhD requirements:

- 15 units of core courses prior to advancement to candidacy divided as follows:
 - o 10 units – in your emphasis (BIOPHENG or BCMB) chosen from the list below
 - o 5 units - in opposite emphasis chosen from the list below
 - o Other courses approved by Faculty Graduate Advisor
 - o A grade of B or better must be maintained in all core courses
- Seminars every quarter: BMSE 262 (FNS), BMSE 265 (seminar discussion group)
- TA twice before graduation (in MCDB or other depts.)

- o Teaching Requirement: MCDB 500 and 502 fall quarter, or equivalent

First quarter:

All students are strongly encouraged to complete the following courses in their first quarter of graduate studies:

BMSE 210 & BMSE 224	Interdisciplinary Quantitative Biomolecular and Biosystems (iQB2)	8 units
BMSE 262	Research Progress in BMSE	1 unit
BMSE 265	BMSE Seminar Discussion Group	1 unit
MCDB 500 or equivalent	Teaching Assistant Orientation	1 unit
MCDB 502 or equivalent	Teaching Assistant Training	1 unit

iQB2 is a bootcamp-style course co-taught by several faculty that offers hands-on experience in experimental design, instrumentation and modeling. After completing the iQB2 in your first quarter, you will have completed 8 units of core courses. The other courses in the above list do not count toward core units. You will need to take remaining 7 units of core courses in the first and second year before you can advance to candidacy.

Biophysics and Bioengineering Emphasis Courses (BIOPHENG):

BMSE 201A	Protein Structure & Function (5wks)	2 units
BMSE 202	Biomaterials and Biosurfaces	3 units
BMSE 216A	Spectr of Bio Mols (5wks)	2 units
BMSE 216B	Diffraction of Biological Molecules (5wks)	2 units
BMSE 217	Electrostatics of Biopolymers (5wks)	2 units
BMSE 219	Basic Microscopy for Quantitative Biology	3 units
BMSE 244	Informational Macro---and Supra---molecules (5wks)	2 units
BMSE 247	Quantitative Methods in Biology	3 units
BMSE 250	Bionanotechnology (5wks)	2 units
BMSE 251	Biopharmaceutical Process Engineering (5wks)	2 units
BMSE 252	Principles of Bioengineering (5wks)	2 units
BMSE 253	Analytical Biotechnology (5wks)	2 units
BMSE 255	Methods in Systems Biology (5wks)	2 units
BMSE 272	Mechanical Force and Biomolecules	3 units
BMSE 276A	Biomolecular Materials I: Structures & Function	3 units

Biochemistry and Molecular Biology Emphasis Courses (BCMB):

BMSE 201B	Chemistry and Structure of Nucleic Acids (5wks)	2 units
BMSE 201C	Biomembrane Structure and Function (5wks)	2 units
BMSE 205A	Biochemical Techniques (2wks)	1 unit
BMSE 205B	Strategies in Protein Characterization (5wks)	1 unit
BMSE 207	Enzyme Mechanisms (5wks)	2 units
BMSE 218A	Methods and Logic in Molecular Cell Biology I (5wks)	3 units
BMSE 218B	Methods and Logic in Molecular Cell Biology II	5 units
BMSE 223	Signal Transduction (5wks)	2 units
BMSE 229	Protein Biochemistry (3wks)	2 units

Approved Optional Courses:

BMSE 204	Post-translational Protein Processing	4 units
BMSE 210.	Biochemistry & Molecular Biology Techniques for Physical Scientists	4 units
ENGR 212	Great Experiments	4 units
ENGR 220A	Molecular Bioengineering (BCMB or BIOPHENG)	4 units
ENGR 220B	Cell and Tissue Bioengineering (BCMB or BIOPHENG)	4 units
ENGR 220C	Tissue & Systems Bioengineering (BCMB OR BIOPHENG)	4 units
BMSE 222A	Colloids & Interfaces I (BIOPHENG)	3 units
BMSE 222B	Colloids and Interfaces II (BIOPHENG)	3 units
BMSE 224	Quantitative Biology iQB2 Lab (BCMB OR BIOPHENG)	4 units
MCDB 224	Signal Transduction and Development in Multicell (BCMB)(5wks)	2 units
ENGR 230	Bioengineering Student Seminar Cell and Tissue Bioengineering (BCMB or BIOPHENG)	1 unit
BMSE 232	Bacterial Pathogenesis (BCMB)	3 units
BMSE 232L	Bacterial Pathogenesis Lab (BCMB)	3 units
BMSE 233	Cell Biology (BCMB)	4 units
BMSE 246	Membrane Biochemistry (BIOPHENG)	4 units
MCDB 246	Stem Cell Biology in Health and Disease (BCMB)	4 units
BMSE 248	Practical Statistics for Biologists (BCMB)	4 units

BIOE 250AA	Tissue Engineering and Regenerative Medicine (BIOPHENG)	2-4 units
BMSE 254	Drug Design (BCMB)	3 units
BMSE 257	Special Topics in Bio Physics (BIOPHENG)	1-4 units
BMSE 258	Methods in Mechanobiology and Biofabrication (BIOPHEG)	3 units
BMSE 259	Special Topics Biochemistry (BCMB)	1-4 units
MCDB 260	Research Strategies in MCDB	2 units
BMSE 262	BMSE Research Progress in BMSE	1 unit
BMSE 264	Literature in Signal Transduction (BCMB)	1 unit
BMSE 265	BMSE Seminar Discussion Group	1 unit
CHEM 271	Bioinorganic Chemistry (BCMB)	3 units
BMSE 276B	Biomolecular Materials II (BIOPHENG)	3 units
BMSE 290XX	Group Studies	2 units
BMSE 293	Computational Methods BMB	1 unit
EEMB 509	Levels of Biological Org II (BCMB)	4 units
BMSE 592	BMSE Lab Rotation	2-3 units
BMSE 595	BMB Literature Seminar	2 units
BMSE 595XX	Critical Review of Selected Literature	2 units
BMSE 596	Directed Reading Research	2-12 units
BMSE 599	PhD Dissertation Preparation	3-12 units

Note: Many BMSE courses are 5 week, 2 unit modules; check current [Schedule of Classes](#) for dates offered in any given quarter.

ADDITIONAL COURSE WORK:

- * BMSE 592 --- BMSE Lab Rotations: 3 units for each 10---wk. rotation OR 2 units for each 5-wk. rotation; intended for first year graduate students only; faculty approval required.
- * BMSE 595 --- Advanced Topics Seminars: 2 units; a critical review of research in selected areas available from participating faculty in the departments of Chemistry, MCDB, Materials, and Physics.
- * BMSE 596 --- Directed Reading & Research: variable units; credit for research performed in one's permanent research laboratory.
- * BMSE 599 --- Ph.D. Dissertation Preparation: variable units; register for ONLY after advancing to candidacy and during final quarter while preparing dissertation.

SEMINAR COURSES:

- * BMSE 262 --- Research Progress in BMSE (1 unit; required enrollment every quarter): research presentations by advanced BMSE & MCDB PhD students on research progress. It is currently held at noon on Friday and it is referred to as the Friday Noon Seminar (FNS).
- * BMSE 265 --- BMSE Seminar Discussion Group (1 unit; required enrollment every quarter for all non---advanced graduate students): A weekly seminar discussion group to review, in advance, relevant literature of participating BMSE seminar guests.
- * Weekly BMSE seminars (not an official course): invited guests present on topics relevant to broad range of topics; weekly attendance strongly encouraged for all BMSE graduate students; held Wednesday at 3 pm in BioE 1001 or TBD.
- * MCDB 260 & 263 – MCDB Research Seminars (optional): invited speakers on research relevant to MCDB and/or faculty research talks. MCDB 263 is concurrent with Wednesday BMSE seminar.

TEACHING ASSISTANT COURSES:

- * MCDB 500 – Teaching Assistant Orientation (1 unit; offered Fall quarter only; required for all incoming first year graduate students): General orientation regarding UC system policies on teaching.
- * MCDB 501 – Practicum in Instruction: 1-4 units; credit for TA assignment; register in quarter assigned a TAship; units depend on teaching load (50% TAship = 4 units).
- * MCDB 502 – Teaching Assistant Training: 1-2 units; offered Fall & Winter quarters; register for only once prior to or concurrent with first TA assignment.

* PRIOR TO ADVANCEMENT TO CANDIDACY:

- * **15 units from core courses:** 10 from chosen emphasis & 5 from other emphasis
- * **6 units minimum of BMSE 595** – Advanced Topics and BMSE 596 – Directed Reading/Research.
- * **9 units of BMSE 592** --- Lab Rotations: 3 units each quarter of first year.
- * **6 units of Seminars** --- BMSE 262 (every quarter; 1 unit each; 3 units total per year; min 2 years).
- * **6 units minimum of TA Training** – MCDB 500/501/502

Examinations: In order to qualify for advancement to doctoral candidacy, students must form a doctoral committee and successfully complete, in addition to the required courses, the qualifying examination consisting of a written research proposition followed by an oral defense of the proposition. The examination is normally taken during the second year of graduate study, and before the end of the Spring term. The topic of the qualifying examination is based on the students' dissertation research. The final requirement for the Ph.D. degree is a written dissertation and its oral defense, which usually is in the form of a scheduled interdepartmental seminar.

Academic (Grade) Standards -- Students are expected to maintain a minimum cumulative grade point average of 3.0 with grades of B or better in core course work. Failure to maintain these grade standards will result in 1) units not counting towards core unit requirements, 2) the student potentially being placed on academic probation (according to the policy of the Graduate Division), and 3) potential dismissal from the program in extreme cases. Research and Teaching Assistants must meet the GPA standard of 3.0 for employment purposes. Students admitted with undergraduate deficiencies must complete all required undergraduate courses, with a letter grade of B or better, during the first year of study.

Laboratory Rotations ----- All entering graduate students in BMSE Doctoral program who are supported wholly or in part by institutional funds (including University fellowships, teaching assistantships, traineeships, etc.) are expected to complete laboratory rotations during the Winter and Spring quarters of their first year of study (option of 2 - 10 week or 3 - 6 week). Rotations through laboratories in different departments are strongly encouraged. Laboratory rotations serve two purposes: 1) students learn first-hand about research efforts in diverse disciplines, thus broadening a student's research perspective; and 2) they allow students and mentors to "match up" so a research advisor may be selected.

Laboratory rotations consists of units of BMSE 592 under the instruction of the appropriate faculty member:

- One 10-week rotation corresponds to 3 units of BMSE 592
- One 6-week rotation corresponds to 2 units of BMSE 592

This translates into a minimum commitment of 15---20 hours per week in the research laboratory. Grades will be assigned according to the Satisfactory --- Unsatisfactory (S/U) grading system, on the basis of a laboratory meeting presentation or a written summary of the student's laboratory experience, at the faculty member's discretion, and a summary of the student's laboratory performance, written by the faculty member, may be placed in the student's permanent academic file. Additionally, the BMSE program requires all rotating graduate students to give ~ 10 min presentation at the end of each quarter on their rotation experience.

Incoming students are expected to submit to the Staff Graduate Advisor their laboratory preferences in the form of a rank---ordered list of three or four names. These lists should be submitted prior to fall quarter and as each quarter comes to an end, the next rotation should be confirmed or adjusted by the student with consultation from both the faculty and staff Graduate Advisor. Final placement each quarter is coordinated between the student, faculty member, and Staff Graduate Advisor.

During the first year of graduate study and during laboratory rotations, first year Ph.D. students should initiate discussions with prospective faculty mentors about joining their research groups for their dissertation research. All students are normally expected to decide on their doctoral research mentor by the end of spring quarter of their first year, although additional rotations are not precluded if deemed academically necessary by the Faculty Graduate Advisor. Early assignment to a faculty lab by spring quarter of the first year is also possible if a summer rotation is performed prior to the fall quarter of the first year.

It should be understood that the relationship between student and faculty advisor must be established by mutual consent and only after thoughtful consideration of the possibilities for research in an area of interest to the student. It is also understood that even a 'commitment' may be tentative and may be broken if experience does not sufficiently match the expectations of the student, or of the faculty member.

DOCTORAL PROGRAM

- **YEAR ONE**

- Lab rotations (a total of 6 units; BMSE 592)
- iQB2 course: BMSE 210 (4 units) & BMSE 224 (4 units). Grade of B or better.
- BMSE core lecture courses 15 units total; 10 units (BCMB/BIOPHENG) & 5 units (other emphasis). Grade of B or better for all core courses.
- Two seminar courses: outside seminar speaker (BMSE 265; 1 unit every QTR until advanced; min 6 units) and Friday Noon Seminars (BMSE 262; 1 unit every QTR, min 15 units)
- TA Orientation/Techniques courses (MCDB 500 & 502 or equivalent)
- Decide on a dissertation advisor/laboratory by end of Spring Quarter
- Non-CA residents are expected to CHANGE THEIR RESIDENCY STATUS to CA before classes start in Fall quarter—this needs to be submitted ASAP upon arrival in California
- TA Requirement (2 quarters to be completed by end of program)

- **YEAR TWO**

- Finish any required coursework
- Enrollment in seminar courses; BMSE 262 (1 unit every QTR) & BMSE 265 (1 unit every QTR)
- Form Dissertation Committee
- Take the Qualifying Exam to advance to candidacy (End of 2nd year – spring or summer)

- Submit dissertation proposal to committee, followed by a formal meeting with the Dissertation Committee to present the proposal.
- Advancement to candidacy upon positive evaluation by Dissertation Committee and satisfactory completion of all required coursework.
- **YEAR THREE**
 - Continue enrollment in BMSE 262 (1 unit every QTR, min 15 units); FNS presentation (advanced students)
 - Meet with dissertation committee at least once per year to evaluate progress and submit short report to Graduate Program Assistant regarding the meeting.
 - Research units (BMSE 595 or 596)
- **SUBSEQUENT YEARS**
 - Continue enrollment in BMSE 262 seminar course (1 unit every QTR, min 15 units); FNS presentation.
 - If necessary, complete 2 quarter teaching requirement.
 - Continue meeting with dissertation committee at least once per year to evaluate progress:
 - Submit short report to Graduate Program Assistant regarding the meeting.
 - The committee must convene and approve the final research plan (typically 3-12 months) before defense of the dissertation.
- **COMPLETION OF DOCTORAL DEGREE**
 - Confirm all course work and teaching requirements for PhD degree are met.
 - Prepare and file doctoral dissertation; enroll in BMSE 599 (instead of BMSE 596).
 - Present the final defense seminar.

LANGUAGE REQUIREMENTS: ENGLISH AS A SECOND LANGUAGE (ESL)

All Ph.D. students are expected to demonstrate proficiency with English in all written examinations. The Biomolecular Science & Engineering Ph.D. program has no foreign language requirement.

Students whose native language is not English are required, as a matter of University policy, to complete a placement examination and courses in the "English as a Second Language" (ESL) program until they earn an exemption from further ESL course attendance. Special proficiency in English must be documented, by appropriate test, before students with a native language other than English may be assigned teaching assistantships. The Staff Graduate Advisor should be contacted for further details.

PH.D. QUALIFYING EXAMINATION

Ph.D. students must complete the qualifying examination consisting of a written research proposition followed by an oral defense of the proposition. The examination, also known as the advancement to Ph.D. candidacy exam, may be taken at any time after the first full year of study and after all core course work has been completed. It should normally be completed before the end of the Spring term of the second year. Formal advancement to Candidacy for the Ph.D. degree depends on the completion of all degree requirements (including courses and examinations) except the dissertation

Nature of Proposition -- The proposition must be focused on the student's own dissertation project. It should raise original questions of significance and provide experimental/computational approaches to addressing the questions. The amount of work implied by the proposition should not exceed the scope of a typical doctoral research effort (roughly equivalent to a 3-4 year grant proposal). The proposition should contain a working hypothesis or model along with a critical consideration of alternative hypotheses or models. As a rule, a proposition will not be acceptable if it addresses a problem involving one experimental system (e.g. a given species) that has already been solved in another system (e.g. another species).

The topic of the proposition can be developed in consultation with the PI. However, the detailed experiments and all the writing must be original to the student. It is appropriate to present preliminary data obtained by the student (computational or experimental) in the written proposal, as well as at the oral examination. In addition, the student should clearly identify any related projects in the laboratory that may be already in progress, and distinguish their own proposal as substantially independent from these.

Proposition Format and Content -- The written version of the proposition must consist of a title page and the five sections described below. The proposition must be typewritten in 12-point Times font with 1 inch margins and 1.5 line spacing. The abstract and the bibliography may be

single-spaced. PowerPoint presentations are not allowed. Exceptions may be made for research involving data sets that are too complex to explain/illustrate in a chalk talk format. Exceptions must be approved by the student's committee chair.

Section 1 -- *Title Page and Abstract*: The abstract should be a concise summary of the proposal and may not exceed one page. It should describe the objectives of the proposed work, the experimental approach, and the significance of the project within the context of the field. The abstract should be preceded by a title page including a descriptive title, an identification of the student, the primary affiliated laboratory, and all individuals serving on the student's thesis committee with appropriate titles.

Section 2 -- *Introduction/Significance*: This section, as a rule, should not exceed five pages. It should include the overall objective of the proposed research, a concise description of the research problem, a description of the most significant previous work, the current status of relevant research, and the rationale behind the proposed approach. All statements must be documented with references.

Section 3 -- *Specific Aims*: This section may not exceed one page. The specific aims of the proposed research should be listed and described. (Each specific aim should be amenable to a one or two sentence description.)

Section 4 -- *Experimental approach*: This section, as a rule, should not exceed eight pages. The details of the research plan should be laid out, including a description of the types of proposed experiments, their purpose and the underlying techniques and methods to be used. The principal experiments should be described in the sequence in which they might be carried out. (A flow chart can be helpful in this regard; also, the use of appropriate figures ----- e.g. the schematic representation of a plasmid construct, or a protein's domain structure ----- is encouraged.) It should be indicated how data will be analyzed to provide answers to the specific aims outlined earlier. It should also be indicated how the possible results obtained in given experiments will be interpreted to permit unambiguous decisions regarding alternative hypotheses or models that are being examined. Control experiments, possible difficulties and alternative approaches should be discussed. Excessive experimental detail (on the order of buffer composition, gel preparation procedures, antibody production, etc.) should be avoided, but the student should be prepared to discuss technical details during the oral defense of the proposition. Any preliminary data obtained by the student should be presented in this section as well.

Section 5 -- *Bibliography*: A complete bibliography is required. Each reference must contain the title of the paper and inclusive page numbers.

Consultation During Preparation of Proposition -- There are certain constraints on the student's freedom to consult or otherwise enlist the aid of others in the course of the preparation of a proposition. Students may consult with the Faculty Graduate Advisor, or with any faculty member, postdoctoral fellow or other graduate student regarding the general format of the

proposal, or the examination procedure. However, the written proposal, even early drafts, may not be circulated to anyone – including the sponsoring faculty member in whose lab the student is working --- prior to its submission. However, after the proposition has been submitted a student may enlist the help of a group of graduate students or postdoctoral fellows, but not faculty, to give a 'mock exam' to aid the student's preparation for the oral defense.

Ph.D. and Examination Committee --The student, after consultation with his/her primary thesis advisor, should propose a dissertation committee (two or three ladder faculty drawn from all UCSB faculty, not necessarily limited to BMSE faculty), and these names should be submitted to the Faculty Graduate Advisor for approval. It is encouraged that the proposed committee members will have the expertise with the candidate's research topic, able to provide critical evaluation, insight and advice into the thesis research work. A brief abstract of the dissertation/written exam should also be submitted at the same time.

Once approved, the graduate student should then coordinate with his/her proposed committee members and decide an oral exam time. The thesis faculty mentor along with this committee will be permanent, and together will serve as the candidate's Ph.D. thesis committee. They are viewed as the thesis Chair and consultants, respectively, and will constitute mandatory annual progress meetings after advancement to candidacy.

For the candidacy exam, the Faculty Graduate Advisor will appoint an additional BMSE faculty member to serve as Chair of the Exam Committee. The Exam Chair supplants the Thesis Chair for the dissertation exam. After successful completion of the advanced to candidacy exam, the Thesis Chair (faculty mentor) returns to the committee replacing the Exam Chair. Graduate Division policy states that a doctoral committee must contain at least three UC ladder faculty members and at least two must be from the student's major program of study (BMSE, in this case).

Submission of Proposition -- Both a hard copy and electronic copy (MS Word format) of the Abstract page of the written proposal is submitted to the BMSE Staff Graduate Advisor and to the Faculty Graduate Advisor. After consultation with the primary faculty advisor, the student is then informed that the process of detailed proposal writing may begin; alternatively, the student may be required to modify the proposal and to resubmit a revised Abstract. After the Abstract is approved, the student should plan on delivering a completed proposal within 6---8 weeks. One hard copy of the completed proposal is submitted to the BMSE Staff Graduate Advisor, and electronic copies (MS Word format) are submitted to both the BMSE Staff Graduate Advisor and the Faculty Graduate Advisor. The BMSE Staff Graduate Advisor then circulates electronic copies to the entire Examination Committee. Within two weeks, the student will be notified as to whether the written proposal is satisfactory. If the proposal is unsatisfactory, the Chair of the Examination Committee will provide a report in writing to the student, identifying deficiencies for correction and identifying a timeframe for resubmission. After a satisfactory written proposal is approved, the BMSE Staff Graduate Advisor will organize a time and place for the examination.

Oral Defense of Proposition -- The student is expected to have a solid intellectual understanding of the proposition. The background should be understood fully: the student should know who the major contributors have been and should be able to critically evaluate their contributions. The student should also be able to discuss the significance of the proposal and will be expected to defend the rationale for the proposed experimental approach. The student will also be expected to draw on other, relevant areas of knowledge. Precedents for the approach, and the conceptual and theoretical basis for all proposed techniques should be understood. The student must also be able to demonstrate a thorough understanding of the basic knowledge relevant to the proposed research. While the defense of the proposition is expected to be conducted with emphasis on the proposal itself, students should also expect questions regarding basic biochemical, biophysical, bioengineering, or molecular biological principles in areas relevant to their proposal. Examination committees will assume that the student's preparedness in the broad field of biochemistry and molecular biology will be commensurate with the successful completion of relevant course requirements. The oral examinations are 2-3 hours in length.

Evaluation of the Proposition Examination -- Immediately after the examination the examining committee will review the student's examination performance. The student's research advisor will then join the meeting of the examination committee in order to participate in the final decision regarding the outcome of the examination (the research advisor serving as a consultant) and the possibility for admission to candidacy (the research advisor then serving as the chair of the student's Dissertation Committee). After consultation with the research advisor the final decision regarding the outcome (Pass, Conditional Pass, or Fail) of the examination will be made solely by the examination committee. In the case of a Conditional Pass, the committee may specify that the student rewrite all or part of the proposition, or it may specify that additional courses be taken. All such imposed requirements must be completed to the satisfaction of the examination committee prior to the advancement of the student to candidacy. A written report summarizing the outcome of the examination and any advice from the committee will be provided to the student by the examination committee chair within one week of the examination. In the case of a passing examination, the examination committee will complete and sign the form recommending admission to candidacy. If any special requirements were imposed by the examination committee, the recommendation for admission to candidacy will not be completed until such requirements have been met. (Advancement to candidacy requires payment of a fee but has a number of advantages including remission of some of a student's educational fees and eligibility for student travel awards from the Academic Senate).

Repeat examinations. The Faculty Graduate Advisor will appoint examination committees for students who are required to repeat the proposition examination, in consultation with the primary faculty advisor. Such committees may be identical to the first examination committee or, alternatively, may include the substitution of one or (rarely) two faculty members from the first examination committee with other faculty. Repeat propositions must be submitted by a deadline that is set by the original examination committee. Repeat propositions may consist of a rewritten proposal only, a repeat of the oral examination only, or both. In addition, after either the first or a repeated oral examination, the examination committee may require the student to

enroll in remedial coursework and/or to serve as teaching assistant for certain classes, if in their judgment the student is deficient in one or more areas in which it appears that greater expertise will be required for successful completion of the dissertation.

A repeat examination is a matter of right for the student, unless the student's progress in the laboratory, in course work, or in the remediation of deficiencies, is grossly unsatisfactory. If the repeat examination is unsatisfactory, the committee may recommend to the BMSE faculty that the student be dismissed from the Ph.D. program. Dismissal from the Ph.D. program is normally accompanied by a written appraisal of the remaining work, if any, that is required for the student to earn a terminal M.S. degree.

Delayed Examinations. - Students may petition to defer the proposition examination by up to a maximum of one year if 1) upon admission to the program, they were required to complete more than four credit units to rectify deficiencies in their undergraduate preparation; 2) they entered the program during the winter or spring quarters; 3) they were admitted as students whose native language is not English and could not meet the English language proficiency standards of the Graduate Division upon entrance; or 4) the student failed to obtain 15 units of coursework with a grade of B or better. All course or English language deficiencies must be removed, as a rule, during the first year of study.

Students wishing to defer their examination must notify the BMSE Staff Graduate Advisor by the abstract deadline. Problems of an exceptional nature regarding the timing of examinations must immediately be brought to the attention of the Faculty Graduate Advisor.

PERIODIC EVALUATION OF STUDENT PROGRESS AND STATUS

The performance of all graduate students will be reviewed and evaluated at least once each year by the Graduate Committee. The performance of first--year students will also be reviewed by the Faculty Graduate Advisor, and also by the Graduate Committee in apparently problematic cases, at the end of the first year. These reviews and evaluations will focus, as applicable, on the student's 1) progress and ability in the laboratory, 2) progress and performance in courses, 3) progress toward the remedy of course and language deficiencies, and 4) performance on the Ph.D. proposition examination.

The Faculty Graduate Advisor will, as necessary, advise students upon completion of their first year regarding their performance. Advice to other students will be given, as appropriate, on the student's progression toward the Ph.D. degree after review by the appropriate program faculty. Such advice may include particular recommendations, notice of specific requirements as a consequence of certain deficiencies, or dismissal from the program. However, no recommendation will be made to the Graduate Division that a student be dismissed from the program without the endorsement of the appropriate program faculty.

COMPLETION OF THE DOCTORAL DISSERTATION

Committee members may be consulted at any time during the research phase of the student's graduate study, at the discretion of the student, or the Committee chair. Also, Committee members may inquire on their own initiative into the student's progress. An annual meeting of the student with the Dissertation Committee is encouraged.

A principal function of the Dissertation Committee is to critically read and ultimately approve the dissertation or thesis. Typically, a 'clean' dissertation or thesis draft which has already received the mentor's approval is submitted to members of the committee whose critical review may aid the student in the completion of the final product. It is the student's responsibility to ascertain that committee members will be available for reading the dissertation or thesis in a timely fashion. Committee members must be given a reasonable amount of time (at least two weeks) for the completion of this task. Students must advise the appropriate Staff Graduate Advisor and all members of their committees of their intent to file a dissertation or a thesis by the end of the second week of the quarter in which they intend to file.

All Ph.D. candidates must also give a final oral defense of the dissertation after the written dissertation has been completed and submitted. At the discretion and mutual consent of student and mentor, this defense may be waived, and a formally announced seminar presented instead. This waiver requires the formal consent of the student's Dissertation Committee, affirmed on a special Graduate Division form, which can be obtained from the Staff Graduate Advisor. It is the student's responsibility to make the necessary arrangements for the seminar presentation, with the assistance of the Staff Graduate Advisor.

PETITIONS

As a rule, students may petition for leaves of absence, inter-program transfers, or regarding certain degree requirements. In most cases, petitions must be made on special forms to be obtained from the Graduate Division. If a student is formally associated with a research advisor, this advisor must signify approval of any petition by initialing it. Finally, petitions must be signed by the BMSE Faculty Graduate Advisor prior to submission to the Graduate Division for action.

Leaves of Absence -- All students are expected to be 'continuously registered' unless the Dean of the Graduate Division approves a leave 'under special circumstances'. Special limitations apply to students who are not U.S. citizens: they may not apply for a leave of absence unless all of their course and residency requirements have been met or, in case of students in Ph.D. programs, unless they have been advanced to candidacy.

Ph.D. and Examination Committee -- The student, after consultation with his/her primary thesis advisor, should propose a dissertation committee (two or three ladder faculty drawn from all

UCSB faculty, not necessarily limited to BMSE faculty), and these names should be submitted to the Faculty Graduate Advisor for approval. It is encouraged that the proposed committee members will have the expertise with the candidate's research topic, able to provide critical evaluation, insight and advice into the thesis research work. A brief abstract of the dissertation/written exam should also be submitted at the same time.

Transfers Between Graduate Programs -- Students may petition for transfer between the BMSE and the Ph.D. programs of the component Departments. Petitions of this nature should be made with justification and be supported in writing by at least one faculty member familiar with the student's academic performance and laboratory progress, if applicable. Students contemplating such transfers should first seek information regarding the procedure from the Staff Graduate Advisor, and regarding the academic implications from the Faculty Graduate Advisor. In all cases, the student's petition should contain a concise justification for the transfer. The Graduate Committee will act on the petition, and such petitions will be evaluated in terms of the same criteria and by the same procedures, which apply to original admissions to the program into which the student seeks entry. If it is approved, the student should consult the Faculty Graduate Advisor without delay regarding program requirements. If the Committee is inclined to deny the petition, it will consult with any faculty members who support the petition and may consult also with the appropriate program faculty body before making its final decision.

FINANCIAL SUPPORT

Every effort is made to provide financial support to students in good academic standing who are progressing normally in the BMSE graduate program. In the allocation of financial aid, students in good standing in the Ph.D. programs are given preference. It is the student's responsibility to observe application deadlines and requirements scrupulously. Students are urged to stay informed regarding opportunities for financial aid. Eligible first year students are encouraged to apply for extramural pre---doctoral fellowships from the National Science Foundation, the American Cancer Society, and the Howard Hughes Medical Institute. Many additional fellowship opportunities exist for members of underrepresented groups, women, and others. The Office of the Graduate Division should be considered as the primary information source

<http://www.graddiv.ucsb.edu/financial>. As a public institution a large share of UC fellowship funds are provided through financial aid monies and each fellowship recipient is required to file the Free Application for Federal Student Aid (FAFSA). Any student hoping for fellowship support should file this form each year. It is available on the Internet:

<http://www.ed.gov/offices/OPE/Students>.

University Scholarships or Fellowships are usually awarded in conjunction with admission to a Ph.D. program. Recommendations for such awards are made by the appropriate

Admissions Committees. Very limited funds may be available for continuing students who have advanced to candidacy.

Fellowships are awarded on the basis of excellence in conjunction with admission to the Ph.D. program. However, in exceptional cases of funding emergencies, some awards may be made to continuing students in response to an application by a student, supported by the student's research advisor.

Funding to cover Non-Resident Tuition is typically awarded in conjunction with admission to the Ph.D. program or later if the student, because of non-U.S. citizenship, is not able to establish California residency after a year of graduate study. It is the responsibility of first year out-of-state domestic students to establish California residency before their second year of study. As a matter of University policy, students appointed to Research Assistantships receive payment of their fees and tuition by the extramural grant, which supports their Research Assistantship.

Research Assistantships are expected to provide the principal support of Ph.D. students, particularly after their first graduate year. Students should discuss such support as a Graduate Student Researcher (GSR) directly with their research mentor.

Teaching Assistantships at UCSB are allocated through academic departments. Teaching Assistantships for BMSE students are typically provided by the MCDB Department. TAs are awarded, upon proper application, to students by the MCDB Vice Chair after consultation with the MCDB Graduate Committee and the MCDB Curriculum Committee. BMSE students may also serve as TAs in courses offered by other Departments as appropriate. During the Spring quarter, students should consult with their mentors about their needs for TA support in the coming year. Students whose research advisors are members of departments other than MCDB should seek the advice of their research mentor regarding Teaching Assistantship assignments in their home department.

Graduate Student Association: All UCSB graduate students are automatically members of The UCSB Graduate Students Association (GSA). Your GSA is made up of the graduate student elected Executive Council, General Council, and the general graduate student body. The GSA lounge is located in UCen#2502 (gsa@gsa.ucsb.edu). Visit the GSA website at: <http://www.gsa.ucsb.edu>

The graduate students of BMSE and the graduate students of MCDB have formed the Graduate Union of Molecular Biology Investigators (GUMBI). GUMBI was created to facilitate the discussion of graduate student issues, to communicate ideas and opinions to the faculty, to administer graduate student run programs such as the Friday Noon Seminar Series, and to encourage more interaction among graduate students. This organization elects graduate student representatives to graduate program faculty committees.

To address special needs or non-academic concerns visit: <http://www.sa.ucsb.edu/guide/> for a listing of campus offices and contact information