OVERVIEW

Established in 2006, the Graduate School of Biomedical Science and Engineering (GSBSE) is a cooperative program between the University of Maine (UM), the Jackson Laboratory (TJL), Maine Medical Center Research Institute (MMCRI), Mount Desert Island Biological Laboratory (MDIBL), University of New England College of Osteopathic Medicine (UNECOM), and the University of Southern Maine (USM). Building from the foundations of the UM Cooperative Ph.D. Program in Molecular Genetics and Cell Biology and a National Science Foundation Integrative Graduate Education and Research Traineeship (IGERT) in Functional Genomics, the GSBSE was formed in order to foster collaborative research among the consortium partners, to train students within the state of Maine for interdisciplinary research, and provide doctoral-level education in the biomedical sciences, including genomics, biophysics, bioengineering and nanotechnology, molecular and cell biology, neuroscience, toxicology, and the molecular mechanisms of disease.

The University of Maine serves as the administering unit of the GSBSE and the Ph.D. granting institution of the consortium. The students in the GSBSE Ph.D. program are University of Maine graduate students and will receive a Doctor of Philosophy in Biomedical Sciences, or a Doctor of Philosophy in Biomedical Engineering.

All incoming graduate students should be familiar with the requirements of the University of Maine Graduate School (http://www2.umaine.edu/graduate).

Please note: The requirements outlined in this document pertain to all GSBSE Ph.D. students and faculty. Although there may be guidelines or requirements specific to individual partner institutions, this document lists the minimum requirements for GSBSE. The requirements of the partner institutions must also be considered and honored when the student is carrying out her/his dissertation work at a partner institution.

ADMISSION

A strong applicant will have an undergraduate degree in the sciences, engineering, or related discipline, with an outstanding academic record and strong GRE scores. The general GRE examination is required for review by the GSBSE Admissions Committee. The subject examination is not required. Evaluation for admission will also consider the motivation and career goals of the applicant, in addition to research experience and the strength of recommendations. The application packet should include:

University of Maine Graduate School application (http://www2.umaine.edu/graduate)
Letter of interest, including motivation to pursue an advanced degree
GRE scores
TOEFL scores, if appropriate
Three letters of recommendation from professional or academic references
Official academic transcript
Any other relevant information that will aid in the evaluation of the applicant

Applications are accepted until January 1st for matriculation in the Fall semester of the same year. The application review process starts in early January. The Admissions Committee completes an initial review of all applicants to select candidates for telephone interviews for domestic students, and video conference interviews for international students. Finalists selected from the initial interviews are invited for on-site interviews for domestic students, or a second round of video conference interviews for international students. Notification of admission into the program occurs in the Spring.
FINANCIAL SUPPORT FOR GRADUATE STUDENTS
GSBSE Ph.D. students will be supported with a $23,000 stipend, tuition, fees and half of the cost of health insurance for the first 2 years of the program (during the rotations and first full year in the mentor's laboratory). At the beginning of the student's third academic year (usually September), the mentor will then be responsible for providing the student's complete stipend, tuition, fees, and half of the cost of health insurance. The level of stipend funding after the initial 2 years will be at the discretion of the institution/program. It should be noted that the student will only have to register for one thesis credit per semester after successfully completing the comprehensive examination.

ADVISING AND PLANNING FOR THE FIRST YEAR

Orientation for new graduate students will be scheduled the week before the start of the Fall semester. New students should plan to attend.

Once accepted into either the Ph.D. in Biomedical Science, or the Ph.D. in Biomedical Engineering program, and prior to the identification of a dissertation mentor, students will be advised by the First Year Advisory Committee (FYA). There is a FYA committee member at each partner institution, a listing of the committee composition may be found here link. Issues and questions relating to laboratory rotations and coursework should be discussed with a FYA committee member. The FYA faculty members will maintain a role as informal advisors and graduate student advocates, and will offer guidance throughout the student's program, as necessary.

Questions or issues regarding registration for classes should be directed to the GSBSE office.

By the time the student has completed three rotations she/he will have chosen a home laboratory and assembled a dissertation committee. The role of advising in the academic programs will then fall to the mentor.

PROGRAM OF STUDY -- YEARS 1 AND 2

Laboratory Rotations
Students desiring to perform dissertation work through GSBSE are required to complete three laboratory rotations, each lasting one academic semester or summer. A rotation abstract booklet will be available for rotating students three months before the start of their first semester in the program. GSBSE requires that at least two Institutions be represented in a student’s rotation experience. These rotations are chosen by the student with the goals of providing experiences in diverse research areas and environments, and in the identification of a dissertation mentor.

The typical rotation schedule for the academic calendar is:
First rotation: Fall
Second rotation: Spring
Third rotation: Summer

At the end of each laboratory rotation, the student will provide a summary of her/his research achievements in the laboratory and an evaluation of the experience. The Principal Investigator (PI) will evaluate the performance of the rotation student, and discuss this evaluation in detail with the student. Strengths and deficiencies will be noted; the PI may suggest coursework or study to correct any deficiencies that are identified. Both evaluations will be forwarded to the GSBSE office. The rotation evaluations will become a permanent part of the student’s file.
Course Requirements
There are three mandatory courses that all GSBSE Ph.D. students are required to complete. The first course is Introduction to Biomedical Science and Engineering (BMS 625). This course is comprised of a series of four modules that provide a framework for an introduction to research in the field of Biomedical Science and Engineering: Signal Transduction, Development, Stress and Genomics. The second course must pertain to Biocomputing or Biostatistics (e.g. BMS 543 Computational Genomics or AMS 597 Biostatistics). The last course must pertain to bioethics and scientific conduct (e.g. INT 601 Responsible Conduct of Research). Additional course requirements will be unique for each GSBSE student and will be tailored depending on their degree (Ph.D. in Biomedical Science, or Ph.D. in Biomedical Engineering). Coursework will be determined by their dissertation mentor and committee. At least twenty total credits of coursework must be performed, and a total of thirty credits completed overall (including thesis credits).

Choosing a Dissertation Mentor(s)
During the summer of the first year, the student is expected to identify a mentor from the three laboratory rotations, exceptions may be made with the Director's approval. The student will begin in the chosen laboratory at the beginning of the Fall semester of the second year. During the first six months in the mentor's laboratory a specific and focused dissertation topic should be identified and a thesis committee established.

The Dissertation Committee
Choosing the Dissertation Committee
A dissertation committee consists of a student's primary advisor and 4 other faculty members. At least one of the faculty members must be from a GSBSE partner institution that is different from the primary advisor's institution. The choice of a dissertation committee is critical, because the committee members will be the student's direct advisors and evaluators throughout the program. Once the committee is established and a student's dissertation project has been proposed, a committee meeting should take place. The goals of this committee meeting include 1) identifying remaining course requirements, 2) approving the dissertation proposal, and 3) establishing a time-frame and topic for the candidacy examinations. In preparation for this meeting, the student should prepare and distribute the Proposed Plan of Study (pdf), which includes graduate course work taken or anticipated, grades earned, and a description of the proposed dissertation topic. All committee members will sign off on the Proposed Plan of Study, if it is deemed acceptable. The Plan of Study must be submitted to the GSBSE office for approval by the Director, and subsequent filing with the Graduate School. Once a committee is established, any proposed changes in the research direction or plan of study must be discussed by the student at a convened committee meeting. The committee will then collectively grant approval of the new plan of study. The revised Plan of Study must be submitted to the GSBSE office for approval by the Director, and subsequent filing with the Graduate School. The committee will meet at least once a year (with an extra meeting for the comprehensive examination), or more frequently, as determined by mutual agreement of the student and his/her committee. After each committee meeting the advisor must submit an evaluation/update of the student's progress to the Director. This progress report should be shared with the student, and if needed, corrective action should be taken.

Committee Meetings
The purpose of the dissertation committee is to advise the student throughout the course of their research work, and to evaluate the student's progress and strategy. It is, therefore, important for the student to have regular committee meetings that will serve the purpose of reporting progress to each member of the committee. A committee must meet at least once every year, but may meet more frequently at the discretion of the committee members. It is the student's responsibility to prepare for the meeting by giving each committee member written materials at least one week before the meeting, and preparing a progress report that will be presented orally at the beginning of the meeting. The student should assemble an agenda for the meeting that includes the progress report, goals for the following year, and specific details and data pertaining to his/her work. The student should also plan to follow up on the meeting in a timely manner by providing additional materials,
updating timelines, goals, etc., as requested by the committee.

The student’s mentor will be responsible for reporting the progress of the student through a Dissertation Committee Summary (pdf) form after each committee meeting. The form is available here [link](#). The Committee Summary should be signed by every member of the committee (an email confirmation to the GSBSE office will suffice) and the evaluation should be shared with the GSBSE student. At that time, concerns or problems should be discussed with the student and a plan to address these problems or concerns should be stated in the form.

**COMPREHENSIVE EXAMINATIONS**

At the first committee meeting, the student and thesis committee should determine the time and topic of the Comprehensive Examination, which marks the formal entry into Ph.D. candidacy. The comprehensive examination must be completed no later than the end of the summer of the student’s second year in the program. The chair of the Comprehensive Examination should be identified at the initial committee meeting. The chair of the Comprehensive Examination committee may not be the dissertation mentor, but should be a member of the committee. The dissertation mentor shall serve on the Comprehensive Examination committee as a non-voting, ex-officio member. In advance of the first committee meeting the student should prepare and submit to the committee three separate, one paragraph proposals, which include specific goals, of potential comprehensive examination topics. The topics proposed cannot be the same as the topic of any document written by the student in a previous or current grant writing course, nor be the subject of any grant proposal prepared by the dissertation mentor. The topics must be separate from the dissertation topic, however the topics may be related to her/his dissertation project. The committee will discuss, provide feedback on, and approve a topic for the Comprehensive Examination. The examination will involve the preparation of a research proposal following the guidelines of an NIH postdoctoral fellowship proposal, or those of a modified NSF proposal, as appropriate for the topic selected. Detailed guidelines for each format may be found here [link](#). The student must independently prepare the written and oral Comprehensive Examination material without detailed input on writing or experimental design from the mentor or other faculty members. The research proposal will be presented and defended orally by the student to the members of the committee. Committee members will question the student about the proposal, as well as any related topics. All committee members must participate in the examination. The GSBSE Director’s office should be notified two weeks in advance of when a Comprehensive Examination is scheduled. If the student does not pass the examination, the committee will make recommendations and allow for one repeat of the examination. Failure to pass the Comprehensive Examination at the second attempt will lead to dismissal from the Ph.D. program. Once the examination is passed successfully, the student will become a candidate for the Ph.D. degree. Completion of the Comprehensive Examination must be reported to the Graduate School as well as the GSBSE office within one week using the Notification of Results of the Comprehensive Examinations form here [link](#). Committee members may require additional coursework, self-study, or impose other requirements based on the student’s performance in the Comprehensive Examination.

**DISSERTATION REQUIREMENTS AND DEFENSE**

Students are required to read the Thesis Guidelines from the University of Maine Graduate School describing the requirements for the written dissertation document, available here [link](#). During the last year of study, the student is responsible for convening a meeting to discuss the expected timeline of the final year of the dissertation work. This meeting should clearly outline the steps required to fulfill the requirements of the program, as well as the predicted timeline of work in the final year. Six months before the expected defense, the student will convene a pre-defense meeting. The details of the overall structure and content of the thesis, remaining experiments, publication status, and overall progress will be discussed and evaluated. The outcome of this meeting will determine if the student will be ready for graduation within the 6 month timeframe. This is a critical meeting that will ensure that the student will be properly prepared when the defense examination is administered. The written dissertation must be submitted to the dissertation mentor at least 6 weeks before the proposed defense date. The mentor should read through the document and give approval for the
defense to proceed. Approval should be based on the quality of the written product, the comprehensive scope of the document, and the student’s ability to present and defend the dissertation. The committee should receive the dissertation for comment at least 2 weeks prior to the oral defense date, but this timeline is at the discretion of the committee and may be modified.

At this point, the written document should be in its final form and should include all corrections and revisions based on comments from the dissertation mentor. Further major experimentation should not be required beyond this time, and it is expected that minor revisions to the written dissertation will occur based on committee feedback. The Thesis Guidelines document from the Graduate School provides strict guidelines for the formatting of the written dissertation. The oral defense consists of an open seminar, followed by a closed session with the student and the committee. Both the dissertation and the oral presentation must be satisfactory and comply with the committee’s requirements. If either the oral presentation or the written document is not of satisfactory quality, the student will not pass the final examination for the Doctorate degree. Documentation of the completion of the oral and written portions of the thesis must be submitted to the Graduate School and GSBSE using the form available here link.

**Please note:** The [Tentative Thesis Acceptance form (pdf)](https://example.com/tentative-thesis-acceptance-form) must be signed by the mentor and committee members 24 hours or more before the dissertation defense.

**STUDENTS WITH DISABILITIES**

If you have a disability for which you may be requesting an accommodation, please contact the Director of Disabilities Services, 121 East Annex, 581-2319, as early as possible.

**OTHER REQUIREMENTS FOR GSBSE STUDENTS**

**Publications**

Students are expected to publish their work in high quality, peer-reviewed journals, in addition to submitting a written dissertation. Publication of at least one first-author paper in a peer-reviewed journal is required for graduation. A copy of a given student's first, first-author peer-reviewed paper should be submitted to the GSBSE office upon publication.

**Presentation of Research**

During the course of the program, students will be expected to submit abstracts for presentation at scientific meetings.

**Please note:** The GSBSE program must be acknowledged in all publications and presentations as the student’s affiliation.

**Attendance at the GSBSE Annual Meeting**

GSBSE graduate students are required to attend the GSBSE Annual Meeting each year.

**Attendance at the Maine Biological and Medical Sciences Symposium**

GSBSE graduate students are also required to attend the Maine Biological and Medical Sciences Symposium (MBMSS) held annually at the Mt. Desert Island Biological Laboratory. GSBSE will provide travel support for students to attend this meeting.

**GSBSE STUDENT AFFILIATES**

Non-GSBSE graduate students who are performing research in biomedical science and engineering may be appointed as GSBSE Student Affiliates. Students should be nominated by a GSBSE Faculty member. The nomination packet should include a letter of recommendation from the faculty member, and a curriculum vitae of the student. The GSBSE Director shall review nominations and approve as appropriate. The Director may refer cases to the Steering Committee as appropriate. GSBSE Student Affiliates may participate in GSBSE annual and other scientific meetings. GSBSE
Student Affiliates may present posters, though not typically deliver oral presentations at GSBSE meetings.

**REQUIREMENTS FOR GSBSE FACULTY**

Faculty may apply for GSBSE faculty status by submitting a Record of Qualification (ROQ) to the GSBSE office. The form may be obtained through the GSBSE office or at this [link](#). A faculty member will be considered for either Associate Faculty or Full Faculty status. An Associate member will be able to participate on graduate committees, but may not be a dissertation mentor for a GSBSE student. A Full Faculty member will be able to mentor a Ph.D. student and participate on graduate committees.

In addition to requirements regarding holding a doctoral degree, having an active scholarly record, and having an independent laboratory with a current or recent funding record (or for junior faculty be actively seeking funding), requirements exist regarding the level of activity of Faculty members in service to the GSBSE. Specifically, in order to hold Full Graduate Faculty status a GSBSE Faculty Member must:

1) Participate in GSBSE teaching and/or GSBSE administrative committees, and

2) Regularly attend the GSBSE Annual and Faculty Meetings

Faculty status is reviewed every 5 years. If a Full Faculty member has not met the requirements during the past 5 years she/he will be moved to Associate Faculty status.

**APPENDIX 1 GSBSE COMMITTEE MEMBERS AND CONTACT INFORMATION**

**APPENDIX 2 GSBSE GRADUATE STUDENT CHECKLIST**

**APPENDIX 3 GSBSE FACULTY CHECKLIST**