GRADUATE HANDBOOK: PHD PROGRAMS

Department of Bioengineering

2026-2027 Academic Year

Northeastern University

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1. General Information

Welcome to the Department of Bioengineering ("BioE") at Northeastern University!

This document provides information for current and prospective students about PhD programs in the Department of Bioengineering, College of Engineering, Northeastern University. Doctoral students are expected to read this document, be familiar with the rules and procedures, follow them, and refer to this guide when they have questions.

Please reach out to relevant department faculty or staff with any questions, comments or concerns, following these steps:

1. **Review guidance in this handbook, including FAQs**
2. **Review the BioE Graduate SharePoint Site**
3. **Reach out to the relevant contact listed in section 1.4.**

New students: visit the New Student Information Page.

You may also e-mail listen2bioestudents@coe.neu.edu with program feedback. For further support on course registration, student records, academic standing, graduation or other general queries, reach out to coe-bioe-gradadvising@northeastern.edu.

1.1 Graduate Programs and Degrees

The BioE Department offers two main graduate programs, a Master of Science (MS) in Bioengineering and Doctor of Philosophy (PhD) in Bioengineering. MS and PhD degree programs are only offered as full-time programs (for guidelines regarding Industry PhD, please see Appendix G). Qualified applicants with a BS or MS degree in bioengineering or related fields can apply to our graduate programs. Policies and curriculum for PhD Advanced Entry are outlined in section 2.2.2.

Students should refer to their Degree Audit via the Student Hub for tracking their degree requirements and progress through their program.

1.2 Department Safety Training

All PhD and MS students who plan to perform laboratory research are required to complete the basic Department of Bioengineering laboratory safety training program, in addition to any lab-specific safety training. To avoid delays in performing research, new students are strongly advised to complete this training in the first month following matriculation. The list of required online and in-class courses is provided in **Appendix A** of this handbook.

For more information, please contact the Bioengineering Lab Operations and Safety Manager.

1.3 Forms for Graduate Studies

Bioengineering PhD Forms: Please use this link to access the following departmental forms: *PhD Advisor Declaration Form, PhD Lab. Rotation Form, Dissertation Committee and Proposal Defense Form,* and the *Directed Study Project Plan Form*.

These forms can also be found in the Appendices of this handbook. These forms should be filled out and e-mailed to the individuals listed on the form for signing, or via Adobe E-sign. Note that Directed Study and MS Project and Thesis sections require departmental approval, and sections are created after forms are approved and signed.

Graduate Student Services Forms: Please use this link for all Graduate School of Engineering Forms, including *course petition forms, registration override forms, credit transfer forms, and academic probation forms*. Once all information is completed and the form is initiated, these forms are auto signed through Adobe Sign.
Please ensure you list the correct Program Contact on your forms. The Graduate School of Engineering/Academic Advisor contact should be listed as coe-gradadvising@northeastern.edu.

- **Standard Petition Forms are used for requests to:** change from full-time to part-time, waiving and replacing a core course, taking a course outside of the pre-approved curriculum, increasing maximum semester hours. Please detail the reason for your request, helpful context, and attach your transcripts.
- **Registration Override Forms are used to request removal of restrictions on a course section,** such as 'signature required', 'student attribute' or 'college restriction'. When submitting the form, make sure to select and all restrictions that you see on the registration portal so program contacts and advisors can review and respond accordingly.
- **To request overriding a pre-requisite course,** you must provide evidence of equivalent knowledge, for example, from another equivalent course and provide relevant documentation attached to the form. We recommend e-mailing your program contact and the instructor of the course alongside form submission to provide ample information.

1.4 Graduate Student Support and Resources

The Bioengineering Department is committed to fostering a welcoming and supportive community. In addition to the wellbeing resources and support offered by the Graduate School of Engineering, students are encouraged to reach out to a department representative with any questions or concerns for support and advice. We encourage students to reach out as and when issues arise, as often problems are much easier to solve early on.

Guidance is provided below on which personnel to contact for specific items.

Departmental first point of contact:

- Assistant Director of Academic Programs - Caroline Pridmore

Additional contacts:
MS Program Contact: Qianqian Fang
PhD Program Contact: Chiara Bellini
Graduate Student Council

- President – Justin Cross; Vice President – Hedieh Karimitar
- Faculty Advisor - Miten Jain

Department staff:

- Director of Operations and Business Management - Esther Cohen
- Lab Operations and Safety Manager – Jeremy Marshall
- Purchasing Specialist – Sarah Cohan
- Events and Engagement Specialist – Sofia Baah
- Senior Lab Technician – Noah Joseph
- Senior Instructional Lab Coordinator – Saige McGinnis
- Administrative and Project Assistant – Tammi Ko

Who to contact:

For...	*email...*
PhD curriculum questions, qualifying exams, WIPs, defense and other milestones, advisor conflict/resolution	Caroline Pridmore, Chiara Bellini
TA inquiries, travel awards, funding questions	Esther Cohen
Conference room or classroom bookings, social media, website updates	Tammi Ko
Poster printing, BCC access, 3D printers, design/fabrication questions	Noah Joseph
Lab orders/purchasing, packages, shipping	Sarah Cohan
Lab concerns/equipment issues, lab access	Jeremy Marshall, Saige McGinnis

1.5 Frequently Asked Questions

See Appendix H for a list of helpful Frequently Asked Questions.

2. Bioengineering PhD Program

2.1 Overview and Research Areas

Students pursuing a PhD degree through the Department of Bioengineering are expected to complete required coursework (**Section 2.2**) and perform cutting-edge research (**Section 2.3**) under the guidance of a primary advisor, and sometimes additional co-advisors, identified from our core and affiliated faculty.

The Department features the research areas as listed below. Students should consult the Bioengineering Research Map for more information about BioE faculty conducting research in these areas.

PhD Bioengineering, Boston Campus

PhD Research Area 1: Biomedical Devices and Bioimaging (BDBI)

The Biomedical Devices and Bioimaging track reflects Northeastern University's outstanding research profile in developing transformative and translational instrumentation and algorithms to help understand biological processes and disease. Our department has active federally funded research spanning across a broad spectrum of relevant areas in instrument design, contrast agent development, advanced computational modeling and reconstruction methods. Example research centers include the Institute for the Chemical Imaging of Living Systems (CILS), the Translational Biophotonics (TBP) Cluster, and the B-SPIRAL signal processing group

PhD Research Area 2: Biomechanics and Mechanobiology (BBMB)

Motion, deformation, and flow of biological systems in response to applied loads elicit biological responses at the molecular and cellular levels that support the physiological functions of tissues and organs and drive their adaptation and remodeling. To study these complex interactions, principles of solid, fluid, and transport mechanics must be combined with measures of biological functions. The Biomechanics & Mechanobiology track embraces this approach and leverages the strong expertise of Northeastern faculty attempting to tie applied loads to biological responses at multiple length and time scales.

PhD Research Area 3: Molecular, Cell, and Tissue Engineering (MCTE)

Principles for engineering living cells and tissues are essential to address many of the most significant biomedical challenges facing our society today. These application areas include engineering biomaterials to coax and enable stem cells to form functional tissue or to heal damaged tissue; designing vehicles for delivering genes and therapeutics to reach specific target cells to treat a disease; and uncovering therapeutic strategies to curb pathological cell behaviors and tissue phenotypes. At a more fundamental level, the field is at the nascent stages of understanding how cells make decisions in complex microenvironments and how cells interact with each other and their surrounding environment to organize into complex three-dimensional tissues. Advances will require

combinations of multiscale experimental, computational and theoretical approaches spanning across molecular-cellular-tissue levels and integration of molecular and physical mechanisms, including the role of mechanical forces.

PhD Research Area 4: Systems, Synthetic, and Computational Bioengineering (SSCB)

Research groups in Systems, Synthetic, and Computational Bioengineering apply engineering principles to model and understand complex biological systems, including differentiation and development, pathogenesis and cancer, and learning and behavior. This involves designing and implementing methods for procuring quantitative and sometimes very large data sets, as well as developing theoretical models and computational tools for interpreting these data.
Deciphering the workings of a biological system allows us to identify potential biomarkers and drug targets, to develop protocols for personalized medicine, and more. In addition, we use the design principles of biological systems we discover to engineer and refine new synthetic biological systems for clinical, agricultural, environmental, and energy applications.

PhD Bioengineering, Portland Campus.

Artificial Intelligence (AI) in Translational Healthcare at the Roux Institute (AI-TH@Roux)

Translational Healthcare is a discipline of biomedical research that seeks to improve the health of individuals and communities by translating research findings into diagnostic tools, medicine, and other therapies. Artificial Intelligence (AI) in Translational Healthcare (AI-TH) uses methods of high-performance computing, data science and modeling to achieve these goals. AI-TH@Roux builds on core research strengths at the Roux Institute, in areas that include machine learning, dynamical systems modeling, biostatistics, human-computer and human-AI interactions, entrepreneurship, and business partnership with not-for-profit research institutions and companies. This research area collaborates closely with Bouvé College of Health Sciences to further enhance connection to clinical practices and policies, and with Khoury College of Computer Sciences to further strengthen students' computational literacy.

2.2 PhD Course Requirements

The following sections explain the course requirements for students entering the Bioengineering PhD program with a BS degree as well as students entering with an eligible Master of Science or Engineering degree ("Advanced Entry"). The normal course-load for PhD students is 8-9 semester hours (SH) per semester (roughly 2 regular courses). In addition to coursework, students must complete the qualifying, proposal, and PhD defense exam sequence described in detail in Section 2.3. All PhD students are expected to maintain regular research progress for timely completion of their PhD, verified by satisfactory reviews in their Annual Reviews).

Students are expected to regularly review their Degree Audit via the student hub to ensure compliance with and progress through their program curriculum.

A student must attain a cumulative grade-point average (GPA) of 3.0 or higher in all courses applied toward that degree and exclusive of any prerequisite courses required of students admitted

provisionally to their program. A student must also earn a grade of "C" or higher in all required core courses (courses must be retaken in the event of attainment below a "C").

2.2.1 Students Entering with BS Degrees

Students entering the Bioengineering PhD program with a BS will take a total of 8 courses (32 SH): three core bioengineering courses (12 SH), two restricted bioengineering technical electives (8 SH), and three unrestricted technical electives (12 SH).

Those courses choices are outlined below:

I. Required Core Courses (12 SH):

BIOE 6100 Medical Physiology

BIOE 6200 Mathematical Methods in Bioengineering

BIOE 7000 Principles of Bioengineering

II. Restricted Technical Electives (8 SH):

BIOE 5115 Dynamical Systems in Biological Engineering

BIOE 5235 Biomedical Imaging

BIOE 5410 Molecular Bioengineering

BIOE 5411 Applied Molecular Bioengineering

BIOE 5420 Cellular Engineering

BIOE 5430 Principles and Applications of Tissue Engineering

BIOE 5440 The Cell as a Machine

BIOE 5630 Physiological Fluid Mechanics

BIOE 5640 Computational Biomechanics

BIOE 5648 Biomedical Optics

BIOE 5660 Integrative Mechanobiology

BIOE 5710 Experimental Systems and Synthetic Bioengineering

BIOE 5720 Physical Bioengineering

BIOE 5750 Modeling and Inference in Bioengineering

BIOE 5810 Design of Biomedical Instrumentation

BIOE 5820 Biomaterials

ME 5665 Musculoskeletal Biomechanics

III. Unrestricted Technical Electives (12 SH) and Directed Study:

Any 3 courses on our master list of approved technical electives. This list can be found on the Course Catalog, and suggestions by research area are also included in **Appendix B**. Some unrestricted BIOE electives may be petitioned to count as a restricted elective.

Other courses may be taken by petition and with approval of PhD Advisor and PhD director, including up to 8 SH of Directed Study* (BIOE 7976).

Directed Study

Directed Study (BIOE 7976) requires department approval and a registration override form. It must be completed with a non-thesis/dissertation advisor faculty in different areas of research in our department. If a Directed Study is to be completed with the thesis advisor, it must be on a project distinctly separate from the thesis work. The number of credits and a course outline agreed upon between faculty and student must be submitted to and approved by the Department of Bioengineering Program Contact and Assistant Director of Academic Programs prior to enrolling. To request a directed study, please fill out the BIOE 7976 Directed Study Project Plan, following the steps outlined on the form.

IV. Professional Development Courses (0 SH):

Complete the following (repeatable) courses, 2 semesters each.

BIOE 7390 Seminar (enrolled in at least two semesters)
BIOE 7391 Student Seminar (2nd and 4th years when presenting)

V. Dissertation (0 SH):

Complete the following two courses:

BIOE 9990 Dissertation Term 1
BIOE 9991 Dissertation Term 2

After achieving PhD candidacy by passing the qualifying exam, the doctoral candidate, in consultation with his or her research advisor, must register in two consecutive semesters (may include full summer term) for Dissertation Term 1 (BIOE 9990) and Dissertation Term 2 (BIOE 9991). Upon completion of this sequence, the student must then register for Dissertation Continuation (BIOE 9996) in every semester they are receiving funding) until the dissertation is completed. Students may not register for Dissertation Continuation (BIOE 9996) until they fulfill the two-semester sequence of Dissertation Term 1 (BIOE 9990) and Dissertation Term 2 (BIOE 9991).

For PhD students who have completed the majority of their course work but not yet reached PhD candidacy, zero-credit course, Research (BIOE 9986) can be taken if needed to fulfill the full-time course registration requirement. These are) individual instruction coursed, billed at 1 SH, and graded S or U. These courses do not have any course content, and students must register in a section for which their research advisor is listed as the “instructor." If your instructor’ section does not exist, you will need to reach out to the department Assistant Director of Academic Programs to request for one to be created.

2.2.2 Advanced Entry Students

The curriculum for PhD students with advanced standing will be selected from the available core and elective courses under the guidance of the student's primary advisor, the Associate Chair for Graduate Studies (PhD Program Contact) and Assistant Director of Academic Programs. The advanced standing PhD degree requires a minimum of 16 semester hours (SH) of course work to

be approved by the graduate director and a completed PhD dissertation. Advanced standing constitutes receipt of a relevant and accepted Master of Science or Master of Engineering degree at a qualified institution. Examples of "relevant degrees" include MS or Meng degrees in various Engineering domains, including, but not limited to, Mechanical, Chemical, Biomedical, Electrical and Computer Engineering; examples of MS degrees that are not considered relevant include professional degrees or prior MS degrees in education, social sciences, arts, etc.

I. Required Courses (8 SH):

BIOE 7000	Principles of Bioengineering	(required for students Fall 2023 onwards)
BIOE 6200*	Mathematical Methods in Bioengineering	(required for students Fall 2023 onwards)

*Students may request to **waive** BIOE 6200 if they demonstrate sufficient graduate-level Math background and **replace it with another course**. In this case students should email the BioE PhD Program Contact and the BIOE 6200 course instructor, providing detail on suitable graduate-level mathematical background, and **undergraduate and graduate transcripts showing Math courses taken**. If approved, students will file a petition form to waive and replace this core course.

II. Electives (8 SH):

Advisor-approved coursework made up of a combination of the following:	8 SH
Electives listed on the Course Catalog/Appendix B Independent Study (BIOE 7978)	
Seminar (register and complete two semesters)	0 SH
Student Seminar (register and complete two semesters)	0 SH
Dissertation 1 and Dissertation 2 (in consecutive semesters)	0 SH
Minimum semester hours required	16 SH

The Master List of approved technical electives is included in Appendix B. A list of suggested courses by research area is also included. Electives for Advanced Entry students may be replaced with up to 12 SH of relevant independent studies courses - Directed Study (BIOE 7976) - by petition.

Directed Study

Directed Study (BIOE 7976) requires department approval and a registration override form. It must be completed with a non-thesis/dissertation advisor faculty in different areas of research in our department. If a Directed Study is to be completed with the thesis advisor, it must be on a project distinctly separate from the thesis work. The number of credits and a course outline agreed

upon between faculty and student must be submitted to and approved by the Department of Bioengineering Program Contact and Assistant Director of Academic Programs prior to enrolling. To request a directed study, please fill out the BIOE 7976 Directed Study Project Plan, following the steps outlined on the form.

2.2.3 Professional Development Course Requirements

The Bioengineering Department holds weekly PhD student work-in-progress (WIP) seminars to give students opportunities to present their research to the bioengineering community. Students are required to present twice throughout the PhD program. The recommended timing of these WIP presentations is to present once in the second year, and another in the fourth year, but may vary based on individual circumstance. Each presentation consists of a 20-minute seminar with 5 minutes for questions.

Students should enroll in "Student Seminar" (BIOE 7391) only in the semesters they are expected to present. The department will contact students to sign up for a WIP timeslot a few months before they are due to present. A grade of S or U will be assigned by the PhD Program Contact at the end of the semester.

Second year WIPs: Students present their research area and anticipated research directions.
Fourth year WIPs: Students present their dissertation work, completed and anticipated.

WIPs provide practice orally communicating research to an audience of **educated non-specialists.** This is an essential skill for anyone seeking a career in scientific research and beyond. Students present to a diverse group of peers from the bioengineering and Northeastern University community.

Students should take the opportunity to attend all seminars to develop familiarity with research outside of their own labs and to support peers. The COE Communications Lab provides additional support as well as personalized feedback for presenters.

2.2.4 MS Along the Way to PhD

Students enrolled in PhD Bioengineering programs may apply for a Master's Degree along the way to the PhD degree, in the event they have 32 SH of relevant science and engineering coursework. For the masters-in-passing, students should complete the COE Graduate Student Services form in the 'Change of Degree' section of the COE Graduate Forms page. This form should only be filled out by a PhD student in the semester they want to graduate with the MS; 32 SH is required.

Students must list a concentration for the MS Bioengineering degree, selecting the MS concentration that aligns most with the coursework they have completed, and follow submission instructions as outlined on the forms page.

Once the form is complete, the GSE advising team will work with the Registrar in order for a graduation application to be created for the student.

When applying, contact coe-phd-gradadvising@northeastern.edu with any questions or help with this process, and contact the BIOE Assistant Director of Academic Programs for any questions on eligibility of your coursework.

2.3 PhD Research Requirements

In addition to coursework (**Section 2.2**), completion of the PhD degree requires students to successfully complete all the research related requirements listed below. An example timeline for a PhD student is listed in **Section 2.4**

2.3.1 PhD Laboratory Rotation

All PhD students who are funded by Bioengineering Fellowship or Teaching Assistant (TA) at the time of entry into the program are required to complete a rotation in *two* department research laboratories. At least one of the two rotations must be performed in the laboratory of a core Bioengineering faculty member. Your **first rotation is required to be with a core Bioengineering faculty member.**

Students should make an appointment to speak with potential research advisors and confirm their willingness to advise and potentially provide financial support to a student via research assistantship (RA) following the rotation. Potential advisors may be found through the Department website, through the Bioengineering Research Map, through the Department Research Fair in September, and by meeting with the PhD Program Director or any member of the faculty Graduate Development Committee.

Students should complete the PhD Laboratory Rotation Form (**Appendix C**) and return it to the department Assistant Director of Academic Programs prior to each lab rotation.

The rotation timeline is as follows (for students with a September/Fall matriculation):

September:	Complete Department Safety Training (**Section 1.2**, **Appendix A**) and identify labs for rotation
October-December:	First Lab rotation
January-March:	Second Lab Rotation

2.3.2 Advisor declaration and performance probation policies

I. Finding and Declaring a Research Advisor

Completion of the research dissertation component of the PhD degree requires that a student selects and formally declares a research advisor. To do this, the PhD Research Advisor Declaration Form (**Appendix D**) is completed, signed by the student and the advisor, and filed with the Assistant Director of Academic Programs of the Bioengineering Department. The research advisor can be any tenured, tenure-track, research, or affiliated Bioengineering faculty. All PhD students must have a research advisor within one calendar year after their matriculation at NU; otherwise, their status changes to MS course-only track. If, after a change of status, these students can find a research advisor, their status will be reset to PhD.

Choosing a research advisor that is a mutually "good match" is perhaps one of the most important decisions a PhD student will make. This is typically done on the student's initiative, before or within the first semester of joining the PhD program. Students should plan to meet with prospective advisors, determine their willingness to take on new students, and ask about research in their labs.

Example questions a student might ask in this meeting to determine the potential fit are:

Are you taking on new students in your group?
Do you have a specific project in mind? If so, is that project currently funded by a research grant?
What other projects are going on in this group? Are all the students in your group funded?
What are the most important skills to be successful in your group?
Would you be able to support me on a research assistantship?
How often do you meet with your students 1-on-1?
Do you have regular lab meetings? Journal club?
Do you normally pair a student up with a senior student?
How big is your group? How many MS, PhD, Postdocs?
Are you a 'hands on' advisor? If not, who would I go to for help?
Can I meet with one of your current grad students?
What journals does your group normally publish in?
What conference does your group regularly attend?
What is your policy on sending students to conferences?
What are your expectations for graduation for a PhD in terms of research output?

II. Transition Periods

Changing Labs and Research Probation

A PhD student should have a primary advisor, either at the time of entry to the program (when admitted as a research assistant) or shortly after completion of lab rotations. Except for lab rotations, any period of time that a PhD student does not have a primary advisor is referred to as the "transition period". In unfortunate cases, a student may experience more than 1 transition period throughout their study, however, the maximum duration for each transition period should not exceed 6 months and multiple transition periods must have a minimum spacing of no less than 6 months. If a student fails to re-declare a new advisor 6 months into the transition period, their status automatically changes to MS course-only track or dismissal from the PhD Program.

If a student is experiencing difficulties in their current lab, they are strongly encouraged to reach out to the Bioengineering PhD Director, or Assistant Director of Academic Programs, for support and to discuss options before making a firm decision.

The start of the transition period may be triggered by one of the 3 below events:
a PhD student may elect to change research advisor partway through their PhD studies,
an advisor may initiate a research probation due to unsatisfactory performance and the student under probation failed to complete the mutually agreed action plan, and
a student completed the maximum number of allowed rotations and failed to join a lab.

In the first scenario, if a student decides to leave a lab, before doing so, the student must speak with the Bioengineering PhD Director or Assistant Director of Academic Programs. A formal written communication must be sent by the student or PhD Director to the student's advisor to inform the decision. The student must identify and re-declare a research advisor within 6 calendar months of this meeting, or within 6 calendar months of leaving their previous lab (whichever comes sooner). The student should identify a rotation lab by the end of the second month, complete a Lab Rotation Allocation Form with the rotation PI and submit the form to the Assistant Director of Academic Programs.

In rare cases, the PhD advisor may also elect to terminate the advisee relationship partway through their PhD studies due to unsatisfactory performance. The advisor must first provide detailed written warning to the student to start a "performance probation" period, with a minimum length of 4 months. This written warning (either by email or AIDP review) must, i) explain the nature of the deficiency, ii) define a 4 month "action plan" by which the student may demonstrate acceptable progress to continue mentorship. The action plan is effective when approved by the Bioengineering PhD Director. During the probation period, the primary advisor of the student remains unchanged (thus probation period and transition period are not overlapping), therefore, the primary advisor is still responsible for mentoring and supporting the student. However, if the student fails to make sufficient progress to address the communicated deficiencies within the probation period, then the student loses their primary advisor and enters the transition period. In some cases, a student may elect to leave the lab, as in scenario 1 above, during the probation period. This also triggers the start of the transition period. The student should provide written notice of this decision to both the advisor and the Bioengineering PhD Director, and this decision must be made by the end of the first month of the research probation.

Similarly, for any student entered the program without an advisor, including Bioengineering Fellows and Teaching Assistants, the student is required to complete lab rotations in the first 2 semesters of their study, identify and declare a research advisor by the end of their second semesters. Please note that Summer 1 and Summer 2 combined are equivalent to one full semester. When necessary, a third rotation is permitted to allow a student to explore additional options. If a rotation student fails to join any lab by the end of the second semester after matriculation, the student also enters the transition period.

Any student in a transition period should discuss the forms of possible financial support with the Department of Bioengineering Associate Chair for Research and PhD Programs and the Business Manager. In principle, funding support is not guaranteed. In certain extraneous situations, our department has limited TA slots that may be allocated to support some of these students, but such funding is not guaranteed and a student must have sufficient technical background to be considered for a TA position for a course that is available at that time.

Advisor Leaves the Bioengineering Department or Northeastern University

PhD students that have successfully passed their proposal defense and are expected to graduate within 6 months/1 year can remain at Northeastern and maintain the same research advisor (in the new department/institution), but must also find a new Northeastern Bioengineering faculty advisor for issues concerning laboratory space, safety, biosafety, animal protocols, etc. The faculty member who leaves must make arrangements to leave/transfer funding for the remainder of their student's PhD program, to cover both research and SGA expenses. A detailed plan must be

developed by all parties involved (faculty leaving, new on-site advisor, student, department) and approved by the Bioengineering Graduate Development Committee and the Bioengineering Department Chair.

PhD students that have successfully passed their proposal defense may opt to remain Northeastern students, but move with their advisor to the new domestic institution as visiting scientists. The faculty member who leaves must make arrangements to leave/transfer funding for the remaining of their student's PhD to cover SGA expenses. A detailed plan must be developed by all parties involved (faculty leaving, new on-site advisor, student, department) and approved by the Bioengineering Graduate Development Committee and the Bioengineering Department Chair. The Office of Global Services needs to be consulted if the student is international to ensure visa compliance.

PhD students that have not yet passed their proposal defense, or are pre-candidacy, and elect to remain in the Northeastern Bioengineering Department must identify a new research laboratory, with up to two rotations permitted. Please refer to guidelines on laboratory rotations and leaving lab for more information on these processes. Students may also elect to change their degree level to the MS in Bioengineering.

2.3.3 Annual Review for PhD Students

The College of Engineering conducts yearly student evaluations in the form of Annual Individual Development Plan (AIDP) review, usually performed in the Spring semester of each year. The purposes of the AIDP/Annual Review are to: i) summarize student academic achievements in the prior calendar year, ii) outline student goals for the present calendar year, and iii) obtain formal written feedback and evaluation from their advisory committee. The AIDP must be discussed with a student's advisor prior to submission.

All PhD students are required to complete the Annual Review reporting process with their advisor by the specified deadline. Specific instructions and deadlines will be provided by the college annually.

If a student fails to submit the Annual Review report before the reporting deadline for the College, an automatic "unsatisfactory" decision may be assigned by the department. An unsatisfactory Annual Review, either concluded by the student's advisor, or by the Department results in a "performance probation". An official probation letter will be sent by the College to notify the respective student. In addition, failing to provide sufficient detail on the AIDP can lead to an unsatisfactory review, therefore leading to a probation period.

2.3.4 Qualifying Exam (written and oral)

Please refer to Appendix E for full information, including policies, committee information, format, exam timeline, and grading rubric.

In order to maintain academic standing in the PhD Program, students must pass a comprehensive qualifying examination in one of the department research areas to demonstrate preparedness to perform doctoral research and eventually complete a satisfactory PhD dissertation. The qualifying

exam is normally taken in the student's second year in the program. In order to take the exam, students must demonstrate satisfactory research progress (as reported by their research advisor) and satisfactory academic standing (as indicated by their GPA). The exam includes written and oral components. Students will prepare a 6-page written document in the format of an NIH R21 proposal (as detailed in Appendix E). This document needs to demonstrate creative thinking and should be focused on the subject of the student's own PhD thesis research and relevant topics at the laboratory where the thesis work will be performed. The oral portion of the exam will involve a presentation by the student of their written proposal and defense of the ideas included within. This exam will assess students' critical thinking, understanding of the fundamental background of their research, and ability to create a logical and rational experimental plan using engineering design principles. The qualifying exam does not require the student to have preliminary data, although presenting relevant preliminary data for explaining the proposed study is permitted and considered helpful.

Plagiarism, i.e. including verbatim copies or slightly modified text from written materials published by others without appropriate citation, is considered severe academic misconduct and is strictly forbidden in all academic works at Northeastern, including qualifying exam reports. The exam committee actively performs plagiarism checks to verify the originality of the report. Any verified plagiarism activities discovered in the written report may automatically result in a failure of the exam, or, in severe cases, discharge from the PhD program.

2.3.5 PhD Dissertation Committee and Proposal (written and oral)

2.3.5.1 Dissertation Committee

After achieving candidacy, students shall form their Dissertation committee. The chair of the committee should be the student's primary advisor or a member of the Bioengineering core faculty.

The dissertation committee shall include a minimum of three members, or four members if there are two co-advisors. At least three committee members should hold a doctorate or an appropriate terminal degree for the discipline, and at least two shall be full-time Northeastern University faculty. At least two committee members shall hold **some** appointment in the department (affiliated, joint, or core) that offers the degree that the student is seeking. At least one member of the committee must not have a primary appointment in the department that offers the degree that the student is seeking.

2.3.5.2 Proposal Format and Form

Once students have formed their committees **and** successfully passed their proposal, they should complete the PhD Dissertation Committee and Proposal Defense Form (**Appendix F)** and file it with the Assistant Director of Academic Programs. Students will be required to meet with their PhD Dissertation Committee at least **annually** to document sufficient research progress. A more frequent meeting schedule and active interactions with the Dissertation Committee members is highly recommended.

Proposal Overview:

A PhD student's first Dissertation Committee Meeting also serves as the Dissertation Proposal Defense in the Bioengineering Department. Students must complete this first meeting in their third or fourth year, and no later than six months prior to the Dissertation Defense. Special

circumstances that require deviation from this timeline must be approved by the PhD Program Contact and the Graduate Development Committee.

Confirming committee members and scheduling a date and time for the meeting/proposal presentation is the responsibility of the student. Students may contact a member of the bioengineering staff for support booking a room.

Prior to the first committee meeting, each student is required to write a research plan outlining the aims and objectives of their research, as described below. The research plan must be distributed to all committee members no later than **one week** prior to the meeting. **After the proposal, research progress update meetings must be held annually.**

Proposal Format:

The written research plan follows the same NIH-style R21 format used for the Qualifying Exam, but differs in scope and committee structure. While the Qualifying Exam represents a student's first attempt at an R21-style proposal, evaluated by a faculty committee that excludes the research advisor, the Dissertation Proposal builds directly on that work and is evaluated by the student's full Dissertation Committee, chaired by the research advisor. As such, advisor feedback on both written and oral part is in this case not only allowed but essential. The written document should present the specific aims, background and significance, and research design and methods for the dissertation project, reflecting refinement of the research direction established at the Qualifying Exam and incorporating any feedback received at that stage. Sample NIH applications can be found on the NIH website. If students have publications, these should also be referenced to the committee.

In addition to the written plan, students give an oral presentation as part of their first Dissertation Committee meeting. This presentation, typically 1 to 1.5 hours in length, further elaborates on the material provided in the written document and gives the committee the opportunity to ask questions about the proposed aims, approach, and feasibility of the research plan. Successful completion of both the written proposal and oral presentation is required.

2.3.6 PhD Post-Candidacy Timeline and Milestone Summary

A PhD student's first committee meeting also serves as the Dissertation Proposal Defense in the Bioengineering Department. Students must complete their first Dissertation Committee Meeting (i.e. Dissertation Proposal Defense) in their third or fourth year, and **no later than six months** prior to the Dissertation Defense.

At the second to last meeting, the Penultimate Committee Meeting, held **at least four months** before the Dissertation Defense, the student must prepare a Thesis Completion Proposal and present this proposal to the thesis committee in order to obtain "permission to write" their final dissertation. The student will be allowed to progress to the PhD Dissertation Defense upon successful defense of this proposal. No form is required to be submitted to the department.

Example Committee Meeting Outline for the Path to Dissertation Defense:

Timing	**Event**
Year 2	● Pass Qualifying Exam (exam scheduled by the department) ● Begin forming Dissertation Committee
Year 3 or 4, and at least 6 months before PhD Dissertation Defense	● Form Dissertation Committee ● Schedule and pass Dissertation Proposal Defense (meeting scheduled by the student). The dissertation proposal will be presented at the First Dissertation Committee meeting; review guidance in Section 2.3.5. Compared to the proposal document presented at the Qualifying Exam in Year 2, which is also related to the student's own research, the Dissertation Proposal should contain a refined and tangible research plan that draws a roadmap towards the dissertation. Please complete the associated forms and submit those to the department.
Second (and additional) Dissertation Committee meetings	● Meet with the Dissertation Committee regularly, **at minimum once per year**, to review research and publication progress; please document the date and topics of the meeting discussions for your own record.
At least 4 months before PhD Dissertation Defense	● Students are encouraged to obtain "permission to write" in the Penultimate Dissertation Committee Meeting (no form required). By the time of the Penultimate Dissertation Committee Meeting, it is recommended that the student should have completed the bulk of the thesis research, and is ready to write the final dissertation (with only a short list of manageable tasks remaining). It is helpful for the student to prepare and submit a "thesis completion proposal" document to their committee, serving as an initial/early draft of the dissertation, including all completed works. The student should specifically include a list of remaining work and the corresponding timeline for completing these tasks before the thesis defense. The document should be sent to the Dissertation Committee at least two weeks before the meeting, and the student should present and answer questions regarding the plan/timeline towards completion. If this presented document and plan is feasible, the committee will approve this thesis completion proposal and give the student "permission to write" for the student's final dissertation. Compared to the student's Dissertation Proposal completed around Year 3, the aim is for the "thesis completion proposal" to contain significantly more completed research with results and findings to support the productivity and novelty of the project. The thesis committee should evaluate the overall quality and novelty of the

	research outcomes and decide if the presented completion plan will result in a meaningful dissertation.
During defense semester	• Apply to graduate via the student hub, and conduct a final review your Degree Audit. • Contact the department to confirm your date 4 weeks prior (see Section 2.3.7); work with the department on funding considerations and, if international, OGS aspects such as OPT.
2 weeks before defense	• Submit written Dissertation document to the thesis committee for review
At least 2 weeks before degree conferral	• Dissertation Defense
After successful defense	• Initiate Signature Page and upload final Dissertation to ProQuest by the listed deadlines for your graduation semester Note: Commencement ceremonies are independent of the department. Review timeline and eligibility on the Commencement website.

2.3.7 PhD Dissertation Defense

All PhD candidates must complete and defend a dissertation of original research in Bioengineering. The dissertation examination committee is composed of the same faculty of the PhD Dissertation Committee, outlined in Section 2.3.5.1.

By the listed deadlines for your defense semester, you must have completed your thesis and defense, initiated the PhD Dissertation Signature Page, and uploaded your thesis to ProQuest. **All deadlines, instructions, the PhD Dissertation Signature page and ProQuest upload link can be found on the COE Dissertation and Thesis Instructions Page.**

It is the student's responsibility to schedule a date and time of the final oral examination with all Dissertation Defense Committee members, and apply to graduate on their Student Hub.

Contact the BioE Assistant Director of Academic Programs **no later than four weeks prior to the Dissertation Defense date** to coordinate room reservation and advertisement of the defense across the University. Please provide the following details:

- Date, start time, finish time
- Expected capacity
- Zoom link if planning a hybrid or virtual presentation
- Title and Abstract, and confirmation of committee members

Students must send a complete version of their PhD dissertation to their examination committee **no later than two weeks prior to the Defense date.** Although students will have an opportunity to make final revisions to the dissertation and abstract after their Final Oral Examination (Dissertation Defense), the Final Dissertation version should be a complete high-quality document that follows COE formatting guidelines.

The format of the defense will be that of an open presentation to the Northeastern Bioengineering faculty, students and staff, followed by a closed meeting with their dissertation committee in which candidates are expected to answer all relevant questions regarding their work, its significance and its relationship to ongoing work across the broader research community. The dissertation defense exam is expected to last approximately 2 hours in total.

If the examination committee deems that a "conditional pass" is appropriate, the student's advisor must convey the specific conditions and proposed timeline in writing to the Assistant Director of Academic Programs and Bioengineering PhD Director within 48 hours of the defense. In certain cases, this action may require additional review by the Bioengineering Graduate Development Committee (GDC).

2.4 Example PhD Timeline – Research Milestones

Year 1	Fall	Find Research Advisor Rotations for TA/Fellowship Students (lab rotation form at the start) Declare your advisor (advisor declaration form)
	Spring	
	Summer	
Year 2	Fall	Qualifying Exam
	Spring	Makeup Qualifying Exam (or Qualifying Exam for students who started the previous Spring semester)
	Summer	Form PhD Committee
Year 3	Fall	First Committee Meeting*, aka. Thesis Proposal; *Dissertation Research Plan in R21 format (PhD Dissertation committee & proposal defense form)* ***minimum 6 months before defense***
	Spring	
	Summer	
Year 4	Fall	Second Committee Meeting
	Spring	
	Summer	
Year 5	Fall	Penultimate Committee Meeting*: *Permission to write/thesis completion proposal* ***minimum 4 months before defense***
	Spring	
	Summer	PhD Dissertation Defense

2.5 PhD Funding

It is the intent and track record of the Department of Bioengineering to be able to provide continuous funding to all PhD students throughout the tenure of their studies. Most students take about 5 years to complete a PhD degree and may be funded through a variety of mechanisms, including RA, TA awards and external fellowships. Students must be in good academic and research standing to receive departmental funding.

2.5.1 Teaching Assistantships

Teaching Assistantships (TAs) are offered to a mixed cohort of incoming PhD and existing students advised by tenured and tenure-track Bioengineering faculty. TAs are administered by the Department of Bioengineering under the direction of the Director of Operations and Business Management. Students supported by TA are assigned to specific Bioengineering courses to assist instructors in various aspects of teaching, including running laboratories and grading assignments, and therefore require matching of skills with course needs. Students funded by TA on entry are required to perform a laboratory rotation (**Section 2.3.1**) to identify a research advisor and transit to RA funding support after the first two semesters. TA funding requests should be made by a student's research advisor directly to the Business Manager.

2.5.2 Bioengineering Fellowships

Bioengineering Fellowships (BIOE-F) are offered to a highly competitive group of incoming PhD students with outstanding academic achievement to support their stipends for their first two semesters. BIOE Fellowships are managed by the Department of Bioengineering under the direction of the Business Manager. Students funded by BIOE Fellowship on entry are required to perform a laboratory rotation (**Section 2.3.1**) to identify a research advisor and continue their studies with RA funding support in the remaining semesters.

2.5.3 Research Assistantships

Research Assistantships (RAs) are offered directly by research advisors, also referred to as Principal Investigators (PIs), to students with a matching background and research interests using PI's active research grants, to support their dissertation research. RAs are renewable on a semester basis, pending satisfactory research progress and availability of funding. Students should discuss expectations for satisfactory progress with their advisor.

2.5.4 Receiving Stipend

PhD Students on SGA, please follow the below steps to complete necessary paperwork in order to receive a stipend.

Step 1: If you are an international student and you do not have a Social Security Number, follow the guidance provided by the Office of Global Services.

Step 2: All students: please set up your direct deposit via the Student Hub.

Step 3: All students: Your stipend will be paid directly into your bank account on the 15th and the 30th or 31st of each month during which you hold your assistantship.

2.5.5 Bioengineering PhD Travel Award

https://bioe.northeastern.edu/coe-research/travel-award-winners/

The Bioengineering Conference Travel Award is a competitive award for BIOE PhD students who have shown outstanding contributions to their lab and the Department by sharing their research through an oral presentation or poster at a conference. Each Bioengineering student is eligible to apply for a $500 travel stipend, once per calendar year, to attend a conference where they are presenting an oral presentation or poster.

3. Academic Standing Policies

3.1 Statement on Academic and Scholarly Integrity

Throughout one's graduate education, a student will be required to write frequently - this includes assignments, essays, tests, and written exams for your courses, and journal papers, texts, conference abstracts and papers related to your research. Please note that plagiarism is considered a form of severe academic/scholarly misconduct and is strictly prohibited at Northeastern and the Department. This means that under absolutely no circumstance a student is it permitted to present another student's or scholar's work without appropriate citation or attribution of credits. Verbatim copies of text, including text with minor modifications, without citing the source are considered unacceptable for any academic or scholarly works at Northeastern, if detected, can result in severe penalties including failure of courses or exams, loss of funding, or discharge from the degree program.

The prohibition of plagiarism also applies to computer codes. For all copyrighted computer programs and codes, one must carefully read and understand the respective software licenses declared by the upstream authors or copyright owners in order to determine whether it is appropriate to be used in your coursework or research. All included software codes, including those with open-source licenses, must be appropriately acknowledged according to the upstream license requirements in your reports or publications (including papers or software releases). In the end you are responsible for any work you hand in and may be asked to explain it to the instructor, so do not hand in anything you do not understand! In the case of improper collaboration, penalties may be assessed to all students involved. Please note that copying code snippets posted on forums or websites (such as StackOverflow) is highly problematic and shall not be used beyond the scope of "fair use" defined by copyright laws.

Similarly, plagiarism from journals, texts or websites are also considered unacceptable; they will be dealt with under the discretion of the course instructor and the Graduate Director. Also please note that assignments and written exams may be tested by the instructor or examination committees using plagiarism detection apps such as Turnitin.

If one has any doubt in a specific situation about what level of collaboration is acceptable, one should ask your instructor or advisor!

3.2 Academic Probation Policies and Procedures

To maintain good academic standing, students must maintain an overall 3.0 GPA and attain a C grade or higher in all of their core courses. So, if a student attains a "C–" (C-minus) grade or below in a core course but has a 3.0 overall, they will need to retake that class to meet the graduating requirements.

If a student's GPA falls below 3.0, they will be placed on an academic probation. Please refer to Section 2.3.2 for information on research performance probations.

One academic term with cumulative GPA below 3.0: Students with a cumulative GPA below 3.000 for one term are required to complete an Academic Probation Action Plan to be signed and approved by their academic advisor and submitted to the Graduate School within 7 business days from the start of the next academic term.
Two consecutive terms with cumulative GPA below 3.0: Students with a cumulative GPA below 3.0 for two consecutive terms will be dismissed from their degree program at the end of the second term. Students in this situation may submit an Academic Dismissal Appeal Form to the Graduate School to request a final one-term extension. The appeal will be reviewed by the student's department.
Three consecutive terms with cumulative GPA below 3.0: Students with a cumulative GPA below 3.000 for three consecutive terms will automatically be dismissed from their degree program. In this case, the student may submit an appeal to the Associate Dean of the Graduate School per the University appeals process.

For more information, please refer to the College of Engineering policy and procedures website.

4. Administrative Policies

4.1 Petition and Registration Override Procedures

Please note the following:

1. Petitions/overrides for taking courses must be filed and approved **before** registration in the course.
2. Filing a petition/override does not mean that it will be approved, you need to receive the approval to go ahead.
3. Please file your petitions/overrides well in advance. Processing times are listed on the Graduate School of Engineering Forms Page.
4. When submitting your petition/override make sure to provide full information and context for why you are submitting the form. You may send an e-mail to your Program Contact/Instructor prior to submitting to provide additional information.
5. All petitions/overrides must be submitted with a copy of your current transcripts. Unofficial transcripts are acceptable for this purpose.

Here are the steps for filing petitions/overrides:

1. To file a petition:

   (a) Complete the petition form from here.

(b) Complete the form; this will then automatically be sent to the appropriate contacts for their approval

2. To file a registration override form (these forms are used to register in courses that have Restrictions, complete the override form here; this will then automatically be sent to the appropriate contacts for their approval

4.1.1 Online (V35) Class Sections - Policies and Procedures

V35 Online Asynchronous Courses:

Enrolling in asynchronous courses can only be approved for graduate students who meet the below requirements. Part-time student status, or an approved registration override form, is required to enroll.

You must fit one of the following categories:

- you are a **part-time MS student**
- you are an **Industry PhD student**
- you are a **full-time student with have a true conflict of time,** with your Northeastern-related research and the time that the course is scheduled to be taught in person, and approval has been given by your lab advisor/PI before submitting the override request
- If you are an **international student**, you must adhere to the guidelines on online courses to maintain visa status. Please review these requirements before submitting an override form.

4.2 Policies and Procedures for Course Transfer

MS and PhD students can transfer a maximum of 9 SH (or equivalent) of eligible coursework from other institutions. Advanced Entry PhD students may transfer a maximum of 4 SH. Note that the number of semester hours being transferred cannot be more than the number of semester hours earned by the student for the course at the Institution at which the course was completed. For example, a course that earned 3 semester hours at another Institution cannot be transferred into Northeastern for more than 3 semester hours, even if it is similar in content to a Northeastern course.

You must read the Transfer Credit policy before submitting your form

For credit transfer from other institutions, the following conditions must be satisfied:

1. Students should have a grade of at least B (or equivalent) in the course.
2. The course must be passed during the past seven years.
3. The course should not be part of the requirements of a degree received by the student in the past.

4. The course will be reviewed by the Graduate Development Committee and should be approved as equivalent to a graduate-level Northeastern course that students can take as part of their degree program.

The process for transfer credit requires filing a Petition to Transfer Credit form. The petition should be accompanied by the detailed syllabus of the course (including textbook information) and the equivalent NU course as well as sufficient evidence that the course has not been part of the requirements of a degree received by the student. Evidence should be noted on the transcripts *or* be sent in a letter/formal email from the Student Service Coordinator (or equivalent) confirming credits were not used towards a degree in the former institution.
The full policy for transferring credits can be found here.

If you are a Northeastern MS BIOE student transferring to the PhD Bioengineering program before the end of the MS program, the relevant graduate BIOE courses you have taken may transfer without limit.

4.3 Policies and Procedures for Requesting Changes in the Graduate Program

In general, changes to the graduate program are possible after completing at least one semester at Northeastern. This gives the students an opportunity to get accurate information about each program in order to make an informed decision. The only request for change in the program that is accepted during the first semester is change from full-time (FT) to part-time (PT) or from part-time to full-time. This change does not apply to those who hold an F-1 student visa.

1. **Change from FT to PT or PT to FT.** This is the only change that can be petitioned during the first semester. To request this change you need to file a petition as explained in **Section 4.1**. FT PhD students cannot change to PT before having a research advisor. Change from FT to PT for international students is only possible if it complies with the immigration regulations; please verify with the Office of Global Services.
   For International Students: An approved change of program requires that a new I-20 be issued. It is the student's responsibility to initiate the I-20 process. Instructions are provided on the official admission acceptance letter. Questions should be directed to the International Student and Scholar Institute on campus.
2. **Change from PhD to MS, or MS to PhD:** Students need to file a Change in Degree Level form. Students must have applied and been accepted into the PhD program in order to change from MS to PhD, and students changing from PhD to MS should first discuss this with their research advisor and the PhD Program Contact.

4.4 Vacation Policy

All full-time Bioengineering PhD students are entitled and encouraged to take two weeks (10 working days) of vacation a year. This vacation time is in addition to the standard Northeastern University holidays, (see Registrar's webpage). Please note that vacation time may not be rolled over to subsequent years.

PhD students should coordinate with their PI/research advisor (and Course Instructor for TAs) in a timely way about their requested vacation time. Time off must be discussed and approved before time off is taken, and the time should not interfere with teaching or research obligations. In the

event a student is required to complete research or be present in the lab due to live experiments during Northeastern University holidays, the student and their research advisor should arrange alternate time off.

To ensure funding is unaffected, extended periods of time away from campus, including extended delays with international travel, should be approved by the student's PI/research advisor and the Department of Bioengineering Associate Chair for Research and PhD Programs. In some cases, additional approval may be needed from the Graduate School of Engineering.

Please refer to the University's Attendance Policies for details on Leaves of Absence and other absences. Please reach out to the Department of Bioengineering Associate Chair for Research and PhD Programs with any concerns or questions regarding time off.

5. Co-op, Internship & Experiential Learning

Co-op and internship are forms of CPT (Curricular Practical Training) that allow full-time students to integrate a practical learning experience into their graduate program. Professional courtesy should be used when deciding whether to pursue a co-op or internship, and you should coordinate all aspects with your PI to ensure your PhD research and milestones are prioritized. The PI should also be involved in all stages of co-op planning. Your PI will need to approve the timeline with you, the department and the co-op team if completing a co-op, prior to moving forward with the process. If no effort is made to coordinate with your PI ahead of time, funding may not be able to be guaranteed following your co-op or internship.

Co-op:
With full approval and ongoing discussion with their PI, PhD students may apply for co-op. Please review the PhD Co-ops and Internships, page for more information about the cooperative education program and detailed eligibility requirements. For full details and instructions on the co-op process, please visit the Graduate Co-op Page.

Internships:
With full approval and ongoing discussion with their PI, internship is an option for PhD students only to provide them with work experience that is integral to the student's education, i.e., required for their dissertation research. Internship provides the opportunity to further the students' training and knowledge in an area central to the advancement of their research. It does not refer to an "internship" as used by companies, agencies and other institutions. Examples include students working at a company, government lab or other entity whereby the tasks, data, protocols, etc. will be brought back to NU and used in an integral way in the advisor's lab and the student's research. Coop is available to all graduate students and its goal is to provide students with actual work experience in their field of study and need not be research oriented (though it often is).

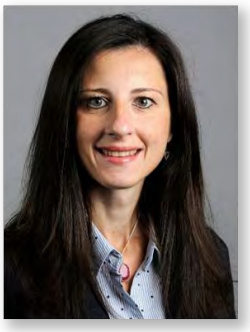
6. Bioengineering Faculty and Staff

Saeed Amal
Assistant Research Professor, Bioengineering
Artificial Intelligent including Deep Learning and Machine Learning for Healthcare, Natural Language Processing (NLP) and Image Processing for Healthcare, Recommender Systems for Healthcare
Roux Institute, Portland ME, s.amal@northeastern.edu
Lab website: The Amal Lab for Precision Medicine

Rouzbeh Amini (he/him)
Associate Professor, Mechanical and Industrial Engineering
Jointly appointed in Bioengineering
Biomechanics, mechanobiology, and biotransport with applications in the eye, heart, and brain.
320 ISEC, r.amini@northeastern.edu

Anand Asthagiri (he/him)
Associate Professor, Bioengineering
Cell engineering, cancer cell biology. The Asthagiri lab investigates how cancer cells migrate and invade their surroundings during metastasis. We apply quantitative experimental analysis of live-cell imaging and mathematical modeling to gain an understanding of single-cell behaviors and cell-cell interactions during cancer progression.
226 ISEC, a.asthagiri@northeastern.edu
Lab website: www.cell-engineering.org

Ambika Bajpayee (she/her)
Professor, Bioengineering
Targeted drug delivery to connective and charged tissues. Her lab utilizes concepts of nanomedicine and bio-electrostatics to design polypeptides and protein-based carriers for targeted and sustained delivery of small molecule drugs, protein growth factors, antibodies and genetic materials to specific intra-tissue and intra-cellular target sites inside connective tissues.
216 ISEC, a.bajpayee@northeastern.edu



Chiara Bellini (she/her)
Associate Professor and Associate Chair for Research and PhD Programs, Bioengineering
Diseases of the cardiovascular system; effects of cell mediated growth and remodeling processes on tissue and organ mechanics
228 ISEC, c.bellini@northeastern.edu

Caroline Blassick (she/her)
Assistant Teaching Professor, Bioengineering
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Samuel Chung (he/him)
Associate Professor, Bioengineering
Researches central nervous system regeneration model in C. elegans, femtosecond laser surgery; user-friendly and low-cost fluorescence microscopy.
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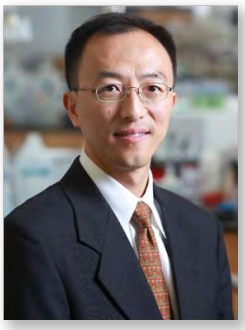
Lab website: https://sites.google.com/view/wormneurolab/



Guohao Dai (he/him)
Professor, Bioengineering
Researches 3-D bioprinting technology, stem cells technology and vascular bioengineering.
224 ISEC, g.dai@northeastern.edu

Lital Davidi (she/her)
Assistant Professor, Biology.
Jointly appointed in Bioengineering
Phyto-molecular biotechnology, with a focus on biofuels, natural products, and extreme environment adaptation.
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EXP 530C

Yinnian Feng, (he/him)
Assistant Professor, Bioengineering
Leveraging high-throughput mechanoimmunology to systematically investigate how immune cells sense mechanical forces and translate that knowledge into therapy.
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328 ISEC

Victoria D'Agostino, (she/her)
Assistant Teaching Professor
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342 Snell Engineering

Eno Ebong (she/her)
Associate Professor, Chemical Engineering.
Jointly appointed in Bioengineering
Researches the means by which endothelial cell mechanotransduction occurs in order to prevent or promote diseases related to blood vessel dysfunction.
221 ISEC, e.ebong@northeastern.edu
Lab website: Ebong Laboratory

Qianqian Fang (he/him)
Professor and Associate Chair for MS Programs & Global Network Programs, Bioengineering
Researches innovations in translational medical imaging devices to better diagnose cancers, neuroinformatics, and high-performance computing tools to facilitate the development of the next-generation imaging methods.
223 ISEC, q.fang@northeastern.edu
Lab websites: http://fanglab.org, http://mcx.space, https://neurojson.io

Daniel Grindle (he/him)
Assistant Teaching Professor, Bioengineering
Biomechanics
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Ben Gyori (he/him)
Associate Professor, Khoury College of Computer Sciences
Jointly appointed in Bioengineering
Intersection of systems biology, bioinformatics, and artificial intelligence to understand how biological cells work and react to drugs and environmental signals.
#909 177 Huntington Ave, b.gyori@northeastern.edu

Christa Haase (she/her)
Assistant Professor, Bioengineering
Jointly appointed in Physics
Research Focus: The lab's long-term research goal is to develop and apply innovative spatial, single cell and optical technologies that will transform our understanding of cellular communication in health and disease and use this insight to develop new treatments.
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Aileen Huang-Saad (she/her)
Associate Professor, Bioengineering
Director of Life Science and Engineering Programs, Roux Institute
Entrepreneurship education microenvironments and their impact on the engagement of diverse populations, the influence of I-Corps on university ecosystems, and transforming BME education through instructional design.
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Lab Website

Michael Jaeggli (he/him)
Teaching Professor, Bioengineering, and COE Associate Dean of Undergraduate Education
Focuses on curricular development and program delivery in bioengineering. During graduate school he specialized in heart valve tissue engineering and the use of 3D printing technologies for surgical planning. He is currently partnering with the Roux Institute to research and develop interdisciplinary programs to address rural health disparities in Maine.
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Miten Jain (he/him)
Assistant Professor, Bioengineering
Jointly appointed in Physics
Research Focus: Nanopore technology, single-cell techniques, computational biology research
Projects: Characterization of paired tumor and normal cell lines using long read sequencing; Multi-platform, high-coverage, long read sequencing of reference human genomes.
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Abraham Joy (he/him)
Professor and Chair, Bioengineering
Research Focus: Design and use of biomaterials for wound healing; antimicrobial/antibiofilm strategies; soft-tissue replacement; polymer condensates; and sustained delivery of therapeutics.
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Timothy Lannin (he/him)
Teaching Professor and Associate Chair for Undergraduate Studies, Bioengineering
Previous research includes work on automating image analysis of cancer cells, measuring the electrical properties of cancer cells to use electric fields to separate them from blood cells, and measuring the electrical properties of algae cells to optimize their output for biofuels.
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Herbert Levine (he/him)
University Distinguished Professor, Physics
Jointly appointed in Bioengineering
Studies mechanics of motility at both single cell and multicellular levels, genetic and metabolic networks underlying phenotypic changes en route to cancer metastasis, effective detection by and activation of the adaptive immune system. See my entry at ctbp.northeastern.edu for more info.
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Elizabeth Libby (she/her)
Assistant Professor, Bioengineering
Researches synthetic biology to build predictably performing biological systems for applications such as biosensor development and quantitative microbiology.
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Lab website: https://libbylab.sites.northeastern.edu/

Francis Loth (he/him)
Professor, Mechanical and Industrial Engineering
Jointly appointed in Bioengineering
Researches biological flows, experimental fluid mechanics, computational fluid mechanics, blood flow simulation, cerebrospinal fluid simulation, Chiari malformation, syringomyelia, medical image processing, magnetic resonance imaging
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Mingyang Lu (he/him)
Associate Professor, Bioengineering
Uses systems biology approaches to uncover the underlying principles governing the operation of genetic networks. Integrates computational modeling and data analysis to elucidate the relationship among robustness of network dynamics, stochasticity in gene expression and heterogeneity in cancer evolution.
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Lab websites: lusystemsbio.northeastern.edu;geneex.jax.org

Lee Makowski (he/him)
Professor, Bioengineering
Jointly appointed in Chemistry and Chemical Biology.
Research focus is on the molecular basis of Alzheimer's disease and other neurodegenerative disorders and the linkage between the structure of pathological fibrillar aggregates and disease progression. The work involves collaboration with neuropathologists in the use of scanning x-ray microdiffraction for study of fibrillar structures within human brain tissue.
230 ISEC, l.makowski@northeastern.edu

Mona Minkara (she/her)
Associate Professor, Bioengineering
Using computational methods, such as Monte Carlo and molecular dynamics simulations, to obtain a fundamental understanding of molecular interactions that occur at biological interfaces, such as the pulmonary surfactant system
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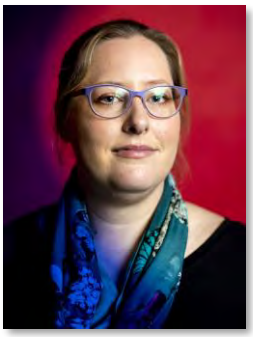
Lab website: https://www.monaminkara.com

Mark Niedre (he/him)
COE Distinguished Professor, Bioengineering, and COE Associate Dean of PhD Education
Associate Dean for PhD Education, College of Engineering.
Researches and finds interest in biomedical optics and non-invasive imaging, rare cell detection and tracking in the body, image reconstruction and biomedical signal processing.
217 ISEC, m.niedre@northeastern.edu
Lab website: https://sites.google.com/site/niedrelab/home

Stephanie Noble (she/her)
Assistant Professor, Psychology
Jointly appointed in Bioengineering
Statistical and computational tools to facilitate more precise human neuroscience inference and prediction.
ISEC 621, s.noble@northeastern.edu



Jessica Oakes (she/her)
Associate Professor, Bioengineering
Researches pulmonary physiology, biofluids and transport phenomenon, computational biomechanics, magnetic resonance imaging, and multi-scale modeling. She is interested in applications pertaining to wildland fire smoke inhalation, e-cigs, and asthma.
229 ISEC, j.oakes@northeastern.edu
Lab website: https://www.northeastern.edu/biofluids/

Harikrishnan Parameswaran (he/him)
Associate Professor, Bioengineering
Researches the mechanobiology of smooth muscle contractions to understand the fundamental mechanisms regulating airway caliber and why they fail in diseases like asthma.
219 ISEC, h.parameswaran@northeastern.edu
Lab website: https://web.northeastern.edu/breathe/

Sara Rouhanifard (she/her)
Associate Professor, Bioengineering
Developing chemical approaches to track and quantify RNA modifications in cells; understanding differences in RNA expression and the impacts on disease and development. Single-molecule fluorescent imaging of RNA. Nucleic acid technologies.
220 ISEC, s.rouhanifard@northeastern.edu
Lab website: https://rouhanifardlab.com/
Twitter: @SRouhanifard

Jeffrey W. Ruberti (he/him)
COE Distinguished Professor, Bioengineering
Researches tissue engineering of load-bearing matrix (bone, cornea), bioreactor design, multi-scale mechanobiochemistry, statistical mechanics, energetics microscopy, high-resolution imaging; and biopolymer self-assembly.
215 ISEC, j.ruberti@northeastern.edu

Sandra Shefelbine (she/her)
Professor, Mechanical and Industrial Engineering
Associate Dean for Space and Special Initiatives, Office of the Dean
Jointly appointed with Bioengineering
Researches multi-scale bone biomechanics – how the structure and composition of bone influences its mechanical properties; mechano-adaptation of bone and joint – how tissue responds to mechanical signals.
222 ISEC, s.shefelbine@northeastern.edu
Lab website: www.shefelbine.org

Shiaoming Shi (he/him)
Teaching Professor, Bioengineering
Researches cancer detection and drug discovery technologies.
342 Snell Engineering, s.shi@northeastern.edu

Nikolai Slavov (he/him)
Professor, Bioengineering
Researches single-cell proteomics, Ribosome-mediated translational regulation, and quantitative systems biology. Most recently Slavov lab developed a high-throughput method for single cell proteomics by mass spectrometry and used it to quantify proteome heterogeneity during cell differentiation.
334 Mugar, n.slavov@northeastern.edu

Eduardo Sontag (he/him)
University Distinguished Professor, Electrical and Computer Engineering
Jointly appointed in Bioengineering
Researches feedback control theory, systems biology, cancer, and biomedicine.
326 ISEC, e.sontag@northeastern.edu

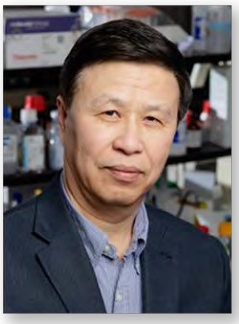
Esin Sozer (she/her)
Associate Teaching Professor, Bioengineering
342 Snell Engineering
Research training spanned electrical engineering, plasma physics, accelerator physics, and biophysics. Research interests include biophysics of electric field and biological system interactions, electropermeabilization, and electrostimulation.
342 Snell Engineering, e.sozer@northeastern.edu

Tao Sun (he/him)
Assistant Professor, Bioengineering
Research Focus: Focused Ultrasound, Ultrasound Imaging, Neuroimaging, Drug Delivery, Immunomodulation and Immunoengineering, Gliomblastoma, Alzheimer's Disease
Works at the intersection of focused ultrasound, neuroimaging and immunoengineering; developing ultrasound devices, imaging methods and engineered cell systems to modulate the neuro-immune interface and their applications in immunomodulation, drug delivery, and cell-based theranostic systems.
206C ISEC, t.sun@northeastern.edu

Amir Vahabikashi (he/him)
Assistant Professor, Bioengineering
Cell and nucleus mechanobiology, soft bioelectronics for organoid/tissue scale mechanobiology and regenerative engineering, mechanotransduction, implantable bioelectronics.
319 ISEC, a.vahabikashi@northeastern.edu

Kiran Vanaja (he/him)
Assistant Teaching Professor, Bioengineering
Systems biology of signaling networks in cancer (and) therapeutics, metastasis and embryonic development.
Roux Institute, Portland ME, k.vanaja@northeastern.edu

Lei Wang (she/her)
Assistant Professor, Bioengineering
Jointly appointed in Biology
Mammalian synthetic biology tools to advance cancer cellular therapy, regenerative medicine, and microfluidic human organ models.
316 ISEC, lei1.wang@northeastern.edu



Ning Wang (he/him)
Professor, Bioengineering
Director of Mechanobiology Institute, Northeastern University
Cellular and molecular mechanomedicine, Cancer cell biology and mechanics, Embryonic stem cell biology and mechanics, Mechanical biotechnologies and their applications to cells, tissues, and organisms, Mechanotransduction: nuclear deformation and gene expression.
225 ISEC, ni.wang@northeastern.edu

Meni Wanunu (he/him)
Professor, jointly appointed in Physics & Bioengineering
Development of next-generation DNA and RNA sequencing methods; nanopores as molecular sensors; bioinspired sustainability solutions; optical and electrical analysis of biomolecular systems; electron microscopy and electron-beam shaping of nanomaterials
329 ISEC, m.wanunu@northeastern.edu
Lab Website: Wanunu Lab

Jing Ke Weng (he/him)
Professor, Chemistry and Chemical Biology
Jointly appointed in Bioengineering
Natural product biochemistry, plant abiotic and biotic interactions, carbon sequestration, agricultural biotechnology, food allergy, drug discovery
jingke.weng@northeastern.edu

Mohammad Abbas Yaseen (he/him)
Associate Professor, Bioengineering
Research Focus: Advanced microscopy for minimally invasive, in vivo characterization of brain function
Research Projects: Relating neuroimmune and neurovascular alterations during Alzheimer's Disease progression Principal Investigator, National Institute of Health
Near Infrared Fluorescence Imaging of Reactive Oxygen Species in Alzheimer's Disease Co-Investigator, National Institute of Health
318 ISEC, m.yaseen@northeastern.edu
Lab website: https://www.yaseen-omnilab.org/

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Purchasing Specialist
206 ISEC
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Director of Operations and Business Management
e.cohen@northeastern.edu
206A ISEC

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Senior Engineering Lab Technician
n.joseph@northeastern.edu
057 Richards Hall

Tammi Ko (she/her)
Administrative and Project Assistant Co-op
tam.ko@northeastern.edu
206 ISEC

Saige McGinnis (she/her)
Lab Coordinator
s.mcginnis@northeastern.edu
234 ISEC

Jeremy Marshall (he/him)
Lab Operations & Safety Manager
234 ISEC
j.marshall@northeastern.edu

Caroline Pridmore (she/her)
Assistant Director of Academic Programs
c.pridmore@northeastern.edu
206 ISEC

7. Campus Map

https://campusmap.northeastern.edu/printable/campusmap.pdf

Academic and Service Buildings

C1 140 The Fenway (140)
E2 177 Huntington (177)
E2 216 Massachusetts Ave (216)
E2 236 Huntington (236)
D2 271 Huntington (271)
B1 O'Bryant African American Institute (AF)
C3 Alumni Center (CP)
B2 Architecture Studio (AS)
D1 Asian American Center (AC)
B2 Barletta Natatorium (BN)
A1 Behrakis Health Sciences Center (BK)
E2 Belvidere Place (BV)
C2 Blackman Auditorium (BL)
C2 Cabot Physical Education Center (CB)
C1 Cahners Hall (CA)
B1 Cargill Hall (CG)
D2 Catholic Center (CC)
B2 Churchill Hall (CH)
C3 Columbus Place (CP)
C2 Cullinane Hall (CN)
C2 Curry Student Center (CSC)
C1 Cushing Hall (CU)
B2 Dana Research Center (DA)
B1 Dockser Hall (DK)
C2 Dodge Hall (DG)
C2 East Village (EV)
B2 Egan Research Center (EC)
C2 Ell Hall (EL)
D2 Fenway Center (FC)
B2 Forsyth Building (FR)
C2 Hastings Hall (HS)
C2 Hayden Hall (HA)
D2 Hillel-Frager (HF)
B2 Holmes Hall (HO)
C2 Hurtig Hall (HT)
B3 Interdisciplinary Science and Engineering Complex (ISEC)
A2 International Village (IV)
B1 Kariotis Hall (KA)
B1 Knowles Center (KN)
B1 Lake Hall (LA)
B2 Latinx Student Cultural Center (LC)
C1 Marino Recreation Center (MC)
D3 Matthews Arena (MA)
B2 Meserve Hall (ME)
C2 Mugar Life Sciences Building (MU)
B2 Nightingale Hall (NI)
A3 Renaissance Park (RP)
C2 Richards Hall (RI)
C2 Robinson Hall (RB)
C2 ROTC Office (RO)
A2 Ryder Hall (RY)
B2 Shillman Hall (SH)
B2 Snell Engineering Center (SN)
B2 Snell Library (SL)
C3 Badger & Rosen SquashBusters (SB)
B1 Stearns Center (ST)
A1 Visitor Center (VC)
B1 West Village F, G, H (WV)

Residence Buildings

B3 10 Coventry (CV)
C1 106–122 Levine (106-122)
C1 142–148 Hemenway St (142)
C1 153 Hemenway St (LF)
C2 319 Huntington Ave (319)
C2 337 Huntington Ave (337)
B1 407 Huntington Ave (407)
B3 768 Columbus Ave (768)
B3 780 Columbus Ave (780)
B1 Burstein Hall (BU)
C3 Davenport Commons A, B (DC)
C2 East Village (EV)
C2 Hastings Hall (HS)
A2 International Village (IV)
D1 Kennedy Hall (KY)
C1 Kerr Hall (KH)
D1 Light Hall (LH)
C1 Loftman Hall (LF)
C1 Melvin Hall (MH)
B1 Rubenstein Hall (RU)
D1 Smith Hall (SM)
C1 Speare Hall (SP)
C1 Stetson East (SE)
C1 Stetson West (SW)
A1 West Village A, B, C, E (WV)
B1 West Village F, G, H (WV)
B1 White Hall (WH)
B1 Willis Hall (WI)

Parking Garages

C3 Columbus Parking Garage (CPG)
E2 Belvidere Parking Garage (BPG)
C2 Gainsborough Parking Garage (GPG)
A3 Renaissance Park Parking Garage (RPG)
A3 West Village Parking Garage (WPG)

Key Bioengineering Buildings

The Interdisciplinary Science & Engineering Complex (ISEC)
Many of the labs and most of our Bioengineering faculty have offices on the second and third floors. The Bioengineering department administrative offices are in 206 ISEC.

Snell Engineering Center
The College of Engineering Graduate Student Services Office is located at 130 Snell.

Mugar Life Sciences Building
Several Bioengineering labs are in Mugar.

Egan Research center
Raytheon Amphitheater is a popular spot for events. The building houses many other events and seminar rooms.

Curry Student Center
Shop in the Northeastern bookstore for textbooks and school supplies, and clothing adorned with the Northeastern logo. There is also the largest food court on campus and a Starbucks.

Popular Coffee Spots
Saxby's – EXP
Dunkin Donuts - Hayden Hall, Shillman Hall
Starbucks Coffee – Curry Student Center
Pavement Coffeehouse - 44 Gainsborough St
Render Coffee - 563 Columbus Ave
Thinking Cup - 165 Tremont
Tatte Bakery and Café - 369 Huntington Ave
Oakleaf Cakes Bake Shop - 12 Westland Ave
Cafe Nero - 114 New Edgerly Rd

Boston Labs: Faculty members have lab spaces in the following areas:

Amini	132 Mugar
Asthagiri	265B-267B, 265C-269C ISEC
Bajpayee	261B-263B, 262C, 265C, 373C ISEC
Bellini	048, 061, 269B-270B, 265C, 271C-272C ISEC
Chung	020, 020A, 020B, 020D, 260B-261B, 265C ISEC
Dai	264B-265B, 263C-265C, 267C ISEC
Davidi	520, 522C EXP
Ebong	275C-276C ISEC

Prof. Fang	020, 020A, 020B, 020Q-020S ISEC
Haase	566B, 568C, 569C, 570C ISEC
Jain	367B-368B, 367C-368C ISEC
Joy	563B-565B, 567C-568C ISEC
E. Levine	Mugar 415-416
Libby	266C, 269C, 271B-272B, 372B ISEC
Loth	TBD, 5th Floor ISEC
Makowski	265B-265C ISEC
Niedre	020, 020A, 020B, 020F, 020J-020L, 047 ISEC
Noble	621 ISEC
Oakes	048, 061, 269B-270B, 265C, 271C-272C ISEC
Parameswaran	263B-264B, 263C-265C ISEC
Rouhanifard	378B-379B, 378C-379C ISEC
Ruberti	062, 267B-268B, 265C-269C ISEC
Shefelbine	270B, 265C, 271C, 273C ISEC
Slavov	Mugar 111-B1 & 119
Sun	364B-365B, 366C, 368C ISEC
Vahabikashi	464B-465B, 464C-466C, 468C, 466D ISEC
L. Wang	460B-461B, 462C-463C, 465C-466C ISEC
N. Wang	363B, 363C, 365C ISEC
Wanunu	356-358 Egan, 372B ISEC
Jing-Ke Weng	540 EXP
Yaseen	045, 466C, 566C, 567B ISEC

8. Other Useful links

- Graduate School of Engineering - all policies and procedures
- Academic Integrity
- Code of Student Conduct
- BioE Department Website
- BioE Facebook
- BioE Twitter
- BioE Instagram
- BioE LinkedIn
- Graduate School of Engineering
- Graduate Student Services and Graduate Student Resources
- Official University Calendars
- Registrar's Office
- University Health and Counseling Services
- General Graduate Forms
- NU Graduate Catalog
- NU Health and Wellness On-Campus Resources

Appendix A. Bioengineering Department Safety Training

All PhD students and MS students who plan to perform laboratory research are required to complete the basic Department of Bioengineering laboratory safety program, plus any additional lab-specific safety training as detailed below. Students are strongly advised to complete this training in the first month following matriculation. For more information please contact the BioE Lab Operations and Safety Manager.

How to Join a BioE Lab (Updated Summer 2024)

Please carefully read and complete all instructions below to join a lab in the Department of Bioengineering. You may send questions to BioE Lab Operations and Safety Manager.

Step 1: NEU account

Verify that you have an active status with Northeastern University (e.g. student, staff, faculty, volunteer, visiting scholar). For volunteers, visiting scholars, and visiting researchers, please note that obtaining a Sponsored Account may not be sufficient for lab access. If you are not sure if you have an active status with Northeastern University, contact the Department of Bioengineering Business Manager.

Step 2: Confer with PI

Contact the faculty member/PI of the lab you wish to join. Once you have reached an agreement to join the lab, move to the next step.

Step 3: Register for SciShield (formerly BioRaft)

A. Request for your PI to add you to their Lab Member List on SciShield Step

4: Complete SciShield trainings

Follow below guidance to complete the necessary trainings to enter a specific lab space.

A. Your prospective PI adds you to their lab's roster on SciShield.
   a. Register for and complete the SciShield-hosted safety training requirements for the lab. Most Lab Safety Trainings will be automatically assigned to your account for completion once you have been added to your lab. Note that certain classroom courses are conducted by Office of Academic Research Safety (OARS) staff over Microsoft Teams at set times which you must register for via SciShield.
   b. Complete the trainings you receive via automated e-mails. You may also review the training requirements by going to this list of student resources and selecting the document titled "Safety Training Requirements and navigating to the lab you are joining.

To access online trainings:

A. Navigate to SciShield and log in.
B. Click on "Training" on the left-hand banner then select "Course Directory."
C. Click on "Launch Course" for each online course you must complete.
D. Click on "Sign Up" for each classroom course you must complete and select a date/time that works for you.

Important: When you log into SciShield, the main page will show you a table of required training. *This table may not be comprehensive*. The only way to know if you have completed all the required training for your lab is to compare the Bioengineering Safety Training Requirements document to your full training history in SciShield.

Step 4: Autoclave training

If you need autoclave access, complete the Autoclave I training on SciShield. Then, ask an experienced user to demonstrate how to use your building's autoclave. Email the BioE Lab Operations and Safety Manager, and cc the person who trained you to request card access.

Step 5: Get Card Access

Once you've completed the required trainings, please fill out this BioE HuskyCard Access Request Form. Completing this document with all of the necessary information will allow the BioE Lab Operations and Safety Manager to grant you access to the appropriate lab spaces associated with your PI.

Step 6: Pay attention to expiration dates!

SciShield: Some trainings will require regular recertification. Please keep an eye out on those expiration dates. Reach out 7-10 days before your card access expires to extend access to lab spaces. If you are graduating, please reach out at least 14 days before that expiration date.

Enrollment: Your card access will expire if the semester ends and you are not enrolled for the next. The Husky card office will list you as a “former student” and your card access for lab, office, and campus spaces will end. While this is fixable, it’s much simpler to double check your enrollment status as the semester ends.

Step 7: Going forward

To request access to additional lab spaces, repeat Steps 4 through 7.

Appendix B. Suggested PhD Electives by Research Area and Master Electives List

Please file a petition form for any courses not currently listed on the catalog; please refer to the Course Catalog and your Interactive Degree Audit (via the Student Hub) for a list of courses pre-approved for your degree.

Suggested PhD Electives by Research Area

Students may take any course as listed in the Course Catalog, which is not separated by research area for degree conferral purposes. Please consult the list below for a general organization by research area. Course enrollment decisions will differ for each student based on research focus and interest.

PhD Bioengineering, Boston Campus

Area 1 – Biomedical Devices and Bioimaging

Restricted Elective List
BIOE 5235 Biomedical Imaging
BIOE 5250 Regulatory and Quality Aspects of Medical Device Design
BIOE 5648 Biomedical Optics
BIOE 5800 Systems, Signals, and Controls for Bioengineers
BIOE 5810 Design of Biomedical Instrumentation

Elective List
Any courses from the Restricted Elective list, and:
BIOE 5115 Dynamical Systems in Biological Engineering
BIOE 5510 Bioengineering Products/Technology Commercialization
BIOE 5820 Biomaterials
BIOE 5850 Design of Implants
EECE 5606 Micro- and Nanofabrication
EECE 5642 Data Visualization
EECE 7200 Linear Systems Analysis
EECE 7202 Electromagnetic Theory 1
EECE 7203 Complex Variable Theory and Differential Equations
EECE 7204 Applied Probability and Stochastic Processes
EECE 7211 Nonlinear Control
EECE 7271 Computational Methods in Electromagnetics

Area 2 - Biomechanics and Mechanobiology

Restricted Elective List
BIOE 5630 Physiological Fluid Mechanics
BIOE 5640 Computational Biomechanics
BIOE 5660 Integrative Mechanobiology
ME 5665 Musculoskeletal Biomechanics

Elective List
Any courses from the Restricted Elective list, and:
BIOL 5601 Multidisciplinary Approaches to Motor Control
BIOE 5440 The Cell as a Machine

BIOE 5820 Biomaterials
IE 7315 Human Factors
ME 5650 Advanced Mechanics of Material
ME 5655 Dynamics and Mechanical Vibration
ME 5657 Finite Element Method
ME 5658 Continuum Mechanics
ME 5659 Control Systems Engineering
ME 5654 Elasticity and Plasticity
ME 7238 Advanced Finite Element Method
PT 5138 Neuroscience
+ PT 5139 Lab
PT 5150 Motor Control, Development and Learning
+ PT 5151 Lab

Area 3 – Molecular, Cell, and Tissue Engineering

Restricted Elective List
BIOE 5410 Molecular Bioengineering
BIOE 5411 Applied Molecular Bioengineering
BIOE 5420 Cellular Engineering
BIOE 5430 Principles and Applications of Tissue Engineering
BIOE 5440 Cell as a Machine
BIOE 5450 Stem Cell Engineering
BIOE 5430 Principles and Applications of Tissue Engineering
BIOE 5510 Bioengineering Products/Technology Commercialization
BIOE 5660 Integrative Mechanobiology
BIOE 5820 Biomaterials

Elective List
Any courses from the Restricted Elective list, and:
BIOE 5115 Dynamical Systems in Biological Engineering
BIOE 5250 Regulatory and Quality Aspects of Medical Device Design
BIOL 5543 Stem Cells and Regeneration
CHEM 5612 Principles of Mass Spectrometry
CHME 5630 Biochemical Engineering
PMST 6254 Advanced Drug Delivery Systems

Area 4 – Systems, Synthetic, and Computational Bioengineering

Restricted Elective List
BIOE 5115 Dynamical Systems in Biological Engineering
BIOE 5710 Experimental Systems and Synthetic Bioengineering
BIOE 5720 Physical Bioengineering
BIOE 5750 Modeling and Inference in Bioengineering
BIOE 5760 Method and Logic in Systems Biology and Bioengineering
BIOE 5860 Engineering Approaches to Precision Medicine I
BIOE 5880 Computational Methods in Systems Bioengineering

Elective List
Any courses from the Restricted Elective list, and:

BIOE 5440 The Cell as a Machine
BIOE 5510 Bioengineering Products/Technology Commercialization
BIOE 5640 Computational Biomechanics
BINF 6400 Genomics in Bioinformatics
BIOL 6299 Molecular Cell Biology for Biotechnology
CHEM 5638 Molecular Modeling
CHME 5630 Biochemical Engineering
DS 5220 Supervised Machine Learning and Learning Theory
DS 5230 Unsupervised Machine Learning and Learning Theory
PHSC 6290 Biophysical Methods in Drug Discovery
PHYS 5116 Network Science 1

PhD Bioengineering, Portland Campus

Artificial Intelligence (AI) in Translational Healthcare at the Roux Institute (AI-TH@Roux).

Restricted Elective List

BIOE 5860 Engineering Approaches to Precision Medicine I
BIOE 5870 Engineering Approaches to Precision Medicine II
BIOE 5115 Dynamical Systems in Biological Engineering
BIOE 5750 Modeling and Inference in Bioengineering
BIOE 5880 Computational Methods in Systems Bioengineering
BIOE 5770 Machine Learning Methods in Biology and Health

Elective List
Any courses from the Restricted Elective list, and:
CS 5330. Pattern Recognition and Computer Vision.
CS 5340. Computer/Human Interaction
CS 5800. Algorithms
CS 6120. Natural Language Processing
DS 5230. Unsupervised Machine Learning and Data Mining
HLTH 5600. Introduction to Patient Safety
HLTH 5610. Patient Safety Science
HLTH 5630. Quality Improvement in Patient Safety
HLTH 5800. AI Across the Health Sciences
HSCI 5150. Methods for Observational Research 1
HSCI 5180. Phenotyping
HSCI 5190. Cohort Building
PHTH 5210. Biostatistics in Public Health
PHTH 5214. Environmental Health
CS 6140. Machine Learning
PHTH 6440. Advanced Methods in Biostatistics

PhD Coursework Master List

BIOE 6100 Medical Physiology

BIOE 6200 Mathematical Methods in Bioengineering

BIOE 7000 Principles of Bioengineering

BIOE 5060 Special Topics in Bioengineering

BIOE 5115 Dynamical Systems in Biological Engineering

BIOE 5235 Biomedical Imaging

BIOE 5250 Regulatory and Quality Aspects of Medical Device Design

BIOE 5410 Molecular Bioengineering

BIOE 5411 Applied Molecular Bioengineering

BIOE 5420 Cellular Engineering

BIOE 5430 Principles and Applications of Tissue Engineering

BIOE 5440 The Cell as a Machine

BIOE 5450 Stem Cell Engineering

BIOE 5510 Bioengineering Products/Technology Commercialization

BIOE 5560 Bioengineering Design for Robotic Rehabilitation

BIOE 5630 Physiological Fluid Mechanics

BIOE 5640 Computational Biomechanics

BIOE 5648 Biomedical Optics

BIOE 5660 Integrative Mechanobiology

BIOE 5710 Experimental Systems and Synthetic Bioengineering

BIOE 5711 Advanced Experimental Systems and Synthetic Bioengineering

BIOE 5720 Physical Bioengineering

BIOE 5750 Modeling and Inference in Bioengineering

BIOE 5760 Method and Logic in Systems Biology and Bioengineering

BIOE 5770 Machine Learning Methods in Biology and Health

BIOE 5800 Systems, Signals, and Controls for Bioengineers

BIOE 5810 Design of Biomedical Instrumentation

BIOE 5820 Biomaterials

BIOE 5850 Design of Implants

BIOE 5860 Engineering Approaches to Precision Medicine I

BIOE 5870 Engineering Approaches to Precision Medicine II

BIOE 5880 Computational Methods in Systems Bioengineering

BIOE 6100 Medical Physiology

BIOE 7210 A Data Science Toolkit for Human Neuroscience Research

BINF 6400 Genomics in Bioinformatics
BIOL 5543 Stem Cells and Regeneration

BIOL 5601 Multidisciplinary Approaches in Motor Control

BIOL 6300 Biochemistry

BIOL 6301 Molecular Cell Biology

CAEP 6202 Research, Evaluation, and Data Analysis

CHEM 5620 Protein Chemistry

CHEM 5621 Principles of Chemical Biology

CHEM 5638 Molecular Modeling

CHME 5630 Biochemical Engineering

CHME 5632 Advanced Topics in Biomaterials

CS 5100 Foundations of Artificial Intelligence

CS 5200 Database Management Systems

CS 5310 Computer Graphics

CS 5330 Pattern Recognition and Computer Vision

CS 5335 Robotic Science and Systems

CS 5340 Computer/Human Interaction

CS 5400 Principles of Programming Language

CS 5600 Computer Systems

CS 5800 Algorithms

CS 6120 Natural Language Processing

CS 6140 Machine Learning

CS 6200 Information Retrieval

CS 6410 Compilers

DS 5220 Supervised Machine Learning and Learning Theory

DS 5230 Unsupervised Machine Learning and Data Mining

EECE 5606 Micro- and Nanofabrication

EECE 5642 Data Visualization

EECE 5644 Introduction to Machine Learning and Pattern Recognition

EECE 7200 Linear Systems Analysis

EECE 7202 Electromagnetic Theory 1

EECE 7203 Complex Variable Theory and Differential Equations

EECE 7204 Applied Probability and Stochastic Processes

EECE 7205 Fundamentals of Computer Engineering

EECE 7211 Nonlinear Control

EECE 7213 System Identification and Adaptive Control

EECE 7214 Optimal and Robust Control

EECE 7271 Computational Methods in Electromagnetics

EECE 7310 Modern Signal Processing

EECE 7323 Numerical Optimization Methods

EECE 7337 Information Theory

EECE 7352 Computer Architecture

EECE 7353 VLSI Design

EECE 7364 Mobile and Wireless Networking

EECE 7368 High-Level Design of Hardware-Software Systems

HLTH 5600 Introduction to Patient Safety

HLTH 5610 Patient Safety Science

HLTH 5630 Quality Improvement in Patient Safety

HLTH 5800	AI Across the Health Sciences
HSCI 5150	Methods for Observational Research 1
HSCI 5180	Phenotyping
HSCI 5190	Cohort Building
IE 7315	Human Factors Engineering
ME 5650	Advanced Mechanics of Materials
ME 5654	Elasticity and Plasticity
ME 5655	Dynamics and Mechanical Vibration
ME 5657	Finite Element Method 1
ME 5658	Continuum Mechanics
ME 5659	Control Systems Engineering
ME 5665	Musculoskeletal Biomechanics
ME 6200	Mathematical Methods for Mechanical Engineers 1
ME 6260	Introduction to Microelectromechanical Systems (MEMS)
ME 7238	Finite Element Method 2
ME 7275	Essentials of Fluid Dynamics
NNMD 5470	Nano/Biomedical Commercialization: Concept to Market
OR 6205	Deterministic Operations Research
PHSC 5100	Concepts in Pharmaceutical Science
PHSC 6290	Biophysical Methods in Drug Discovery
PHTH 5210	Biostatistics in Public Health
PHTH 5214	Environmental Health
PHTH 6440	Advanced Methods in Biostatistics
PHYS 5116	Network Science 1
PHYS 7301	Classical Mechanics/Math Methods
PHYS 7321	Computational Physics
PHYS 7741	Physics of Biological Processes and Living Systems 2
PMST 6250	Advanced Physical Pharmacy

PMST 6252 Pharmacokinetics and Drug Metabolism

PMST 6254 Advanced Drug Delivery Systems

PT 5138 Neuroscience

PT 5139 Lab for PT 5138

PT 5150 Motor Control, Development, and Learning

PT 5151 Lab for PT 5150

Appendix C. Laboratory Rotation Form

Graduate Student Lab Rotation Allocation Form (Prior to Rotation)

Graduate Student Lab Rotation Allocation Form (Prior to Rotation)

Rotation mentors must be a Core Faculty or Affiliated Faculty of the Bioengineering Department. The rotation is an opportunity to determine if the lab is a good 'fit' for both mentor and the student. Students are expected to do 2 rotations and should choose a mentor and program by the beginning of Spring Term.

- **ROTATION ADVISOR**

Name:
Primary Admin Dept.: _____
Phone: _____ **Email:** _____
Research area affiliation (mark all that apply)

- ☐ Biomedical Devices & Bioimaging
- ☐ Biomechanics & Mechanobiology
- ☐ Molecular, Cell, & Tissue Engineering
- ☐ Systems, Synthetic, & Comp. BioE.

Student

Name: _____

NUID: _____

This is my… (check one)

- ☐ **1st rotation**
- ☐ **2nd rotation**
- ☐ **Additional**

- **FUNDING (check one)**

- ☐ I have funding to support this student if they join my lab.
  - Grant number: Expiration date:
- ☐ Grant application is submitted/scored. I expect to have funding to support this student.
- ☐ I will not have funding, but my department has agreed to support this student for years.
- ☐ I will not have funding to support this student joining my lab.

If you will not have funding, you and the student should discuss, and explain below, why you think this rotation is justified (e.g., the student wishes to learn a specific technique)

- **PROJECT**

Please provide a brief description of the project the student will be working on during their rotation.

- **SIGNATURES**

_____
Mentor Date

_____
PhD Program Contact Date

_____
Student Date

Appendix D. PhD Advisor Declaration Form

PhD Advisor Declaration/Advisor Change Request Form | Department of Bioengineering

Student Name: _____

NUID#: _____ E-mail Address: _____

Advisor Declaration

Advisor Name (print): _____

Department: _____

Semester/Year Advisor's RA Support to Begin: _____

*Advisor's Index Number(s) for first two semesters of RA Support: _____

Advisor's Signature: _____ Date: _____

Advisor Change Request

Current Advisor Name (print): _____

Department: _____

Current Advisor's Signature: _____ Date: _____

Proposed New Advisor's Name (print): _____

Department: _____

Semester/Year New Advisor's RA Support to Begin: _____

*New Advisor's Index Number(s) for first two semesters of RA Support: _____

Proposed New Advisor's Signature: _____ Date: _____

Student Signature: _____ Date: _____

Approved by PhD Program Contact : _____ Date: _____

***Note to Advisor: Index numbers for advisor's support of subsequent semesters will be required at the time of SGA appointment requests.** After completing this form, submit it to the Bioengineering Assistant Director of Academic Programs and save a copy for your records.*

Appendix E. Bioengineering Qualifying Exam, Structure and Criteria

Format and some text adapted from:
Georgia Tech Biomedical Engineering, Harvard Bioengineering, and Einstein Biomedical Sciences

I. Scope of the exam

To maintain academic standing in the PhD Program, students must pass a comprehensive qualifying examination to demonstrate preparedness to perform doctoral research and eventually complete a satisfactory PhD dissertation. The qualifying exam is normally taken in the student's second year in the program. To take the exam, students must demonstrate satisfactory research progress (as reported by their research advisor) and satisfactory academic standing (as indicated by their GPA). The exam includes written and oral components. Students will prepare a 1 (specific aims) + 6 (research strategy) page written document in the format of an NIH R21 proposal (as detailed below). This document needs to demonstrate creative thinking and should be focused on the student's own PhD thesis research and relevant topics at the laboratory where the thesis work will be performed. The oral portion of the exam will involve a presentation by the student of their written proposal and defense of the ideas included within. This exam will assess students' critical thinking, understanding of the fundamental background of their research, and ability to create a logical and rational experimental plan using engineering design principles. The qualifying exam does not require the student to have preliminary data, although presenting relevant preliminary data for explaining the proposed study is permitted and considered helpful.

II. Policies

III. Student Progress Requirements

- Students taking the qualifying exam must be in good academic standing (i.e., minimum cumulative 3.0 GPA and not on research probation).
- The qualifying exam should be completed in the student's second year; special considerations may be permitted to delay depending on the student's specific background.
- A minimum of 6 months is recommended since the student joined their advisor's lab.

The Role of the PI

- The PI may:
    - help the student develop understandings of the field and relevant literature
    - consult with the student about non-independent aims
    - not comment on or provide feedback on the independent aim (as defined in the 'format' section)
    - not write or edit any other part of the proposal or presentation
- Students are permitted to have their fellow students and the NU CommLab provide feedback to their written proposal. **However, the advisor is not allowed to read, edit, or provide feedback to the written proposal or to the**

presentation.

- Students are encouraged to discuss the scope of the project and relevant literature with an advisor and/or colleague.
- The student's PI will be required to confirm that the written portion of the exam is derived from the student's own writing and not that of the PI.

Academic Integrity

- Plagiarism, i.e. verbatim copies or slightly modified text from written materials published by others, is considered severe academic misconduct and is strictly forbidden in all academic works at Northeastern, including qualifying exam reports. Please also note that self-plagiarism (i.e., to reuse or adapt previously published written materials developed or co-developed by the student) is also considered a form of plagiarism and is thus forbidden. All written examinations will be submitted via the Qualifying Exam Canvas site by the due date to undergo an originality check.
- Any verified plagiarism activities discovered in the written report may automatically result in a failure of the exam, and, possibly, dismissal from the PhD program.

Permitted vs. Not Permitted AI Use

This content was generated by Claude and edited/approved by the BioE Graduate Development Committee

- **Proposals are assessed as demonstrations of your thinking.** Using AI to generate research rationale, specific aims, or significance sections, even with editing, undermines the purpose of the exercise and may constitute academic misconduct if undisclosed. The committee is evaluating you, not a polished AI output.
- **Permitted:** grammar/clarity editing, literature search assistance, formatting references, summarizing background reading. Generating concept figures is allowed.
- **Not permitted:** generating aims, hypotheses, or scientific arguments; drafting Introduction/Significance/Innovation sections; generating fictional or hypothetical data is not allowed.
- **Disclosure to your committee is required.** If AI was used in any substantive way, students should declare it to their committee at the beginning of the oral exam presentation, with a dedicated slide.
- **If the oral defense exposes undisclosed AI use:** if a student cannot fluently explain and defend every part of a written proposal, it will be apparent. Concerns about undisclosed or non-permitted AI use will factor into the exam assessment.

We understand this is unchartered territory. As such, always ask questions and clarify with the BioE department if you are unsure about any aspect of using AI for your Qualifying Exam.

Decisions:

- Decisions may be a pass, a conditional pass, or a fail
- A "conditional pass" is a common result, that may apply to resolving issues identified from the written report or the oral presentation. Students will receive clear instructions from the Qualifying Exam committee on additional actions necessary for passing.
    - Examination policies apply until the final decision is communicated
- Decisions will be communicated via a formal letter e-mailed from the department to the student and their PI
- Students who fail their qualifying exam on the first attempt may have at maximum one additional opportunity to retake the exam in one of the following (fall/spring) semesters. Students may not take the qualifying exam more than twice.
- Any disagreements on the outcome of the exam shall be reported to and resolved by the graduate committee and department chair.

IV. Qualifying Exam Committees:

The qualifying exam committee is composed of 3 faculty members. It is the student's responsibility to provide to the graduate committee a list of 4 faculty members, with their confirmed interest, and their affiliations as potential members of their qualifying exam committee prior to the exam. The committee should be composed of:

- Member 1: a core BIOE faculty member, including tenure/tenure-track/teaching and research BIOE faculty (All three members can be core faculty, more options listed below for the other 2 members)
- Member 2: a core or affiliated BIOE faculty member
- Member 3: a Northeastern faculty member (BIOE or non-BIOE faculty)).

The student is encouraged to discuss the list with their research advisor and should confirm faculty's interest and availability before submitting the list to the department. Members of the qualifying exam committee, and a committee chair, will be assigned by the Graduate Development Committee.

Because the qualifying exam aims to serve as a departmental evaluation of the student's research capabilities, the student's primary research advisor may **not** be part of the qualifying exam committee or be present during the examination.
Students can use their qualifying exam committee as a basis for their dissertation committee.

V. Format:

Written component:
The student will submit a written proposal that includes an introductory review of the research field to be presented in the exam, motivation and potential impact of the proposed research field, specific research aims or goals, and any preliminary work towards these goals.

R21-style (7 pages, excluding references) document with:

- Page 1: 2-4 Specific Aims (at the student's discretion)
    - One of the aims must be fully independent
        - Independent aims are developed without consultation with the student's PI. This aim should still test the hypothesis and should incorporate ideas outside of the scope of their immediate laboratory. This aim will be assessed on originality and creativity. The remaining aims may be crafted in consultation with the PI
    - The remaining aims may be crafted in consultation with the PI
- Page 2-7: research strategies
    - Significance/Background (including identification of knowledge gaps)
    - Innovation
    - Hypothesis
    - Approach - describing specifically the proposed research activities associated with each specific aim (one per subsection)
    - Timeline (for example, a Gantt Chart)
- Formatting guidelines:
    - 11 font size
    - 1-inch margins (all 4 sides)
    - Arial typeface
    - Single-line spacing
    - All figures and legends must be easily legible

The student should then prepare an oral presentation as described below and be ready to answer any related questions that may arise during the exam.

VI. Oral component:

The student will present and respond to questions on their written document and the fundamentals of their proposed research

- The student gives a presentation (~45 minutes), explaining the background, rationale, related prior works, aims, and the proposed steps to achieve the

desired target.

- If available, students are allowed to present preliminary data, although it is not a requirement. Students without substantial preliminary data should primarily focus on the scientific rationales and methods. One should never use fictional or hypothetical data in the exam.
- The committee may ask questions of clarification and elaboration throughout the presentation – in this event your presentation will exceed 45 minutes.
- The committee may also probe the student's knowledge on the fundamentals supporting the proposed research.
- The student will be asked to leave the room at the end of the exam, so that the committee may deliberate.
- The total length of the exam, including the time for the committee's close-door discussion, should be typically limited to 1.5 hours.

VII. Exam Timeline:

- First week of the semester
    - Initial e-mail sent to students with full instructions and deadlines and link to the online form due in week 3; qualified students will be added to Canvas page
    - From the first day of the semester, students have two weeks to form their committees. Students are required to reach out to 4 faculty, with the aim of confirming 3 committee members and confirming their availability for the exam period.
    - *An email template will be provided for students to use*
    - Qualifying Exam Information Session held
- Third week of the semester
    - Student submit a form via Canvas including
        - Their 4 committee member names
        - Tentative proposal title
        - and begin writing. Students will have two weeks to complete the written report.
    - Deadline to request an in person, or hybrid, exam.
- Week 7: Students to be informed of their committee and date/time of oral exam
- Week 8: All students will submit their written exams via Canvas
    - All submitted documents will be run through Turnitin
    - Oral exam window will be Weeks 9-12 of the semester

Additional Notes:

- A roughly one-year gap between the qualifying exam (2nd year) and the proposal (3rd year) is recommended. This gap is critical to allow the student to have sufficient time for further development of their thesis proposal at the next milestone.
- Special circumstance for fellowship applicants: students may elect to delay to Spring with approval from and proof of fellowship submission e-mailed to Graduate Chair and Assistant Director of Academic Programs

Bioengineering PhD Qualifying Exam Grading Rubric

Criterion	Satisfactory	Unsatisfactory	Criterion Summary
Criterion 1: Understanding of underlying bioengineering research and applications, ability to critically read, understand literature	Student demonstrates sufficient understanding of the background materials and the general research domain.	Insufficient background knowledge of field	Know what they are talking about; know the field and prior works
Criterion 2: identify knowledge gaps and unmet challenges	Identify the main challenge(s) to be addressed	Insufficient understanding of the knowledge gaps	Understand what problem(s) they are solving, and why
Criterion 3: Utilize a logical approach in the design and implementation of a research strategy to solve a complex bioengineering problem	Student demonstrates knowledge and application of design principles	Inability to describe how evaluation of the results will solve the problem	Everything has to be justified; use logic for decision making, can not be arbitrarily decided
Criterion 4: Apply quantitative/engineering skills appropriate for the specific research application/data to be generated.	Student appropriately uses quantitative analyses (including statistics, power analysis, modeling, and literature) to justify design decisions and parameters	Insufficient understanding of the quantitative analysis applied in the proposal. Student fails to provide rationales or justifications for specific design choices	Know how to use math, models, statistics and other scientific tools to solve the problem in hand
Criterion 5: Effective communication skills, including presentation, professionalism and scientific writing skills	Presentation materials and delivery are clear and well-organized. Understanding the questions and responding appropriately.	Presentation is not following the correct format. Student fails to address questions effectively.	Clear and well organized presentation and writing.

Written Exam: Pass / Conditional Pass / Fail
Comments:

Oral Exam: Pass / Conditional Pass / Fail
Comments:

Overall Decision: Pass / Conditional Pass / Fail
Comments:

Appendix F. PhD Dissertation Committee & Proposal Defense Form

Department of Bioengineering Doctoral Degree in Bioengineering

PhD Dissertation Committee & Proposal Defense Form

Name: _____

Date: _____ NUID: _____

Complete form after successful proposal defense/first committee meeting.

Dissertation Committee Composition

The Dissertation Committee composition should adhere to the following guidelines:

The dissertation committee shall include a minimum of three members, or four members if there are two co-advisors. At least three committee members should hold a doctorate or an appropriate terminal degree for the discipline, and at least two shall be full-time Northeastern University faculty. At least two committee members shall hold some appointment in the department (affiliated, joint, or core) that offers the degree that the student is seeking. At least one member of the committee must not have a primary appointment in the department that offers the degree that the student is seeking.

Dissertation Proposal Defense

The Dissertation Proposal should adhere to the guidelines outlined in the Bioengineering Graduate Handbook Section 2.3.5.

The PhD Candidate must defend their Dissertation Proposal before the Dissertation Committee. Committee Members must receive the Proposal no later than 1 week prior to the meeting.

Proposal Title: _____

Approved for Proposal Defense Requirement for the Doctor of Philosophy Degree

Dissertation Advisor Name (print): _____

Signature: _____ Department: _____

Committee Member Name (print): _____

Signature: _____ Department: _____

Committee Member Name (print): _____

Signature: _____ Department: _____

Committee Member Name (print): _____

Signature: _____ Department: _____

Committee Member Name (print): _____

Signature: _____ Department: _____

Student's Signature: _____ Date: _____

BioE PhD Department Signature: _____ Date: _____

After completing this form, please submit it to the BioE Assistant Director of Academic Programs and save a copy for your records.

Appendix G. Industry PhD - Best Practices and Recommendations

Advisor Requirements

All Industry PhD Students, beginning Summer 2024, must be advised by a core Bioengineering tenure/tenure-track faculty member.

Coursework Requirements

Industry PhD students follow the BioE PhD degree requirements.

The coursework, research, and professional development requirements for Industrial PhD students follow normal degree requirements, as per the Graduate Handbook.

***Advanced Entry**:*

- Industry PhD students in Bioengineering must qualify for '**advanced entry**' (**AE**) status, i.e., they must hold an MS in a related field; this significantly reduces course requirements (16 Semester Hours or 4 Courses), as specified in the Course Catalog.
- AE students are required to register for Principles of Bioengineering (BIOE 7000) and Math Methods for Bioengineering (BIOE 6200); students may petition to waive BIOE 6200 if they have a sufficient mathematical background.
- Classes should be taken in person wherever possible, or enroll in Directed Study (BIOE 7976) or an available V35 Online Asynchronous course.
    - Directed Study (BIOE 7976) is completed under the supervision of a faculty member in the Bioengineering Department other than their dissertation advisor. Students are responsible for coordinating with the faculty member listed as an instructor for their Directed Study, to submit a curriculum proposal that contains abstract, topics, outline, and timeline. Note, a Directed Study may be a literature review that can be done offsite in the student's own time, but needs breadth and depth to satisfy course requirements. Note, the Directed Study course may be taken at most 3 times.

Seminars:

All PhD students are required to enroll and present their research progress in the Student Seminar (BIOE 7391) course, typically in their 2nd and 4th year. **Students should present their work with no redactions.** All PhD students are also required to take the Seminar (BIOE 7390) course for two semesters, where they attend faculty talks organized by the Department.
Offsite (non-local) students may choose to view faculty seminars online and deliver their presentations remotely, upon request. Student Seminars will be uploaded to the BioE Graduate Student Canvas Page for convenience.

Research Requirements

The core of the PhD program is research and scholarship. **Qualifying exam, committee meetings, annual reviews, and defenses** must be performed as described in the Graduate Handbook Section 3.2. Research performed by Industry PhDs who are employed at an outside company may present unique challenges with respect to publications, conference presentations, and intellectual property. **Logistical arrangements between the student and their Northeastern faculty advisor must be communicated to the Department by completing and signing the Department of Bioengineering Industry PhD Program Agreement**. As a rule, the PhD research should extend beyond the student's job-related research, so that it may be **freely** and **publicly discussed**. Further questions should be addressed to the Department of Bioengineering Associate Chair for Research and PhD Programs and to the PhD Network.

Some considerations include:

- *Where will the research be performed?*
- *How often will the student be on campus?*
- *How often will the advisor and student meet?*
- *What will be the format of the advisor/student meetings?*
- *How will the student structure their work around their employment schedule?*
- *What are the expectations for journal and conference publications?*
- *Will the student be able to present the research at internal seminars and meetings, as well as at academic conferences?*

Further questions should be addressed to the Department of Bioengineering Associate Chair for Research and PhD Programs and the PhD Network.

Appendix H. Frequently Asked Questions

Contacts & Staff Roles

Q: How do I know who to reach out to when I have questions?

Firstly, consult the handbook and the Graduate Student SharePoint site. If you still have questions, use the table below as a quick-reference guide. When in doubt, Caroline Pridmore is the recommended first point of contact for most program and academic questions.

Office / Group	Contact	Go to them for...
BIOE Department	**Chiara Bellini** (PhD Program Contact)	Registration form signatures (override, petition, transfer credit); research guidance and progress tracking; research probation (lab-based); high-level concerns
	Caroline Pridmore (1st point of contact)	Program and course planning (classes, milestones: qual, proposal, defense); department policy and procedures; progress tracking; questions or concerns at any level (lab, advisor, or coursework); anything under the "academic" or "program" umbrella
	Esther Cohen	Funding, SGA payments, TA positions
	Jeremy Marshall	All aspects of lab training, access, and safety (if BIOE lab)
	Saige McGinnis	BIOE Teaching lab, lab courses, lab safety and operations
	Sarah Cohan	Reimbursement; lab purchasing and orders (if BIOE lab)
	Sofia Baah	Social media; marketing; WIP seminar scheduling; department events
	Noah Joseph	Poster printing, 3D printing, BIOE Makerspace
	BIOE admin	Room booking
University Offices	**Graduate Student Services / Academic Advising**	Registration errors, processes, issues, logistics; Degree Audit; academic probation (GPA-based); student-record related issues; general guidance and connection to other offices coe-gradadvising@northeastern.edu
	Office of Global Services (OGS)	All aspects related to student visas and compliance
	University Health and Counselling Services (UHCS)	Mental health and wellbeing support; NU Student Health Plan
	Disability Access Services (DAS)	Accommodations
	Student Financial Services (SFS)	Tuition and fees
	Graduate Admissions	Official transcript submission (coe-gradadmissions@northeastern.edu)

Handbook reference: Section 1.4 – Graduate Student Support; Key Contacts page

Q: Who are the Graduate Student Council representatives, and how can I reach them?

The Graduate Student Council for 2026–27 is: President – Justin Cross; Vice President – Hedieh Karimitar; Faculty Advisor – Prof. Miten Jain. The GSC is a good resource for peer support, program feedback, and connecting with the broader student community.

Handbook reference: Section 1.4 – Graduate Student Support

Registration & Enrollment

Q: What should I enroll in for research credit, and when?

Your registration sequence depends on where you are in the PhD program:

- Before achieving PhD candidacy (i.e., before passing your Qualifying Exam): If you have completed most of your coursework but have not yet reached candidacy, you may register for BIOE 9986 (Research) to fulfill the full-time registration requirement. This is a zero-credit course, graded S/U. You must register in a section where your research advisor is listed as instructor — contact Caroline Pridmore if that section doesn't exist.
- After achieving PhD candidacy: Register for BIOE 9990 (Dissertation Term 1) and BIOE 9991 (Dissertation Term 2) in two consecutive semesters (which may include a full summer term).
- After completing the Dissertation Term 1 & 2 sequence: Register for BIOE 9996 (Dissertation Continuation) every semester in which you are receiving funding, until your dissertation is complete. You may not register for BIOE 9996 before completing the two-semester Dissertation Term sequence.

Handbook reference: Section 2.2.1 – Dissertation (0 SH); Section 2.2 – PhD Course Requirements

Q: What does full-time enrollment mean for PhD students, and what is the normal course load?

The normal course load for PhD students is 8 semester hours (SH) per semester, roughly equivalent to two regular courses. PhD programs are only offered as full-time programs. If you wish to change from full-time to part-time status, you must file a petition — and note that FT PhD students may not change to part-time before declaring a research advisor. International students should consult the Office of Global Services before making any status changes.

Handbook reference: Sections 1.1, 2.2, and 4.3 – Graduate Programs; PhD Course Requirements; Program Changes

Q: What happens if candidacy is delayed in being added to my transcript?

Candidacy is formally recorded on your transcript after you pass the Qualifying Exam. If you believe there has been a delay in your candidacy being reflected on your record — for example, following a Spring exam — please contact Caroline Pridmore (Assistant Director of Academic Programs) directly to follow up. Please allow for at least two weeks following receiving your decision letter for 'Achieved Candidacy' to appear on your transcript.

Handbook reference: Section 2.3.4 – Qualifying Exam; Section 1.3 – Forms for Graduate Studies

Work-in-Progress (WIP) and Seminars

Q: When should I sign up for a WIP, and how?

You are expected to present your WIP seminar twice during your PhD: once in your second year and again in your fourth year. You do not sign yourself up — the department Events and Engagement Specialist (Sofia Baah) will contact you when you are due to present. At that point, you should enroll in BIOE 7391 (Student Seminar) for that semester.

Handbook reference: Section 2.2.3 – Professional Development Course Requirements

Q: What do I need to prepare for my WIP, and what should I expect?

Each WIP presentation is 25 minutes, followed by 5 minutes of questions from the audience. The audience is a diverse, interdisciplinary group — fellow BioE students, faculty, and other Northeastern community members — not a specialist audience.

Second-year presentations focus on reviewing your research area and outlining your planned research directions. Fourth-year presentations focus on presenting your dissertation work and findings.

A key goal is clear, accessible communication to educated non-specialists. For example, rather than saying 'as you can see on this graph,' describe clearly what the graph shows. You are also encouraged to attend all other students' WIP presentations as a secondary goal of enriching the department's intellectual community.

Handbook reference: Section 2.2.3 – Professional Development Course Requirements

Q: Who introduces me at my WIP?

When you receive the sign-up sheet for your WIP presentation, you should identify an individual to introduce you. This can be your faculty advisor, a member of your lab, a fellow PhD student, or another member of the BIOE faculty or staff.

Handbook reference: Section 2.2.3 – Professional Development Course Requirements

Q: Can I switch my WIP date after signing up, or present online?

We cannot accept last-minute cancellations, particularly once the add/drop deadline passes, except for rare extenuating circumstances which must be confirmed by you and your PI. For Industry PhD students, remote presentation is permitted upon request. For all other students, please contact Caroline Pridmore to discuss any scheduling changes or requests to present virtually.

Handbook reference: Section 2.2.3; Appendix G – Industry PhD

Q: Is Seminar (BIOE 7390) mandatory, and how often do I need to register?

Yes. All PhD students are required to register for BIOE 7390 (Seminar) for at least two semesters. This is a 0 SH professional development course. Student Seminar (BIOE 7391) is enrolled only in the semesters you are presenting (your 2nd and 4th years), and the department will contact you when it is time to enroll. You are not required to attend every Seminar, but you should attend both Wednesday and Friday seminars regularly throughout your program.

Handbook reference: Section 2.2.1 – Professional Development Courses; Appendix G

Lab Rotations

Q: Who needs to do rotations, and how many are required?

Rotations are required for PhD students who are funded by a Bioengineering Fellowship or a Teaching Assistantship at the time of entry. Students entering directly as Research Assistants (i.e., with an advisor already declared) will not rotate, as these are direct-to-lab admissions. Required students typically complete rotations in two department research labs, with a third rotation permitted if needed.

Handbook reference: Section 2.3.1 – PhD Laboratory Rotation

Q: Can I rotate if I am already an RA?

Generally, students entering as RAs (already attached to an advisor's lab) will not complete the formal rotation sequence. If you are uncertain about your funding type and rotation obligations, contact Caroline Pridmore or Prof. Bellini.

Handbook reference: Section 2.3.1 – PhD Laboratory Rotation

Q: How long are rotations, and what is the timeline?

For students matriculating in the Fall, the rotation timeline is as follows:

- September: Complete Department Safety Training and identify labs for rotation
- October – December: First lab rotation (core BioE faculty required, unless otherwise approved)
- January – March: Second lab rotation

Your first rotation should be with a core Bioengineering faculty member.

Handbook reference: Section 2.3.1 – PhD Laboratory Rotation

Q: How do I set up a rotation, and what forms are required?

Reach out to potential advisors directly to confirm their willingness to host you and potentially offer RA support afterward. You can find faculty through the department website, the BioE Research Map, the September Research Fair, or by speaking with the PhD Program Director.

Before each rotation, complete the PhD Laboratory Rotation Form (Appendix C) and submit it to Caroline Pridmore. The form is available on the department SharePoint forms page.

Handbook reference: Section 2.3.1 – PhD Laboratory Rotation; Appendix C

Q: Who do I inform about my rotation intentions, and what if my plans change?

Submit the Lab Rotation Allocation Form to Caroline Pridmore before each rotation begins. If your plans change — for example, if you decide not to rotate in a lab you had initially planned to join — notify Caroline Pridmore and your current/prospective PI as soon as possible. During a transition period, you should identify a rotation lab within two months and submit the form to Caroline Pridmore.

Handbook reference: Sections 2.3.1 and 2.3.2 – Lab Rotation; Transition Periods

Qualifying Exam

Q: When do I take the Qualifying Exam, and what does it involve?

The Qualifying Exam is normally taken in your second year. It includes two components: a written proposal (7 pages, R21-style NIH format, with 2–4 specific aims) and an oral presentation and defense (~45 minutes) before a committee of three faculty members. The exam focuses on your own PhD thesis research area.

To be eligible, you must be in good academic standing (minimum 3.0 GPA, not on research probation) and your advisor must confirm satisfactory research progress. A minimum of 6 months in your advisor's lab is recommended before taking the exam.

Handbook reference: Section 2.3.4 – Qualifying Exam; Appendix E – Qualifying Exam Structure and Criteria

Q: What are the possible outcomes of the Qualifying Exam, and what happens next?

The possible outcomes are:

- Pass: You achieve PhD candidacy. You may then begin forming your Dissertation Committee.
- Conditional Pass: Issued when there are specific issues with the written report or oral exam. You will receive clear written instructions from the committee on what is required to fully pass.
- Fail: You may retake the exam once in a subsequent fall or spring semester. Students may not take the exam more than twice. A second failure may result in transition to the MS track or dismissal from the PhD program.

If you disagree with the outcome, you must notify the PhD Program Chair in writing within one week of receiving the decision letter. The matter will first be discussed with the student, exam committee, and Assistant Director of Academic Programs; if unresolved, it escalates to the Department Chair.

Handbook reference: Appendix E – Policies; Grading Rubric

Dissertation Committee & Proposal

Q: When should I form my Dissertation Committee, and how do I ask faculty to serve?

You should begin forming your Dissertation Committee in the summer of your second year, after passing the Qualifying Exam. The committee must be formed and the Proposal Defense completed by Year 3 or 4, and no later than six months before your Dissertation Defense.

Your committee must have at least three members (or four if there are two co-advisors). Requirements include: at least two full-time NU faculty, at least two members with some appointment in BioE (affiliated, joint, or core), and at least one member without a primary BioE appointment. The committee chair should be your primary advisor or a core BioE faculty member.

When approaching potential committee members, you can draw on the list of faculty you proposed for your qualifying exam committee as a starting point. Reach out by email to explain your research, your timeline, and ask if they would be willing to serve.

Handbook reference: Section 2.3.5 – PhD Dissertation Committee; Section 2.4 – Example PhD Timeline

Q: What does the Dissertation Proposal involve, and how often does the committee meet?

A PhD student's first Dissertation Committee Meeting also serves as the Dissertation Proposal Defense in the Bioengineering Department. Students must complete this first meeting in their third or fourth year, and no later than six months prior to the Dissertation Defense. This proposal should be more refined than your Qualifying Exam document, with preliminary data and a tangible research roadmap.

See Section 2.3.5 for full guidance and information.

Handbook reference: Section 2.3.5 – Dissertation Committee; Proposal and Committee Meetings

Funding, Fees & Billing

Q: What fees am I responsible for each semester, and why do I receive billing notices?

PhD students on a funded assistantship (RA, TA, or Fellowship) have their tuition fees covered by their SGA and some, but not all, university fees. See the 'Billing Questions' section of this page for more information on what your SGA does/does not cover.

See the Student Financial Services Tuition and Fees page for a breakdown of all fees.

However, Northeastern may still send you billing account notifications — these are often automated and may not require any payment from you. Always verify with the Student Hub or contact Esther Cohen (Director of Operations) or Student Financial Services if you are unsure whether a balance is your responsibility.

Handbook reference: Section 2.5 – PhD Funding; Section 2.5.4 – Receiving Stipend

Q: How do I apply for conference/travel funding?

The department offers a competitive Bioengineering Conference Travel Award of $500, available once per calendar year. You must be presenting an oral presentation or poster at the conference to be eligible. Apply via the Office 365 form linked in the handbook.

For college-level funding, check the Graduate School of Engineering's graduate student resources page for additional funding opportunities.

Handbook reference: Section 2.5.5 – Bioengineering PhD Travel Award; Section 8 – Other Useful Links

Q: What fellowships can I apply for?

Incoming students with outstanding academic records may be offered a Bioengineering Fellowship for their first two semesters. Beyond that, students are encouraged to seek external fellowship funding. While the handbook does not list specific external fellowships, Northeastern's Graduate School of Engineering and the Office of Research provide resources for identifying and applying for external fellowships (e.g., NSF GRFP, NIH F31, DOD fellowships). Speak with your advisor and Prof. Bellini for guidance on fellowship opportunities relevant to your research area.

Handbook reference: Section 2.5.2 – Bioengineering Fellowships

Research Advisors & Lab Placement

Q: Who can I talk to if I have concerns about my advisor-mentee relationship or lab placement?

You are strongly encouraged to reach out early if any issues arise — problems are much easier to address before they escalate. Your first departmental contact for any concerns is Caroline Pridmore (Assistant Director of Academic Programs). You may also speak confidentially with the PhD Program Contact, Prof. Chiara Bellini.

Before making any formal decision to leave a lab, the handbook requires that you first speak with either the PhD Director or the Assistant Director of Academic Programs. A formal written communication must then be sent to your advisor. The department is committed to supporting students through advisor transitions.

You may also email listen2bioestudents@coe.neu.edu for program feedback.

Handbook reference: Sections 1.4, 2.3.2 – Graduate Student Support; Advisor Declaration and Performance Probation Policies

Courses, Course Planning & Transfer Credit

Q: How should I plan my courses depending on whether I already have a Master's degree?

Your course requirements differ significantly depending on your entry status:

- BS Entry (Standard): 32 SH total — 3 required core courses (12 SH), 2 restricted technical electives (8 SH), and 3 unrestricted technical electives (12 SH), plus professional development and dissertation courses.
- Advanced Entry (MS/MEng degree in a relevant field): 16 SH minimum — 2 required courses (BIOE 7000 and BIOE 6200, 8 SH) plus 8 SH of electives, plus professional development and dissertation courses.

For Advanced Entry students, the handbook's Advanced Entry section and the Course Catalog provide a detailed breakdown. You are encouraged to review the Northeastern Advanced Entry information page for a comprehensive overview (link available in Section 2.2.2).

Handbook reference: Sections 2.2.1 and 2.2.2 – Students Entering with BS Degrees; Advanced Entry Students

Q: Can I transfer courses from other institutions toward my Northeastern degree?

Yes, with conditions. PhD (standard entry) students may transfer up to 9 SH from other institutions; Advanced Entry PhD students may transfer up to 4 SH. To be eligible, the course must:

- Have been completed within the past seven years
- Have received a grade of B or higher
- Not have been used to fulfill requirements of a prior degree
- Be approved as equivalent to a graduate-level NU course in your program

To apply, file a Petition to Transfer Credit form (available on the COE Graduate Forms page), and include the detailed course syllabus, the equivalent NU course, and evidence that the course was not applied to a prior degree. Note: if you are an NU MS BioE student transferring to the PhD program, relevant graduate BIOE courses transfer without limit.

Handbook reference: Section 4.2 – Policies and Procedures for Course Transfer

Room Reservations

Q: How can I reserve a study room or meeting room? Do I need to go through my advisor?

For rooms within BioE spaces, contact a member of BioE staff (see section 1.4). For general campus spaces (e.g., Snell Library study rooms, student lounges), these are typically reservable directly through Northeastern's room booking systems without advisor involvement.