GRADUATE HANDBOOK: MS PROGRAMS

Department of Bioengineering

2026-2027 Academic Year

Northeastern University

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Table of Contents

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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 MS 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. **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. Qualified applicants with a BS or MS degree in bioengineering or related fields can apply to our graduate programs.

1.2 Department Safety Training

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 department Lab Operations and Safety Manager.

1.3 Forms for Graduate Studies

Please use this link to access the following departmental forms: *MS Project and Thesis form* and the *Directed Study Project Plan Form*. These forms can also be found in the Appendix section. These forms should be filled out and e-mailed to the individuals listed on the form for signing. Note that Directed Study and MS Project and Thesis sections require departmental approval, and sections are created after forms are approved and signed.

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 Contacts on your forms. The Graduate School of Engineering 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.
> *If you are petitioning to increase semester hours, 17SH is the maximum that will be allowed.*
> *Typically 1 or 2 science or engineering courses outside of the approved curriculum is permitted.*
>
> **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

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.

First points of contact:

- Graduate Student Services, Academic Advising – coe-bioe-gradadvising@northeastern.edu
- Bioengineering 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
- Senior Lab Technician – Noah Joseph
- Senior Instructional Lab Coordinator – Saige McGinnis
- Administrative and Project Assistant Co-op – Tammi Ko

Who to contact:

For...	*email...*
Student record, degree audit, registration issues, graduate forms (petition, override), graduation clearance	Graduate Academic Advisors, coe-bioe-gradadvising@northeastern.edu
MS curriculum questions, course planning, departmental forms and processes (project, thesis, directed study)	Caroline Pridmore, Qianqian Fang
Grader and course assistant position inquiries	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 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 Master of Science – Overview and Program Concentrations

Students accepted to the Master of Science in Bioengineering program have four concentrations from which to choose:

- Concentration 1: Biomedical Devices and Bioimaging
- Concentration 2: Molecular, Cell, and Tissue Engineering
- Concentration 3: Biomechanics and Mechanobiology
- Concentration 4: Systems, Synthetic, and Computational Bioengineering

A study concentration is required for every MS student. Each concentration has required courses and a list of technical electives. Students should select two to five courses, depending on the concentration, and whether they select the project and thesis option, project option, or course-only option (please consult the detailed requirements for each concentration on the Course Catalog for your year of entry to the program).

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

2.1 MS Concentrations

Biomechanics and Mechanobiology

Students who join this concentration will cover multiscale mechanics, including whole-body movement, mechanical properties of biomaterials, and fluid mechanics of physiological fluids. 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 function 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 function. The Biomechanics and Mechanobiology research area 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.

Biomedical Devices and Bioimaging

This concentration is appropriate for students interested in the design of biomedical devices, as well as biomedical imaging and signal processing. This 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, and advanced computational modeling and reconstruction methods. Example research centers and laboratories include the Institute for the Chemical Imaging of Living Systems, the Translational Biophotonics Cluster, and the B-SPIRAL signal processing group.

Molecular, Cell, and Tissue Engineering

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

Systems, Synthetic, and Computational Bioengineering

This concentration covers topics including statistical physics, statistical inference, dynamical and stochastic modeling, execution and analysis of quantitative experimentation, machine learning, and control and information theory. These techniques are taught in the context of biological applications, such as gene regulation, differentiation and cancer, epigenetics, the microbiome, memory and learning, and synthetic genetic circuits.

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.

2.2.1 Detailed MS Program Course Requirements

The following sections explain the course requirements for students entering the bioengineering Master Program. A total of 32 semester hours (SH, 1 SH is roughly equivalent to 45 hours of learning) and a minimum 3.0 GPA are required to complete the MS degree. In addition to the core courses for each MS student, each concentration has its own course and credit requirements (see below).

Required Core Courses (All Concentrations)

BIOE 7390 Seminar	0 SH
BIOE 6100 Medical Physiology	4 SH
BIOE 6000 Principles of Bioengineering	1 SH

Concentration Specific Requirements
Complete requirements for *one of the four* MS concentrations as follows:

Note: Principles of Bioengineering (BIOE 6000) and Seminar (BIOE 7390) are not required for students in a **PlusOne Bioengineering** pathway, but students must successfully complete a total of 32 semester hours.

MS Concentration 1 – Biomechanics and Mechanobiology

Required Course Work (**8 SH**)
A grade of C or higher is required.
Complete two of the following courses:

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

and one of the following:

i) Coursework Option (**20 SH**)
Complete 20 SH from the course list (see below). Any course on the required course list not used toward the core requirement may also be taken.

ii) Project Option **(20 SH)**

BIOE 7945	Master's Project	**4 SH**
+ Complete 16 SH from the course list.		**16 SH**

iii) Thesis Option **(20 SH)**
Complete the following courses:

BIOE 7945	Master's Project	**4 SH**
BIOE 7990	Thesis	**4 SH**
+ Complete 12 SH from the course list.		**12 SH**

Concentration Electives Course List:

BIOE 5115	Dynamical Systems in Biological Engineering
BIOE 5440	The Cell as a Machine
BIOE 5560	Bioengineering Design for Robotic Rehabilitation
BIOE 5630	Physiological Fluid Mechanics
BIOE 5640	Computational Biomechanics
BIOE 5660	Integrative Mechanobiology
BIOE 5770	Machine Learning Methods in Biology and Health
BIOE 5820	Biomaterials (or CHME 5631 Biomaterials Principles and Applications)
BIOL 5601	Multidisciplinary Approaches in Motor Control
CHME 5632	Advanced Topic in Biomaterials
EECE 7200	Linear Systems Analysis
EECE 7203	Complex Variable Theory and Differential Equations
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 7238	Finite Element Method 2

MS Concentration 2 – Biomedical Devices and Bioimaging

Required Course Work (**12 SH**)

A grade of C or higher is required.

Required:

BIOE 5800 Systems, Signals and Controls for Bioengineers

Complete two of the following:

BIOE 5235	Biomedical Imaging
or BIOE 5648	Biomedical Optics
BIOE 5250	Regulatory and Quality Aspects of Medical Device Design
BIOE 5810	Design of Biomedical Instrumentation

and one of the following:

i) Coursework Option (**16 SH**)

Complete 16 SH from the course list (see below). Any course on the required course list not used toward the core requirement may also be taken.

ii) Project Option **(16 SH)**

BIOE 7945	Master's Project	**4 SH**
+ Complete 12 semester hours from the course list.		**12 SH**

iii) Thesis Option **(16 SH)**

Complete the following courses:

BIOE 7945	Master's Project	**4 SH**
BIOE 7990	Thesis	**4 SH**
+ Complete 8 SH course works from the elective course list.		**8 SH**

Concentration Electives Course List:

BIOE 5115	Dynamical Systems in Biological Engineering
BIOE 5250	Regulatory and Quality Aspects of Medical Device Design
BIOE 5510	Bioengineering Products/Technology/Commercialization
BIOE 5560	Bioengineering Design for Robotic Rehabilitation
BIOE 5648	Biomedical Optics (or BIOE 5235 Biomedical Imaging)
BIOE 5770	Machine Learning Methods in Biology and Health
BIOE 5810	Design of Biomedical Instrumentation
BIOE 5800	Systems, Signals, and Controls for Bioengineers
BIOE 5820	Biomaterials (or CHME 5631 Biomaterials Principles and Applications)
BIOE 5850	Design of Implants
CHME 5632	Advanced Topics in Biomaterials
EECE 5606	Micro- and Nanofabrication
EECE 7200	Linear Systems Analysis

EECE 7203	Complex Variable Theory and Differential Equations
EECE 7204	Applied Probability and Stochastic Processes
ME 5657	Finite Element Method
NNMD 5370	Nanomedicine Research Techniques

MS Concentration 3 - Molecular, Cell, and Tissue Engineering

Required Course Work (**16 SH**)
Complete three of the following, a grade of C or higher is required.

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 5710	Experimental Systems and Synthetic Bioengineering

and one of the following:

i) Coursework Option (**15-16 SH**)
Complete 15-16 SH from the course list (see below). Any course on the required course list not used toward the core requirement may also be taken.

ii) Project Option

BIOE 7945	Master's Project	**4 SH**
+ Complete **11-12 SH** from the course list.		**11-12 SH**

iii) Thesis Option
Complete the following courses:

BIOE 7945	Master's Project	**4 SH**
BIOE 7990	Thesis	**4 SH**
+ Complete **11-12 SH** from the course list.		**11-12 SH**

Concentration 2 Electives Course List:

BIOE 5115	Dynamical Systems in Biological Engineering
BIOE 5250	Regulatory and Quality Aspects of Medical Device Design
BIOE 5411	Applied Molecular 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 5660	Integrative Mechanobiology
BIOE 5711	Advanced Experimental Systems and Synthetic Bioengineering
BIOE 5720	Physical Bioengineering
BIOE 5770	Machine Learning Methods in Biology and Health
BIOE 5820	Biomaterials (or CHME 5631 Biomaterials Principles and Applications)

BIOL 5543	Stem Cells and Regeneration
BIOL 6301	Molecular Cell Biology
CHME 5160	Drug Delivery: Engineering Analysis
CHME 5515	Process Safety Engineering for Biotechnology and Pharmaceutical Industries
CHME 5620	Protein Chemistry
CHME 5621	Principles of Chemical Biology
CHME 5632	Advanced Topics in Biomaterials
CHME 5683	Introduction to Polymer Science
NNMD 5370	Nanomedicine Research Techniques
NNMD 5470	Nano/Biomedical Commercialization: Concept to Market

MS Concentration 4 – Systems, Synthetic, and Computational Bioengineering

Required Course Work (**12 SH**)
A grade of C or higher is required.
Complete three of the following courses (**12 SH**)

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

and one of the following:

i) Coursework Option **(15-16 SH)**

Complete 15-16 SH from the course list (see below). Any course on the required course list not used toward the core requirement may also be taken.

ii) Project Option

BIOE 7945	Master's Project	**4 SH**
+ Complete **11-12 SH** from the course list.		**11-12 SH**

iii) Thesis Option

Complete the following courses:

BIOE 7945	Master's Project	**4 SH**
BIOE 7990	Thesis	**4 SH**
+ Complete **7-8 SH** from the course list.		**7-8 SH**

Concentration 4 Electives Course List:

BINF 6400	Genomics in Bioinformatics
BIOE 5115	Dynamical Systems in Biological Engineering
BIOE 5440	The Cell as a Machine
BIOE 5510	Bioengineering Products/Technology Commercialization
BIOE 5640	Computational Biomechanics
BIOE 5711	Advanced Experimental Systems and Synthetic 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 5860	Engineering Approaches to Precision Medicine I
BIOE 5880	Computational Methods in Systems Bioengineering
BIOL 6299	Molecular Cell Biology for Biotechnology
CHEM 5638	Molecular Modeling
CHME 5630	Biochemical Engineering
DS 5110	Essentials of data science
DS 5220	Supervised Machine Learning and Learning Theory
DS 5230	Unsupervised Machine Learning and Data Mining
HINF 5101	Introduction to Health Informatics and Health Information Systems
PHTH 5202	Introduction to Epidemiology
PHYS 5116	Network Science 1

2.2.2 PlusOne with MS in Bioengineering

PlusOne accelerated master's degrees allow Northeastern undergraduate students to accelerate the attainment of the master's degree by applying graduate credits taken as an undergraduate toward both the undergraduate and graduate degrees. Current undergraduate students apply to enroll in the PlusOne program. With the PlusOne program, students attain their bachelor's degree followed by a PlusOne year to complete the master's degree.

Students currently pursuing their Northeastern Bachelor's degree should refer to their graduate program's guidelines on how the graduate courses can be shared with their undergraduate degree, while ensuring undergraduate requirements are fulfilled. College of Engineering undergraduate students should refer to their Plan of Study page.

Principles of Bioengineering (BIOE 6000) and Seminar (BIOE 7390) are not required for students in a PlusOne Bioengineering pathway, but students must successfully complete a total of 32 semester hours for their MS degree, including Medical Physiology (BIOE 6100). Refer to your concentration requirements via your degree audit, also outlined in Section 2.2.1, to inform the other courses you complete.

See full guidelines and approved pathways on the PlusOne with MS in Bioengineering website. For other questions on graduate course sharing, please contact Graduate School of Engineering Advising. The MS program phase of the PlusOne program is typically completed in two semesters.

Students should plan to attend the majority of their coursework on campus, though select courses may be offered online, providing added flexibility for students in the graduate phase of the PlusOne program, balancing their studies with professional commitments.

2.3 MS Program Thesis Option Requirements

For MS students choosing the Thesis Option, the process begins with finding a thesis advisor, who must be a Bioengineering tenured, tenure-track, research, or affiliated faculty member. Before enrolling, the student and advisor must fill out and submit an **MS Project and Thesis Track Form** to the BioE department. Sections are created by the department only after the form is fully approved. The objectives and logistics of the thesis are agreed upon in this form, and these guidelines should inform the thesis work for the duration of both semesters.

Semester 1: The student completes 4 SH of BIOE 7945 (Master's Project). A project report is due at the end of this term.

Semester 2: The student completes 4 SH of BIOE 7990 (Thesis). If a student has completed both BIOE 7945 and BIOE 7990 but has not yet defended their thesis, they must continue to enroll in BIOE 7996 (Master's Thesis Continuation, 0 SH) each term until they successfully defend.

Forming a Thesis Committee and Defending
When beginning the second semester (BIOE 7990), the student should review the Graduate School of Engineering Thesis Instructions Page for important deadlines and instructions, and begin forming a Thesis Committee in consultation with their advisor.

The thesis committee must have at least three members, at least two of whom must be BIOE tenured, tenure-track, teaching, research, or affiliated faculty. The student will then schedule a defense date with their committee, and a complete version of the thesis must be sent to the committee no later than one week before the defense.
The date and location of the defense should be announced at least one week in advance. To arrange this, students should reach out to the BioE Assistant Director of Academic Programs at least two weeks before the defense, providing:

- Date, start time, and finish time
- Location, or, if department assistance is wanted, preferred location and expected capacity
- Teams or Zoom link, if the defense will be hybrid or virtual
- Title, abstract, and confirmation of committee members

After a successful defense, the student's advisor assigns a letter grade for BIOE 7990. Beyond completing the course itself, students must also finish the thesis submission process — securing committee and Graduate School of Engineering signatures and submitting an electronic copy of the thesis to ProQuest. Students should adhere to Graduate School of Engineering deadlines and initiate the MS Thesis signature page after defending. Deadlines and related links can be found here.

Graduating
An MS student in the thesis option may graduate once they have successfully defended their thesis and fulfilled all other course requirements. To graduate, a student must attain a cumulative GPA of 3.0 or higher across all courses, and must earn a grade of "C" or higher in all required core courses.

2.4 MS Program Project Option Requirements

For MS students choosing the Thesis Option, they must find a project advisor and complete 4 SH of BIOE 7945 (MS Project). The project advisor must be a Bioengineering tenured, tenure-track, research, teaching, or affiliated faculty member. Projects with full-time faculty members outside of these categories may be considered by the MS Program Contact. Before enrolling, the student and advisor must fill out and submit an MS Project and Thesis Track Form to the BioE department. Sections are created by the department only after the form is fully approved. The objectives and logistics of the project are agreed upon in this form, and these guidelines should inform the project work and deliverables for the duration of both semesters.

When an MS student has completed the MS project, they must write a Project Report. The report must be submitted to the student's project advisor and obtain their approval. An MS student taking the project option can graduate once they have obtained their Project advisor's approval of the Project report and fulfilled all course requirements. To graduate, one must have a cumulative GPA of at least 3.00 with a grade of "C" or higher in all required core courses.

2.5 MS Bioengineering Connect program

The MS in Bioengineering-Connect Program, with a concentration in Biomedical Devices and Bioimaging, addresses the demand for skilled individuals who can engage with bioengineering challenges and innovations by preparing students from non-Engineering backgrounds to become bioengineers. Recognizing Bioengineering's complexity and interdisciplinary nature, this Connect program focuses on learners developing the necessary foundational and applied knowledge in mathematics and programming to successfully transition to the Bioengineering field. Through specially created and defined core courses, students gain the bioengineering knowledge to excel in their academic coursework and the Bioengineering sector.

Program credits – 41 total semester hours required and a minimum of 3.0 GPA.

Complete all courses and requirements listed below unless otherwise indicated.

CONNECT COURSES

Courses to be taken concurrently in the first semester. A grade of C or higher is required.

BIOE 5090	Foundational Mathematics for Engineers	2 SH
BIOE 5091	Foundational Applied Mathematics for Bioengineers	2 SH
BIOE 5092	Computational Tools in Bioengineering	4 SH

Core requirements

Code	**Title**	**Hours**
Required Core		
BIOE 6000	Principles of Bioengineering	1 SH
BIOE 6100	Medical Physiology	4 SH

Seminar

BIOE 7390	Seminar	0 SH

Concentration in Biomedical Devices and Bioimaging

Code	Title	Hours
Required Core		
A grade of C or higher is required		4 SH
BIOE 5800	Systems, Signals, and Controls for Bioengineers	
Complete two of the following:		8 SH
BIOE 5235	Biomedical Imaging	
or BIOE 5648	Biomedical Optics	
BIOE 5250	Regulatory and Quality Aspects of Medical Device Design	
BIOE 5810	Design of Biomedical Instrumentation	

and complete one of the following:

i) Coursework Option (**16 SH**)
Complete 16 semester hours of courses from the elective course list.

ii) Project Option

BIOE 7945	Master's Project	**4 SH**
+ Complete 12 SH from the course list.		**12 SH**

See section 2.4 for full details on the Project Option

iii) Thesis Option
Complete the following courses:

BIOE 7945	Master's Project	**4 SH**
BIOE 7990	Thesis	**4 SH**
+ Complete 8 SH from the course list.		**8 SH**

See section 2.3 for full details on the Thesis Option

In addition to completing the thesis course, students must successfully complete the thesis submission process, including securing committee and Graduate School of Engineering signatures and submission of an electronic copy of their MS thesis to ProQuest.

Electives:

BIOE 5115	Dynamical Systems in Biological Engineering
BIOE 5510	Bioengineering Products/Technology Commercialization

BIOE 5560	Bioengineering Design for Robotic Rehabilitation
BIOE 5648	Biomedical Optics
BIOE 5770	Machine Learning Methods in Biology and Health
BIOE 5820 or CHME 5631	Biomaterials Biomaterials Principles and Applications
BIOE 5850	Design of Implants
CHME 5632	Advanced Topics in Biomaterials
EECE 5606	Micro- and Nanofabrication
EECE 7200	Linear Systems Analysis
EECE 7203	Complex Variable Theory and Differential Equations
EECE 7204	Applied Probability and Stochastic Processes
ME 5657	Finite Element Method 1
NNMD 5370	Nanomedicine Research Techniques

2.6 Graduate Certificate Options

Students enrolled in an MS degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options.

Gordon Institute of Engineering Leadership

Master's Degree in Bioengineering with Graduate Certificate in Engineering Leadership
Students may complete an MS in Bioengineering in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option.

The program requires fulfillment of the 16-semester-hour-curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 33-SH degree and certificate will require 17 hours of approved bioengineering concentration-specific courses.

3. Statement on Academic and Scholarly Integrity

Throughout one's MS 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!

4. Policies and Procedures

4.1 Petition and Registration Override

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.
   Please use coe-gradadvising@northeastern.edu in the academic advisor field.
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

   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.
If you are petitioning to increase semester hours, 17SH is the maximum that will be allowed. Typically 1 or 2 science or engineering courses outside of the approved curriculum is permitted.

2. To file a registration override form, complete the override form here; this will then automatically be sent to the appropriate contacts for their approval.
    - 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 any 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. Relevant documentation includes transcripts and course syllabi. We recommend e-mailing your program contact and the instructor of the course alongside form submission to provide ample information.

4.2 Online (V35) Class Sections

V35 Online Asynchronous Courses:

The availability of V35 sections varies between classes and semesters, and is not guaranteed.

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** (in this case, you can enroll in V35 sections with no additional approval needed)
- you are a **full-time student with a true conflict of time.** In this case, a registration override form must be submitted to receive approval from the instructor, Program Contact, and academic advising office. Please state the reason in detail, and e-mail relevant parties if additional context is required.
    - If your conflict is due to employment alongside study, you may wish to consider a change to part-time status, via a Standard Petition Form.
- If you are an **international student**, you must adhere to the guidelines on online courses to maintain visa status. Please review these requirements ahead of submitting an override form.

4.3 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 Sections 3.2.2 and 3.2.3 for information on 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.

4.4 Course Transfer

You must read the Transfer Credit policy for credit transfer guidelines and eligibility.
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.

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 MS Program Contact 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.

4.5 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.

4.5.1 Change from Full Time to Part Time or Part Time to Full Time.
This is the only change that can be petitioned during the first semester. To request this change you need to file a petition. 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.

4.5.2 Change in Concentration.
Students should have a conversation with their MS Program Contact to discuss courses previously completed at Northeastern. Student are required to complete a Change of Degree Program/Concentration form. Keep in in mind that the application review process may take several weeks, so plan your request accordingly.

See full instructions and find the form on this page.

4.5.3 Change from PhD to MS, or MS to PhD.
Students must have applied and been accepted into the PhD program in order to change from MS to PhD. In this event, students need to file a Change in Degree Level form.

5. Co-op & 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.

See all details on the Master's Co-op Page linked here.
For full details and instructions on the co-op process, please visit the Graduate Co-op Page.

6. 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)**
E1 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)**
C3 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)**
B3 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)**
A2 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

7. 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

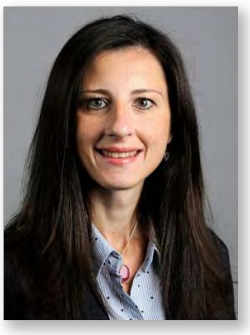
8. Bioengineering Faculty and Staff

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
342 Snell Engineering, c.blassick@northeastern.edu

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.
218 ISEC, s.chung@northeastern.edu
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.
l.davidi@northeastern.edu
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.
yi.feng@northeastern.edu
328 ISEC

Victoria D'Agostino, (she/her)
Assistant Teaching Professor
Bioengineering
v.dagostino@northeastern.edu
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
342 Snell Engineering, d.grindle@northeastern.edu

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.
525 ISEC, c.haase@northeastern.edu

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.
Roux Institute, Portland ME, a.huang-saad@northeastern.edu
Lab website: https://teel.sites.northeastern.edu/

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.
342 Snell Engineering, m.jaeggli@northeastern.edu

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.
206D ISEC, mi.jain@northeastern.edu

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.
206B ISEC, a.joy@northeastern.edu

Timothy Lannin (he/him)
Teaching Professor and Associate Chair for Undergraduate Affairs, 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.
342 Snell Engineering, t.lannin@northeastern.edu

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.
1308, 177 Huntington Ave; h.levine@northeastern.edu

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.
323 ISEC, e.libby@northeastern.edu
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
524 ISEC, f.loth@northeastern.edu

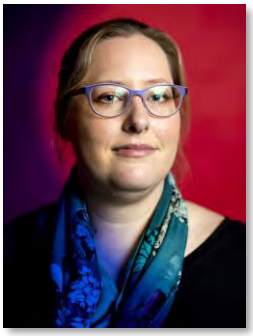
Mingyang Lu (he/him)
Associate Professor, Bioengineering
Uses systems biology approaches to uncover the underlying principles governing the operation of genetic networks. Integrates computational modeling and data analysis to elucidate the relationship among robustness of network dynamics, stochasticity in gene expression and heterogeneity in cancer evolution.
1319, 177 Huntington, m.lu@northeastern.edu
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
325 ISEC, m.minkara@northeastern.edu
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

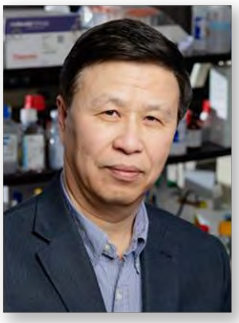
Esin Sozer (she/her)
Associate Teaching Professor, Bioengineering
342 Snell Engineering
Research training spanned electrical engineering, plasma physics, accelerator physics, and biophysics. Research interests include biophysics of electric field and biological system interactions, electropermeabilization,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

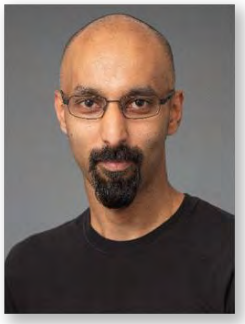
Lei Wang (she/her)
Assistant Professor, Bioengineering
Jointly appointed in Biology
Mammalian synthetic biology tools to advance cancer cellular therapy, regenerative medicine, and microfluidic human organ models.
316 ISEC, lei1.wang@northeastern.edu



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/

STAFF

Sarah Cohan (she/her)
Purchasing Specialist
206 ISEC
s.cohan@northeastern.edu

Esther Cohen (she/her)
Director of Operations and Business Management
e.cohen@northeastern.edu
206A ISEC

Noah Joseph (he/him)
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

Appendix A. Bioengineering Department Safety Training

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. BIOE 7976 Directed Study Project Plan Form

BIOE 7976

Directed Study Project Plan

Directed study should be completed with either a non-dissertation/thesis advisor faculty or if with the student's dissertation/thesis advisor, should be a distinctly different project from the dissertation/thesis research.

1. Faculty advisor to complete this form

2. Student to e-mail this form to the Program Contact and the BIOE Assistant Director of Academic Programs

3. Once approved, a section will be created for the student to enroll in; student to fill out and submit a registration override form (override the Instructor Signature requirement, request for course to count towards degree requirements)

Name of Student: _____NUID #: _____

Student Level (MS or PhD): _____ Number of Semester Hours: _____

Year and Semester of Directed Study: _____

Name of Project Faculty Advisor: _____

Note- Instructor of record must be a Northeastern faculty member.

Project Abstract (4-5 sentences):

Expected Level of Effort:

__ 12-15 hours/week (Fall/Spring/Summer Full term)

__ 22-28 hours/week (Summer 1 or Summer 2 term)

Student Objectives and Expected Results:

Grade Criteria:

Please note below how a student will be graded for this course. (E.g., This student will be graded on attendance, consistency of participation, assistance with any and all research required tasks, final paper/presentation, compliance with required safety and training, etc.)

Contingency Plans:

In case of emergency (i.e. restricted access to lab, materials, etc. or inability to complete intended research), please note how the course objectives may change.

I affirm that this project will constitute a learning experience comparable to a graduate BIOE unrestricted elective course.

Signature of project faculty advisor: _____

Signature of Program Contact: _____

Appendix C. MS Project and Thesis Track Form

Bioengineering MS Project and Thesis Track Form for BIOE 7945 / BIOE 7990

The purpose of this form is for Bioengineering Master's students to declare their intended research track for students interested in completing a Master's Project (4SH), or a Master's Project + Thesis (8SH). Before completing this form, please review section 2.3 and 2.4 of the BioE Graduate Handbook for full information on selecting an advisor and on track requirements for both project and thesis.

1. Faculty advisor and student complete this form

2. Student e-mails this form to the MS Program Contact and the BIOE Assistant Director of Academic Programs

3. Once approved, a section will be created for the student to enroll in for the MS Project; student fills out and submits a registration override form (override the Instructor Signature requirement)

4. For Thesis student, a section will be created for the following semester for MS Thesis. Complete a second registration override form (override the Instructor Signature requirement) at this time.

Name of Student: _____ NUID #: _____

Select your intended track:

BIOE 7945 MS Project
A one-semester project, requiring an advisor and a project report at the end of the semester

BIOE 7945 MS Project + BIOE 7990 Thesis
A two-semester project, requiring thesis committee formation, and a written thesis with thesis defense in the second semester

Undecided (MS Project only for now)
In this event, complete a project with a project report in semester 1, and reach out to the Program Contact and the BIOE Assistant Director of Academic Programs with your research advisor CCed to request extending to thesis.

Year and Semester of BIOE 7945 MS Project: _____

Name of Faculty Advisor: _____

Note- Instructor of record must be Northeastern faculty member.

Project Abstract (4-5 sentences):

Expected Level of Effort:

12-15 hours/week (Fall/Spring/Summer Full term)

22-28 hours/week (Summer 1 or Summer 2 term)

Student Objectives and Expected Results:

Grade Criteria:

Please note below how a student will be graded for this course. (E.g., This student will be graded on attendance, consistency of participation, assistance with any and all research required tasks, final paper/presentation, compliance with required safety and training, etc.)

Contingency Plans:

In case of emergency (i.e. restricted access to lab, materials, etc. or inability to complete intended research), please note how the course objectives may change.

I affirm that this project will constitute a learning experience comparable to a graduate BIOE

course.

Signature of Project Faculty Advisor _____

Signature of Program Contact _____

Appendix H. Frequently Asked Questions

Registration

Q: How many courses should I take per term?

The MS program is a full-time program. The normal course load is

The normal course load is **8–9 semester hours (SH) per semester**, equivalent to roughly two regular courses (most BIOE courses are 4 SH). Taking two courses per semester across four semesters allows you to complete the 32 SH degree in two years.

If you have strong academic standing and a compelling reason to take more, you may petition to increase beyond the default maximum — see the next question. Taking fewer courses is possible if you change to part-time status, but this requires a formal petition and is subject to visa restrictions for international students.

Handbook reference: Sections 1.3 (Petition and Override Procedures); Section 4 (Petition and Registration Override Procedures)

Q: How do I increase my maximum semester hours?

To take more than the default maximum, you must submit a **Standard Petition Form** through the COE Graduate Forms page. In the petition, explain why you need additional courses and provide any relevant context. Attach your current unofficial transcripts.

Important: for MS students, 17 SH is the maximum that will be approved via petition. Petitions must be filed and approved before you register — do not register first and petition after.

Handbook reference: Section 1.3 – Standard Petition Forms

Q: Who is eligible for online (asynchronous) courses, and how do I access them?

Online asynchronous sections (V35) are not automatically available to all students. Availability is subject to instructor and departmental discretion each semester, and eligibility depends on your student status. See full details in Section 4.1.

Handbook reference: Section 4.1 – Online (V35) Class Sections – Policies and Procedures

Choosing Your MS Track

Q: What is the difference between the Coursework, Project, and Project + Thesis options, and how do I choose?

All three options lead to the same MS degree. The difference lies in depth of research involvement and the total course breakdown:

- **Coursework Only:** All credits come from graded courses. No research component is required. Best suited to students focused on career goals in industry where coursework-based credentials are valued, or those not planning to pursue further academic research.
- **Project Option:** Includes BIOE 7945 (Master's Project, 4 SH), replacing some elective coursework. Requires a faculty advisor and results in a written Project Report. Good for students who want some research experience without committing to a full thesis.
- **Thesis Option:** Includes both BIOE 7945 (Master's Project, 4 SH) and BIOE 7990 (Thesis, 4 SH) across two consecutive semesters. Requires forming a thesis committee, conducting original research, and completing a public defense. Best for students considering a PhD or research-intensive careers.

It is possible to start undecided (registering for the Project only) and extend to a Thesis later. If you wish to do this, contact the MS Program Contact (Prof. Qianqian Fang) and Caroline Pridmore with your research advisor copied.

Handbook reference: Sections 2.3 and 2.4; Appendix C – MS Project and Thesis Track Form

Getting Involved in Research

Q: How do I get involved in research as an MS student?

MS students are not required to conduct research (the Coursework-Only option requires none), but research involvement is available through three routes:

- **Project or Thesis Track:** The most formal route. Approach BioE faculty directly to discuss possible projects. Review faculty research on the BioE Department Website and the Bioengineering Research Map. Your advisor must be a Northeastern BioE tenured, tenure-track, research, or affiliated faculty member. Complete the MS Project and Thesis Track Form (Appendix C) together with your advisor before enrolling.
- **Directed Study (BIOE 7976):** Allows you to work on a defined research project with a faculty member for academic credit (counts as an unrestricted elective). Requires departmental approval via the Directed Study Project Plan Form (Appendix B) and a registration override form. The project must differ from any thesis/project work if done with the same advisor.
- **Informal / Volunteer:** Some MS students join labs on a volunteer basis without formal credit. This is arranged directly with a faculty member and does not appear on your degree audit, but is a valid way to explore research interests.

Handbook reference: Sections 2.3 and 2.4 (Thesis and Project Options)

Q: Can I participate in research without committing to a thesis?

Yes. Both the Project Option and Directed Study allow you to engage in supervised research without writing a full thesis. The Project Option requires a written report but no defense, while a Directed Study is structured more like an independent course. You may also volunteer in a lab informally with no academic credit requirement.

Handbook reference: Sections 2.3 and 2.4;

Setting Up Your MS Project or Thesis

Q: How do I set up the MS Project (BIOE 7945) or Thesis (BIOE 7990) courses?

Follow these steps:

- **Step 1 – Find a faculty advisor.** Reach out to BioE faculty in your research area of interest. Your advisor must be a BioE tenured, tenure-track, research, or affiliated faculty member (for the Project Option, full-time faculty outside these categories may be considered by the MS Program Contact).
- **Step 2 – Complete the MS Project and Thesis Track Form.** Download the form from the BioE department SharePoint forms page. You and your advisor complete it together, outlining your project, objectives, effort expectations, and grade criteria.
- **Step 3 – Submit the form.** Email the completed form to the MS Program Contact (Prof. Qianqian Fang) and Caroline Pridmore (Assistant Director of Academic Programs). The section (BIOE 7945) will be created for you after the form is approved — do not attempt to self-enroll before then.
- **Step 4 – Submit a Registration Override Form.** Once the section is created, submit a Registration Override Form to override the Instructor Signature requirement.
- **For Thesis students (BIOE 7990):** In the semester following BIOE 7945, your advisor will arrange for a BIOE 7990 section to be created. Submit a second Registration Override Form at that time. You should also begin forming your Thesis Committee (see next question).

If you have completed both BIOE 7945 and BIOE 7990 but have not yet defended, you must enroll in BIOE 7996 (Master's Thesis Continuation, 0 SH) each semester until your defense.

Handbook reference: Sections 2.3 and 2.4; Section 1.3 – Forms

Q: How do I form a Thesis Committee?

You should begin forming your committee during your BIOE 7945 semester, in consultation with your thesis advisor. Requirements:

- Minimum of three members
- At least two must be BioE tenured, tenure-track, teaching, research, or affiliated faculty

Work with your advisor to identify suitable committee members, then reach out to each individually to confirm their willingness to serve. Once your committee is formed, coordinate with them to schedule your defense date.

Please contact Caroline Pridmore (Assistant Director of Academic Programs) at least two weeks before your planned defense date to arrange room booking and announcement. Your complete thesis draft must reach your committee no later than one week before the defense.

Handbook reference: Section 2.3 – MS Program Thesis Option Requirements

Co-op

Q: Is co-op required as part of the MS degree?

No. Co-op is not a required component of the MS in Bioengineering. It is an optional experiential learning opportunity. Review full eligibility requirements on the Masters Co-op Page.

Handbook reference: Section 8 – Co-op & Experiential Learning

Q: Can thesis students complete a co-op without delaying graduation — is it realistic to do a thesis, a co-op, and graduate in two years?

This is possible, but requires careful planning. A standard two-year thesis timeline (without co-op) looks roughly like:

- Year 1 Fall/Spring: Core and concentration courses
- Year 2 Fall/Spring: BIOE 7945 (Project), BIOE 7990 (Thesis) + remaining elective courses

A co-op is 4, 6, or 8 months. Inserting a co-op generally adds one or more semesters to graduation.

Whether this is feasible depends heavily on your research scope, advisor flexibility, and course availability. We strongly recommend discussing this plan explicitly with your thesis advisor and the MS Program Contact before committing to a co-op.

Handbook reference: Section 8 – Co-op & Experiential Learning; Sections 2.3 and 2.4

Graduate Certificates

Q: What graduate certificates can be completed with minimal additional coursework alongside the MS?

The handbook notes that MS students may pursue engineering graduate certificates in addition to or in combination with their MS degree. The full list of COE graduate certificate options is available on the Northeastern Graduate Certificate Programs page.

One certificate with a specific integrated pathway in the handbook is the Gordon Institute Engineering Leadership Certificate:

- **Graduate Certificate in Engineering Leadership (Gordon Institute):** An integrated 33 SH program that combines the MS BioE degree with the 16 SH Engineering Leadership curriculum, requiring only 17 SH of BioE technical courses (versus 28–32 SH in the standard MS). Students must apply and be admitted to the

Gordon Engineering Leadership Program separately. More information is available at the Gordon Institute page.

For certificates with strong overlap with MS BioE electives — such as the Nanomedicine certificate — see the next question.

Handbook reference: Section 2.5 – Graduate Certificate Options

Q: Can courses count toward both the MS degree and a graduate certificate? Is there a list of those courses?

Yes — in general, courses can count toward both an MS degree and a graduate certificate, subject to the rules of each individual certificate program. This is commonly referred to as 'double-counting' and is permitted at Northeastern for graduate certificates.

The Nanomedicine Graduate Certificate is a frequently cited example for BioE students. It includes courses already available as BioE electives, such as NNMD 5370 (Nanomedicine Research Techniques) and NNMD 5470 (Nano/Biomedical Commercialization: Concept to Market), both of which appear on the MS Concentration 2 (Biomedical Devices and Bioimaging) and Concentration 3 (Molecular, Cell, and Tissue Engineering) elective lists. The full certificate requirements are listed in the Graduate Catalog.

To explore which courses in your concentration overlap with a certificate of interest, we recommend:

- Reviewing the relevant certificate listing on the Graduate Certificate Programs page
- Comparing against your concentration's elective list in the MS Handbook
- Consulting with your faculty advisor or the MS Program Contact (Prof. Qianqian Fang) to plan an efficient combined pathway

Handbook reference: Section 2.5 – Graduate Certificate Options; Concentration Elective Lists

Course Planning

Q: Are there courses that are only offered once per year and require early planning?

Yes — several courses in the MS program are offered only once per year, typically in either Fall or Spring. Enrolling in the wrong semester can delay your graduation, so prioritize required coursework first.

The handbook does not currently include a term-by-term course availability schedule, but the department emails out a yearly course offering plan each semester. We recommend:

- Reviewing the Northeastern Course Catalog for offerings
- Checking the course schedule at the start of each registration period on Student Hub (myNortheastern)
- Reviewing the departmental course offering map to inform your course plans.

Handbook reference: Section 2 – MS Course Requirements (Concentration-specific)