

## **Report to the President for year ended June 30, 2024, Department of Biological Engineering**

### **Graduate Education**

Our current enrollment is 144 graduate students, predominantly in the PhD program. The department graduated 17 PhD students for the AY2024 academic year. Our graduate student population represents women and men in roughly equal numbers. 13% of our graduate students are from underrepresented populations. Our AY 2024 application cycle had a 5 % admittance rate. 58% of our students that we admitted decided to come to the program. The Department is proud of the leadership of our graduate students, both while at MIT and after they graduate and help to grow the field through innovation and impact. This impact is shown through the many Institutional awards they have won, the leadership they show when they graduate, and the accolades they receive in their careers.

### **Undergraduate Education**

We are excited about the continuing growth of our pioneering Course 20 SB Major program. We had 49 graduating seniors in 2024 and hosted approximately 50 seniors, 38 juniors, and 50 sophomores for the AY2024 academic year. Our undergraduate class is comprised of 70% women and 31% underrepresented students. From our perspective, there is no similar undergraduate degree program elsewhere nationally that is centered on genetics, biochemistry, molecular biology, and cell biology as its science foundation and that fuses this science with quantitative, integrative-systems design-oriented engineering principles and approaches (e.g., thermodynamics, kinetics, mechanics, transport, fields, instrumentation, and computation), including two hands-on laboratory subjects. Our uniquely educated Course 20 students continue to find attractive career opportunities across a spectrum of industrial, academic, and professional areas. About 50% of our AY 2024 undergraduates went onto postgraduate studies (MD, MD/PhD, or PhD). 45% went to industry or academic research jobs. We also continue to administer two SB minor programs, in biomedical engineering (BME) and in toxicology and environmental health (Tox/EH). In addition, we administer a five-year MEng program in a biomedical engineering, bioengineering track.

### **Research**

During fiscal year **2024**, total amount of sponsored research volume supervised by BE faculty members was approximately **\$67** million. This figure includes sponsored projects formally administered by the department (more than **\$32** million), as well as projects directed by BE faculty members supervised administratively within other departments and centers, including but not limited to the Center for Biomedical Engineering, Center for Environmental Health Sciences, Computational & Systems Biology Initiative, Division of Comparative Medicine, Institute for Medical Engineering and Science, and Koch Institute.

Major research areas within BE include biomaterials; biomolecular engineering; cell and tissue engineering; computational biology and bioinformatics; discovery, design, and delivery of molecular therapeutics; molecular and cellular biophysics; infectious

disease and immunology; microbial ecosystems; neurobiology and neuroengineering; molecular epidemiology; molecular toxicology; agriculture and climate change; plant engineering; bio-manufacturing; bio-mining, and synthetic biology.

### **Resource Development**

Biological Engineering had a strong fundraising year in FY24, with \$6,513,188 in new gifts and pledges. Of note, the department received generous support from several foundations, including research in acute and chronic Lyme disease as well as Alzheimer's Disease. The department will continue to prioritize building its fundraising pipeline in collaboration with Resource Development, the Alumni Association, and other campus partners.

### **Paul Blainey and Anders Sejr Hansen Faculty Promotions**

Paul C. Blainey's Full Professor promotion case was presented to EC in AY24 with a start date of July 1, 2024. Paul joined the faculty at the start of 2012, focusing his lab on engineering molecular, instrumentation, and computation-based technologies, conducting both fundamental and applied research. Through prodigious teaching and the supervision of over 30 PhD trainees, he has inspired countless students and colleagues. Paul is a Core Institute Member of the Broad Institute.

Anders Sejr Hansen's Professor without Tenure case was presented to Engineering Council in AY24, with a start date of July 1, 2024. Since joining the faculty in 2020, Anders' innovative research has focused on unraveling the complexities of gene expression regulation in mammals. He continues to make an impactful contribution to our academic community through his commitment to our graduate program. In 2021, as an Assistant Professor, Anders received the Pew-Stewart Scholar for Cancer Award for his outstanding promise in science relevant to advancing a cure for cancer. Anders is the Class of 1943 Career Development Professor.

### **New Faculty Hiring**

Jessica Carol Stark, PhD joined BE in December of 2023. Jessica received her BS from Cornell University and her PhD Northwestern University. Jessica came to us as an American Cancer Society Postdoctoral Fellow from the lab of Carolyn Bertozzi at Stanford University (Nobel Prize Laureate). Dr. Stark has a 0% appointment with Chemical Engineering and is a member of the Koch Institute, where her lab is situated.

### **BE Career Expo**

The 10th Annual BE Career Expo took place on MIT's campus in October 2023, bringing together 20 companies. A total of 135 undergraduates, graduate students, and postdocs participated, engaging with representatives from diverse sectors such as biotech, pharmaceuticals, biomedical, consulting, and law. This event provided students with valuable opportunities to explore career paths and network with potential employers. Notably, 16% of attendees were first-year undergraduates. Students came from a variety of departments, including Biological Engineering (BE), Chemical Engineering, Materials

Science and Engineering, Electrical Engineering and Computer Science (EECS), Mechanical Engineering, Biology, and Chemistry.

### **BE Departmental Retreat**

The BE Department Retreat was held at Hotel Commonwealth and highlighted posters and a community gathering. The speakers were from our Grad Student and Post Doc cohort, along with speakers from the US Government, and alumni from the department. Our keynote speaker was Lisa Dyson PhD from Air Protein. The next full retreat is planned for October 2024.

### **Society for Biologists and Biological Engineers (SUBE)**

The Department continued to support the student-led group, SUBE. Through generous funding from the Packard Foundation, SUBE was able to hold their first ever symposium, providing networking opportunities for underrepresented undergraduate and graduate students. The students worked during AY 2024 on planning their next symposium which is being held in November, 2024 at Endicott House.

### **Department Awards**

Ellen J. Mandigo Award for Outstanding Service–MIT School of Engineering  
Rolanda Dudley-Cowans (2023)

Infinite Mile Award–MIT School of Engineering  
Dianne Bickford (2023)  
Alexis Runstadler (2024)

National Academy of Engineering Membership  
Prof Roger Kamm (2023)

National Academy of Medicine Membership  
Prof Darrell Irvine (2023)

Society of Toxicology Education Award  
Prof Bevin Engelward (2023)

American Association for the Advancement of Science Fellow  
Prof Bevin Engelward (2023)

American Institute for Medical and Biological Engineering (AIMBE) College of Fellows  
Prof Jacquin C. Niles (2024)

Bose Award for Excellence in Teaching  
Prof Michael Birnbaum (2024)