The Department of Biomedical Engineering

at the University of Rochester

URBME

UNIVERSITY *of* ROCHESTER

MELIORA 1850

UR BME points of pride

Research and Innovation

The BME department has a robust research portfolio with internationally recognized areas of strength across the field of biomedical engineering.

UR BME researchers are:
- Forging breakthroughs in **neuroengineering** to develop new technologies for hearing loss, innovate brain-computer interfaces, advance Alzheimer's treatments, and unlock our understanding of the brain
- Innovating state-of-the-art **optical and ultrasound imaging** modalities to enhance early diagnosis of diseases such as cancer and cardiovascular disease
- Creating **advanced biomaterials** for therapeutic applications in cancer, osteoporosis, oral health, and drug delivery
- Engineering new **nanotechnologies and microsystems** for biosensors, hemodialysis, cancer detection, and biotechnology
- Advancing **regenerative medicine** to engineer tissue replacements and therapeutics for orthopaedic, cardiovascular, neural, and wound healing applications
- Developing **biomechanics and mechanobiology** approaches to improve treatments for diseases and injuries affecting musculoskeletal and ocular tissues, such as arthritis, vision care, tendinopathy, and trauma
- Translating their research to clinical and industrial practice as evidenced by patents, industry collaborations, and start-up ventures

Faculty

UR BME has an internationally-recognized, vibrant faculty with world-class research laboratories. BME faculty members have garnered numerous awards and honors for their research, innovation, and education.

- 15 of our BME faculty members are Fellows of the American Institute for Medical and Biological Engineers (AIMBE), representing the top two percent of medical and biological engineers.
- Total number and dollars of new grants awarded for the BME Department are at historic highs.
- Our BME faculty are among the finest educators in the university and have been recognized for their teaching and mentoring excellence.
- Professor Amy Lerner and Professor Diane Dalecki have been recipients of the Goergen Award for Excellence in Undergraduate Education, the highest award for undergraduate education bestowed by the University.
- The Hajim Outstanding Faculty Award was presented to Professor Jim McGrath in 2019 and to Professor Laurel Carney in 2018.
- Professor Danielle Benoit was recognized with the 2019 Award for Undergraduate Teaching & Research Mentorship.

Diversity

UR BME values and embraces an environment of diversity and inclusion to advance our research, education, and innovation missions.

- Women represent approximately 50% of our BME faculty, as well as our undergraduate and graduate student populations. The percentage of women faculty in our department far exceeds the national average of BME departments.
- Professor Amy Lerner was a recipient of the 2018 Presidential Diversity Award for her leadership of the Commission on Women and Gender Equity in Academia.
- Professors Mark Buckley and Laurel Carney were each honored with The David T. Kearns Faculty Mentoring and Teaching Awards that recognize outstanding faculty members who excel at mentoring and teaching low-income, first-generation, and/or underrepresented minority students.

Pictured above: Robert B. Goergen Hall, home to the Department of Biomedical Engineering at the University of Rochester.

Multidisciplinary Collaboration

Creative discoveries are found at the intersection of traditional disciplines, and transformational advances arise from multidisciplinary research teams. Our department offers outstanding opportunities for faculty and students to engage in multidisciplinary, collaborative research projects.

- BME faculty and students collaborate widely across the University and the School of Medicine and Dentistry (SMD).
- The BME Graduate Faculty, comprised of secondary faculty from other University departments, adds strength to our research collaborations and education programs.
- Our BME faculty are leaders of multidisciplinary centers and programs across the university.
  - Danielle Benoit is the director of the Materials Science Program.
  - Diane Dalecki is the director of the Rochester Center for Biomedical Ultrasound.
  - Greg Gdowski and Amy Lerner direct the Center for Medical Technology and Innovation.
  - Jim McGrath is the associate director of the UR Nano facility.

Undergraduate Program

The outstanding UR BME undergraduate program is one of the most subscribed majors in the Hajim School of Engineering and Applied Sciences, and offers experiences in research, design, and innovation. Our dynamic curriculum includes breadth and depth in BME and basic sciences, experience in engineering design, and development of experimental, communication, and computational skills.

- BME Senior Design, a national model for engineering design education, enables students to work with real customers to solve problems related to medical technology and health care over the course of their senior year.
- BME students concentrate their studies in biomechanics, biosignals and biosystems, cell and tissue engineering, or medical optics, or may choose to design their own path of concentration.
- Our students are well prepared for a wide range of careers as well as graduate education in engineering, medical, or professional fields.
- BME students regularly garner awards and honors recognizing their talents in academics, research, entrepreneurship, leadership, athletics, music, and the arts. Many BME students also gain enriching and educationally stimulating experiences through studying abroad.

Graduate Program

BME doctoral and master's programs provide advanced education in biomedical engineering, and opportunities for training in world-class faculty research laboratories. Our graduate students engage in research across many disciplines in biomedical engineering and tailor their research and educational experiences. Graduates of UR BME doctoral and master's programs are prepared to be leaders in industry and academia.

- The Center for Medical Technology and Innovation (CMTI) features a master's path focused on medical device design and innovation, including an intensive clinical immersion experience.
- Signature enrichment programs provide mentored career and professional development opportunities specifically for graduate students, and the BME Graduate Student Council promotes professional development, community engagement, networking and mentorship.
- BME graduate students regularly receive a wide variety of honors for their research, innovation, and teaching.
  - Doctoral students receive fellowships from the NIH, NSF, American Heart Association, and numerous other organizations.
  - Master's students in the Medical Device Design path regularly place among the winners in design and entrepreneurial competitions.
  - Our graduate students embrace teaching and mentoring. In recent years, several BME students have received the prestigious Edward Peck Curtis Award for Excellence in Teaching by a Graduate Student (Madeline Cappeloni–2019, Jacob Kallenbach–2017, Alex Kotelsky–2016).

Alumni

We are enormously proud of our BME alumni! Graduates of our B.S., M.S., and Ph.D. programs are successful in a broad range of professional careers. They pursue careers in medical device and biotechnology industries, healthcare professions, the FDA, academia, research foundations, law, entrepreneurial initiatives, and other exciting professions. Our BME alumni are leaders in their fields, whatever their chosen path.

MATT VESSA, MBA
CEO and Co-Founder of Palisade Heart
UR BME Alumnus, BS '99

DELALI ATTIPOE, MS, MBA
COO at 54gene
UR BME Alumna, BS '03

DAVID NARROW, MSE
CEO at Sonavex, Inc., Co-Founder and CEO of MonoMano, Inc.
Forbes 30 under 30
UR BME Alumnus, BS '12

CHRISTINE VIETZ, PhD
Senior Vice President, Product Development at Foundation Medicine
UR BME Alumna, PhD '01

UR BME
20 years

Celebrating 20 years of UR BME
and a vision for our future

The Department of Biomedical Engineering at the University of Rochester was formally established in July 2000. Since its inception, UR BME has become a premier biomedical engineering department, internationally-recognized for excellence in research, education, and innovation. At our 20-year point, we celebrate the talents of our undergraduate and graduate students, the growth and accomplishments of our faculty, the dedication of our administrative and technical support teams, and the vibrant achievements of our diverse BME alumni!

Looking to the future, we aim to:

Enhance our research enterprise

• Recruit new BME faculty of the highest caliber to keep UR BME on the forefront of innovations in healthcare and medical technology.
• Increase the strength and international visibility of our research enterprise by building upon our areas of expertise in biomechanics, biomedical optics, biomedical ultrasound, biomaterials, bio-nanotechnology, neuroengineering, tissue engineering and regenerative medicine.
• Establish new centers of excellence in BME that harness our foundational strength in multidisciplinary research and innovation.
• Expand our research infrastructure and core facilities to ensure state-of-the-art research capabilities for our students and faculty.

Enrich our educational programs

• In the spirit of Meliora, continually improve our academic curricula to provide leading-edge education and training for our BME students.
• Grow the size of our doctoral and master's programs to increase the impact of our advanced education and research programs.
• Ensure access for all BME students to opportunities for research experiences.
• Expand participation of BME students in academic enrichment programs, such as study abroad, research experiences, internships, community engagement, and other university programs.

Expand our industry partnerships

• Increase industrial collaborations with BME faculty laboratories on projects of mutual benefit.
• Enhance interactions between industry partners and BME graduate and undergraduate students through internships, design and innovation projects, site visits, and career mentoring.
• Develop new opportunities to incorporate industrial perspectives, expertise, and business insights into our educational programs.

Engage our alumni and community

• Embrace the diversity of our alumni, students, faculty, and staff to enrich our research, education, and innovation missions.
• Encourage our alumni to remain connected to our BME department through avenues of active participation.
• Strengthen our connections with community partners to enhance student experiences, faculty collaborations, and innovation opportunities.

Stay engaged with our BME Department

Our BME students' educational experiences and our departmental research and innovation are uniquely enhanced through the participation of alumni, industry, and community partners. Please consider connecting with us through one of the avenues listed below, and contact Department Chair Diane Dalecki (dalecki@bme.rochester.edu) to learn more or to explore other ways to engage with UR BME!

Student Project Customer

Could your company, laboratory, or clinical practice use a fresh perspective on an engineering problem? Each year, students in our undergraduate Senior Design experience, and Master's students in our Medical Device Design program, partner with companies, researchers, and clinicians to solve problems through developing medical devices and research instruments. Consider being a customer for a student design project.

Research Collaborator

Collaborate with our world-class faculty in state-of-the-art laboratories to advance research in biomedical engineering. Whether you are in industry, academia, or healthcare, our faculty and students welcome new collaborative opportunities to advance novel research initiatives.

Mentor a Student as a "Real Reader"

BME alumni can mentor current engineering students as they develop resumes and cover letters, practice spoken communication skills, and reflect on their career goals. Volunteering as a "Real Reader" for a required course called Communicating Your Professional Identity is a meaningful way to give back without a large time commitment.

Industry Partner

Consider a partnership between your company and our BME department. Industry partnerships can include joint research initiatives, design projects, student internships, and other opportunities of mutual benefit.

Teacher

Contribute your expertise to our BME courses and educational programs. Your knowledge and perspective can offer new dimensions to our courses, student experiences, projects, and academic programs.

Career Advisor

Interested in sharing your experience with the next generation of biomedical engineers? Help BME students navigate the next steps of their careers through one-on-one conversations or participating in a BME Career Conversations session.

Donor

Support our BME students, research, and educational programs through philanthropy.

Visitor

Come back to Rochester and visit the BME department and our students! Let us know when you will be in Rochester and we will work with you to schedule opportunities for you to interact with students, faculty, and staff.

W. SPENCER KLUBBEN, MS

"As an alumnus, it is extremely gratifying to give back to such an amazing department at the UR. It's a privilege to challenge such a creative and bright group of engineering students, to witness what they come up with, and to see how they challenge you in return!"

-W. Spencer Klubben, Product Manager
Foundation Medicine
UR BME *Alumnus, BS '13, MS '14*

SARA HALTON, JD

"The Real Reader program provides a great opportunity for alumni to get involved with current students. The students with whom I've interacted are engaged and excited for the opportunity to connect one-on-one with department alumni."

-Sara Halton, Senior Patent Counsel
adidas/Reebok
UR BME *Alumna, BS '04*

NATHAN ALVES, PhD

"It's amazing to be able to help shape a student's future simply by sharing my experiences through a few mentoring interactions over the course of a semester."

-Nathan Alves, Assistant Professor
Indiana School of Medicine
UR BME Alumnus, BS '07, MS '08

Help shape the future of UR BME

Department Funds
Your contribution to one of the following BME Funds will have immediate impact on the mission of the BME department.

BME Undergraduate Program Fund (Rochester.edu/giving/bmeundergrad)
The BME Undergraduate Program fund supports activities associated with the BME undergraduate program, including student awards and scholarships, undergraduate student research projects, travel for undergraduate students to attend scientific conferences, senior design projects, the UR BMES Student Chapter, undergraduate teaching laboratories, undergraduate curriculum development, broadening participation in BME, and new initiatives in undergraduate education. (A12748)

BME Graduate Programs Fund (Rochester.edu/giving/bmegrad)
The BME Graduate Programs Fund supports activities associated with BME doctoral and master's programs, including awards and scholarships, support for student research projects, graduate student professional development activities, travel for graduate students to attend scientific conferences, graduate curriculum development, broadening participation in BME, and new initiatives in graduate education. (A12746)

BME Research and Innovation Fund (Rochester.edu/giving/bmeresearch)
The BME Research and Innovation Fund supports activities associated with advancing BME research and innovation, including pilot funds for new research initiatives, shared instrumentation and core research labs, industry engagement with BME research, and support for innovative design projects and clinical translation. (A12747)

Transformational Impact
Your support can have a transformational impact on our BME department and a profound effect on human health. Please consider any of the following opportunities.

Student Scholarships
Scholarships enable BME undergraduate and graduate students to achieve their greatest potential at the UR. Scholarships remove financial barriers, ensuring educational opportunities for our diverse and talented student body. Graduate student fellowships accelerate the growth of our BME doctoral program.

Endowed Professorships
The success and stature of our BME department is directly attributable to the highest caliber of our faculty. Endowed professorships enable us to expand and strengthen our department by attracting world-class leaders in BME research and education to our faculty.

Research and Innovation Centers
Multidisciplinary collaboration is at the core of advances in research and innovation in BME. Research centers that bring together faculty, students, and other collaborators provide a rich environment for sparking scientific breakthroughs and fostering student training. Your support for the development of new centers of excellence can have a transformational impact on our BME department.

Industry Partnerships
Partnerships with industry provide exciting opportunities for student training and research initiatives. Industrial partnerships with our BME department can include support for joint research initiatives, enhancement of research infrastructure, student internships and fellowships, and other opportunities.

Core Facilities
Help us stay on the leading-edge of the field of biomedical engineering by ensuring that our core research laboratories and education facilities are state-of-the-art. Expanding the capabilities of our BME core facilities in microscopy, mechanical testing, imaging, fabrication, and cell culture enables us to train our students to the highest standards and lead new innovations in biomedical engineering research.

Research and Entrepreneurial Seed Funds
BME faculty and students thrive on invention and innovation! Research and Entrepreneurial Seed Funds enable our students and faculty to forge new discoveries, advance their ideas into practice, and close the gap between prototype and clinical translation.

To learn more about opportunities for impact on the University of Rochester Department of Biomedical Engineering, please contact BME Department Chair Diane Dalecki at dalecki@bme.rochester.edu or Associate Director of Advancement Derek Swanson at derek.swanson@rochester.edu (585-273-1341).