



The Institute of Biomedical Engineering (iBME) seeks to develop and implement life-enhancing biomedical engineering solutions, which will be accomplished by uniting and leveraging the resources of diverse disciplines throughout the University of Tennessee System.

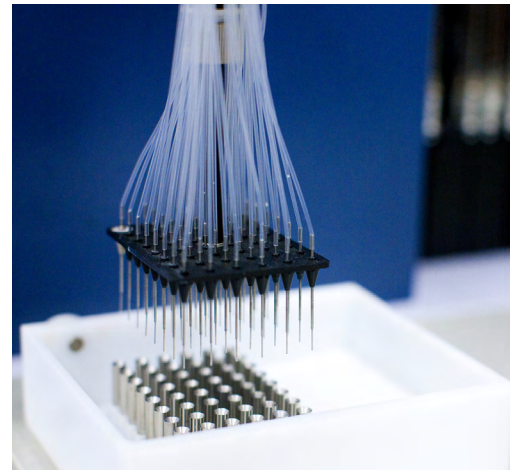
The College of Engineering and the Office of Research & Engagement at the University of Tennessee, Knoxville, in collaboration with the UT Graduate School of Medicine and UT College of Veterinary Medicine, established iBME to facilitate multi-disciplinary solutions to medical problems

such as devices for improved delivery of medications and monitoring of patients; better imaging technology; regenerative models to help the body heal itself; and optimized efficiency in the healthcare setting.

Finding answers to these and many other healthcare problems is possible through the collaborative environment that is the essence of iBME.

While the Institute is based in the UT College of Engineering, it aspires to be a bridge between a number of disciplines including engineering, medicine, veterinary medicine, arts and sciences, nursing, agriculture, and others.

iBME provides a unique opportunity for UT to respond to the growing demand for education and research opportunities in the rapidly expanding field of biomedical engineering within the region, nation, and world.



INSTITUTE GOALS

- Facilitate multidisciplinary research teams to address priority healthcare problems and challenges.
- Offer a high quality graduate-level biomedical engineering academic program.
- Serve as a regional resource to improve the general public's understanding of biomedical engineering.
- Establish outreach to area educators and students to develop interest in and knowledge of the field.

ACADEMICS

The Institute offers MS and PhD degrees in biomedical engineering. These degree programs are administered and provided by faculty from various departments in the College of Engineering. Students have the option of majoring in biomedical engineering or a related discipline such as Chemical and Biomolecular Engineering with a focus in BME. Entrance and degree requirements have been developed to encourage prospective students from both the sciences and engineering. The curriculum includes the full spectrum from foundational courses through state of the art topical courses (ibme.utk.edu/education).

RESEARCH FOCUS

The Institute emphasizes translational technologies—patient-specific medicine (precision medicine), patient-centric translational research, and big data—that would positively assist the country's effort to find cures to long standing diseases and to adjust to the increasing aging population. Current iBME development initiatives include:

- Healthy Aging
- Orthopedic Modeling, Device Development, and Surveillance
- Healthcare Engineering and Triage
- Medical Imaging
- Organ on a Chip

iBME Technical Community

iBME has the opportunity and the challenge to facilitate the integration of diverse engineering, science, and medicine-related units on campuses across the state into unique research and development teams.

Through the Institute, students and faculty, across this spectrum, are strengthened in their pursuit of world-class biomedical research.

Currently, partner institutions include:

UT, Knoxville:

- College of Engineering
- College of Arts and Sciences
- College of Nursing
- College of Education, Health, and Human Science
- Haslam College of Business
- Center for Environmental Biotechnology

UT System:

- Health Science Center
- Graduate School of Medicine
- College of Veterinary Medicine
- UT Institute for Agriculture

Region:

- Oak Ridge National Laboratory
- Various Biomedical-related Corporations



OUTREACH

The Institute strongly believes in community engagement. This outreach includes education, engagement, and service and aspires to enrich the regional and state communities through a number of partnerships.

The outreach goals of iBME include providing a regional resource to improve the general public's understanding of biomedical engineering and reaching out to K-12 educators and students to develop interest and knowledge in biomedical engineering. The Institute's faculty continually shows their support for community outreach and education year after year. Beyond the classroom, a range of presentations are available to a wide audience varying from local recreation centers to large-scale education seminars within the community.

Through student education, iBME strives to provide an understanding of the applications of biomedical engineering through science, technology, engineering, and math.

Current activities range from single presentations to week long programs.

Some of the programs iBME faculty supports include:

- Pre-Collegiate Research Scholars Program (PCRSP)
- Governor's School for the Sciences and Engineering
- Engineers Day
- High School to Engineering Systems (HITES)
- Engineering VOLunteers for Tenth Graders (eVOL10)
- Medical Explorations Program
- Tennessee Junior Science and Humanities Symposium
- Tennessee Science Olympiad
- Farragut High School Science Academy

RESEARCH STRUCTURE

The iBME technical community is organized into working groups that are structured around specific research areas and interests. Working groups are dynamic and are expected to change as a function of research priorities and opportunities. The current set of working groups is highlighted below.

Healthcare Engineering and Bioinformatics

Application of the latest biomedical engineering research in enhancement of the healthcare field, specifically process modeling and optimization, healthcare delivery, assistive technologies, patient informatics, diagnostic and treatment protocols.

Systems Modeling and Simulation

Pursue research and development in systemic physiologic modeling as well as detailed high fidelity modeling of specific regions and functions in order to better understand patient responses to treatment, new technology for improved patient care and well-being, and enhanced simulation.

Medical Sensors and Devices

Development of novel sensors and devices enabling diagnostic and therapeutic applications in both normal and diseased physiologic structures and systems, assistive technologies, patient informatics, diagnostic and treatment protocols.

Biomechanics

Merging expertise in engineering, anatomy, medicine, orthopedics, and

sport science to model and study the structure and motion of the human body, and its application in orthopedic implant and prosthetic design, kinematic analysis, and computational biomechanics.

Multi-Scale Imaging

Development of innovative translational imaging technologies, methods, techniques, and compounds utilizing cross-disciplinary expertise from clinical and preclinical imaging, engineering and computer science.

Systems Biology and Molecular Medicine

Translate experimental and computational system biology at the molecular, cellular and organismal levels into an integrated drug discovery, design, development and delivery pipeline.

Biomaterials and Regenerative Medicine

Leverage technologies including genetic engineering, tissue engineering, biomaterials, and multipotent cells to develop in vitro assays, optimal biomaterial-tissue interfaces, tissue replacements, or targeted human tissue regeneration.

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INSTITUTE OF
 BIOMEDICAL ENGINEERING

The University of Tennessee is an EEO/AA/Title VI/Title IX/Section 504/ADA/ADEA institution in the provision of its education and employment programs and services. All qualified applicants will receive equal consideration for employment without regard to race, color, national origin, religion, sex, pregnancy, marital status, sexual orientation, gender identity, age, physical or mental disability, or covered veteran status.