Department of Bioengineering

Master of Technology in Bioengineering

Indian Institute of Science

Bengaluru

THE DEPARTMENT

Introduction

The tremendous advances in the recent years in our ability to observe, understand, and manipulate biological systems have spawned the promising and fast-growing discipline of Bioengineering. We are poised to see major contributions from the discipline, impacting global efforts to address the key challenges our society faces, from food and energy security to healthcare and environmental preservation. The M. Tech. program in Bioengineering is envisioned as a means to produce highly trained professionals who can occupy the centre-stage in catalysing the transformations that the discipline promises.

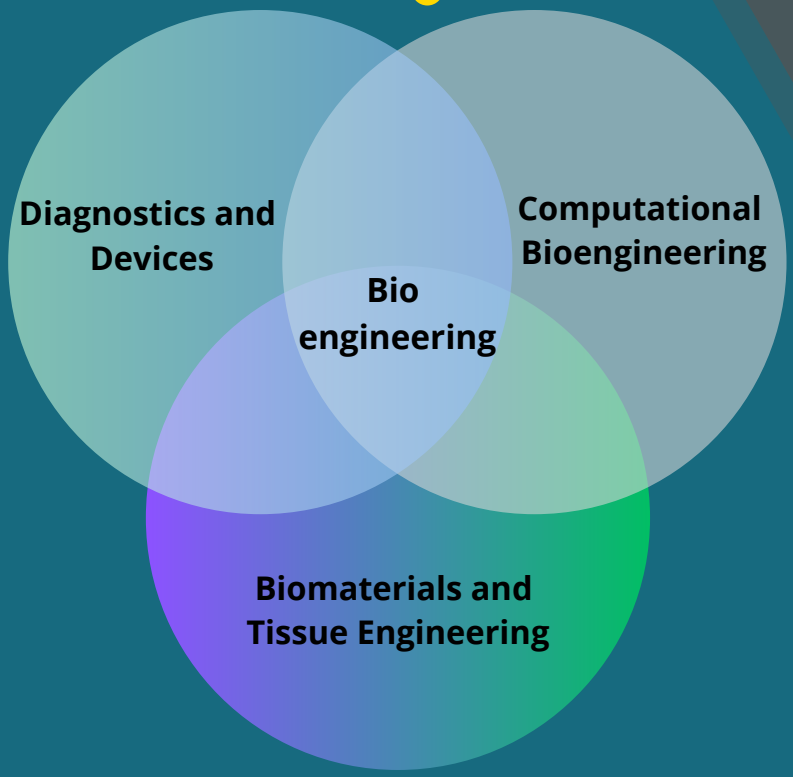
Bioengineering has caught the imagination of many bright undergraduate students, majoring not only in biotechnology and allied streams, but also in traditional streams like computer science and chemical engineering. The M. Tech. program offers a much needed avenue for such students to pursue their interests and mature into professionals who could make lasting contributions.

Recognizing the diversity of pursuits in Bioengineering, the program offers core courses, central to Bioengineering, and a set of specializations representing key modern divisions in Bioengineering today. The program envisions strong connects with the industry. The curriculum has been designed with inputs and feedback from industry stakeholders. Throughout the program, participation of colleagues from the industry is involved. In addition, training in communication, management, and entrepreneurship are proposed, which would render graduates well suited to positions in the industry.

OUR USP

1. Interdisciplinary program involving students from various background including Biomedical, Biotechnology, Chemical, Electrical, Mechanical Engineering and many more.
2. Industry internship experience.
3. Industry Collaborative interdisciplinary projects.
4. State-of-the-art research facilities.

CURRICULUM



COURSES

- Fundamentals of Bioengineering
- Biology for Engineers
- Mathematical Methods for Bioengineers
- Data Science for Bioengineers
- Essentials of Research and Innovation
- Fundamentals of Bioengineering
- Industry Seminars

INSTITUTE ELECTIVES

- Chemistry for Bioengineers
- Introduction to Biomaterials Science
- Neural Signal Processing
- Medical Imaging
- Cell Mechanics
- Data Analytics
- Microfluidics
- Drug Delivery
- Biophysics
- Devices and Diagnostics
- Stem Cell Technology
- Design of Biomedical Devices and Systems

THE FACULTY

Kaushik Chatterjee
(Professor & Chair)
Biomaterials; Tissue Engineering;
Biomedical Devices;
3D Printing

Ajay Tijore
(Assistant Professor)
Cancer and stem cell
mechanobiology

Bhushan Toley
(Associate Professor)
Point-of-care medical
diagnostics,
paper-based microfluidics

Deepak Kumar Saini
(Associate Professor)
Signaling in aging,
inflammation and infection,
Mycobacterium tuberculosis.

Mohit Kumar Jolly
(Assistant Professor)
Computational Systems Biology,
Cellular networks, Physics of Cancer

Medhavi Vishwaakarma
(Assistant Professor)
Epithelial mechanobiology,
cell competition, cancer initiation

Nagasuma Chandra
(Professor)
Cell modelling, Computational
system biology, structural bio
informatics and drug discovery

Narendra M Dixit
(Professor)
Computational biology;
Infectious diseases,
Theoretical immunology

Prerna Sharma
(Associate Professor)
Soft matter, Biophysics

Prosenjit Sen
(Associate Professor)
Microfluidics

Rahul Roy
(Associate Professor)
Single molecule biophysics, Metagenomics, Diagnostics, Microfluidics and Virology

Ramray Bhat
(Associate Professor)
Biological Morphogenesis

Rachit Agarwal
(Assistant Professor)
Drug delivery and tissue engineering

SP Arun
(Professor)
Neuroscience; Image processing; Signal processing

Siddharth Jhunjhunwala
(Associate Professor)
Immuno-engineering, Biomaterials, Drug Delivery

Sanhita Sinharay
(Assistant Professor)
Molecular imaging, contrast agent development in vivo translation

Vishwesha Guttal
(Associate Professor)
mathematical modelling and large-scale data analysis of biological systems

Industry collaborations

MetFlux RESEARCH

ACHIRA

VANTAGE RESEARCH

SIEMENS Healthineers

Batch of 2024

Abhinav Raghunath

Passionate about clinical and translational immunology research and data science for clinical application. I excel at analyzing large datasets to drive research decisions and identify opportunities for improvement in patient care.

Aditi Joshi

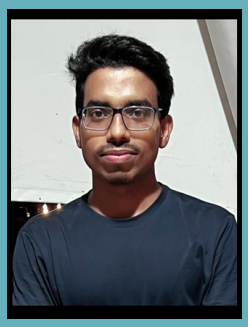
I am a Bioengineering graduate currently working on inducing osteogenesis using mechanical forces with the aim of creating 3D transplant grafts. My background is in the field of biotechnology and my interest lies in tissue engineering, immunology and genetic engineering. Having had an opportunity to intern at a diagnostics and assay development based company, I wish to be a part of the dynamic industry of bioengineering, to enhance my knowledge and skills.

Amruth Deepak Bhatt

"My primary interests involve employing systems biology techniques, both experimental and computational to unravel biological mechanisms behind various phenotypes. I am competent in MultiOmics, Flow Cytometry and Molecular characterization techniques. I have research experience in the fields of brain cancer omics, biomarker identification, image analysis and signaling pathway/network based analytics."

Arka Roy Choudhury

I am a Bioengineering graduate working in the field of mechanobiology, to study the effect of mechanical forces on patient derived oral cancer associated fibroblasts. My interests align to early detection and therapy of cancer and point of care diagnostics. I have interned in an industry and worked on assay development for point of care diagnostics, and I further wish to be a part of an industrial setup in the field of Bioengineering.



Ashish Kumar

I studied Biotechnology and love using machine learning to solve health challenges. I built a system for predicting lung diseases during an internship and now focus on immune response modeling for my MTech project. I want to work as an ML engineer or data scientist, preferably in Bioengineering.

Hrishikesh Kumbar

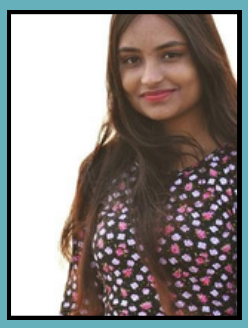
A bioengineering graduate working on a cancer research project. Employing a multiomics and computational modeling approach, my work focuses on unraveling cancer metabolism to identify potential therapeutic targets. With my background in mechanical engineering , my passion for biomechanics and medical devices drives me to merge mechanical engineering principles with biological complexities, aiming to innovate healthcare solutions.

Madhumitha S

An aspiring bio-engineering student interested in working on a diverse and exploratory environment in the field of oncology. I am currently working on investigating the association between morphological and migratory dynamics of cancer cells on different substratum.

Mahalakshmi R

I have pursued my undergrad in Pharmaceutical technology and my project focused to understand the mechanism of action of 3 plant defebsins known to exhibit bactericidal activity through phenotypic studies. Currently I'm pursuing masters in bioengineering and my project focus to develop and validate device prototypes for rapid urinary tract infection diagnosis based on the insights, I gathered through market survey conducted in various healthcare settings.



Sayantani Garai

I come from a biotechnology background with a passion for interdisciplinary research and a zest to unite biology and computational sciences. I am currently working in developing computational models for CAR T-cell therapy in cancer, and looking for opportunities in clinical pharmacology, drug development and data sciences.

Shekhar Mohite

I hold a degree in Electrical Engineering and am presently engaged in mechanistic modeling for innate immune pathways. With hands-on experience from internships and academic projects in machine and deep learning, specifically in Computer Vision and Natural Language Processing, I am enthusiastic about applying my skills to contribute to innovative projects within a dynamic team environment.