



भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

Biomedical Engineering

Where the boundaries between disciplines fade !

PhD Admissions Brochure
(2021 - 2022)



PhD Admissions @ Biomedical Engineering

The Department of Biomedical engineering at Indian Institute of Technology Hyderabad (IITH) welcomes applications from suitably qualified and highly motivated students, willing to pursue research in the following research areas.

- Bio-nanotechnology & Nanomedicine
- Ultrasound Imaging & Therapeutics
- Biofabrication & Tissue Engineering
- Biomicrofluidics & Biomechanics
- Nano Medicine & Regenerative Medicine
- Neurotechnology & Neuroscience
- Computational Neurosciences
- Biomedical Imaging
- Regenerative Medicine & Stem Cell Research
- Computational Systems Biology and Biomechanics



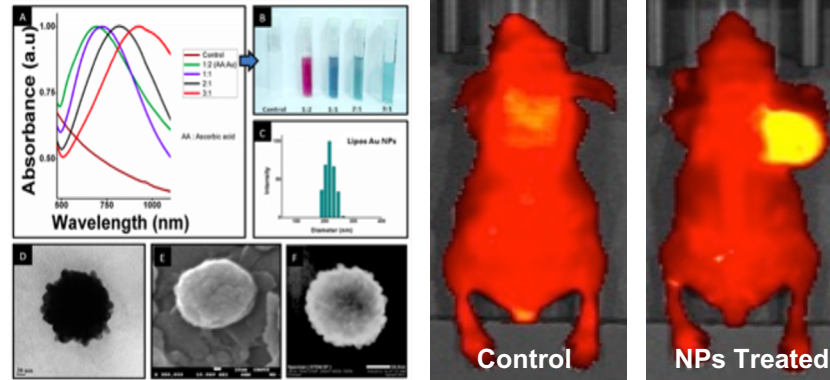
IITH Hostels

Bio-nanotechnology and Nanomedicine

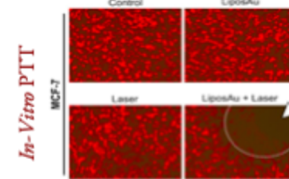
Dr. Aravind Kumar Rengan

- Nanomedicine
- Cancer Nano-Theranostics
- Nano-Biomaterials
- Triggered/Targeted Drug Delivery
- Anti-microbials, AMR
- Photon based Therapeutics

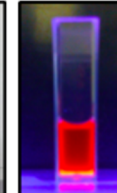
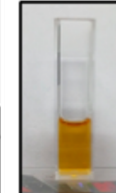
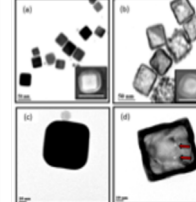
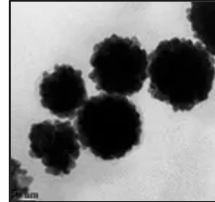
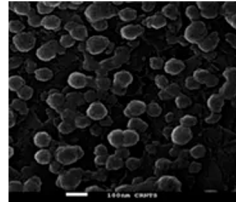
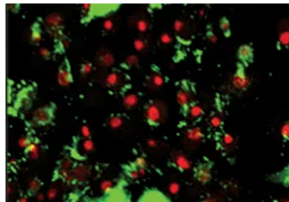
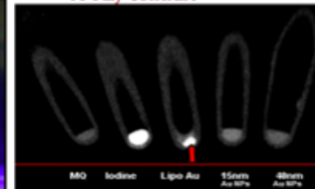
Targeted Nano Theranostics



www.pnaslab.com



X-Ray contrast



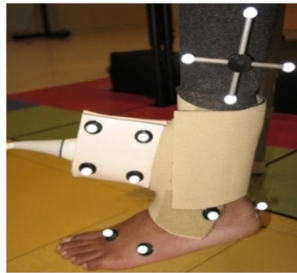
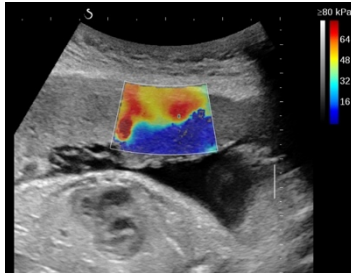
Ultrasound Imaging & Therapeutics

Dr. Avinash Eranki

My lab is focused on developing:

- Image-guided Therapeutic Ultrasound (FUS/HIFU) techniques for cancer therapy
- Liquid biopsy using Focused Ultrasound
- Ultrasound-based drug delivery
- Ultrasound Imaging for musculoskeletal applications & placental & fetal applications

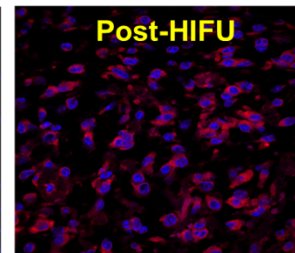
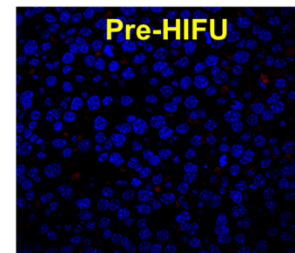
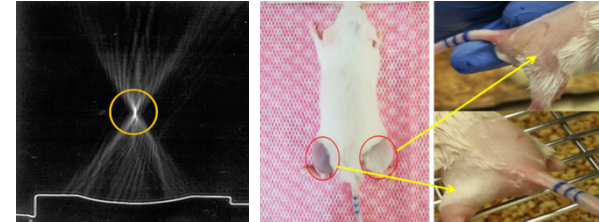
Ultrasound for Maternal/Fetal & Rehabilitation Applications



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Therapeutic Ultrasound for Cancer Therapy



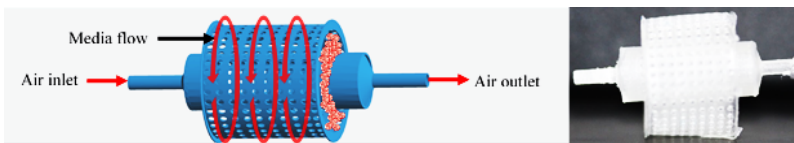
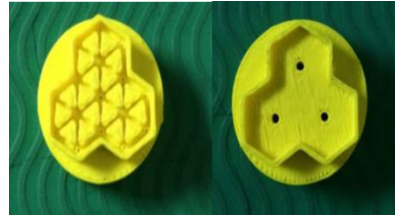
Biofabrication and Tissue Engineering

Dr. Falguni Pati

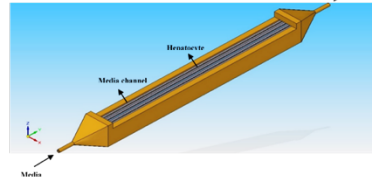
- 3D bioprinting of tissue/organ constructs for tissue engineering and regenerative medicine
- *In vitro* tissue/organ/tumor models for fundamental study and drug/toxicity testing
- Development of novel bioprintable biomaterials and bioink formulations
- 3D cell and tissue printing for personalized medicine
- 3D printed customized and personalized orthosis and prosthesis



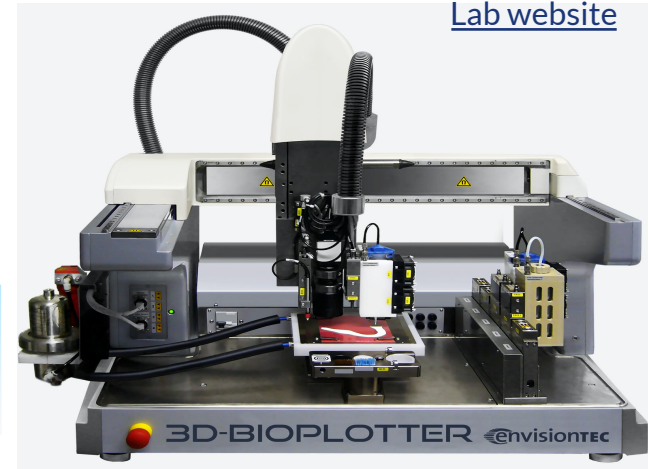
Tissue/Organ-derived bioink for 3D bioprinting



CAD Model and 3D printed structures of next generation miniature bioreactor



[Lab website](#)

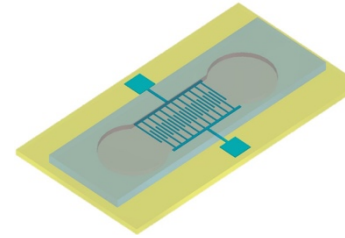


3D Bioprinting facility at Biofab lab

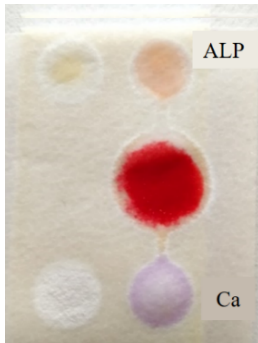
Biomicrofluidics and Biomechanics

Dr. Harikrishnan Narayanan Unni

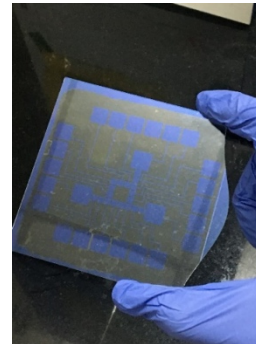
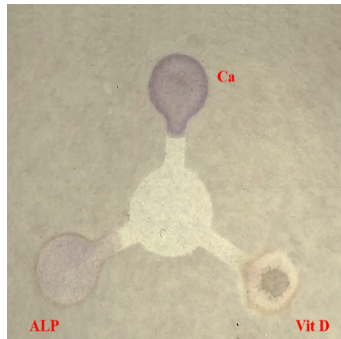
- Microfluidics and Lab on Chip for Bioengineering
- Lab on Chip for protein aggregation modelling
- Computational Biophysics and Systems Biology
- Computational Biomechanics



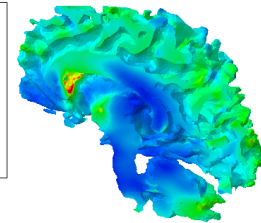
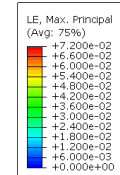
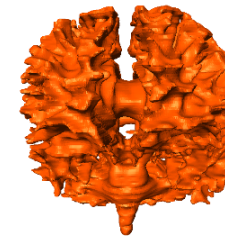
DEP Microfluidic Device



muPADs- Paper analytic devices



EWOD Electrode patterns



**White matter Strain distribution
– impact loading – FEM study**

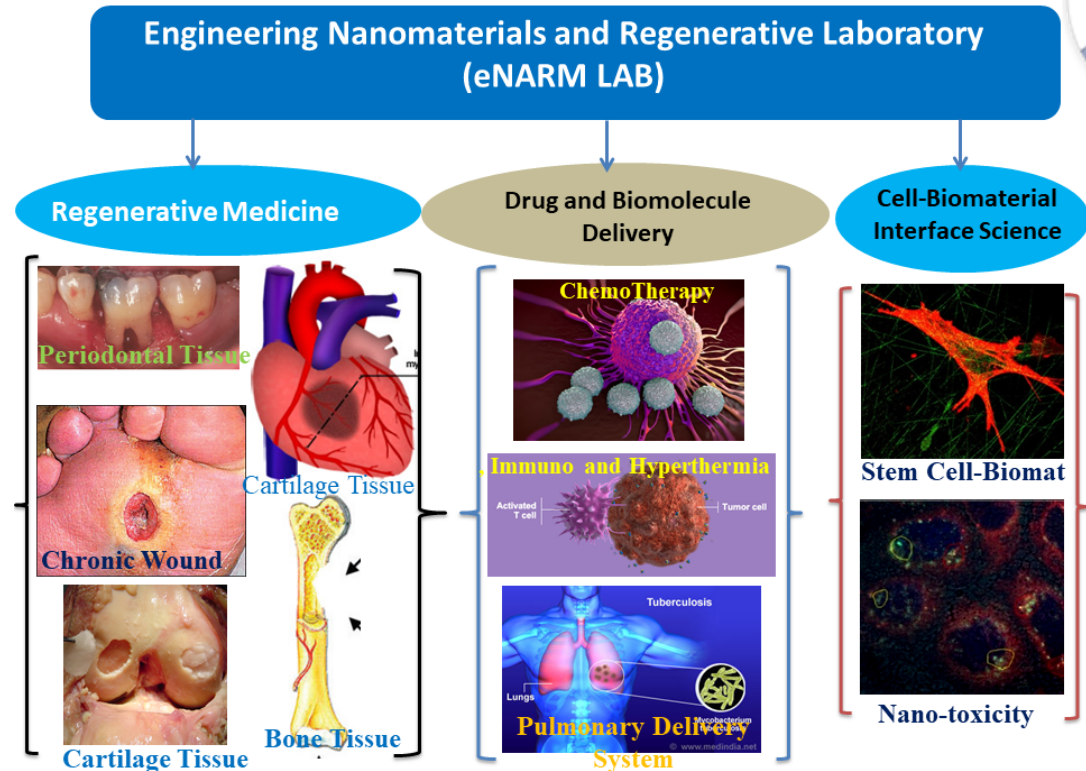
Nano Medicine & Regenerative Medicine



[Lab website](#)

Dr. Jyotsnendu Giri

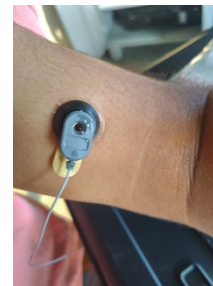
- Nano delivery system for Drug and biomolecules
- Nanomedicine for cancer stem cells therapeutics and diagnostics
- Micro/nano system for Immunoengineering and vaccine development
- Novel Biomaterials for Tissue Engineering
- Stem Cell Engineering and delivery
- Organoid for tissue model and drug screening



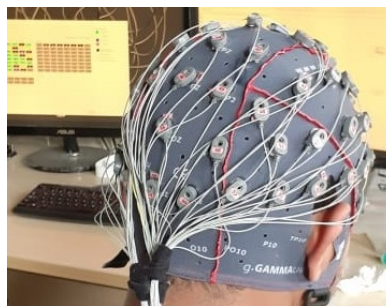
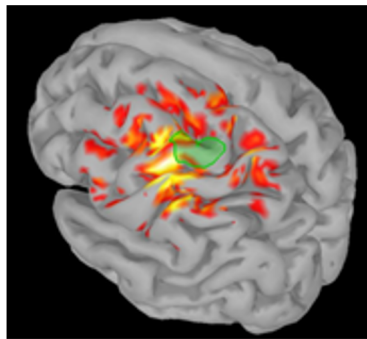
Neurotechnology and Neuroscience

Dr. Kousik Sarathy Sridharan

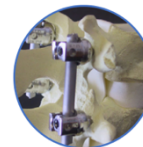
- Neuroimaging of the brain & peripheral electrophysiology
- Invasive and non-invasive neuromodulation for neurological and psychiatric disorders
- Intraoperative Neuromonitoring support systems



[Lab website](#)



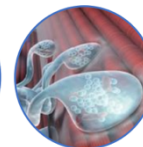
Stroke rehabilitation



Intra-operative
neuromonitoring



Disorders of
consciousness



Diagnostics for
neuromuscular
disorders

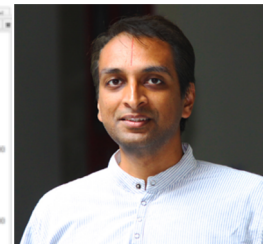
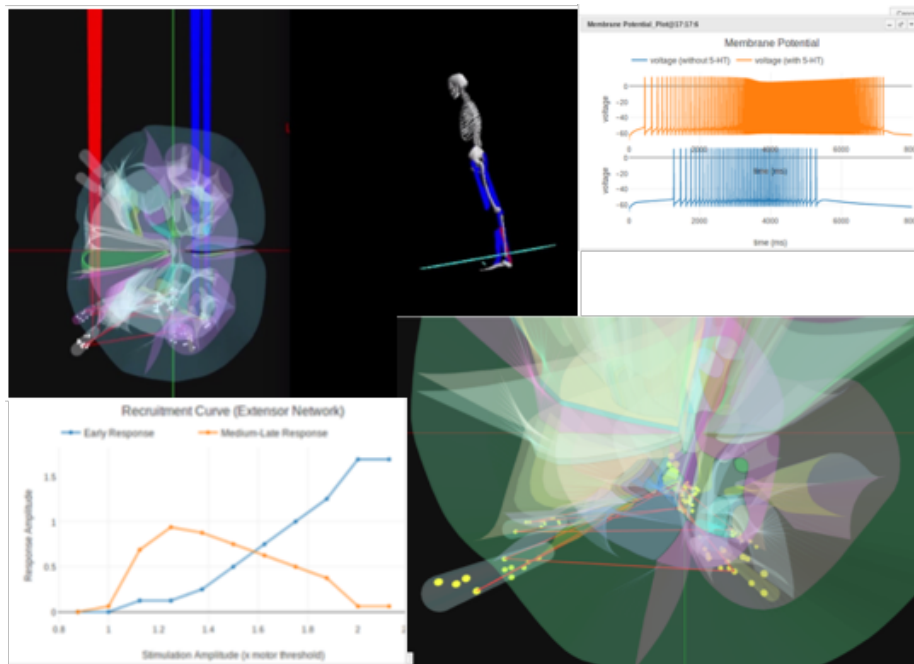
Computational Neurosciences

Dr. Mohan Raghavan

Spine Labs is focused on developing platform technologies around Neural simulation of human motor circuitry and afferent fibres. We use these simulation based technologies for advancing

- Clinical Practice & Medical device development
- Robotics and Neuromorphic technologies
- Basic science and Education

Note: Candidates with a background in programming, mechanical engg or any other quantitative sciences are preferred!!



[Lab website](#)

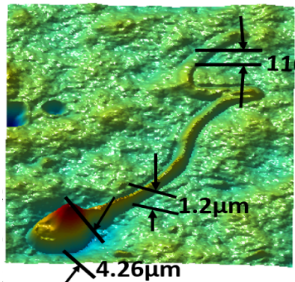
Biomedical imaging and Microscopy

Dr. Renu John

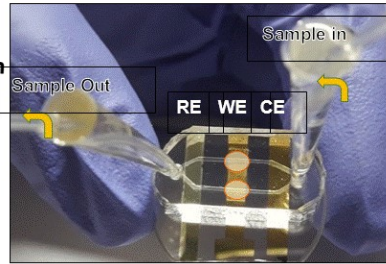
- Novel non-invasive bio-imaging techniques
- 3-D Microscopy of live cells
- Targeted molecular imaging
- Nanoparticles and nano optics
- Targeted drug delivery and Bio-photonics
- Artificial Intelligence and Machine Learning for Imaging and Microscopy
- Point of care Biosensors and Medical Devices



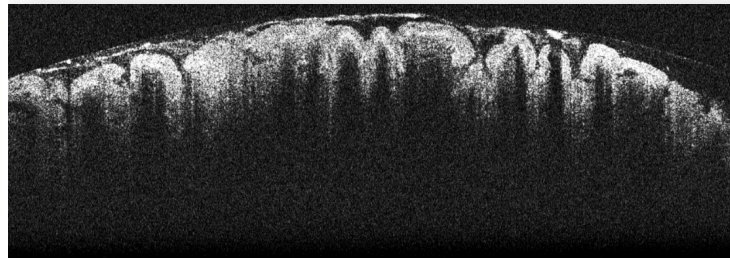
[Lab website](#)



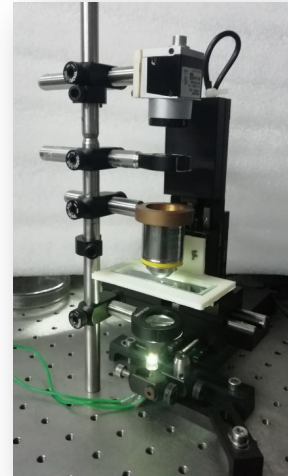
Live microscopy for IVF



Microfluidic Biomarker Detection



OCT of human GI tissue

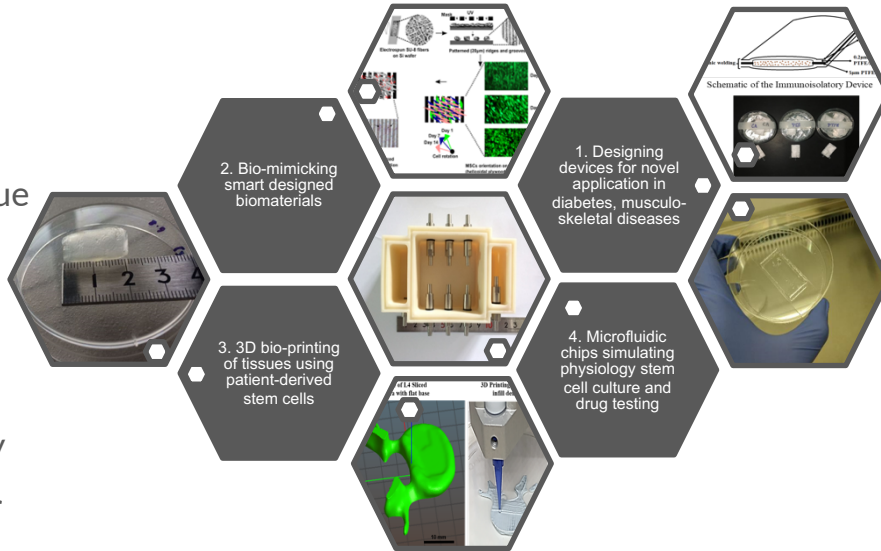


AI for Digital Pathology

Regenerative Medicine & Stem Cell (RMS)

Dr. Subha Narayan Rath

- Evaluation of in vitro stem cell-biomaterial interactions using micropatterning and nanofibers
- In vivo like bioreactor use for tissue development
- Molecular biological analysis of angiogenesis, osteogenesis, and evaluation of diabetic cell therapy
- Application of 3D-cell printing for regeneration of vascularized and osteo-chondral tissues.



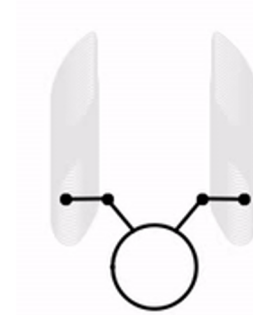
[Lab website](#)

Computational Systems Biology and Biomechanics

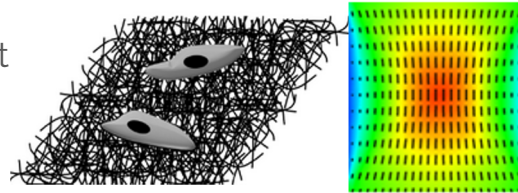
Dr. Mohd Suhail Rizvi

We utilize theoretical and computational approaches to study the biological systems in physiological contexts as well as in their engineered analogues. Our research focus includes

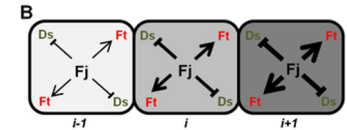
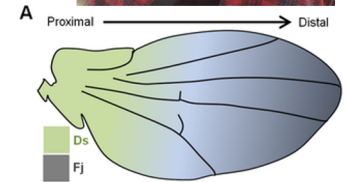
- Constitutive modeling of biomaterials
- Mechanics of active suspensions
- Systems biology of embryonic development
- Mechanotransduction in tissue engineering



Mechanics of algal swimming



Model of electrospun fibers



Mathematical model of Planar Cell Polarity

Eligibility criteria



1. M.Tech./M.E./M.S.(Engineering/Technology)/MD/MDS degree in the respective or allied areas
2. Candidates with Bachelor's degree in Engineering/Technology or Master's degree in Sciences in an allied area and possessing a valid GATE score may also apply.
3. For those who have not yet completed their qualifying examination, marks up to the 7th semester/ 3rd year (for B.Tech students) and 3rd semester/ 1st year for PG students will be considered
4. Candidates with CSIR-NET-JRF / UGC-NET-JRF/DBT-JRF/ICMR-JRF/DST-INSPIRE awards for Research fellowship or equivalent are encouraged to apply
5. Please note that a stringent criteria may be used based on the marks in previous degrees in short-listing candidates to be called for interview.

General information

- Residency requirement is compulsory for external registrants to complete the required course credits (a minimum of four (4) courses) in the first year
- Applicants working in reputed R&D Organizations/Laboratories are eligible to apply
- Such applicants (a) need to be deputed on leave by the parent organization/department (b) do not require GATE qualification, and (c) will not be paid any assistantship or scholarship by IIT Hyderabad.
- Selection process is purely merit based and candidate will be tested in interview/written test
- Application fees and details are available on IITH web page (www.iith.ac.in)
- Create login id and apply online on IITH website www.iith.ac.in/phdadmissions

Contact details

Dr. Falguni Pati

Department of Biomedical Engineering, IIT Hyderabad

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Email: bme_admissions@iith.ac.in

www.iith.ac.in

<https://bme.iith.ac.in>