Biomedical Engineering

భారతీయ సాంకేతిక విజ్ఞాన సంస్థ హైదరాబాద్
भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

Where the boundaries between disciplines fade !

PhD Admissions Brochure

(2024)

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.

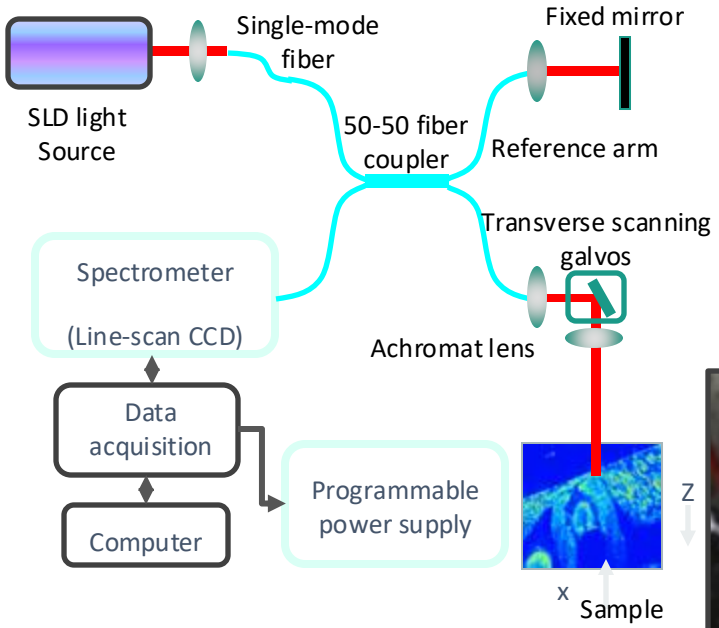
- *Biomedical Imaging*
- *Biomicrofluidics & Biomechanics*
- *Regenerative Medicine & Stem Cell Research*
- *Nano Medicine & Regenerative Medicine*
- *Computational Neurosciences*
- *Bio-nanotechnology & Nanomedicine*
- *Biofabrication & Tissue Engineering*
- *Neurotechnology & Neuroscience*
- *Computational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

IITH Hostels

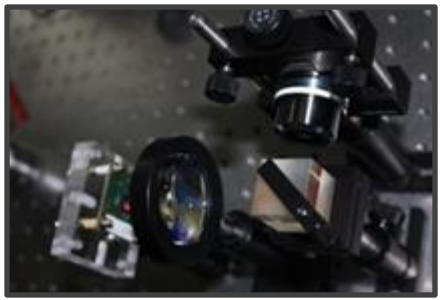
Biomedical imaging

Dr. Renu John

- Novel non-invasive bio-imaging techniques
- Coherence imaging and microscopy techniques
- Molecular contrast agents and Targeted molecular imaging
- Nanoparticles
- Targeted drug delivery and Bio-photonics applications



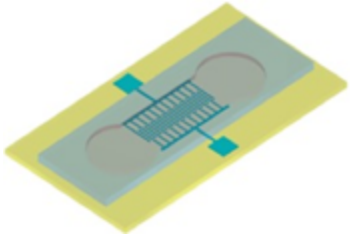
Lab website



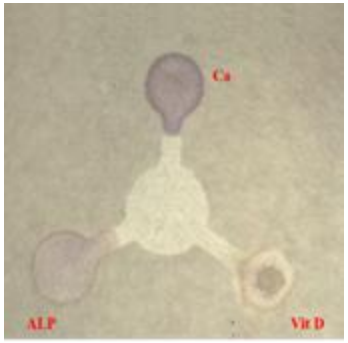
Biomicrofluidics and Biomechanics

Dr. Harikrishnan Narayanan Unni

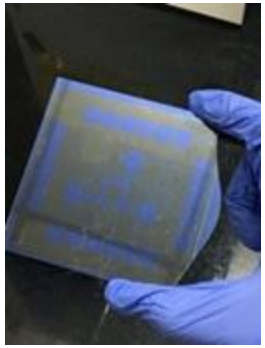
- Microfluidics and Lab on Chip for Bioengineering
- Lab on Chip for protein aggregation modelling
- Computational Biophysics and Systems Biology
- Computational Biomechanics



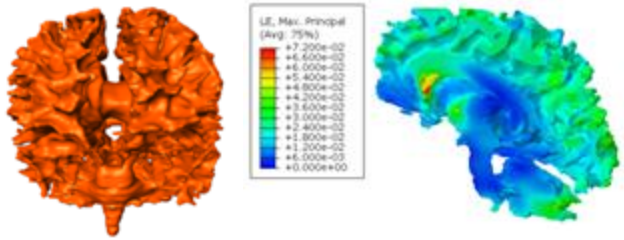
DEP Microfluidic Device



muPADs- Paper analytic devices



EWOD Electrode patterns

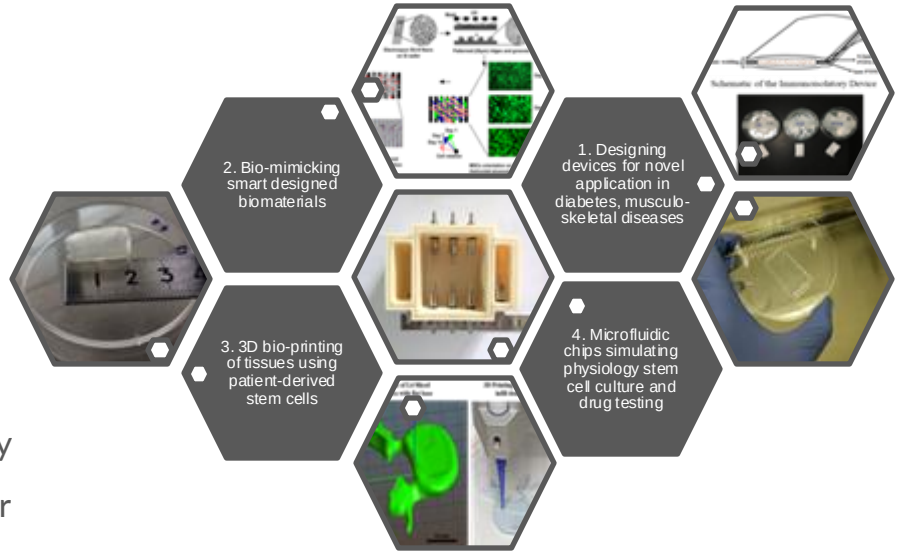


White matter Strain distribution – impact loading – FEM study

Regenerative Medicine & Stem Cell (RMS)

Dr. Subha Narayan Rath

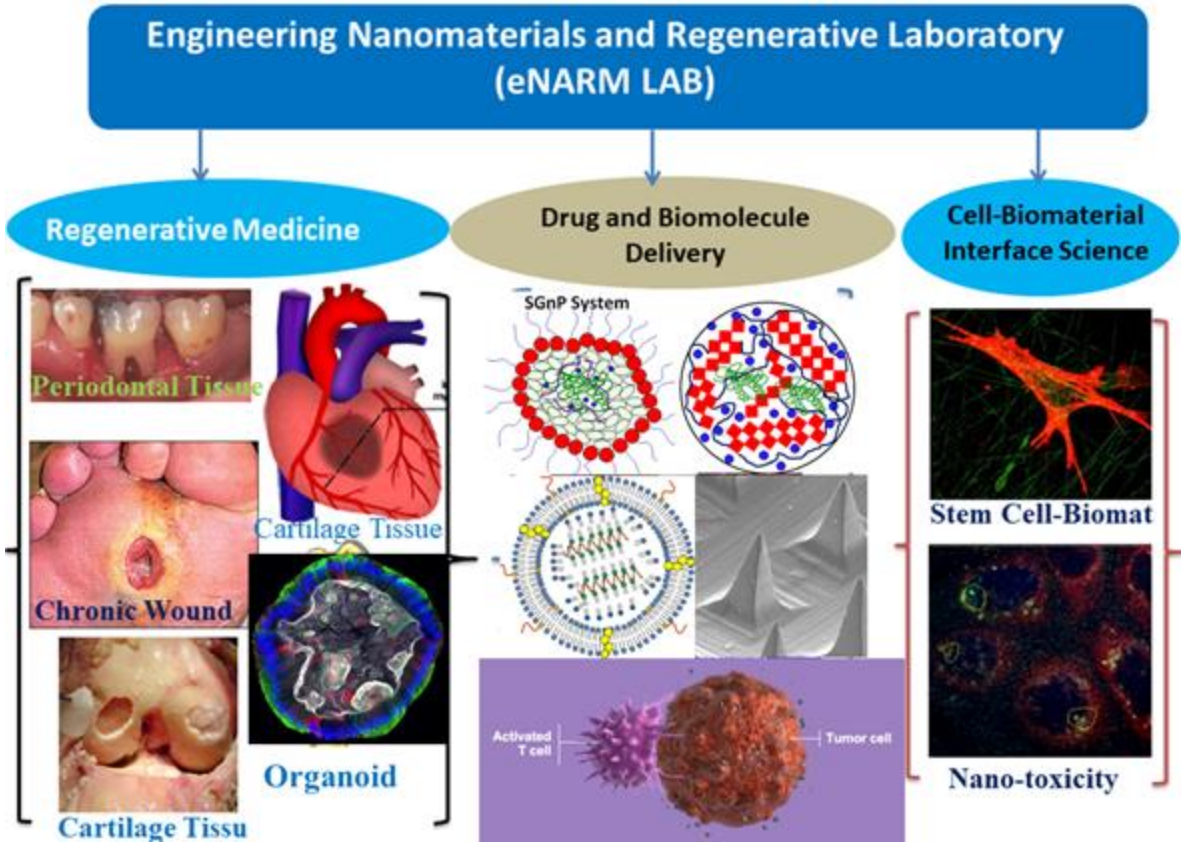
- Evaluation of in vitro stem cell-biomaterial interactions using micropatterning and nanofibers
- In vivo like bioreactor use for tissue development
- Molecular biological analysis of angiogenesis, osteogenesis, and evaluation of diabetic cell therapy
- Application of 3D-cell printing for regeneration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



Lab website

Nano Medicine & Regenerative Medicine (eNARM Lab)

- **Regenerative Medicine:**
  - Heart Tissue Regeneration
  - Chronic Wound Healing
  - Cartilage Regeneration
  - Periodontal Regeneration
  - Stem Cell and Delivery
  - 3D Organoid for Drug/disease model
- **Nanomedicine**
  - Cancer Stem Cell Therapeutics
  - Immunoengineering and Therapy
  - Affordable Vaccine Platform (Microneedle)
  - Protein Delivery and Therapeutics
  - mRNA Delivery and Therapeutics
- **Cell-Materials Interactions**
  - Nanotoxicity
  - Stem Cell-Biomaterials Interaction



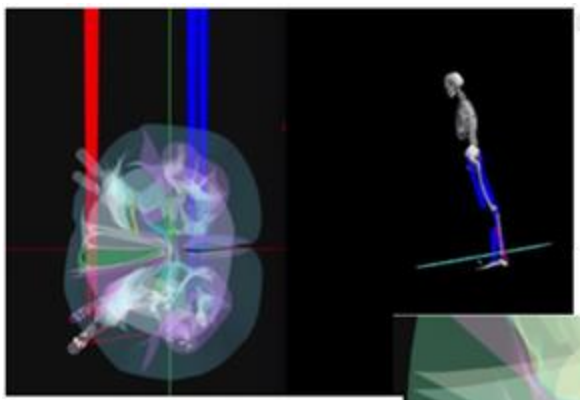
Computational Neurosciences

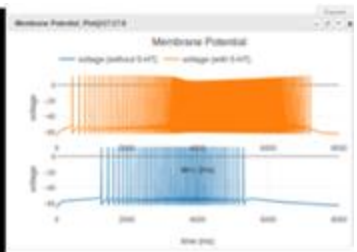
Dr. Mohan Raghavan

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!!





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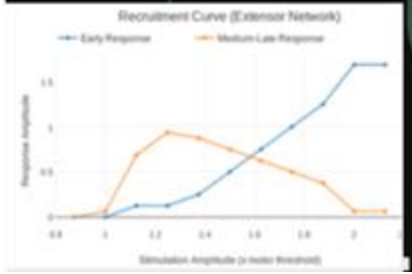
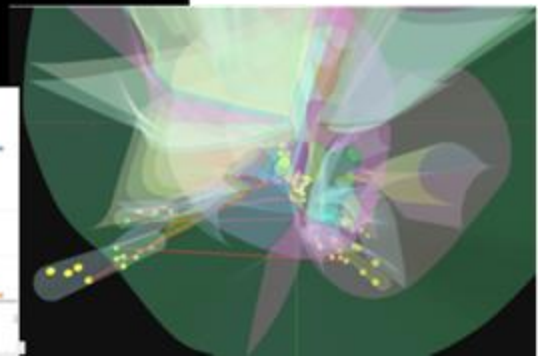


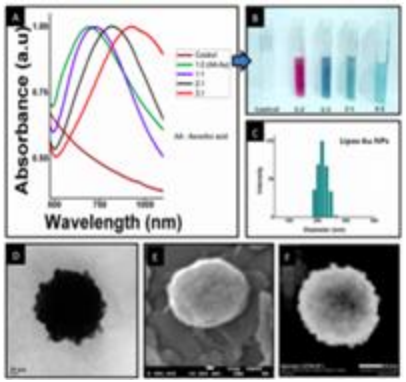


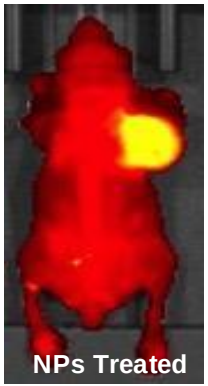
Bio-nanotechnology and Nanomedicine

Dr. Aravind Kumar Rengan

- Cancer Nanotechnology
- Nanotoxicology
- Nano-Biomaterials
- Triggered/Targeted Drug Delivery
- Anti-microbial nano-therapeutics
- Theranostic applications

Targeted Nano Theranostics





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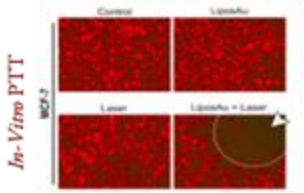
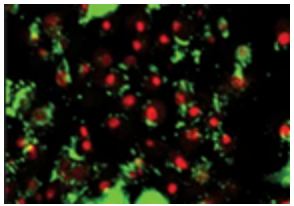
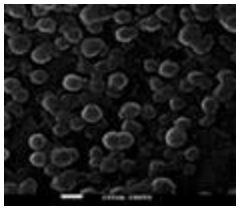
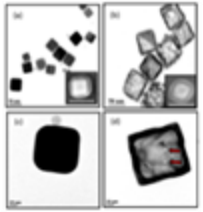
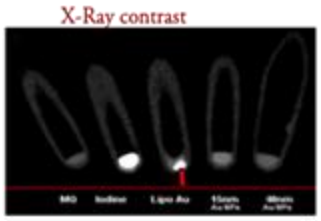








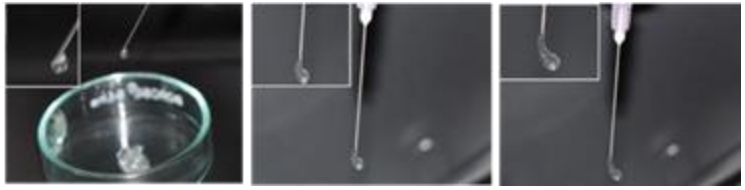


Biofabrication and Tissue Engineering

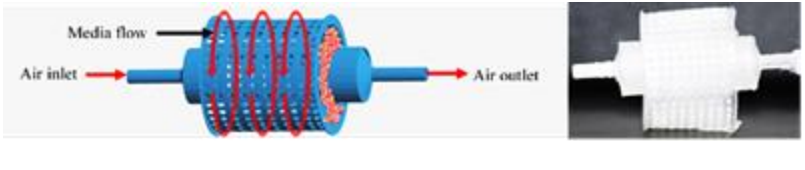
Dr. Falguni Pati

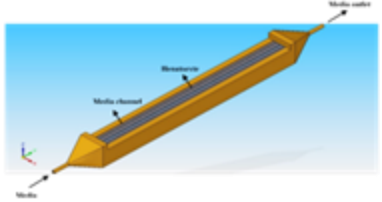
- 3D bioprinting of tissue/organ constructs for tissue engineering and regenerative medicine
- *In vitro* tissue/organ models for fundamental study and drug/toxicity testing
- Development of novel bioprintable biomaterial and bioink formulation
- 3D cell and tissue printing for personalized medicine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

Lab website

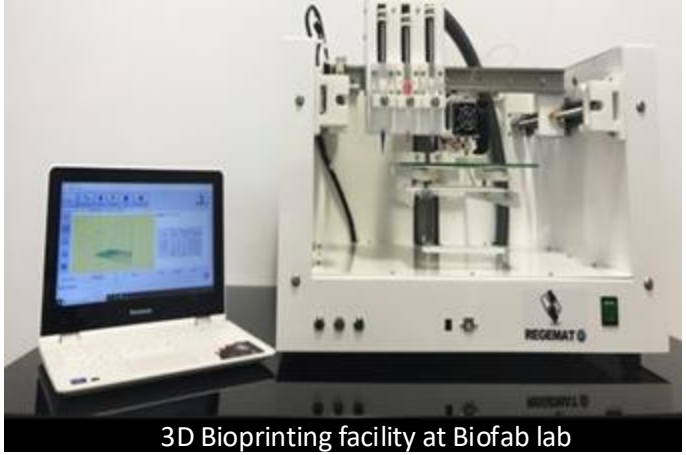


Tissue/Organ-derived bioink for 3D bioprinting





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



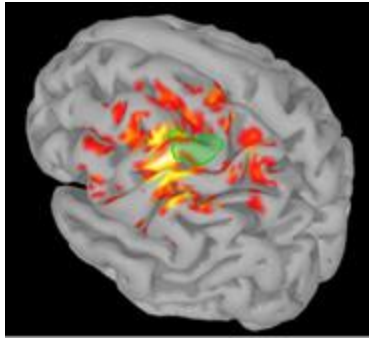
3D Bioprinting facility at Biofab lab

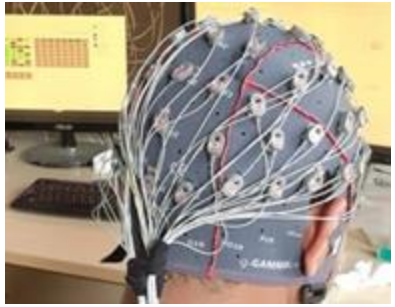
Neurotechnology and Neuroscience

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



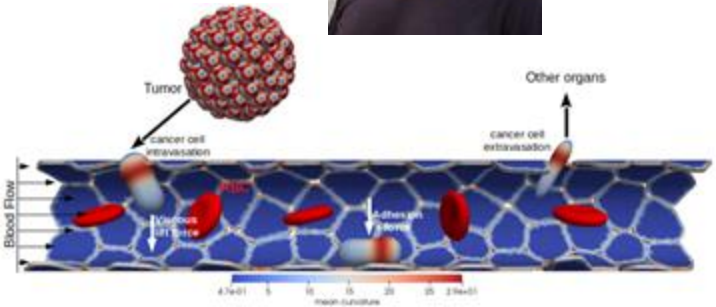


Computational Bioengineering

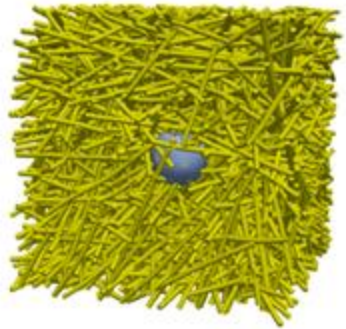
Dr. Mohd Suhail Rizvi

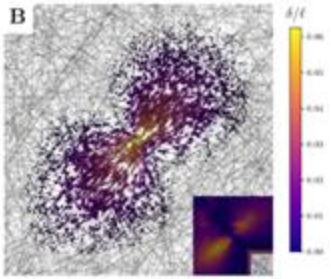
We utilize mathematical and computational approaches to study

1. mechanics of cancer metastasis
2. cell-ECM interactions
3. computational frameworks for drug delivery
4. *in silico* disease models

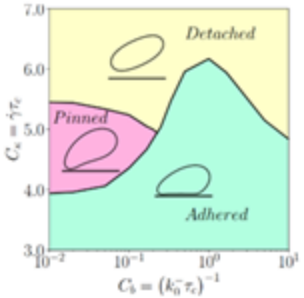


Cancer metastasis

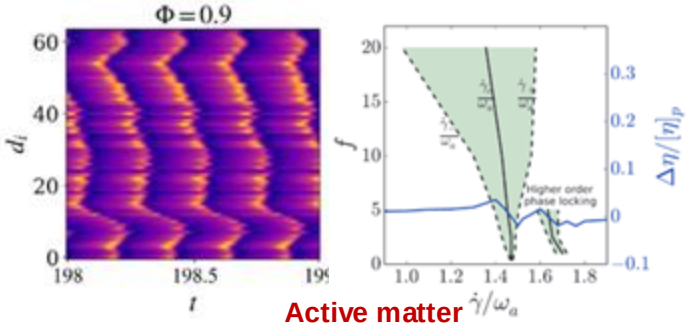




Cell-ECM interactions



Bio-hydrodynamics



Active matter

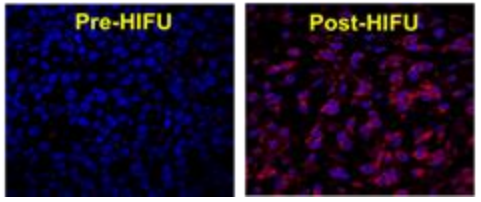
Ultrasound Imaging & Therapeutics

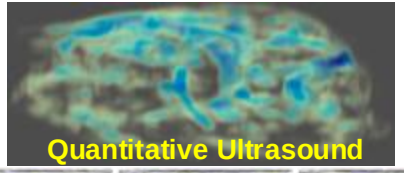
Dr. Avinash Eranki

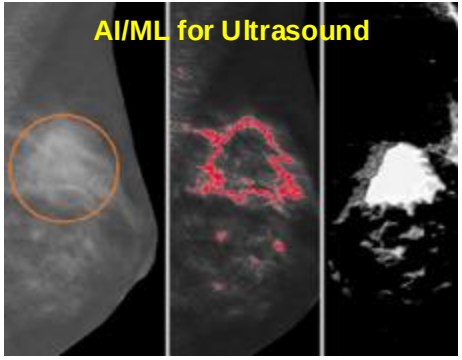
My lab is focused on developing:

- AI and ML for Ultrasound
- Image-guided Therapeutic Ultrasound (FUS/HIFU) for solid tumor therapy
- Ultrasound-based drug delivery & Liquid Biopsy

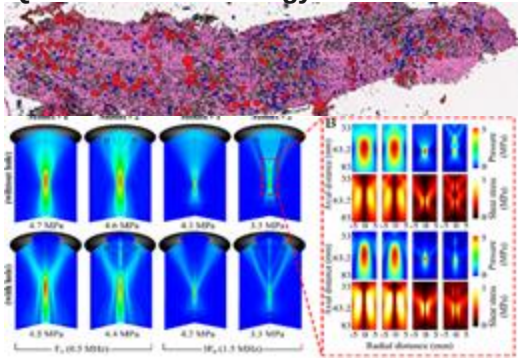
MURL.bio

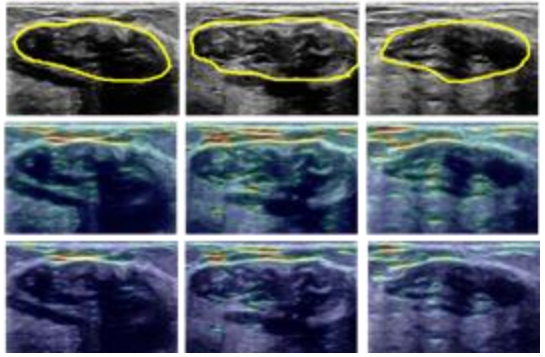






Quantitative Pathology and Acoustics



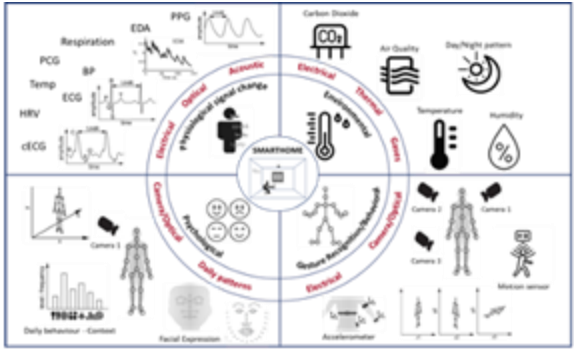


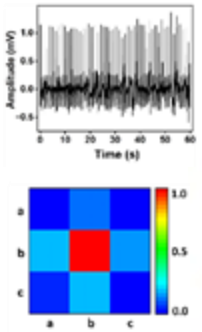
Medical Informatics & Digital Health

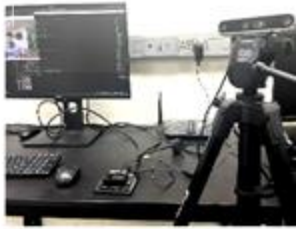
Dr. Nagarajan Ganapathy

My lab is focuses on the solutions for

Digital Health / Artificial Intelligence (AI) for healthcare / Machine Learning / Pattern Recognition/ Explainable AI	Affective Computing / Pervasive computing / Mental Health / Human Wellbeing / Behaviour analytics
MInDH Lab	
Biomedical Devices / Wearables / Sensors/ Imaging / Biomedical Signals and Imaging Analytics	Internet of medical things / Smart spaces / Big Data – Privacy, Ethics / Regulations and medical standards







Magnetic Resonance Imaging

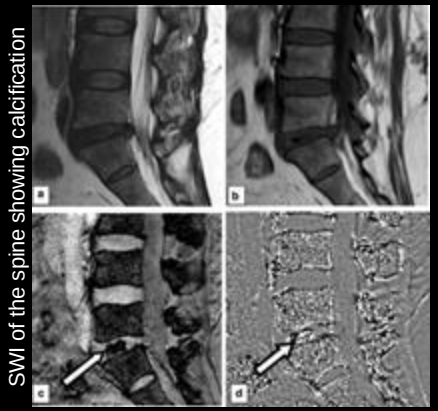
Dr. Jaladhar Neelavalli

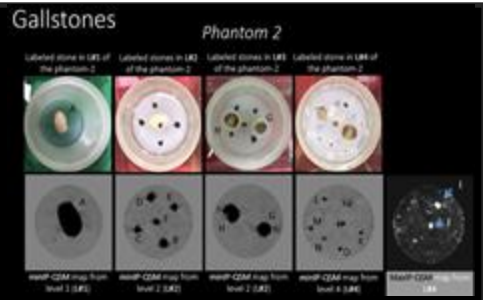
My lab is focused on developing

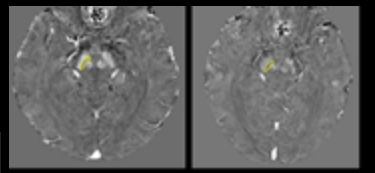
- Novel biomarkers for neurodegenerative diseases and therapy monitoring
- Fast and motion-robust MR imaging techniques for fetal imaging
- Quantitative MRI methods for body imaging
- Building low/ultra low-field MRI systems and developing their clinical applications

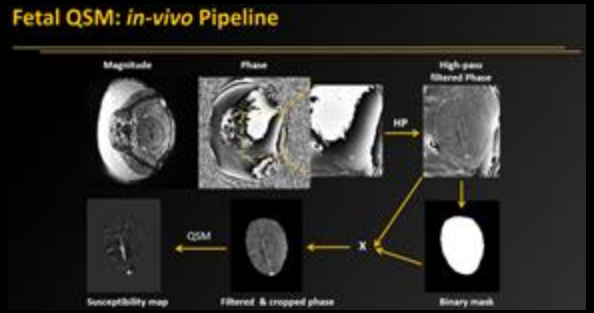
Applied Magnetic Resonance Imaging Sci. & technology lab

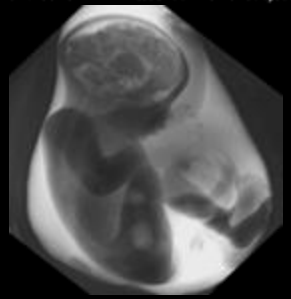
AMRIT











Eligibility criteria

1. M.Tech./M.E./M.S.(Engineering/Technology)/MSc/MBBS/BDS 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 qualifying 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 DST/INSPIRE/DBT/ICMR/CSIR-NET-JRF/UGC-NET-JRF award for Research fellowship or equivalent or GATE Qualification 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
- 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