Biomedical Engineering

भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

Where the boundaries between disciplines fade !

PhD - Jan 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

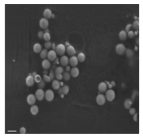
IITH Hostels

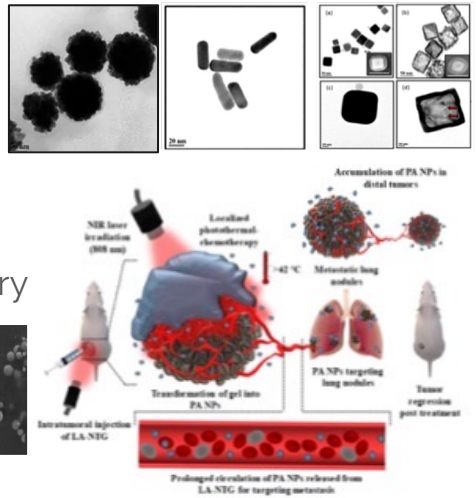
Bio-Nanotechnology and Nanomedicine

www.pnaslab.com

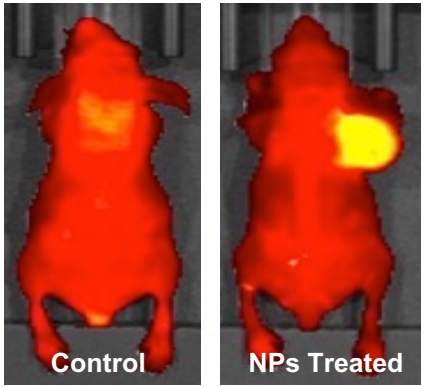
Dr. Aravind Kumar Rengan

- Cancer Nanotheranostics
- Nanotoxicology
- Biomaterials
- Triggered/Targeted Drug Delivery
- Radiation Biology
- Anti Microbial Resistance

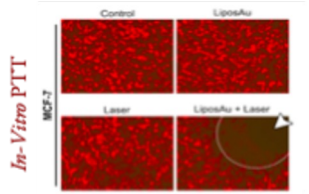




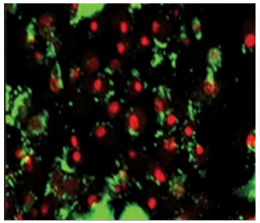
Targeted Nano Theranostics (in-vivo studies)



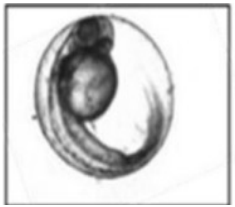
Lab website

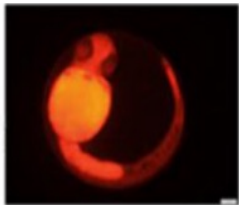


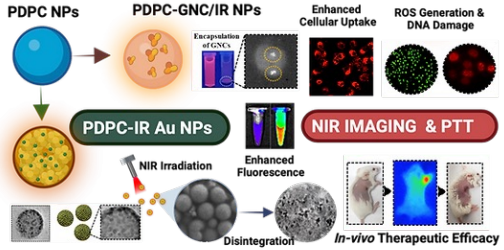
In-vitro studies

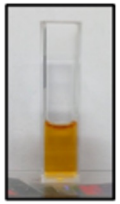


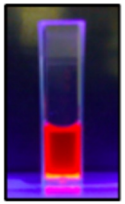
In-ovo studies



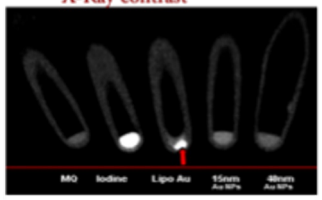








X-Ray contrast



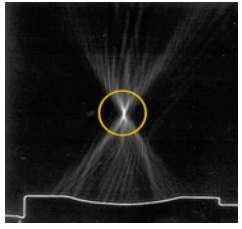
Ultrasound Imaging & Therapeutics

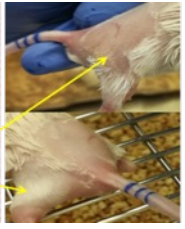
Dr. Avinash Eranki

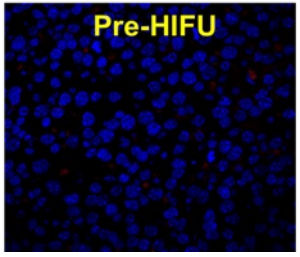
My lab is focused on developing:

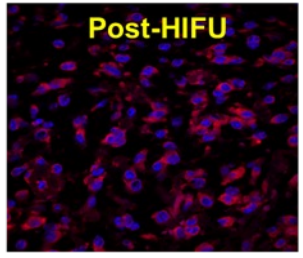
- Image-guided Therapeutic Ultrasound (FUS/HIFU) techniques for cancer therapy
- Liquid biopsy using Focused Ultrasound
- Ultrasound-based drug delivery
- Ultrasound Imaging for musculoskeletal applications & placental & fetal applications

Therapeutic Ultrasound for Cancer Therapy

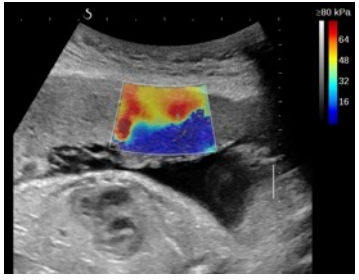


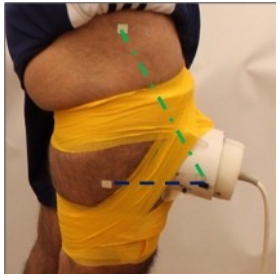


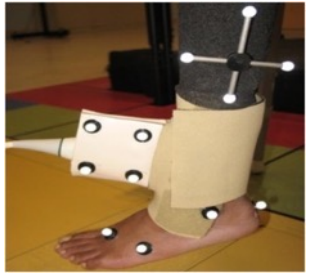




Ultrasound for Maternal/Fetal & Rehabilitation Applications







Biofabrication and Tissue Engineering

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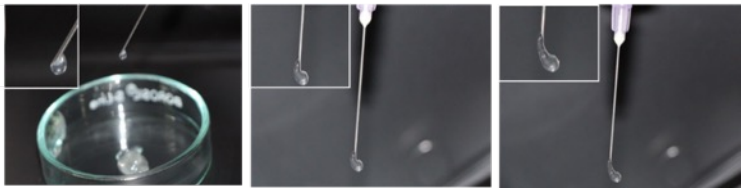
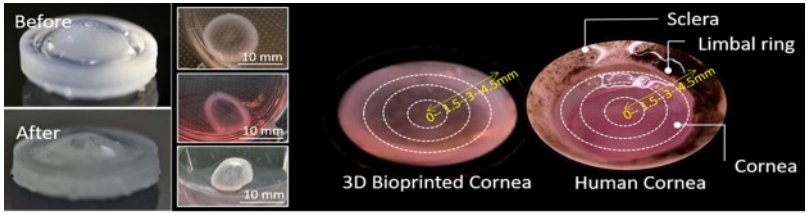
Dr. Falguni Pati

- 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

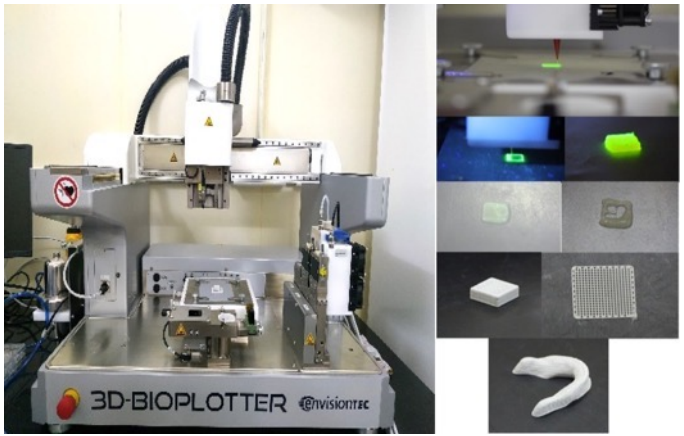


Tissue/Organ-derived bioink for 3D bioprinting



3D Bioprinted Human Cornea with Decellularized Cornea Matrix Hydrogel

In vivo implantation of Bioprinted Cornea

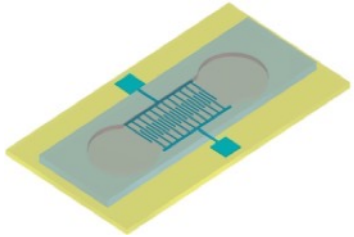


3D Bioprinting facility & Printed objects

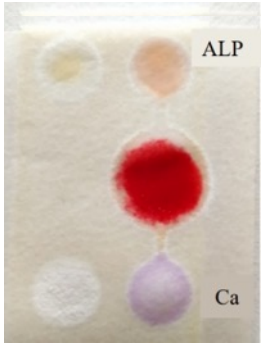
Biomicrofluidics and Biomechanics

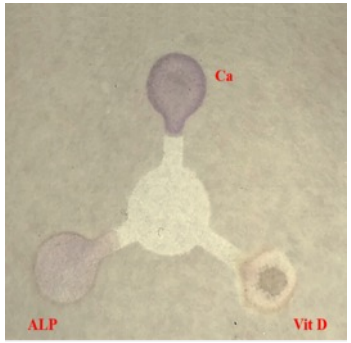
Dr. Harikrishnan Narayanan Unni

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

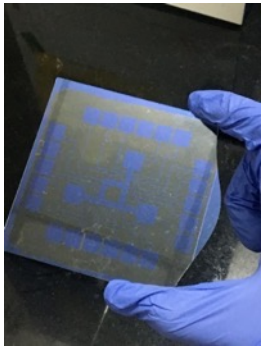


DEP Microfluidic Device

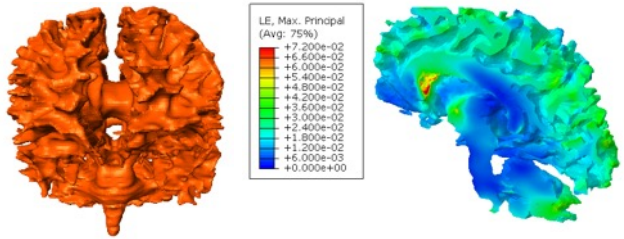




muPADs- Paper analytic devices



EWOD Electrode patterns



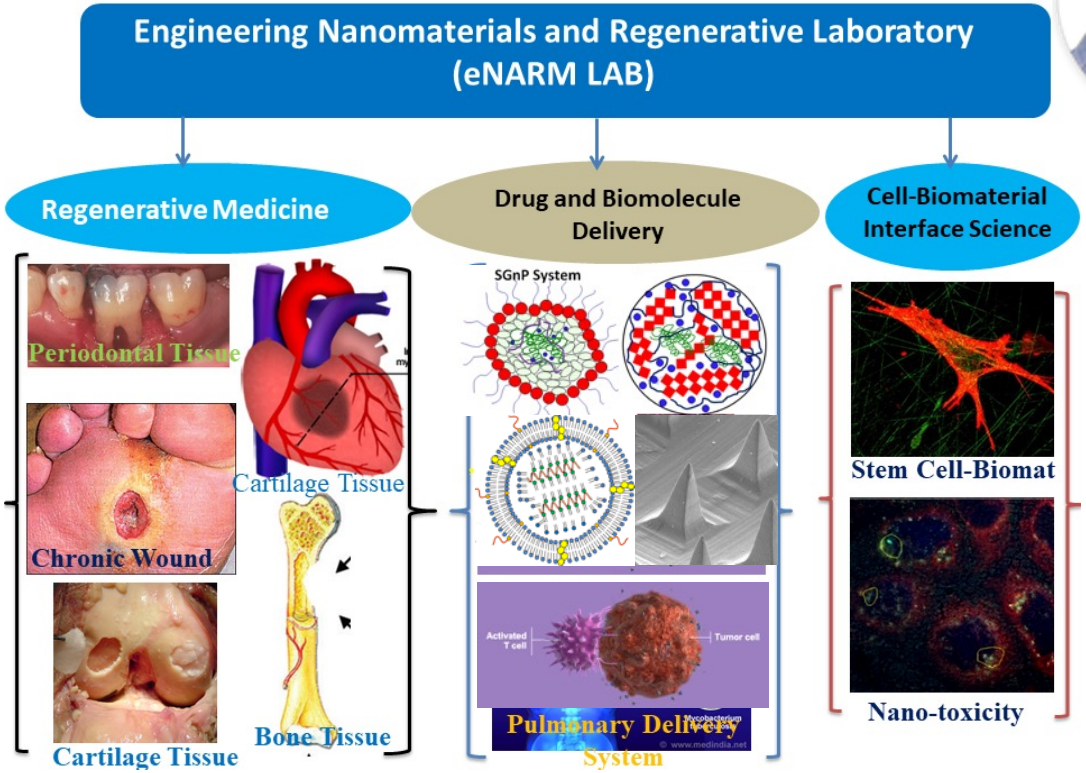
White matter Strain distribution – impact loading – FEM study

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

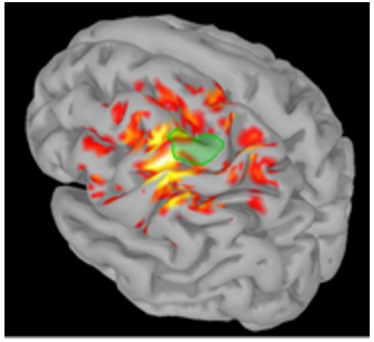


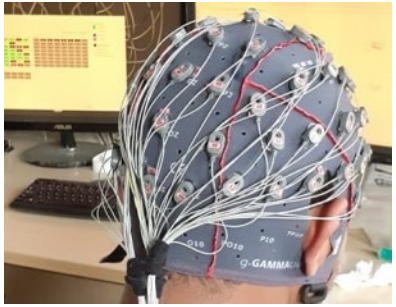
Neurotechnology and Neuroscience

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

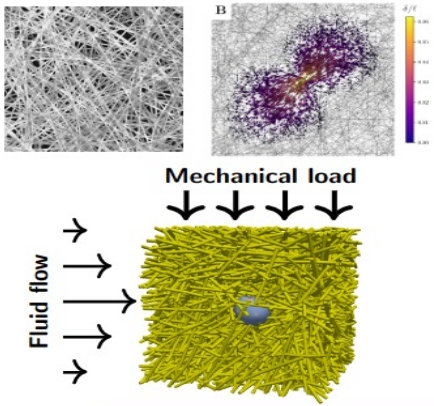
Intra-opertative neuromonitoring

Disorders of consciousness

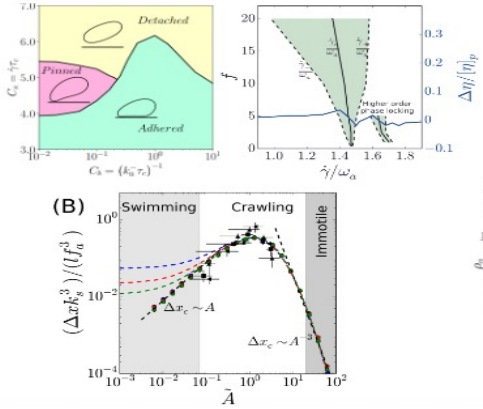
Diagnostics for neuromuscular disorders

Computational Bioengineering

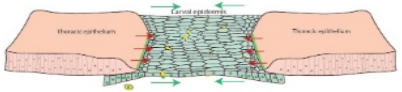
Articular cartilage model for osteoarthritis

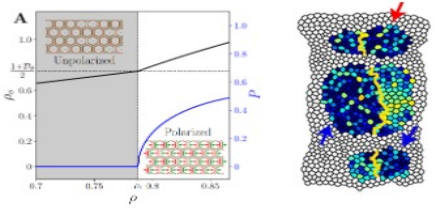


Cell migration and cancer metastasis



Wound healing and systems biology





increasing length and time scales

- ECM micromechanics
- Structure-micromechanics relation
- ECM structural characterization using CNN

- Cell-ECM interactions
- Cell crawling and swimming
- Active rheology
- Mechanics of CTCs

- Mechanics of development
- In-silico tumor spheroids
- Protein expression ↔ mechanics

For more information: http://people.iith.ac.in/suhailr

Computational Neurosciences

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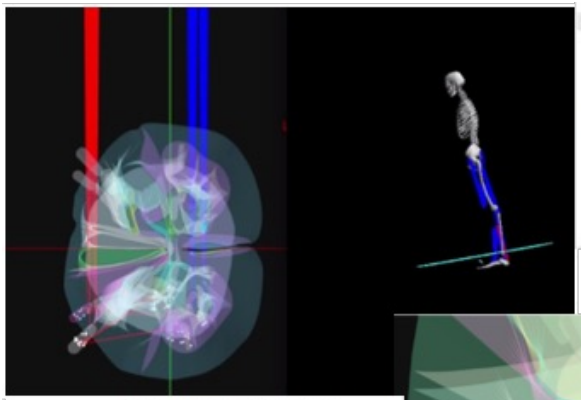
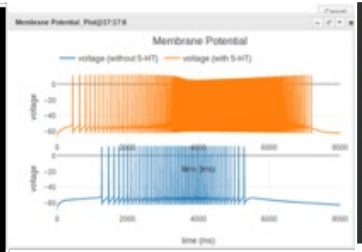
Dr. Mohan Raghavan

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

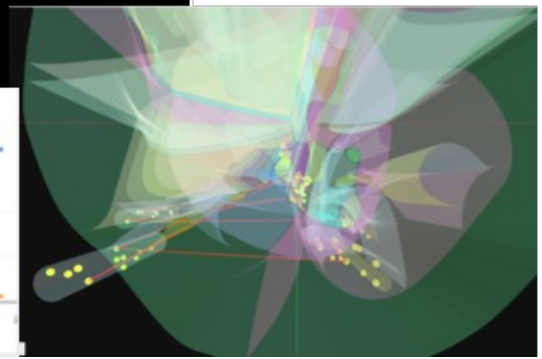
- Clinical Practice & Medical device development
- Robotics and Neuromorphic technologies
- Basic science and Education

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





Lab website



Biomedical Informatics & Healthcare

Dr. Nagarajan Ganapathy

My lab is focuses on the solutions for

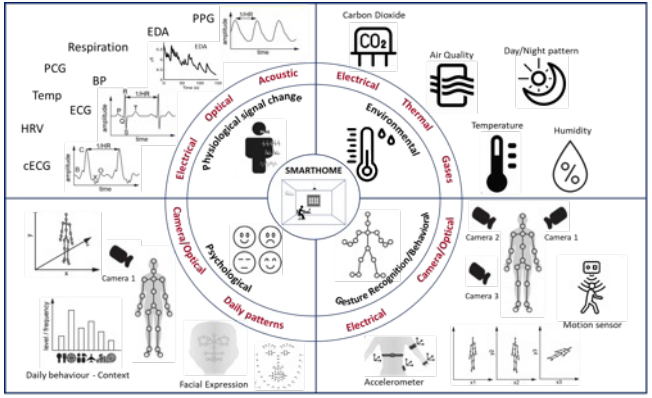
Digital Health / Artificial Intelligence (AI) for healthcare / Machine Learning / Pattern Recognition/ Explainable AI

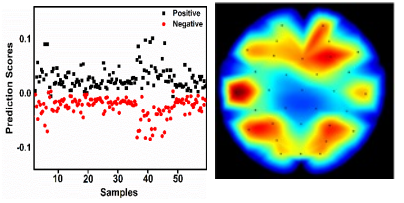
Affective Computing / Pervasive computing / Mental Health / Human Wellbeing / Behaviour analytics

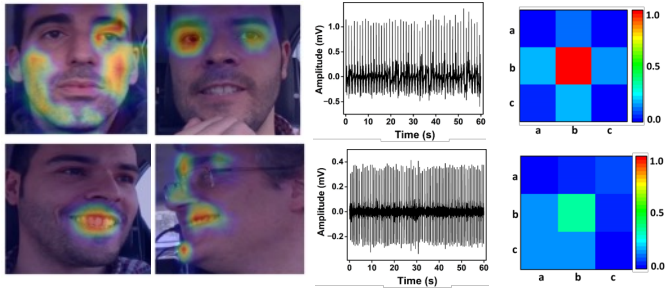
Biomedical Informatics Lab

Biomedical Devices / Wearables / Sensors/ Imaging / Biomedical Signals and Imaging Analytics

Internet of medical things / Smart spaces / Big Data – Privacy, Ethics / Regulations and medical standards



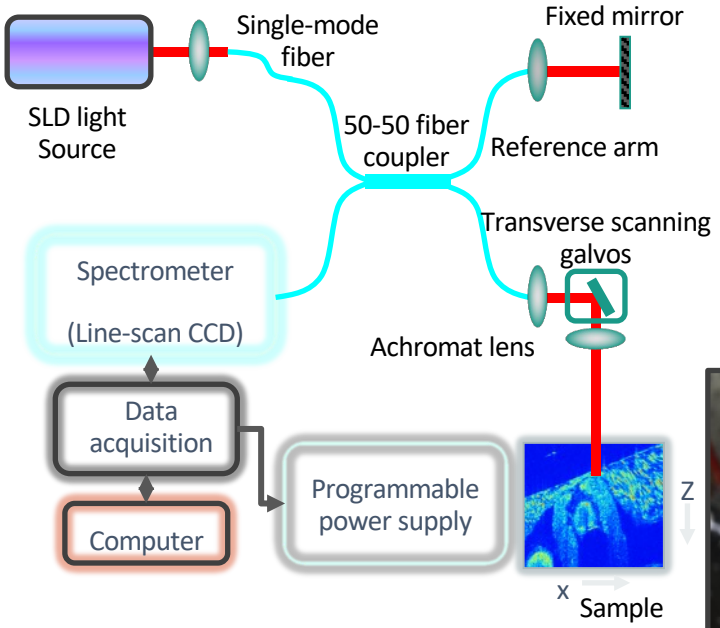




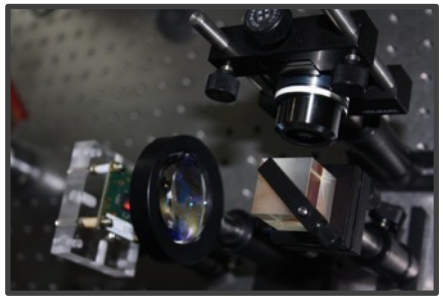
Biomedical imaging

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

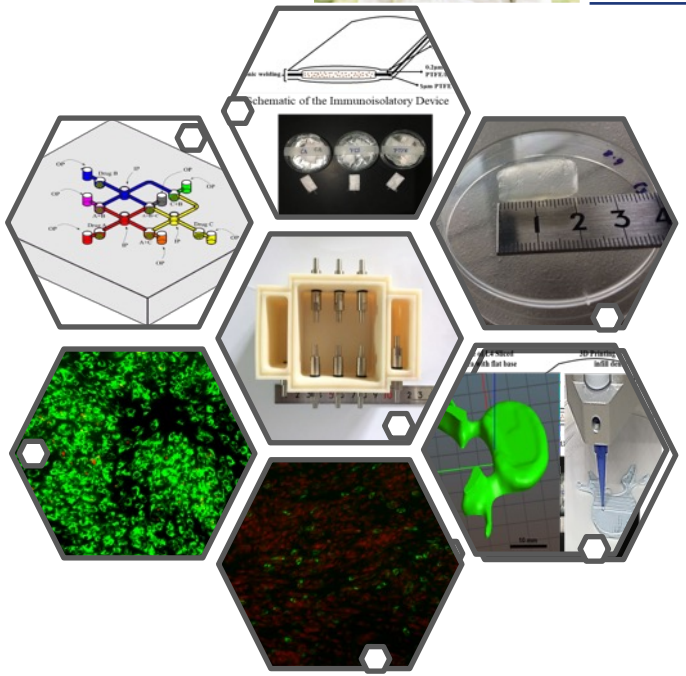


Regenerative Medicine & Stem Cell (RMS)

Lab website

Dr. Subha Narayan Rath

- Adipose- and umbilical cord-derived stem cells and bioengineered strategies for diabetes and osteochondral tissue regeneration
- Organoid/spheroid system for diabetes and vascularized tissues, using 3D bio-printing.
- 3D printing-based microfluidic device for personalized medicine especially, anti-cancer drug testing.



Contact details

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