



Indian Institute of Engineering Science and Technology, Shibpur

An Institute of National Importance

भारतीय अभियांत्रिकी विज्ञान एवं प्रौद्योगिकी संस्थान, शिवपुर

## Centre for Healthcare Science & Technology

*Innovating Health through Science and Technology...*



A Biannual Newsletter  
January - June, 2025



## Centre for Healthcare Science and Technology

### Message from HoD's Desk



**Dr. Ananya Barui**  
Assistant Professor

It gives me immense pleasure to present this issue of our newsletter, highlighting the endeavors and accomplishments of the Centre for Healthcare Science and Technology (CHST) at IEST, Shibpur. Since its inception in 2010, initially as part of the erstwhile BESU, the Centre has been committed to fostering interdisciplinary research and training programs that encompass diverse domains such as biotechnology, medicine, engineering, physics, chemistry, and mathematics. Our mission is to address pressing challenges in biomedical science and public health by integrating expertise across these disciplines and creating a platform for indigenous innovation in the healthcare sector.

The vision of the Centre is ambitious yet focused: to undertake cutting-edge research and educational initiatives in areas of national healthcare importance. We aim to develop comprehensive and integrative solutions for complex healthcare problems, contributing to sustainable living and affordable healthcare. Through collaborative efforts with various departments within the institute, industrial enterprises, and relevant academic, medical, technological, or management institutions, CHST aspires to evolve into an internationally recognized Centre of Excellence in biological and biomedical engineering.

This issue provides insights into the Centre's academic and research activities, including the courses offered, areas of focus, and outcomes achieved through our concerted efforts. Highlights include publications in reputed journals, ongoing R&D projects, and state-of-the-art laboratories that support our research initiatives.

Our guiding principle remains the belief that impactful biomedical technologies require the active involvement of multiple stakeholders. At CHST, we strive to develop strategies and models that bring together academia, industry, and society to deliver meaningful technological advancements that can transform healthcare.

I extend my heartfelt gratitude to all our faculty, researchers, students, and collaborators who have contributed to the Centre's growth and success. I hope this newsletter will inspire and inform our readers about our progress and future directions.

Warm regards,

### Courses offered

- M.Tech in Biomedical Engineering
- Ph. D. in Biomedical Engineering & Biotechnology

### Thrust Areas

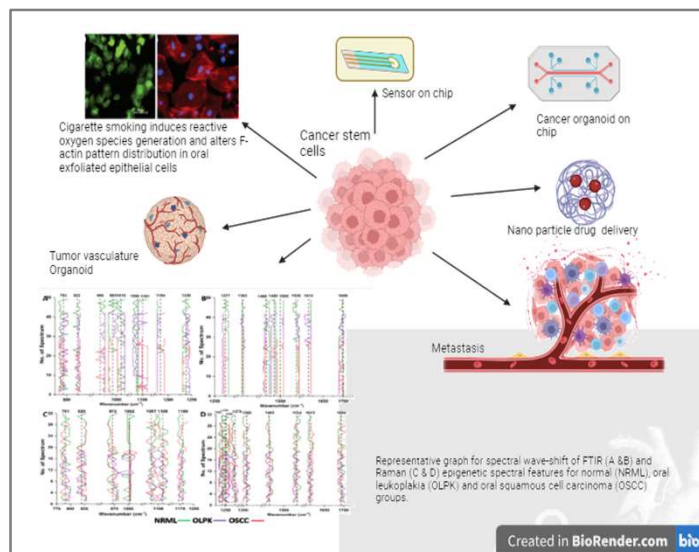
- Tissue engineering
- Cancer biology
- Neurotherapeutics.
- Biosensor and bioelectronics
- Protein engineering and structural biology



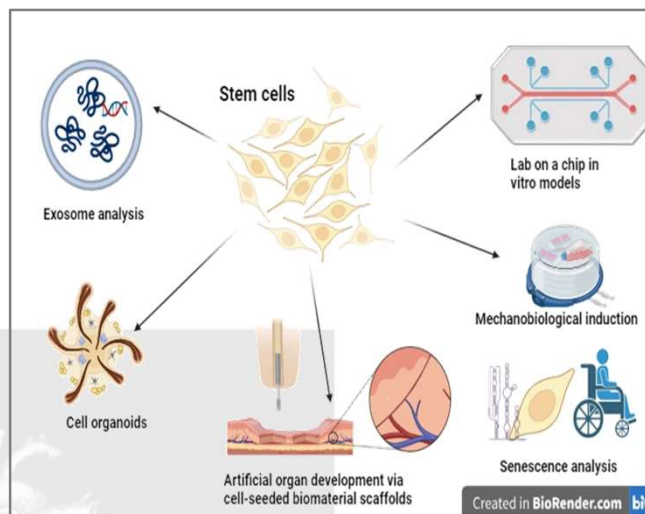


## RESEARCH OVERVIEW

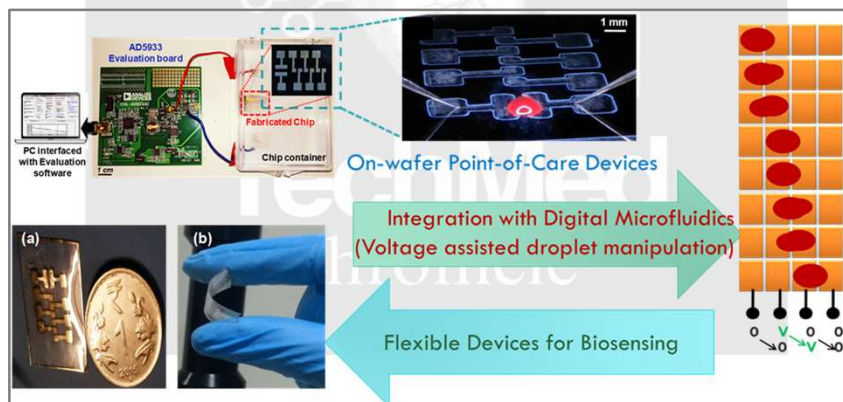
### TRANSLATIONAL CANCER DIAGNOSTICS LAB



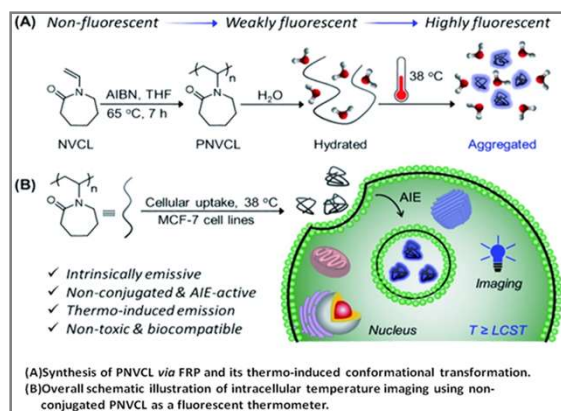
### REGENERATIVE ENGINEERING AND MECHANOBIOLOGY LAB



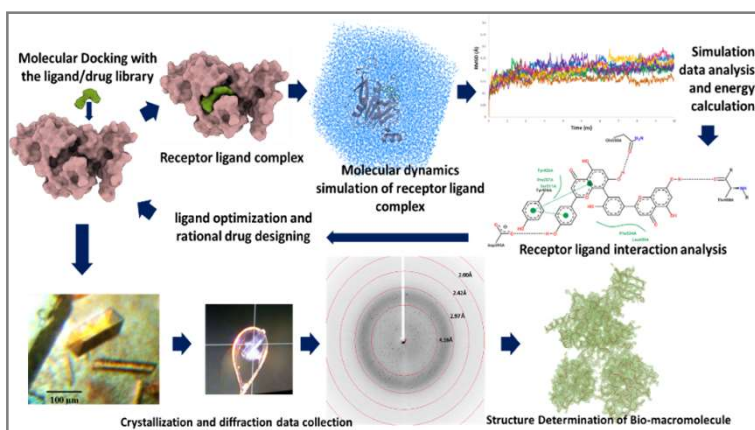
### BIOSENSOR AND BIOINSTRUMENTATION LAB



### NEURO-BIOTECHNOLOGY LAB



### PROTEIN ENGINEERING AND STRUCTURE BIOLOGY LAB



## Centre for Healthcare Science and Technology

### DR. BHOLANATH CHAKRABORTY MEMORIAL FUNDAMENTAL RESEARCH LABORATORY OF HOMEOPATHY

**Funded by Central Council for Research in Homeopathy (CCRH), Ministry of AYUSH, Govt. of India**

The laboratory as an integral part of the Centre aims to investigate and standardize the nature of homeopathic substances in terms of its composition, molecular structure, and physical characterization.

#### Equipment present in the lab

##### CONFOCAL MICROSCOPE WITH TIRF



##### RAMAN SPECTROSCOPE



##### Dynamic Light Scattering & Particle Size Analyser



#### Inaugural Occasion



The occasion marked glorious presence of Smt. Tejaswini Ananth Kumar, Chairperson, Board of Governors, IIST, Shibpur along with the Hon'ble Director of the institute Prof. Parthasarathi Chakrabarti. Dr. Subhash Kaushik, Director General of Central Council for Research in Homoeopathy (CCRH) also graced the program. List of other respected dignitaries present at the occasion includes Dr. Vishwa Kumar Gupta, Prof. Ajoy Kumar Roy, Prof. Chaturbhuja Nayak, Dr. Kanjaksha Ghosh, Dr. Rathin Chakravarti along with scientists and officials of IIST, CCRH and other reputed institutes.





## Centre for Healthcare Science and Technology

### Research Outcome

- Developing fundamental knowledge-base and technologies for Bioengineering.
- Collaborating with industry, academia and healthcare organizations.
- Drawing extramural funds from different government agencies.
- Training manpower in the capacity of MTech and PhD students.



### R&D projects & Fund allocated

The Centre has been thriving to established itself as a hub of impactful R&D, addressing critical challenges in biomedical science and public health through interdisciplinary collaboration and innovation. With a focus on sustainable and affordable healthcare solutions, the Centre has executed numerous projects funded by several agencies, yielding high-impact publications, patents, and indigenous technologies.

### Project & Funding Details



### Funding Agencies

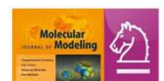
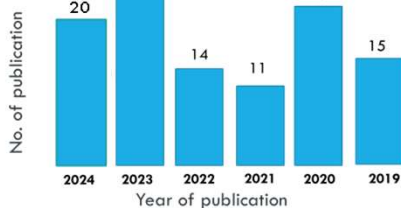


### Publications



Nucleic Acids Research

First Quartile (Q1)/ Second Quartile (Q2) Publications





## Centre for Healthcare Science and Technology

### Recognitions

#### Awards

- Dr. Ananya Barui, Asst. Professor in CHST has received the prestigious Women Excellence Award, 2024 sponsored by SERB, DST India and INAE Young Engineer Award, 2022.
- DST SERB Early career fellowship award to Dr. Ananya Barui.
- Research scholars have been awarded with Newton-Bhabha fellowships (02), CSIR SRF (02), ICMR-SRF (01), ICMR-RA (01).

### Research works of the faculty members getting frequently highlighted by DST and DBT, Govt. of India.

**MOLECULAR RESEARCH SHOWS PATH TOWARDS BETTER TREATMENT OF KIDNEY AILMENTS**  
The work by Dr. S. Chakraborty et al. has been highlighted by DST, India in their official website



pubs.acs.org/JPCB



Article

#### Solvation Plays a Key Role in Antioxidant-Mediated Attenuation of Elevated Creatinine Level: An In Vitro Spectroscopic Investigation

Subhadip Chakraborty,<sup>†</sup> Indrani Bhattacharya,<sup>‡</sup> and Rajib Kumar Mitra<sup>\*</sup>

Cite This: J. Phys. Chem. B 2023, 127, 8576–8585

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Molecular research shows path towards better treatment of kidney ailments

### VITAMIN D3-INCORPORATED CHITOSAN/COLLAGEN/ FIBRINOGEN SCAFFOLDS PROMOTE ANGIOGENESIS AND ENDOTHELIAL TRANSITION VIA HIF-1/IGF-1/VEGF PATHWAYS IN DENTAL PULP STEM CELLS



International Journal of Biological  
Macromolecules

Volume 253, Part 6, 31 December 2023, 127325



Vitamin D3-incorporated chitosan/collagen/fibrinogen scaffolds promote angiogenesis and endothelial transition via HIF-1/IGF-1/VEGF pathways in dental pulp stem cells

Shalini Dasgupta<sup>a</sup>, Kolimi Prashanth Reddy<sup>b</sup>, Pallab Datta<sup>b</sup>, Ananya Barui<sup>a</sup>

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Received 15 May 2023; Revised 3 October 2023; Accepted 6 October 2023; Available online 11 October 2023; Version of Record 11 October 2023.

TechMed

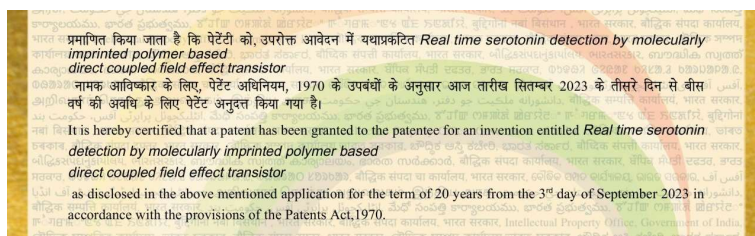
The study, led by Dr. A. Barui has been featured in the official X (Formerly Twitter) handle of DBT India.



Department of Biotechnology  
@DBTIndia

@DBTIndia at IISER, Shibpur, demonstrated that Vitamin D3-incorporated chitosan/collagen/ fibrinogen scaffolds promote angiogenesis and endothelial transition via HIF-1/IGF-1/VEGF pathways in dental pulp stem cells. @DrJitendraSingh @rajesh\_gokhale

### An Indian Patent has been granted on work "Real time serotonin detection by molecularly imprinted polymer based direct coupled field effect transistor" with Dr. C. Das Mukhopadhyay as a contributor



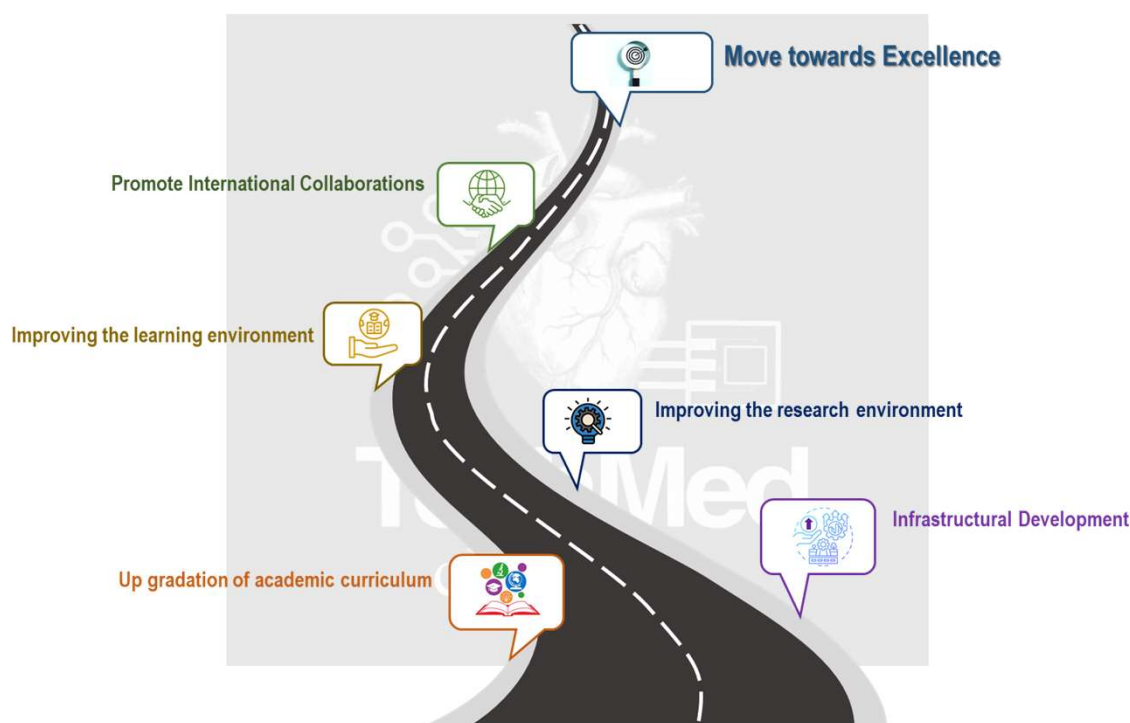


## Centre for Healthcare Science and Technology

### Participation in the CBDE Program

The faculty and students of the Centre for Healthcare Science and Technology (CHST) at IEST Shibpur are actively participating in the **Capacity Building on Design and Entrepreneurship Program**, fostering innovation and entrepreneurial skills. This initiative equips participants with the knowledge and tools to transform ideas into impactful solutions, bridging the gap between research and industry. By integrating design thinking with entrepreneurial strategies, the program empowers individuals to address real-world challenges, particularly in the healthcare sector, and contributes to the Centre's mission of sustainable and affordable healthcare innovation.

### Our Roadmap



### Editorial Team

Dr. Ananya Barui, Head, CHST; Editor in Chief  
Dr. Subhadip Chakraborty  
Dr. Amlan Roychowdhury  
Mr. Pratap Chandra Ari  
Mr. Siluveru Raja Viveka Vardhan