



# Frontiers in Nanomedicine and Space Biology: Cutting-Edge Molecular Techniques with Zebrafish and Chick Embryo Models.

Organized by  
Department of Applied Mechanics & Biomedical Engineering,  
IIT Madras, Chennai 600036.

5<sup>th</sup> May - 7<sup>th</sup> May, 2025

ICSR & Nanomolecular Lab, MSB, IIT Madras

## Conveners

Dr. Swathi Sudhakar  
Dr. Vimalraj Selvaraj  
Department of Applied  
Mechanics & Biomedical  
Engineering, IIT Madras.

## Organizing Committee

Prof. S. Ramakrishnan  
Prof. S. Pandian  
Dr. M.S. Narayanan  
IIT Madras

## Speakers

Prof. Apoorva Bhatt, University of Birmingham, UK  
Prof. Poornima Budime Santhosh, BAS, Bulgaria  
Prof. Varsha Wankhade, University of Pune, Maharashtra  
Prof. S. Ramakrishnan, IIT Madras, Chennai  
Prof. S. Pandian, IIT Madras, Chennai  
Dr. S. Saravanan, Saveetha University, Chennai  
Dr. Swathi Sudhakar, IIT Madras, Chennai  
Dr. Vimalraj Selvaraj, IIT Madras, Chennai

## For more information

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## Registration

Registration deadline: 20<sup>th</sup> April, 2025

Registration fee for students ( only PG/PhD): Rs. 1500/-

Registration fee (Faculty/Industry ) : Rs. 2500/-

Note: No spot registration & No accommodation will be provided

(The fee includes registration kit, coffee, snacks and lunches for the workshop duration)



## Topic of Interest

### Nanomedicine Innovations:

- o Design and application of nanoparticles for drug delivery
- o Nanotechnology in diagnostics and imaging
- o Nanomaterials in tissue engineering and regenerative medicine

### Space Biology:

- o Adaptations of organisms to space environments
- o Implications of space travel on human health

### Molecular Biology Techniques:

- o High-throughput molecular techniques
- o Advanced bioimaging and microscopy

### Zebrafish Models:

- o Genetic and developmental studies using zebrafish
- o Zebrafish in drug discovery and toxicology
- o Disease modeling and regenerative studies in zebrafish
- o Bone regeneration model under microgravity

### Chick Embryo Models:

- o Developmental biology and embryogenesis in chick embryos
- o Chick embryo as a model for studying organ development and disease

### Integrative Approaches:

- o Combining nanomedicine and molecular techniques in research
- o Cross-disciplinary collaborations between nanotechnology and biology
- o Translational research from animal models to human applications

### Ethical and Regulatory Considerations:

- o Ethical implications of nanotechnology in medicine
- o Regulatory challenges in space biology research
- o Animal welfare in biomedical research

## Scope

The workshop aims to explore the innovative intersections of nanotechnology and biological sciences, focusing on applications in space biology and advanced molecular techniques. Participants will delve into the latest developments in nanomedicine, understanding how nanoscale materials and devices can revolutionize medical diagnostics and therapies, particularly in the unique environment of space. Emphasis will be placed on the utilization of zebrafish and chick embryo models, both of which are invaluable in biomedical research due to their genetic similarities to humans, transparency during early development, and rapid life cycles. Through hands-on sessions and expert-led discussions, attendees will gain proficiency in advanced molecular biology techniques and bioimaging.

The workshop will also address the challenges and opportunities presented by conducting biological experiments in microgravity, offering insights into how space conditions affect cellular and molecular processes. By integrating nanomedicine with space biology, the workshop seeks to inspire new research avenues and collaborations, fostering a deeper understanding of life sciences and enhancing the development of novel therapeutic strategies for both terrestrial and extraterrestrial applications.

## About the Department of Applied Mechanics & Biomedical Engineering

Established in 1959, the Department of Applied Mechanics & Biomedical Engineering (Rechristened in 2023) has evolved into a comprehensive interdisciplinary graduate research department. Its foundation lies in three core domains: Biomedical Engineering, Fluid Mechanics, and Solid Mechanics. Since its inception, the department has been committed to advancing academic pursuits while actively contributing to society. The faculty members are esteemed in their fields, garnering international acclaim for their industrial research and sponsored projects. Their expertise has been pivotal in shaping the academic landscape and addressing contemporary challenges.

Distinguished for its state-of-the-art facilities, the department boasts unique laboratories unparalleled in the country. These cutting-edge resources provide students and researchers with invaluable opportunities to explore, innovate, and push the boundaries of knowledge. With a rich history of excellence spanning over six decades, the Department of Applied Mechanics & Biomedical Engineering continues to uphold its commitment to scholarly achievement, technological innovation, and societal impact. Its legacy of pioneering research and academic rigor cements its position as a leader in the realm of applied mechanics and biomedical engineering.

## About IIT Madras

A distinguishing feature of IIT Madras is its advanced research centers, which are dedicated to various specialized fields. These centers are spearheaded by faculty members who are recognized internationally for their research contributions. The institute's commitment to research excellence is evident in its numerous publications in high-impact journals, patents, and collaborations with leading global institutions. The research ecosystem at IIT Madras is further enriched by state-of-the-art laboratories and facilities that support cutting-edge research and innovation. The IIT Madras campus is also unique for its rich biodiversity. It is a protected forest area and serves as a habitat for various species of flora and fauna. The natural lake within the campus plays a crucial role in rainwater management, reflecting the institute's commitment to sustainable practices. The campus is home to wildlife such as blackbucks, spotted deer, and an array of bird species, offering a serene and picturesque environment that fosters a sense of closeness to nature.

## Sponsors

