NEWSLETTER

Department of Biotechnology
Bhupat & Jyoti Mehta
School of Biosciences

ISSUE 5
(May-Aug 2025)

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Department of Biotechnology
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MESSAGE FROM THE EDITORIAL DESK

We are pleased to present the fifth issue of our Departmental Newsletter. In this edition, we are delighted to share that this year's Departmental Convocation was a resounding success. We look forward to seeing the next generation forge their own paths, inspired by the achievements of their distinguished seniors. We had a successful third edition of BIOMERS, our graduate student symposium, which has now evolved into a student-run event. We would be grateful if some of you could support this initiative by instituting awards for the best research, thereby encouraging and motivating our students further. This issue also highlights the research journey of one of our younger faculty colleagues, Dr. Nathiya Muthalagu. In addition, our department organized a training programme for teachers from across the country, which was very well received. We are also excited to inform you that the upcoming CARE Conference (originally, PAN IIT Meeting) will feature a distinguished lineup of world-class speakers, and we look forward to enthusiastic participation from our alumni. Finally, we hope to see many of you at the alumni reunion on the 6th of December.

FACULTY AWARDS

Dr. Richa Karmakar received the Trend Setter Grant Award-2025 from the Energy Consortium, IIT Madras for her research on biofuels to enable sustainable and scalable energy solutions.

Prof. Smita Srivastava has been awarded the Himalaya Wellness Best External Collaborator Award for 2025, recognizing the collaborative efforts in the joint project and accelerating research in Ayush and plant biotechnology.

STUDENT AWARDS

Indira Priyadarshani Patra (Dr. Shantanu Pradhan Lab) received the Best Poster Presentation in the "8th European Symposium on Biomaterials and Related Areas", held in Weimar, Germany.

Srijith Sasikumar (Prof. Himanshu Sinha Lab) received the 1st prize and a cash award of INR 75,000 for his poster presentation at the "Wadhwani School of Data Science (WSAI) Annual Research Showcase 2025", held at IIT Madras.

Pavani Hathi (Prof. R. Baskar Lab) received the International Dictyostelium Postdoctoral Researcher Award, announced at the "International Dictyostelium Conference 2025", held in Potsdam, Germany.

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Jaya Vasavi (Prof. Sanjib Senapati lab) was selected for the 7th Cycle of the “International Immersion Experience (IIE) Program”, Purdue University, USA, for a six-month visit.

Varshiny G (Prof. Vignesh Muthuvijayan Lab) received a fellowship to attend the “Neuroscience and Behavioral Pharmacology Workshop” at the School of Medicine, Stanford University, USA.

Sowmya R K (Prof. M. Michael Gromiha Lab) has been recognized for her paper titled "Reliable method for predicting the binding affinity of RNA-small molecule interactions using Machine Learning" as the most cited article in 2024 by the Briefings in Bioinformatics journal.

VISITS BY DISTINGUISHED SCIENTISTS

- Dr. K. Thangaraj, CCMB, Joint National Coordinator, GenomeIndia Project
- Prof. Vasanthi Jayaraman, Editor-in-Chief of the Biophysical Journal
- Dr. Vasant Muralidharan, University of Georgia, Atlanta, USA
- Dr.-Ing. Kevin Joseph, Universitätsklinikum Freiburg
- Dr. Debasmita P., NISER Bhubaneswar
- Prof. P. Ravi Selvaganapathy, McMaster University, Canada
- Dr. Arijit Roy, TCS Hyderabad
- Prof. Saumitra Das, National Institute of Biomedical Genomics, Kalyani
- Prof. Mukund Thattai, NCBS Bengaluru
- Dr. Rajasekaran Namakkal-Soorappan, University of Alabama, Birmingham, USA

HIGHLIGHTS

19	4	1	6	471.12 lakhs
Publications	Patents Applied/Granted	Consultancy projects	Sponsored Projects	Grant Amount

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STUDENT RESEARCH HIGHLIGHTS

Title: *Sex based cardiovascular differences in adult and middle-aged hypertensive schlager mice*
Authors: Sunil D, Subramaniam G, Shivanaiah B, ..., Ninitha A J
Journal: *Scientific Reports 15: 31679 (2025).*
DOI: https://doi.org/10.1038/s41598-025-16459-7

Devika Sunil

Summary

- Non-invasive echocardiography analysis showed cardiac dysfunction in adult hypertensive males compared to a preserved cardiac function in adult female mice.
- This study highlights the use of Schlager or BPH/2J mice as a model to study the mechanism of sex-based differences in heart failure development.

P Ramakrishna Reddy

Title: *TMB Stab-pred: Predicting the stability of transmembrane β-barrel proteins using their sequence and structural signatures*
Authors: Reddy PR, Kulandaisamy A, Gromiha MM
Journal: Biochimica et Biophysica Acta (BBA) - Proteins and Proteomics 1873,141070 (2025).
DOI: 10.1016/j.bbapap.2025.141070

Summary

- The study identified structural and energetic features influencing the folding and stability of TMBs.
- Developed a linear regression–based method for predicting the stability of TMBs.
- Developed a user-friendly web server, TMB Stab-pred, available at https://web.iitm.ac.in/bioinfo2/TMBB/.

Chinaithi Narzary

Title: *Light-responsive pullulan-based dural adhesive with enhanced anti-fibrotic properties, in vitro*
Authors: Narzary C, Ganesh S, Kaur T, Shyam Mohan T, Natesan S, Thrivikraman G
Journal: *Journal of Materials Chemistry B, 8121-8135 (2025)*
DOI: https://doi.org/10.1039/D5TB00297D

Summary

- Developed a novel pullulan-based dural adhesive that instantly gels with UV light.
- The adhesive acts as a sealant for spinal dura injuries, showing strong adhesion to wet tissue, high resistance to burst pressure, and suitability for injectable applications.
- When loaded with naringin, the adhesive provides sustained drug release and demonstrates anti-fibrotic activity without harming cells.
- These features make it a promising candidate for scarless and biocompatible repair of the spinal dura.

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DEPARTMENT DEGREE DISTRIBUTION

The Department of Biotechnology, IIT Madras, held its Convocation Ceremony, celebrating the graduation of 114 students, including 70 Dual Degree, 15 M.Tech, 5 MS, and 24 Ph.D. scholars. The event was graced by Dr. Harish Iyer, Director (Health R&D, Digital Innovations, and AI), Gates Foundation, as the Chief Guest. Addressing the gathering, Dr. Iyer congratulated the graduates and emphasized the role of biotechnology in solving global healthcare and sustainability challenges. He encouraged students to pursue interdisciplinary research and innovative solutions with societal impact. Faculty, students, and families joined to celebrate this milestone, highlighting the department's strong academic and research culture. The ceremony marked the beginning of a new journey for the graduates as they stepped into leadership roles in biotechnology, healthcare, and allied fields.

CONVOCATION 2025 PRIZE WINNERS

PRIZE	STUDENT	PRIZE	STUDENT
Best Ph.D. Thesis in the Dept. Of Biotechnology	Lawanya N	Vishwakarma Prize	Goutham B
GE Ecomagination Excellence Award	Vaishnavi S	Kalapathi AGS Prize/Biocon Prize	Bavishya S M
Batc of 1979 Award (Ph.D.)	R Dhanya	Batch of 1979 Award - Biological Engineering	Rajagopal Subramaniam C
Best M.S. Thesis in the Dept. Of Biotechnology	Anjali Rao Kalbavi	Institute Merit Prize	Jalan Ishaan Deepak
Institute Merit Prize	Nagarjun R	The Divashri Award	Ananya Sangeetha Nagarjunan
Prof. KB Ramachandran Award	Varsha V	Prof. CS Krishnamoorthy Endowment Prize/Lakshmi Ravi Prize	Malavika Venkatesh
Governor's Prize	Rajagopal Subramaniam C	Batch of 1979 Award - Biological Sciences/48th Indian Pharmaceutical Congress Prize	Vatsal Arya

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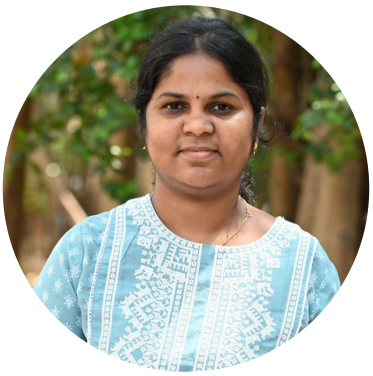
RESEARCH HIGHLIGHTS



Dr. Nathiya Muthalagu

Dr. Nathiya Muthalagu is an Assistant Professor in the Department of Biotechnology. She finished her Ph.D. at the University of Glasgow, UK, and pursued her postdoctoral training at the Cancer Research Beatson Institute, UK. Her lab focuses on understanding the mechanism of neuroendocrine plasticity and its role in cancer progression using cellular and mouse models of cancer.

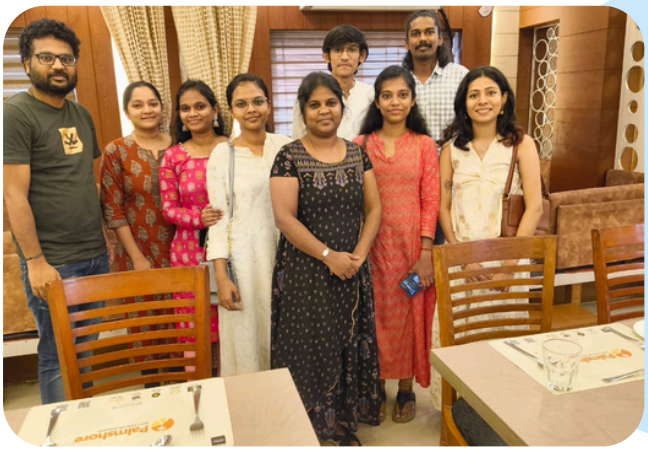
1. What first sparked your interest in your field of research? Was there a specific event or person that inspired you?

During my postdoctoral training, I was characterizing a novel mouse model of pancreatic cancer. I spent countless hours looking at the tumour histology to train myself to recognize the features of pancreatic ductal adenocarcinoma, a type of pancreatic cancer. One particular phenotype stood out: amidst the ductal tumour, there were small pockets of cells that looked very different, which we later identified as neuroendocrine cells. That particular observation sparked my interest in cancer cell plasticity, and decided to focus on investigating its role in cancer progression when I started my independent group.

2. Can you share a bit about your academic journey? What key moments or mentors guided you toward your current research area?

I completed my Master's in Biotechnology at the University of Madras. A key moment that motivated me to pursue research was my Master's thesis project. I carried out the project at our department (IIT Madras), under the guidance of Prof. Karunagaran. This not only helped to gain some research experience but also helped me discover my passion for research. Following that, I joined Dr. Daniel Murphy's lab for my Ph.D. Daniel is an exceptional scientist and an outstanding mentor who has played a huge role in shaping my scientific career.

3. Can you describe your current research for those who may not be familiar with your field?



A tumor is essentially a collection of cells, but interestingly, it is not a homogeneous one. The cancer cell heterogeneity, where each cell may differ from its neighbours, is one of the critical factors driving disease aggressiveness and resistance. My lab investigates the mechanisms underlying this heterogeneity and aims to identify vulnerabilities imposed by this phenomenon.

4. What are some real-world applications of your research?

For the most part, our work focuses on basic research. Although there is no immediate real-world application, it generates fundamental knowledge that is essential for designing novel treatment strategies in the future. In collaboration with the National Cancer Tissue Bank, we are also establishing cancer organoids, which may have more immediate application as a drug screening platform.

5. What do you do outside of research to stay creative and motivated?

I read a lot of short stories and novels, which helps expand my worldview. However, I don't have any creative hobby, which is something I need to work on.

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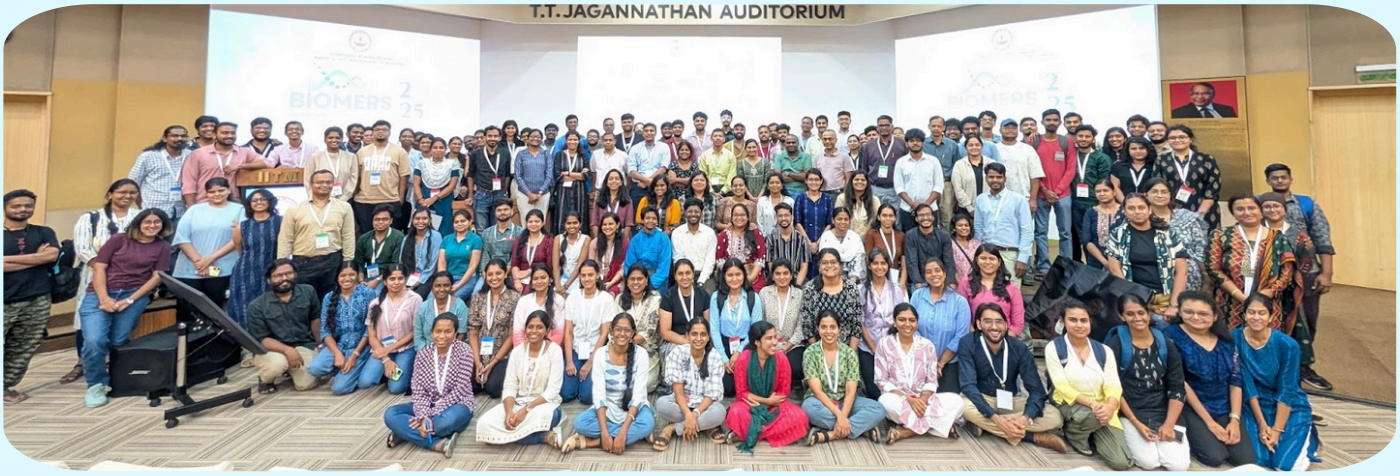
SYMPOSIUM/CONFERENCE

The **Annual Research Scholars' Symposium of the Department of Biotechnology, BIOMERS 2025**, was held at ICSR on 2nd August 2025. The symposium was a one-day event that included scientific talks, a poster session, and a quiz about the department. 25 student talks organised under the unifying themes of 'Small molecules, Proteins and Pathways', 'Physiology and Neuroscience', and 'Cellular and Molecular Biology' showcased the expertise of students in their respective fields as well as the breadth of research carried out in the department. The one-hour poster session in Hall 4 served as a concentrated dose of scientific enthusiasm, with 39 posters presented by representative student groups. The magnitude of the event, planned and executed by students and technical staff under the mentorship of Drs. Shantanu Pradhan, Richa Karmakar, and Mamata Bangera served as a testament to the growing size and prominence of the department.



As part of the **Malaviya Mission Teacher Training Programme (MMTTP)** programme launched by the Ministry of Education, the Department of Biotechnology offered a 9-Day Programme titled 'Emerging Trends in Life Sciences and Biotechnology' for the Biology module of the initiative. The programme was coordinated by the Teaching Learning Centre (TLC) at IIT, Madras, and locally organised by Prof. Sanjib Senapati, Dr. M.S. Narayanan (from the Department of Medical Sciences and Technology), and Dr. Mamata Bangera, with support from department staff, Mr. Vengadeshkumar V., Mr. Karthick, and Mr. Nishanth. The participants included 39 faculty teaching undergraduate students in institutions all over the country.

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WORKSHOP

Dr. Vasant Muralidharan (University of Georgia, USA), a VAIBHAV fellow, with Dr. Arumugam Rajavelu's team, conducted a hands-on Expansion Microscopy workshop, trained more than 20 students in this cutting-edge methodology. Participants learnt how to expand cells isotropically up to 5-fold, without lysing them, which permitted the study of organellar/structural localization in the cell with high resolution.

ANNOUNCING CARE CONFERENCE 2025, ALUMNI REUNION & 20TH ANNIVERSARY CELEBRATION

The Department of Biotechnology at IIT Madras is thrilled to announce its upcoming conference, **CARE CONFERENCE (PAN IIT) 2025**, a platform for insightful discussions, knowledge sharing, and networking within the area of biological sciences & engineering. Also, join us for the **20th Anniversary Alumni Reunion** — a celebration of science, connection, and cherished memories. We warmly invite all alumni to participate in the conference, the reunion, or both!

Newsletter Committee:

Prof. M. Michael Gromiha, Prof. Himanshu Sinha, Prof. Greeshma Thrivikraman, Prof. Santhosh Sethuramanujam & Mr. Amit Phogat