Mehta Family Centre for Engineering in Medicine

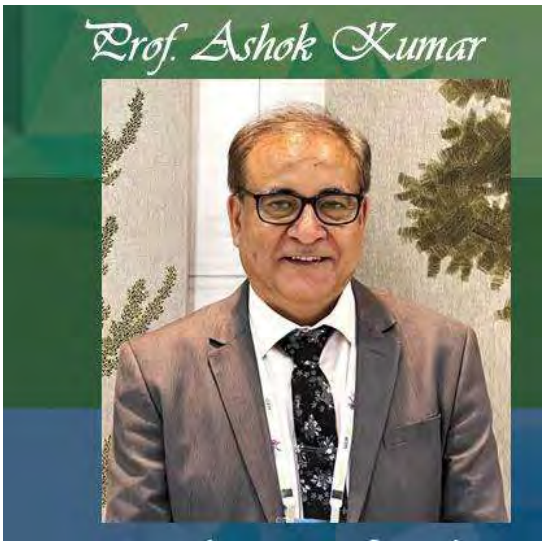
Annual Report
2024

MFCEM Annual Report

2024

Awards/Honors/Recognitions

Academy Member



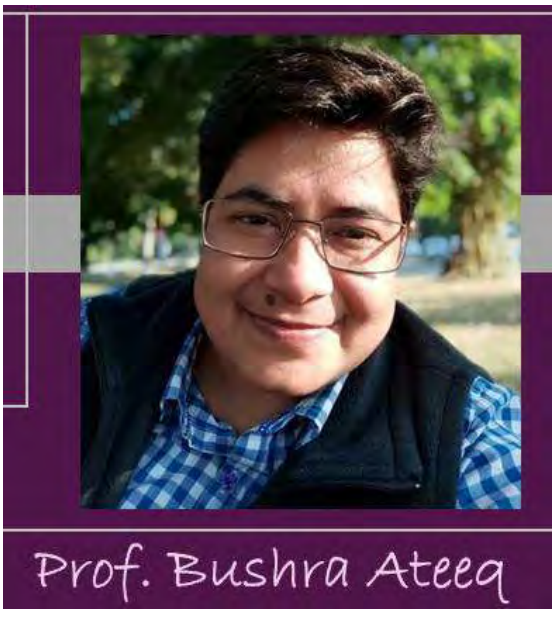
Prof. Ashok Kumar was elected Fellow of the **Indian National Academy of Engineers** (INAE) and of the **National Academy of Medical Sciences** (NAMS), Ministry of Health and Family Welfare, Government of India.

Prof. Ashok Kumar was also conferred with an honorary membership in the **Romanian Society of Biomaterials** during the 10th BiomMedD 2024 held in Romania. This is the highest recognition by the Society.

INAE, Indian National Academy of Engineers, was founded in 1987. It comprises India's most distinguished engineers, engineer-scientists and technologists. INAE functions as an apex body that promotes the practice of engineering & technology and the related sciences for their application to solving problems of national importance.

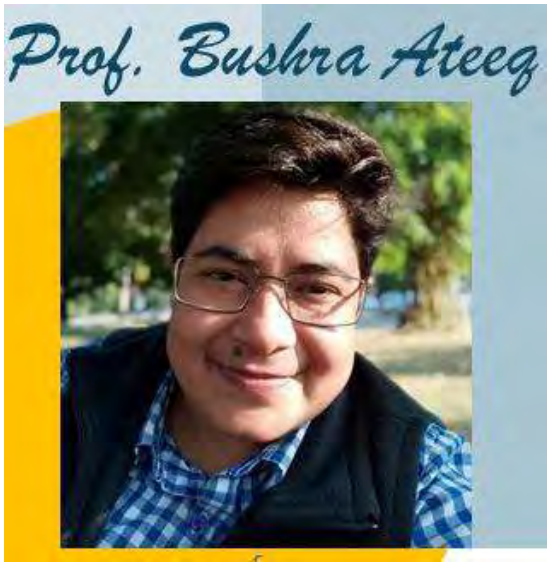
NAMS, National Academy of Medical Sciences, India was registered as the 'Indian Academy of Medical Sciences' on 21st April, 1961 under Societies Registration Act XXI of 1860. It is a unique institution which fosters and utilizes academic excellence as its resource to meet medical and social goals.

Prof. Bushra Ateeq was elected fellow of the **National Academy of Medical Sciences (NAMS)**, Ministry of Health and Family Welfare, Government of India, at the 64th Annual Conference of the National Academy of Medical Sciences organized by All India Institute of Medical Sciences, Jodhpur.



Awards/Honors/Recognitions

Awards



Prof. Bushra Ateeq has been selected for the **World Academy of Sciences (TWAS)-UNESCO Award (2026)** in Medical & Health Sciences.

Prof. Bushra Ateeq was awarded the **TATA Innovation Fellowship** 2023-24, DBT India, in recognition of outstanding innovative and translational research.

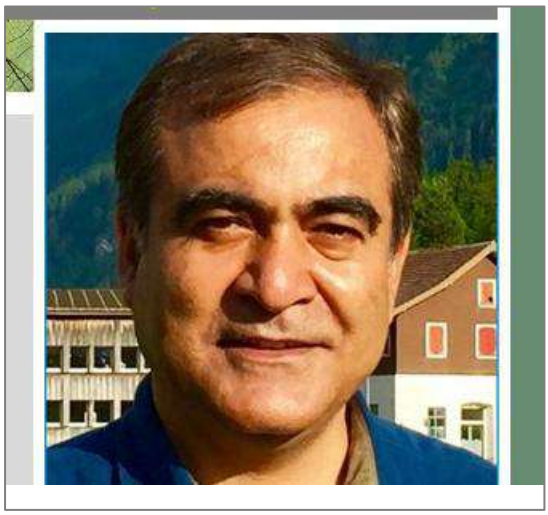
Prof. Bushra Ateeq was awarded **the Rajib Goyal Prize (2021-2022)** for Young Scientists conferred by Kurukshetra University (2024) in the Life Sciences category.

Prof. Bushra Ateeq was felicitated by the Late Saleemuddin Educative and Cultural Society, Kanpur.

Prof. Bushra Ateeq was invited for an "*At Home*" ceremony hosted by the **Honorable President Smt. Droupadi Murmu** at the Rashtrapati Bhavan, New Delhi on 15th August 2024.

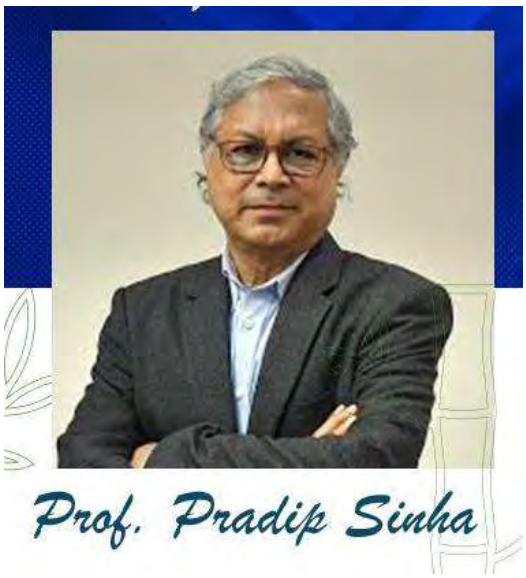
Awards/Honors/Recognitions

Awards



Prof. Ashok Kumar was conferred with an Honorary doctorate in the field of technology, **DSc (Tech) by Aalto University, Finland.**

Prof. Ashok Kumar was selected for Poonam and Prabhu Goel chair professor.



Prof. Pradip Sinha was honoured with Institute Fellow award**,** 2024, for his outstanding contribution to research and institute building.

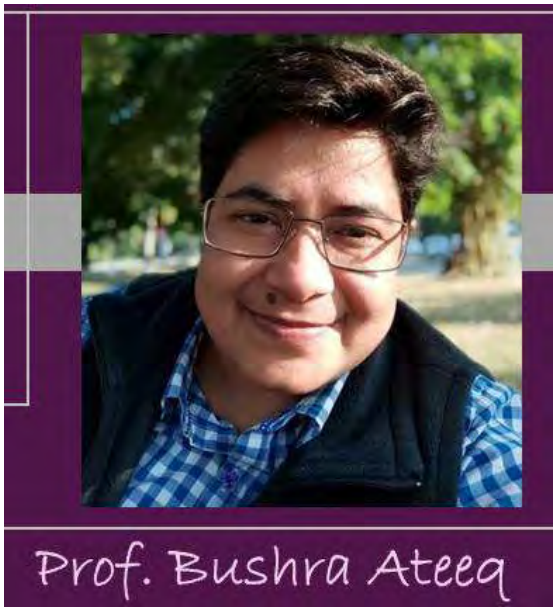
Awards/Honors/Recognitions

Prof. Dhirendra S. Katti has been appointed **Director, Indian Institute of Technology Goa.**

Prof Bushra Ateeq has been appointed **Dean of International Relations**, IIT Kanpur.

Honors/Awards/Recognitions

Member of Advisory Committee



Prof. Bushra Ateeq has been inducted as Member, Expert, of the Research Advisory Council (Dec 2024-Dec 2027) of **Bose Institute, Kolkata**, Dept. of Science and Technology (DST), Govt. of India.

Prof. Bushra Ateeq has been inducted Member, Expert, of the Advisory Committee of the Bioscience and Bioengineering Department at **Indian Institute of Technology Dharwad**.

Prof. Bushra Ateeq has been inducted Member, Expert, of the committee to assess the performance of Chief scientists of the Biological Sciences group at the **CSIR-Indian Institute of Chemical Biology (IICB), Kolkata.**

Grants/Fellowships

Prof. Appu Kumar Singh

Prof. Rakesh Kumar

Principal investigator and Co-PI: **Appu Kumar Singh** (PI), **Rakesh Kumar Majhi** (Co-PI)

Sponsor/Agency: Indian Council of Medical Research, ICMR Intermediate Grant (2.98 Cr)

Title: Augmenting NK cell immunotherapy for Oral Squamous Cell Carcinoma by genetic and pharmacological modulation of a calcium-permeable TRP channel

Period: 2024-2027

Principal investigator: Prof. Rakesh Kumar Majhi

Sponsor/Agency: DST-Technology Development Program

Title: Therapeutic Antimicrobial Chemicals and Antimicrobial Peptides (TACAP)
Role: Co-PI
Period: 2024-2027

Grants/Fellowships

Prof. R. Sankararamakrishnan
Sponsor/Agency: SERB
Title: Computational approach to investigate the molecular mechanism of arsenic and drug transport in human, plant and parasitic aquaglyceroporin channels
Role: PI
Period: 2024-2027

Prof. R. Sankararamakrishnan

Prof. Saravanan Matheshwaran

Principal investigator: Prof. Saravanan Matheshwaran
Sponsor/Agency: Department of Science & Technology, Gov. of India-Technology Development Program
Title: Centre of Excellence in Antimicrobial Resistance (2024)
Budget: 8 crores

Principal investigator: Prof. Saravanan Matheshwaran
Sponsor/Agency: Department of Biotechnology
Title: DBT- Frontiers in Biotechnology grant for the project entitled Deciphering the role of *Ustilago maydis* SWR1 chromatin remodeler in melanin biosynthesis, morphogenesis, and virulence mechanism".
Budget: 99.9 Lakhs

Principal investigator: Prof. Saravanan Matheshwaran

Grants/Fellowships

Sponsor/Agency: SERB, Gov. of India Title: Deciphering the role of LexA-family transcription regulator induced mutageneisis and AMR of MDR strain of Acinetobacter baumannii.
Budget: 72.55 Lakhs

Prof. Sandeep Verma

Principle Investigator: Prof. Sandeep Verma
Sponsor/Agency: WCF, New Delhi
Project Title: Promotion of Equitable Access to Affordable Healthcare in Uttar Pradesh
Period: 6 months

Prof. Bushra Ateeq

Principal Investigator: Prof. Bushra Ateeq
Funding Agency: CSIR-ASPIRE, Counsil of Scientific and Industrial Research. Government of India
Project title: Liquid biopsy-based diagnostics for circulating biomarkers in prostate cancer.
Duration: July 2024 – June 2027.

Principle Investigator: **Prof. Bushra Ateeq**
Project title: Fabrication of low-cost microfluidic device for improved molecular diagnostics and assessing treatment response of Prostate Cancer Patients.
Sponsor: Department of Biotechnology; Tata Innovation Fellowship (HRD-16012/6/2024-HRD-DBT).
Project Duration: December 2024 –December 2027.

Grants/Fellowships

Prof. Jayandharan G Rao

Principle Investigator: Prof. Jayandharan G Rao
Co-PIs: SK Misra, Nitin Mohan, Appu Kumar Singh, Sai Pydi, Sivaprakash Ramalingam
Sponsor: Scientific and Useful Profound Research Advancement (SUPRA), Anusandhan National Research Foundation (ANRF), DST
Title: Next-generation genome engineering and chemo-genetic platform technologies for gene therapy of ocular disorders.
Total Award: 230 lakhs.
Duration: 2024- 2027

Prof. Nitin Gupta

Principle Investigator Prof. Nitin Gupta
Sponsor/Agency: Department of Biotechnology
Title: "Understanding the mechanism of DEET sensing in the antennal lobe of Aedes aegypti mosquitoes".
Role: PI
Period: 2024 – 2027

Patents

Prof. Jayandharan G Rao

Inventors: Shubham M, Mary B, **Jayandharan GR.**

Title: Recombinant adeno-associated vectors and method thereof.

Application no. 201911018990.

Status: Awarded

Inventor: Shubham M, Mary B, **Jayandharan GR.**

Title: PTM modified AAV vectors-Recombinant adeno-associated vectors and method thereof.

Application no. 201911018990.

Status: Awarded

Inventors: Vijayata Singh, Shamshul Huda, Narendrakumar G, **Jayandharan GR.**

Title: An optimized transgene for an ocular gene therapy

Application no. 202211017896.

Status: Awarded

Prof. Sarvanan Matheshwaran

Inventor: Afjal Ansari, Naveen Kumar Verma, Nishith Verma and **Sarvanan Matheshwaran**

Title: Development of a Packed Bed Photobioreactor Operated in Light On-Off Switching Mode for Aqueous CO_2 to Formate Conversion

Status: Filed.

Inventor: Saravanan M, **Misra SK,** Chatterjee C, Hariharan VC.

Title: Entitled "A Nanoformulation For Inhibition Of Mycobacterial Sos Response And A Process Of Preparation Thereof"

Indian Patent Application No: 202411039655

Status: Filed.

Patents

Prof. Sandeep Verma

Applicant: Sandeep Verma, Ashok Kumar, Rakhi Bormon, Ekta Srivastava,
Title: 6,9-Trisubstituted adenine derivatives for promoting osteogenesis and bone regeneration.
Patent No: 202411084515, November 5, 2024.

Inventor: Dr. Ashwani Kumar Thakur, Nabodita Sinha
Title: A Fullerene C60 Nano-formulation for Acute respiratory distress syndrome
Patent No: 508046
Status: Awarded

Prof. Ashwani Kumar Thakur

Inventor: Dr. Ashwani Kumar Thakur, Yashwant Avinash Gahane
Title: Combination of Fluorenylmethyloxycarbonyl conjugated amino acids (FMOC-AA) and membrane permeabilizing agents against gram-negative bacteria.
Patent No: 500912
Status: Awarded

Inventor: Dr. Ashwani Kumar Thakur,
Title: A nasal spray formulation against SARS-COV-2 and related respiratory viruses
Patent No: 518361
Status: Awarded

Prof. Santosh Kumar Misra

Inventor: Dr. Santosh Misra, Dr. Dhirendra S. Katti, Sreyashi Das
Title: A transdermal gel for transdermal melanoma therapy and a process for synthesis thereof
Patent No.: 504008
Status: Granted

Inventor: Santosh Kumar Misra, Piyush Kumar
Title: A process for fabrication of paper based analytical device for detection of bacteria and product thereof
Patent No. 498747
Status: Granted.

Patents

Prof. Jayandharan G Rao

Inventor: Jayandharan Giridhara Rao, Shubham Maurya
Title: Process for producing a plurality of sumoylation target-site modified AAV vector and product thereof.
Application No. 201841042550.

Inventor: Jayandharan GR, Navaneeth Srinivasan, Anila Varghese, Vijayata Singh, Pratiksha Sarangi.
An optimized AAV vector for gene therapy of muscular dystrophy-
Application no. 202211036305.

Prof. Amitabha Bandyopadhyay

Inventor: Abirami S, Jay Harkishanbhai Prajapati, Kartikeya Dixit, Mandeep Singh Rana, Rushit Mansukhbhai Bhanderi, Sunita Mehta, Supriya Das, Vikas Kannojiya, Harindra Prasad Sharma, Manoj Sharma, Phool Chand Gond, K. Muralidhar, Pranav Joshi, Niraj Sinha, Kantesh Balani, **Jayandharan Giridhara Rao, Amitabha Bandyopadhyay, Santanu Kumar Mishra**
Title: Design application titled "Brushless DC (BLDC) motor" bearing
Application no. 375689-001.

Inventor: Khan N, **Jayandharan GR.**
Title: Gene delivery vector and method there of.
Application no. 201911019997.

Inventor: Abirami S, Jay Harkishanbhai Prajapati, Kartikeya Dixit, Mandeep Singh Rana, Rushit Mansukhbhai Bhanderi, Sunita Mehta, Supriya Das, Vikas Kannojiya, Harindra Prasad Sharma, Manoj Sharma, Phool Chand Gond, K. Muralidhar, Pranav Joshi, Niraj Sinha, Kantesh Balani, **Jayandharan Giridhara Rao, Amitabha Bandyopadhyay,** Santanu Kumar Mishra
Title: VAD demonstrator system with mock circulatory loop for testing, demonstrating functions and performance of VAD.
Application no. 202311000260.

Patents

Prof. Jayandharan G Rao

Inventors: Jayandharan GR, Pratiksha Sarangi, G Narendra Kumar.
Title: Method for combination of adeno-associated virus vectors, Genome editing, bypass coagulation factor for hemophilia Management.
Application no. 202411005068.
Status: Filed

Inventors: Jayandharan GR, Pratiksha Sarangi, Shamshul Huda, G Narendra Kumar.
Title: AAV-mediated combination therapy for sustained vision rescue in leber congenital amaurosis type 2.
Application no. 202411038240.
Status: Filed

Inventors: Jayandharan GR, MohanKumar, Sanya Sharma, G Narendra Kumar.A
Title: Bioengineered AAV9 vector carrying optimized transgene for Duchenne muscular dystrophy gene therapy.
Application no. 202411046835.
Status: Filed

Inventors: Jayandharan GR, Vijayata Singh, Subhajit Pathak, G Narendra Kumar.
Title: AAV-mediated combinatorial gene therapy for the treatment of hepatocellular carcinoma.
Application no. 202411046833.
Status: Filed

Applicant: Jayandharan GR, Navaneeth Srinivasan, Anila Varghese, Vijayata Singh, Pratiksha Sarangi.
Title: An optimized AAV vector for gene therapy of muscular dystrophy.
Patent/Application No.: 18/862,617.
Status: Filed.

Inventor: Khan N, Jayandharan GR.
Title: Exosome-associated AAV (vexosome) vector in suicide gene therapy, compositions and methods thereof.
Application no. 202011003360.

Invited Talks/Panel Discussion/Review Board

Prof. Dhirendra S. Katti

Prof. Dhirendra S, Katti, delivered the keynote address, titled: Injectable scaffolds-based strategies for cartilage tissue regeneration. Medical Materials and Devices. ASM International India Chapter. 5th-6th September, 2024.

Prof. Katti was invited to give a talk on: Development of a vaccines/nanovaccines for multi-drug resistant diarrhoea, in the 13th edition of Bengaluru India Nano conference. (Nanotechnology for Sustainability: Climate, Energy and healthcare). August 1st-3rd, 2024.

Prof. Dhirendra S. Katti, Nikhil Teki, Zahra S. Zaidi,. Dissociation constant mediated surface charge switchability of nanoparticles for biomedical applications. Nanomaterials in Biomedical Applications, Manipal Academy of Higher Education, Karnataka, 26-27th, February, 2024.

Prof. Jayandharan G Rao

Prof. Jayandharan G Rao. Invited talk, CME on "Beyond the Ordinary: Empowering Healthcare Professionals with Essential Insights for Diagnosing and Care of Rare Genetic Disorders" AIIMS. New Delhi. 01. Feb. 2024

Prof. Jayandharan G Rao, delivered an invited talk on World Duchenne Awareness day, Sir Gangaram Hospital, New Delhi. 24.09.2024

Invited talk, Indo-US Bridging Rare Summit, Indian National Science Academy, New Delhi. Nov 17, 2024:

Keynote lecture, Bioworld Retreat, IIT Delhi, Naukuchiatal. Nov 27, 2024:

Invited talk, CME in PG Hematology and 25th anniversary of DM Hematology, CMC, Vellore Dec 04, 2024: Colloquium Lecture, BSBE, IIT Indore. Nov 23, 2024:

Prof. Jayandharan G Rao, and team (Singh V, Huda S, Kumar N, Jayandharan GR) attended the European Society for Gene and Cell Therapy meeting, Rome, Italy, 2024., presented their study titled: Co-delivery of AAV based RPE65 and Survivin augments visual response in preclinical models of LCA2. 35: P0164.

Invited Talks

Prof. Bushra Ateeq

- **Prof. Bushra Ateeq** delivered the Keynote lecture at the 43rd Annual Indian Association for Cancer Research (IACR) Conference organized by IISER Pune. 21st January 2024
- Keynote lecture at an International conference "Advancements in Diagnostic Technologies: Global Healthcare Monitoring" (ADT-2024) from November 15-17, 2024 at the Motilal Nehru National Institute of Technology, Allahabad (MNNIT or NIT Allahabad).
- Keynote lecture at the National Conference on "Advances in Biological Sciences: molecules to organisms" (28-29 December 2024) in the Department of Zoology, Aligarh Muslim University, Aligarh
- Invited talk, at the launch of the "SWATI" portal at the Indian National Science Academy (INSA), Delhi on the occasion of International Day of Women and Girls in Science. 11th February 2024.
- Invited to give a talk at the Dept. of Biochemistry, All India Institute of Medical Sciences, New Delhi. 12th February 2024.
- Invited talk on the occasion of Women's Day at the National Institute of Biomedical Genomics, Kalyani. 1st March 2024.
- Invited Talk (9th May 2024) at the Department of Biochemistry, University of Kashmir, Srinagar.
- Oration on Innovation in Health Care lecture series (4th June 2024) at the CSIR-Central Drug Research Institute, Lucknow.
- Organized Mihir Chowdhury Memorial Medal Oration under Indian National Science Academy (INSA) Kanpur local chapter.
- Invited Annual Talks-2024 at the Centre for DNA Fingerprinting and Diagnostics (CDFD), Hyderabad. (July 18 – 19, 2024)
- Invited Talk at the Kashmir Science Vision-2024, August 24, 2024, organized by Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir (SKUAST-K), Srinagar.
- Invited Talk at Annual meeting of the DBT/Wellcome Trust India Alliance (August 28 – 30, 2024), Hyderabad.
- Invited talk at the RGCB Conference 2024 at Kumarakom organized by Rajiv Gandhi Centre for Biotechnology (RGCB), Thiruvananthapuram, from September 25 – 28, 2024.
- Invited Talk at the 64th Annual Conference (23rd November 2024) of the National Academy of Medical Sciences, organized by All India Institute of Medical Sciences, Jodhpur.

Invited Talks/Panel Discussion/Review Board

Prof. Bushra Ateeq

- Invited talk at the Pan-IIT and IISERs Meeting and Conference on Engineering in Medicine organized by IIT Kanpur (6– 8 Dec 2024).
- Invited popular lecture at the 6th edition of Manohar Parrikar Vidnyan Mahotsav (13th December 2024) organized by the Government of Goa, Department of Science, Technology and Waste Management.
- Invited talk at the Indian National Science Academy (INSA)- and ACS-sponsored workshop on "Building Skills to Navigate PhD Journey" (30 December 2024) for the PhD students under INSA Kanpur local chapter.
- Attended the BSBE, IIT Kanpur Outreach at the Sher-e-Kashmir University of Agricultural Sciences and Technology (SKUAST), Srinagar (May 8 to 9, 2024) organized by IITK and SKUAST.
- Co-Chair of the Women in Science panel discussion at the Kashmir Science Vision-2024 organized by Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir (SKUAST-K), Srinagar, August 23 – 24, 2024 Attended Annual meeting of the DBT/Wellcome Trust India Alliance (August 28 – 30, 2024), Hyderabad.
- Attended the 6th Senate meeting of the NIPER-Raebareli (28th May 2024).
- Attended Research Council Meeting (27-28 June 2024) at the CSIR-Institute Of Genomics And Integrative Biology (CSIR–IGIB), New Delhi.
- Was invited to attend The Kashmir Science Vision-2024 organized by Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir (SKUAST-K), Srinagar from August 23 – 24, 2024.
- Project Review meeting for the CSIR Pan-Cancer Genomics, August 9 – 10, 2024 at the CSIR-Institute Of Genomics And Integrative Biology (CSIR–IGIB), New Delhi.
- Invited talk at the RGCB Conference 2024 at Kumarakom organized by Rajiv Gandhi Centre for Biotechnology (RGCB), Thiruvananthapuram, from September 25 – 28, 2024.
- Attended the 6th Senate meeting of the NIPER-Raebareli (28th May 2024).

Invited Talks/Panel Discussion/Review Board

Prof. Bushra Ateeq

- Attended Research Council Meeting (27-28 June 2024) at the CSIR-Institute Of Genomics And Integrative Biology (CSIR–IGIB), New Delhi.

- Represented IIT Kanpur at the inauguration ceremony of the Melbourne Global Centre at New Delhi on 17th September 2024.
- Attented RGCB Conference 2024 at Kumarakom organized by Rajiv Gandhi Centre for Biotechnology (RGCB), Thiruvananthapuram, from September 25 – 28, 2024.
- Attended the 3rd Japan-India Universities Forum in New Delhi to foster new academic collaborations with Japanese Universities (October 19th 2024).

- Moderator for a panel discussion in the *Samanvay 2024* (Nov 28th- 29th 2024) at IIT Kanpur. Samanvay is the thought-leadership platform that brings together industry leaders, academicians, and innovators.

- Panelist for the Johns Hopkins - India partnerships and initiatives (18th November 2024) organized by Gupta-Klinsky India Institute at Stein Auditorium, India Habitat Centre, New Delhi.
- Attended 64th Annual Conference (22-24 November 2024) of the National Academy of Medical Sciences, organized by All India Institute of Medical Sciences, Jodhpur

Prof. R. Sankararamakrishnan

- Prof. R. Sankararamakrishnan was invited for a talk, at the Symposium on Accelerating Biology 2024 -The Exascale Leap, CDAC-Pune, Feb 2024.

- Invited Talk, Frontier Symposium in Biology, Indian Institute of Science Education and Research, Thiruvananthapuram (IISER TVM), Feb 2024.

Invited Talks/Panel Discussion/Review Board

Prof. Sarvanan Matheshwaran

Prof. Saravanan Matheshwaran was invited for a guest lecture, titled "Multifaceted Impact of SWR1 in Ustilago maydis: Insights into Fungal Biology and Virulence Mechanisms" at INRES- Plant pathology, University of Bonn, Germany. 7th October 2024.

Invited Lecture titled "Targeting Bacterial SOS Response to Combat Antimicrobial Resistance" at the Institute of Biology, Leiden University, Netherlands, 18th October 2024

Invited Keynote lecture titled "Antibiotics and Alternative Strategies for Combating Antimicrobial Resistance" Sri Krishna ARTS and Science College, Coimbatore, Tamilnadu, 25th July 2024,

Invited lecture entitled "Role of SWR1 chromatin remodeling complex in virulence and Morphogenesis" Division of Biotechnology, Karunya University, Tamilnadu, 24th July 2024.

Invited Chairperson, Antimicrobial Resistance Research Conference, NCBS, Bangalore 22nd August 2024.

Delivered an invited talk, titled " Targeting mycobacterial "SOS" Response- A strategy to toggle antimicrobial resistance (AMR), at the Department of Biochemistry, University of Calcutta, on 20th Sep 2024.

Prof. Santosh Kumar Misra

Prof. Santosh Kumar Mishra. Invited talk on "Nanocarbon: Template for New Generation Diagnalytics" at 10th Annual Research Symposium, Department of Bioengineering, Indian Institute of Science, Bangalore, India, 12-13th Jan, 2024.

Prof. Santosh Kumar Mishra. Invited Talk "Biodegradable Nanocarbon: Template for Translatable Bioactives " at International Conference on Translational Materials for Sustainable Technology (TransMate 2k24) at IIT BHU, Feb 01-04, 2024.

Invited Talks/Panel Discussion/Review Board

Prof. Arjun Ramakrishnin, was invited to give a talk titled 'Neuroengineering for Mental Health: understanding the mechanisms underlying suboptimal decision making in anxious individuals' at InterfaceRice 2024 held at Rice university, Houston, Texas, USA in May, 2024.

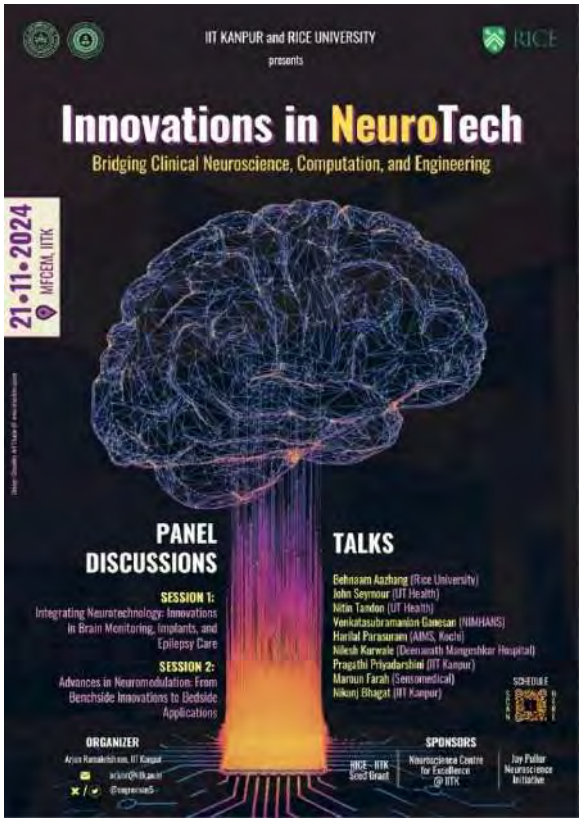
Prof. Arjun Ramakrishnin

Debanjan Dasgupta Invited speaker at an international conference organized by Rama University, Kanpur, 19-20th April.

Prof. Debanjan Dasgupta

Conferences/Seminars/Workshops (organized)

Rice-IITK Workshop on NeuroTech Innovations



Prof. Arjun Ramakrishnan organized the Rice-IITK Workshop on NeuroTech Innovations in the areas of clinical neuroscience, computational neuroscience, and neuroengineering aiming to develop innovative solutions for neurological and psychiatric care.

INSA and ACS-sponsored workshop

Prof. Bushra Ateeq organized Indian National Science Academy (INSA)- and ACS-sponsored workshop on "**Building Skills to Navigate PhD Journey**" (30-31 December 2024) for the PhD students under INSA Kanpur local chapter.

Conferences/Seminars/Workshops

Innovative solutions for metabolic health

A one-day conference on metabolic disorders titled "Innovative solutions for metabolic health was organized on 27th September, spearheaded by Prof. Sai Prasad Pydi. The event included highly in depth talks by clinicians, academicians and startups.

Conferences/Seminars/Workshops

Talks hosted at MFCEM Lecture Hall

SPARC Symposium on "Point-of-Care Healthcare Devices" & Pant Workshop Series on Medical Technology & Future Medicine.
November 25th,
MFCEM Lecture Hall,
Organizer: The Gangwal School of Medical Sciences and Technology

Introduction of a New Master's Program:

M. Tech in Biomedical Engineering

Rising to the need for skilled Biomedical Engineers, the Department of Biological Sciences and Bioengineering (BSBE) along with the Mehta Family Center for Engineering in Medicine (MFCEM) and the Gangwal School of Medical Sciences and Technologies (GSMST) is offering a new and a unique M.Tech. program in Biomedical Engineering. The course is available for enrolment commencing July 2024 academic session.

The meticulously designed, forward-looking course aims to provide a deep and an immersive understanding of the development of biomedical devices and diagnostics, along with a hands-on experience of product-development. The program aims to produce well-trained engineers capable of meeting India's demand for skilled "Bio-med-tech" professionals and entrepreneurs with the ability to spearhead brilliant and innovative medical device startups with scaling aspirations.

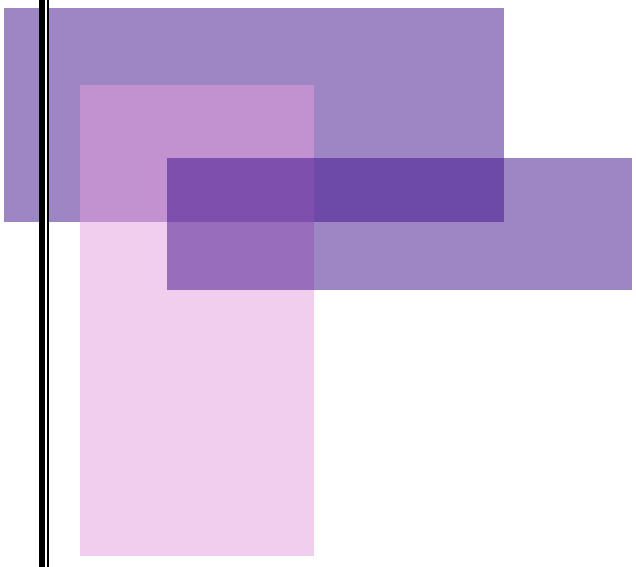
The M.Tech. program in Biomedical Engineering is structured into two essential components: 1) The course component and, 2) The project component. The course component is meticulously designed to provide students with a balanced curriculum, consisting of mandatory courses and a diverse range of electives.

The curriculum encompasses a wide range of topics such as device design, instrumentation, biomaterials, along with comprehensive teaching of human physiology and anatomy. This solid foundation ensures that students are well-prepared before embarking on the development of medical devices or diagnostics.

In the project component, students will embark on product development, under the able guidance of one or more participating faculty members. This component is centred around addressing practical challenges in the field of Biomedical Engineering.

In a first of its kind the students enrolled in this program will go through "clinical immersion" at esteemed Medical Schools, where students can gain valuable firsthand experience and exposure to real-world medical environments. Furthermore, students graduating from this program will be well-suited for the DBT SIB-SHInE program, a joint initiative hosted by IIT Kanpur and King George Medical University Lucknow, to facilitate their participation to cutting-edge research and advancements in the field of medical technology.

In all, the offered MTech program in Biomedical Engineering, aims to nurture a new generation of skilled professionals and entrepreneurs who will contribute significantly to India's self-reliance in the medical device and diagnostic sector, furthering advancements in healthcare technology for the benefit of all.



Welcome Dr. Nikunj Arunkumar Bhagat

Assistant Professor

Department of Electrical Engineering
Department of Biological Sciences and Biosciences (joint appointment)

Research Interests: Neural & Bio-signal processing, Medical Instrumentation, Brain-machine interfaces, Functional Electrical Stimulation, and Rehabilitation Engineering

Dr. Nikunj Bhagat did PhD with Prof. Jose Contreras-Vidal, in Electrical Engineering, University of Houston, in Brain-machine interface (BMI) with closed-loop neuromuscular stimulation to restore grasping in stroke and spinal cord injury survivors.

Dr. Bhagat is a Nidhi Prayas Awardee, 2021, Dept. of Science & Technology & SCTIMST, Trivandrum, and was also awarded the Ramalingaswami Faculty Fellow, Dept. of Electrical Engg. Indian Institute of Science Mar – Oct 2023

In conversation with
Dr. Nikunj Arunkumar Bhagat
Assistant Professor
Department of Electrical Engineering,
Department of Biological Sciences and Biosciences,
and Mehta Family Centre for Engineering in Medicine.

MFCEM: Dr Bhagat, it is great to have you at IIT Kanpur. Your research straddles two disparate fields of Electrical engineering and Biomedical science. Having done a BTech and MTech in electrical engineering what drew you to apply your training to Biological/Medical problems?

Dr. Nikunj Bhagat: Thank you, I am very excited to join IIT Kanpur and become a member of MFCEM. I studied Biology when I was in High School and was fascinated by

the human body and how its various organs function. During my undergraduate, I became more and more curious on how my engineering skills can be applied to create medical devices such as prosthetic limbs, artificial organs, etc. My M.Tech thesis gave me first-hand experience of working on biomedical problems, when I devised a smart glove to measure tremors in a surgeon's hands during microsurgery. Post M.Tech, I worked as a Researcher on Image-guided robotic surgery in South Korea, which further deepened my passion in medical devices for healthcare applications. These early career experiences were very instrumentational in motivating me to pursue my PhD dissertation in the Biomedical domain, specifically in Neural Engineering and Rehabilitation.

MFCEM: Could you shed some light on the larger research vision of your lab.

Dr. Nikunj Bhagat: The vision of my lab is to develop neuro-technologies that can integrate with our body's nervous system in order to repair, restore, or replace any damaged neural pathways, caused by a neurological disease or injury. Broadly, I am interested in 2 types of problems: First, is the forward or decoding problem where we want to understand brain activity and use it to drive external devices such as a robotic limb for restoring movement in a paralyzed person. This technology is sometimes also called an electronicneural "bypass". Second, is the reverse or encoding problem where we want to study theeffect of such a neural bypass on the brain and its ability to repair and restore the damaged neural pathways. To address these questions, we are focusing on different technologies such as brain-computer/machine interfaces, electrical stimulation, neuro-rehabilitation, and bio/neural feedback.

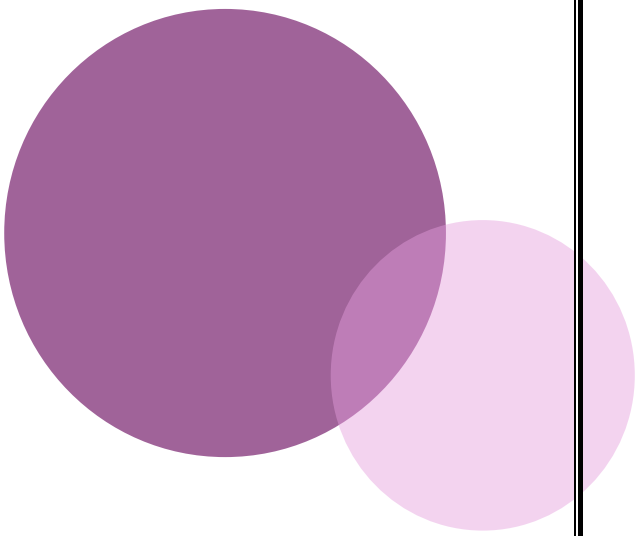
MFCEM: Does having your lab in the Mehta Family Centre for Engineering in Medicine at IIT Kanpur, as compared to a traditional biology department, help you in any way further your research goals?

Dr. Nikunj Bhagat: What I admire about MFCEM is that it is clearly focused on translational medicine for patient-centric problems. It will serve as an enabling platform for engineers, clinicians, scientists, and research scholars to come together and work on solutions that target specific issues in the Indian healthcare system. Moreover, IITK is investing in developing an entire MedTech ecosystem, including the Gangwal School of Medical Sciences and Technology (GSMST) and the Start-Up Incubation and Innovation Centre (SIIC), which together with MCFEM, will fast-track the development and clinical translation for various drugs and devices. I feel having such an ecosystem is what distinguishes IIT Kanpur from other Institutions of our country.

MFCEM: We are currently witnessing a paradigm shift in approach towards health care delivery and medical research in our country. How do you see the growth of MedTech innovations in India in the near and far future.

Dr. Nikunj Bhagat: Access to healthcare has tremendously improved with the advent of smartphones and digital technology. Moreover, a number of startups have come up that are working on med-tech solutions for the Indian population. However, a lot of medical research and innovations are still funded only through government grants or philanthropic donations. We need more buy-in from Industry, for example by setting up R&D labs or by promoting industry-university collaborations, in order to grow and sustain our med-tech industry. At the same time, we also need to be cognizant that as compared to other industries, med-tech development takes years at a stretch and investors, VCs must set realistic expectations from startups in terms of their return on investments and time-to-market horizons.

I recently read [1] that India is becoming a global venue for conducting clinical trials. While this is encouraging, I would really like to see a number of these drugs and devices being indigenously developed in India rather than only being validated in the Indian population.



MFCEM EVENTS

MFCEM Dialogues #9

Prof. Mriganka Sur, Newton Professor of Neuroscience, Massachusetts Institute of Technology, USA

Title: How the brain works: Neuroscience and next-generation AI

24th Feb, 2024

The MFCEM Dialogue is an interactive event that includes a short presentation by the speaker, aimed at a wide audience, followed by an extended interaction session with the speaker, covering new developments in the field and the speaker's experiences.

Dr. Mriganka Sur is the Newton Professor of Neuroscience and Director of the Simons Center for the Social Brain at MIT.

Dr. Sur studies the organization, plasticity and dynamics of the cerebral cortex of the brain using experimental and theoretical approaches. His laboratory has identified gene networks underlying cortical plasticity, and pioneered high resolution imaging methods to study cells, synapses and circuits of the intact brain.

The impact of these discoveries, ranges from understanding dysregulation in brain disorders to brain architectures for next-generation AI.

Dr. Sur received B. Tech. degree in Electrical Engineering from the Indian Institute of Technology, Kanpur, and PhD degree in Electrical Engineering from Vanderbilt University, Nashville.

Dr Sur has received numerous awards and honors, such as the Krieg Cortical Discoverer Prize. At MIT, and the Sherman Fairchild and Newton Chairs. He is an elected Fellow of many prestigious Academies, including the Royal Society of the UK, the National Academy of Medicine, the American Institute of Medical and Biological Engineering to name some

Prof. Mriganka Sur was conferred with the Distinguished Alumnus Award, 2002 from IIT Kanpur.

MFCEM EVENTS

MFCEM Dialogues #10

Prof. Deepak Vashishth, Rensselaer Polytechnic Institute, NY, USA

Title: Loss and Modulation of Bone and Brain Health in Diabetes and **Alzheimer's**

18th March 2024

Dr. Deepak Vashishth, is the Director of Rensselaer Polytechnic Institute Center for Biotechnology and Interdisciplinary Studies (CBIS).

Dr. Vashishth's research interests are in the area of biomolecular science and engineering of extracellular matrix with particular emphasis on diagnosis and treatment of osteoporosis, and bone tissue engineering.

His research group has identified new structural roles for bone proteins and developed new biomimickry-based strategies for tissue engineering scaffolds.

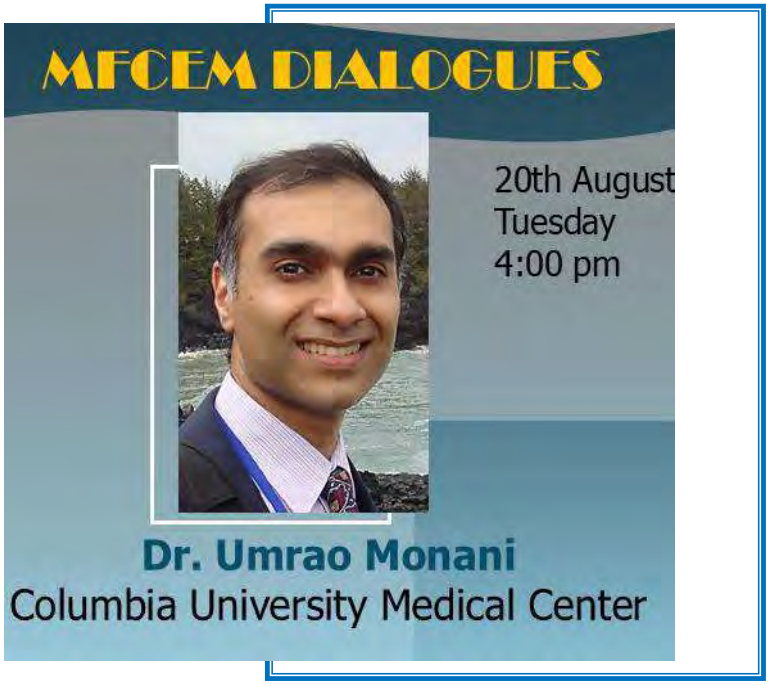
In 2012 he was elected Fellow of the American Institute of Medical and Biological Engineering (AIMBE). He also is a member of the Biomedical Engineering Society, American Society of Bone and Mineral Research and the Orthopaedic Research Society. Dr. Vashishth has been awarded the Rensselaer awards for outstanding and innovative classroom teaching.

Dr. Deepak Vashishth is working to redefine the role of a top-tier research university: one that is engaged in public and private partnerships, involved in interdisciplinary research, and providing quality education, to drive entrepreneurial, sustainable, socially responsible scientific discovery and technological innovation.

Dr. Vashishth, provided interesting insights into the brain-bone cross-talk in disease individuals suffering of Diabetes or Alzheimer. He also engaged with students imparting valuable inputs on how to translate basic and applied research into viable entrepreneurial outcomes.

MFCEM EVENTS

MFCEM Dialogues #11



Dr. Umrao Monani, De Vivo Professor of Neurology, Columbia University Medical Center, delivered the 12th MFCEM Dialogue lecture, on "***Mechanisms underlying infantile-onset spinal muscular atrophy: Clues from a novel disease modifier***"

Dr. Monani's lab is dedicated to the study of rare pediatric neurological diseases with a view to eventually treating them.

Dr. Monani has received several awards including the American Academy of Neurology Young Investigator Award, the Sanofi Innovator Award, the 2023 Humanitarian Award from the Hope for Children Research Foundation and the Darryl C. De Vivo Endowed Professorship at Columbia University.

He has spent three decades in the study of the neuromuscular disorders, such as the spinal muscular atrophy (SMA). He was amongst the first to develop viable SMA model mice and his work has informed SMN repletion treatments for the human disease. Dr. Monani's lab continues to investigate the basic biology of SMA with a view to refining current treatments.

In his talk, Dr. Monani shared some recent insights from his lab on genetic modifiers of SMA. He presented Hspa8, a synaptic chaperone variant, which suppressed SMA phenotypes. Dr. Monani displayed how the expression of the variant in the severely

affected mutant mice improved motor performance, and mitigated neuromuscular pathology, and overall increased life span by more than 10 folds.

Post the scientific session Dr. Monani interacted with the students, wherein he shared his academic journey. He stressed the importance of pursuing a research problem with single focus and undeterred determination. While at the same time he strongly emphasized the importance of a healthy work-life-balance.

MFCEM Workshop

by Prof. Sandhya Kaushika,
Tata Institute of Fundamental Research (TIFR), Mumbai. 8th March

TITLE: Fun & frustration: navigating career paths in science

Prof. Sandhya Kaushika is neuroscientist at the Tata Institute of Fundamental research, Mumbai. She is a recipient of the Howard Hughes Medical Institute (USA) Early Career Award. Her lab's interest lies in the field of cellular neurobiology, investigating the processes of axonal cargo biogenesis and transport and their impact on neuronal function and behaviour of the organism

Besides cutting-edge research, Prof. Kaushika is keenly interested in interacting with students, post-docs and early career fellows. In this fun and informative workshop, Prof.

Kaushika, led the audience through, how the outside, romantic view of doing science is often challenged when one embarking on an intense PhD program.

Prof. Kaushika, emphasized how despite high rate of failures and endless marathon of work the thrill of discovery, makes the journey worth its while. She further elaborated on how the valuable skills acquired can be used in many science career paths. The journey may be arduous, but can be highly rewarding.

MFCEM EVENTS

MFCEM Workshop

by, **Dr. Sanjay Kumar Mishra**, **Senior Advisor, Dept of Biotechnology, Government of India**

TITLE: Funding and Career Opportunities in STEM in India

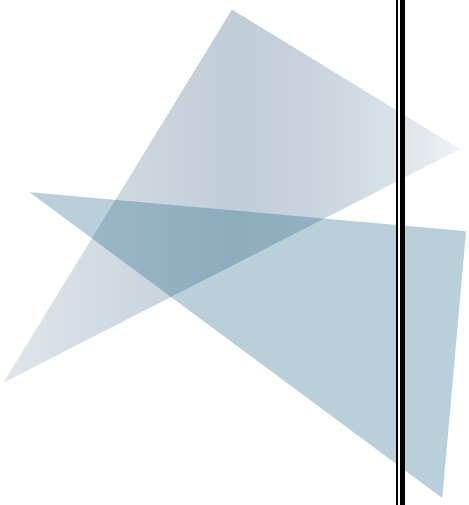
An online interactive session was organized on 18th May with **Dr. Sanjay Mishra**, **Senior Advisor, DBT, Gov. of India**. The interaction session was aimed at students and post-docs to make aware numerous funding opportunities and Career Options in the field of STEM in India

Dr. Sanjay Kumar Mishra has a rich experience in science management and administration, serving currently as a senior advisor, DBT, prior to which he served as an advisor, Dept of Science and Technology (DST) Government of India.

Dr Sanjay Mishra has to his credit two decades of teaching, research and academic management experience from India, the UK, the USA and Australia along with 10 years of working in Government of India. He has experience in strategic planning, designing, and implementation of policy, programs in areas of education, science, technology, innovation, STEM, gender advancement, climate change and biotechnology, often in partnership with industry, research institutions, non-government-organizations and academia.

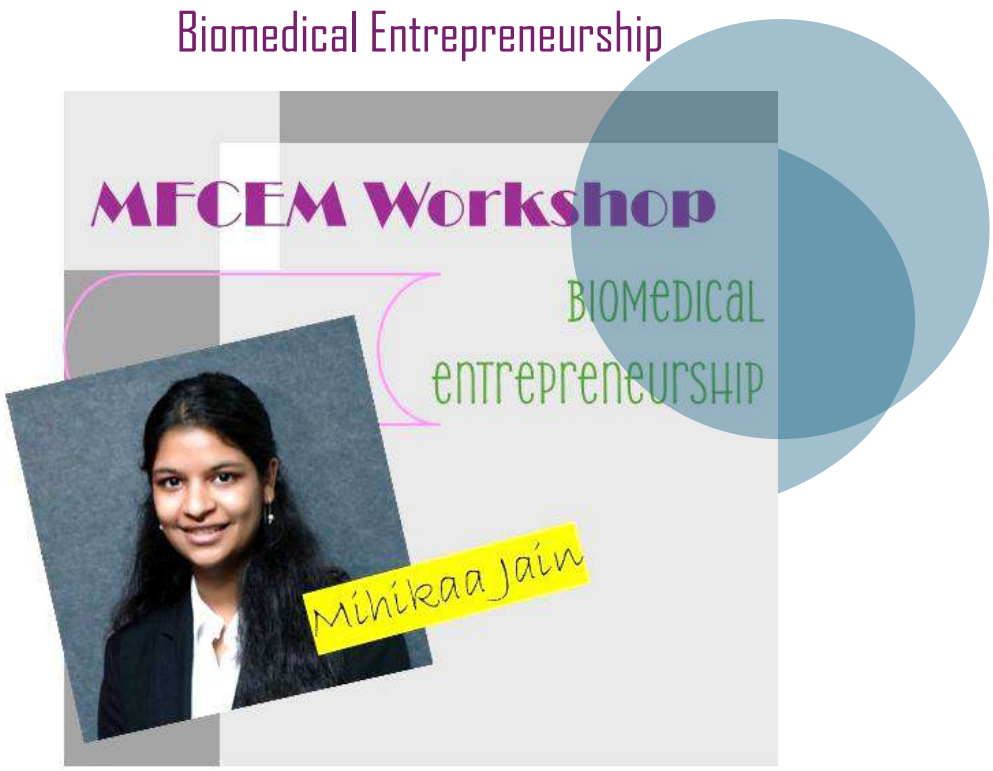
Drawing from his vast experience Dr. Mishra spoke in depth about the various departments, numerous programs and schemes within the larger Department of Science and Technology. Elaborating on the partnerships between academic institute,

government of India and industry he elaborated on the numerous shared funding opportunities. Dr. Mishra also encouraged students/postdocs to explore various niche programs for funding opportunities across disciplines. Further Dr. Mishra spoke about the many career options in STEM across academia and industry, as policy makers and think tanks and as entrepreneurs.



MFCEM EVENTS

MFCEM Connect



As part of the MFCEM workshop series an interactive session with **Ms. Mihikaa Jain** on **Biomedical Entrepreneurship** was held on 28th September 2024.

Mihikaa Jain is a business development associate in San Francisco Bay Area, wherein she spearheads establishing business partnerships and corporate strategy for **biotech startup**, particularly in the cell & gene therapy space.

Mihikaa is an IIT Kanpur Alumnus, and a BTech graduate in Bioengineering from department of Biological sciences and Bioengineering, BSBE (2015-2019). During her student days at IIT K, she was awarded the Academic Excellence Award (2018-19). Mihikaa undertook a Masters in **Translational Medicine**, from **University of California**, San Francisco, and honed her skills in commercialization of new healthcare innovations University of California, Berkeley.

During the interactive session, Mihikaa shared her journey from academia to being part of the biotech startup ecosystem at the bay area. She spoke of the numerous opportunities in the biotech space. She also made aware of the many ways one could be part of the startup ecosystem not only as an inventor one but also as investors of early-stage biotech companies, or as services provider for legal, finance, business strategy, marketing, product design, manufacturing, etc. She also shared how one

could be actively engaged in technology transfers in university and academic setups to facilitate spin off IP from academia into startups.

The session ended with a vibrant question-answer session with the students on various aspects of establishing and sustaining startups, with discussion on critical exit strategies in place.

MFCEM Events

MFCEM Workshop

Science Journalism

MFCEM workshop on Science Journalism was conducted by **Mr. Jacob Koshy, Deputy Science Editor,** of **The Hindu,** a prestigious Indian English-language daily newspaper owned by The Hindu Group, on 31st August 2024.

Mr. Jacob Koshy writes on many issues pertaining to science policy, innovation and research happening out of India and is a constant contributor to the opinion pages. Mr. Koshy did Electrical engineering, followed it with a Master's degree in India studies from King's College London and went on to study print journalism.

The online interaction session was aimed at students and post-docs to make known the various aspects of Science Journalism.

Jacob Koshy briefly talked about his foray into journalism post his training in engineering domain. He emphasized, that now more than ever, individuals trained in STEMM were gravitating towards different forms of science communication and journalism. Further he spoke about how the rapid expansion of the online space was making individuals with keen interest in science communication to define their own niche and have a visible digital footprint.

MFCEM EVENTS

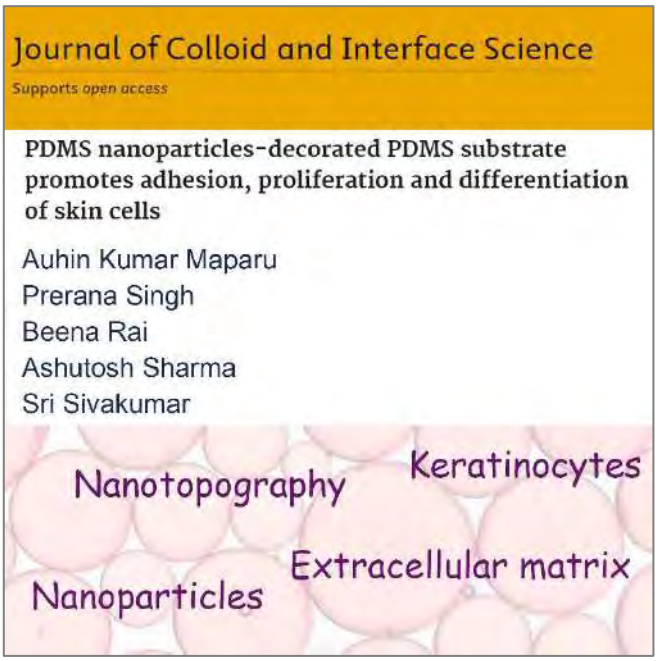
MFCEM-BSBE JOINT PAINTING COMPETITION

BSBE & MFCEM Joint Painting Competition, was help on September 14th, 2024 in the MFCEM foyer. It was open to all students, postdocs, project fellows and faculty members. The competition witnessed a lively participation on various themes such as, Nature, Science Fiction, Black and White, My Favourite Cartoon Character and Warli Art.

The paintings were exhibited at the MFCEM building from September 16-21, 2024.

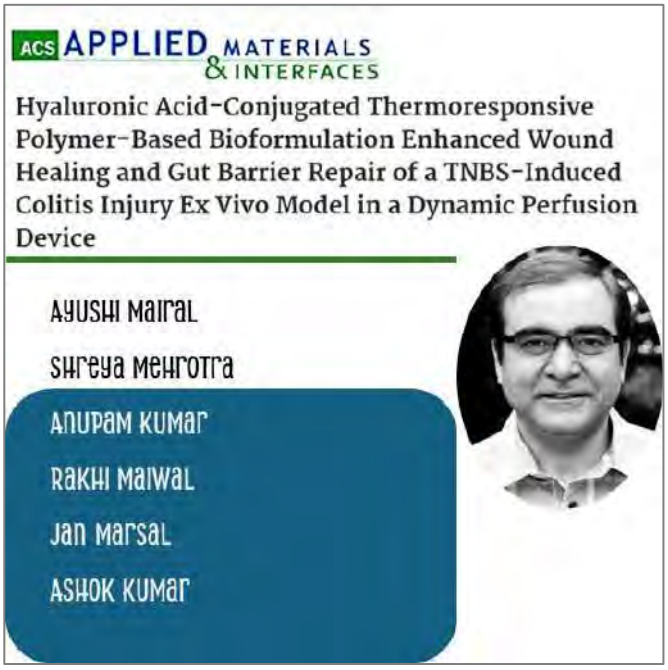
Participants of the top five paintings were felicitated at the BSBE Day celebration on September 29th, 2024.

Research Highlights



Prof. Sivakumar & team engineered PDMS nano particles for recreating near native extracellular microenvironment showing optimal nano-topography for growth of epidermal skin cells.

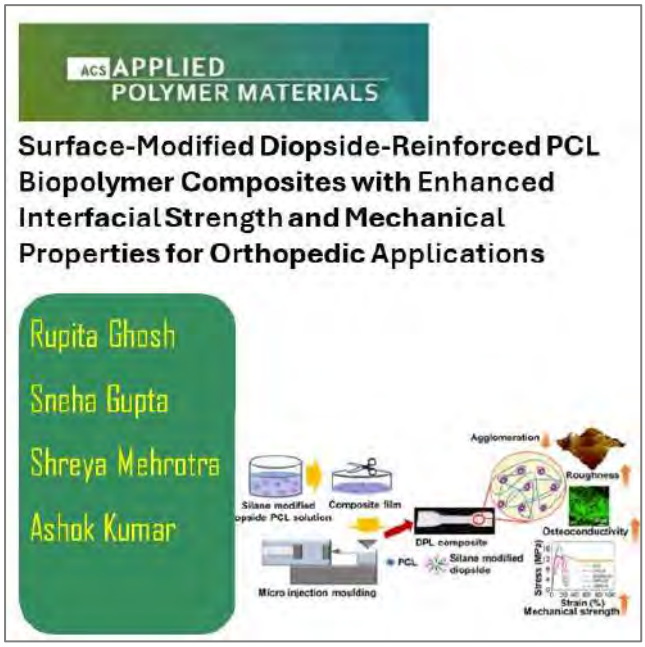
https://pubmed.ncbi.nlm.nih.gov/38198940/



Prof. Ashok Kumar & team have engineered a sprayable therapeutic formulation of potential use in treatment of inflammatory bowel disease. The temperature-responsive polymer adheres to the damaged gut mucosa due to its temperature-induced phase transition & mucoadhesive properties and has shown to repair damaged mucosa in ex vivo experimental conditions.

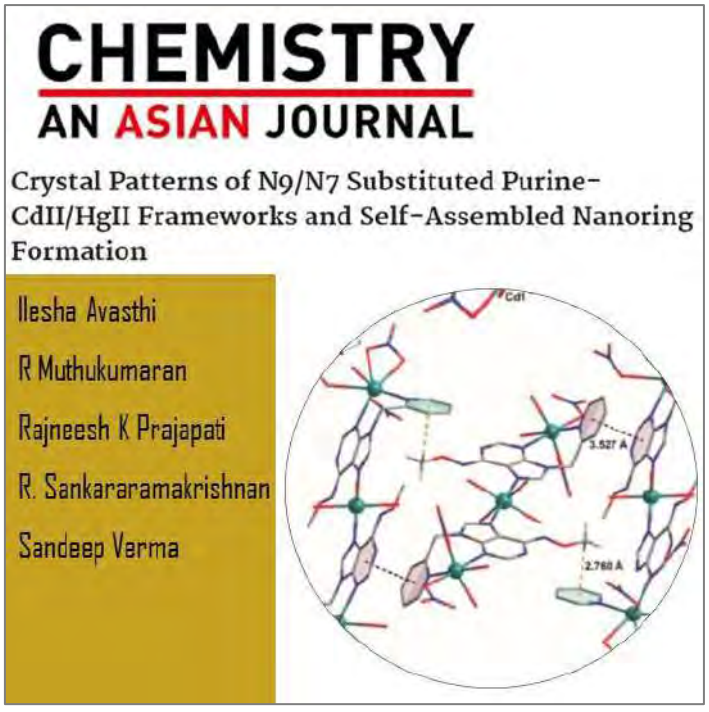
https://pubmed.ncbi.nlm.nih.gov/38266010/

Research Highlights



A study by **Prof. Ashok Kumar** & team displaying fabrication of silane-modified composite with enhanced osteoconductive properties. The engineered composite holds immense potential for improved orthopedic applications.

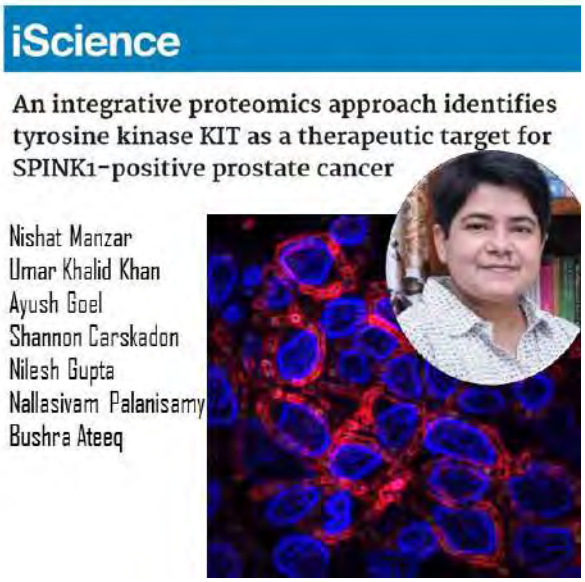
https://pubmed.ncbi.nlm.nih.gov/38310585/



A study by **Prof Sandeep Verma** & team, displays the formation of nanorings by self-assembly and offers valuable insights into the process. Such nanostructures offer immense potential for novel applications in the fields of imaging, sensing, electronics & energy devices.

https://pubmed.ncbi.nlm.nih.gov/38286758/

Research Highlights



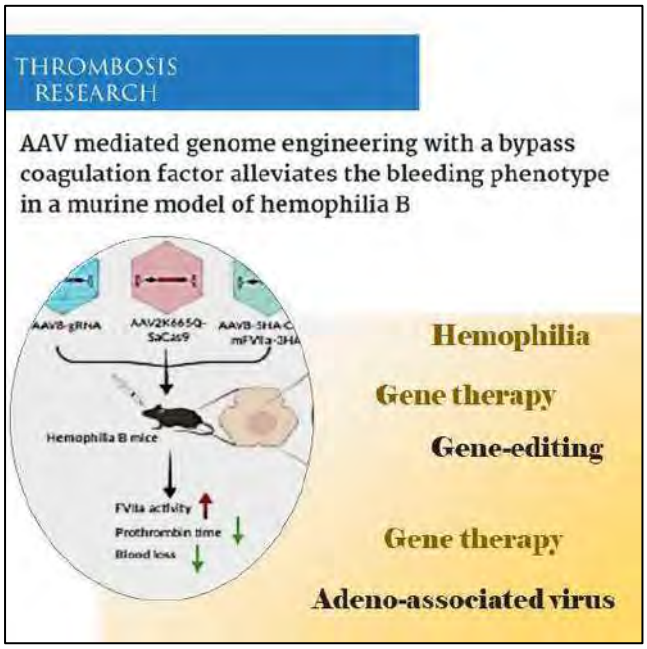
A study by **Prof. Bushra Ateeq** and team which uncovers the role of KIT signaling in regulating lineage plasticity in SPINK1-elevated prostate cancer. The study offers new treatment modalities for advanced-stage SPINK1-positive patients.
https://pubmed.ncbi.nlm.nih.gov/38384854/

https://pubmed.ncbi.nlm.nih.gov/38801374/

Electrostimulatory Therapeutics

Prof Santosh Misra & team have engineered an LA-Graphene nanoplatelet based drug delivery device: the 3D-est-MediPatch. This customizable, 3D printed device is promising development in the field of electrostimulatory therapeutics.

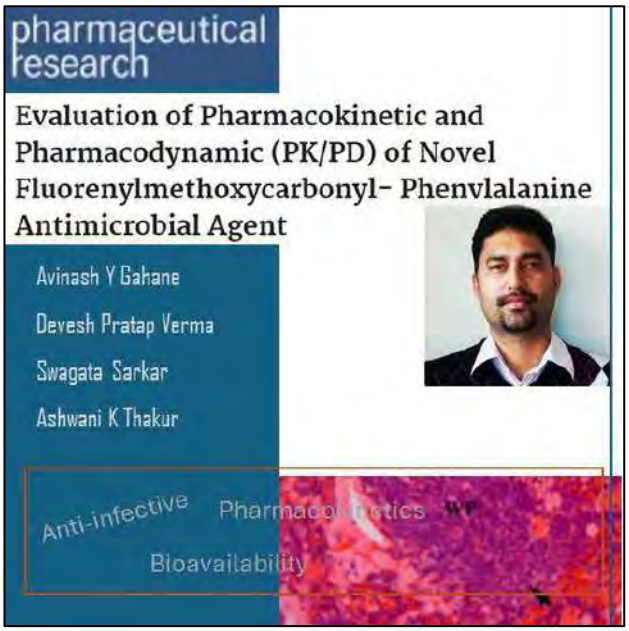
Research Highlights



https://pubmed.ncbi.nlm.nih.gov/38718473/

Gene Therapy

In a breakthrough, **Prof. Jayandharan Rao** & team have designed an AAV-based gene-editing strategy to rescue hemophilia in mice by sustained expression of coagulation factor VIIa

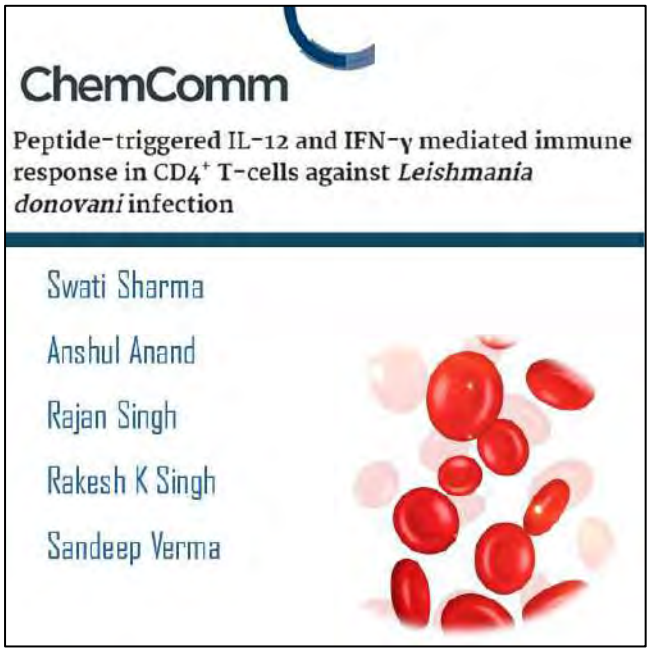


https://pubmed.ncbi.nlm.nih.gov/38519814/

Pharmaceutical Research

Prof. Ashwani Kumar Thakur and team have established Fmoc-F as a potential antibacterial agent, and its suitability for clinical translation, by studying the pharmacokinetic and pharmacodynamic properties of Fmoc-F.

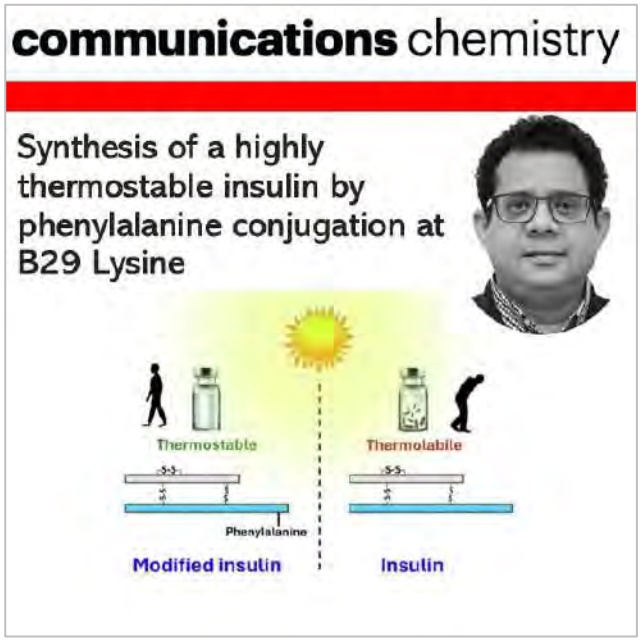
Research Highlights



https://pubmed.ncbi.nlm.nih.gov/38511970/

Peptide Therapeutics

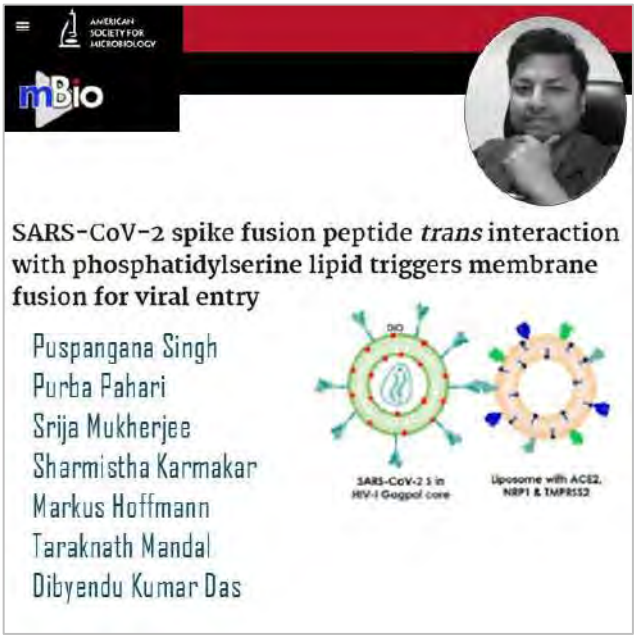
Prof. Sandeep Verma & team, have engineered a newly designed tripeptides that can trigger proinflammatory cytokine in response to *Leishmania donovani* infection. The peptides display reduced cytotoxicity and overcome drug resistance associated with current drugs for leishmania.



https://pubmed.ncbi.nlm.nih.gov/39043846/

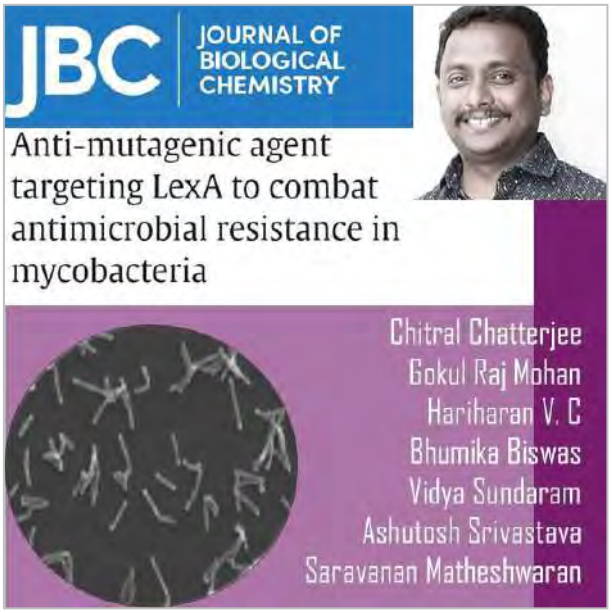
Prof Sandeep Verma and team report the synthesis of highly **thermostable human insulin analogs** that can withstand elevated temperatures, salt stress and pH variations. The study promises a much sought after solution to the major challenge of uninterrupted refrigeration required for insulin storage.

Research Highlights



The study by **Prof Dibyendu Das** & team uncovered the role of a membrane lipid in cellular entry of SARS-CoV-2. The study offers phosphatidylserine as a promising candidate for **strategizing COVID-19 interventions.**

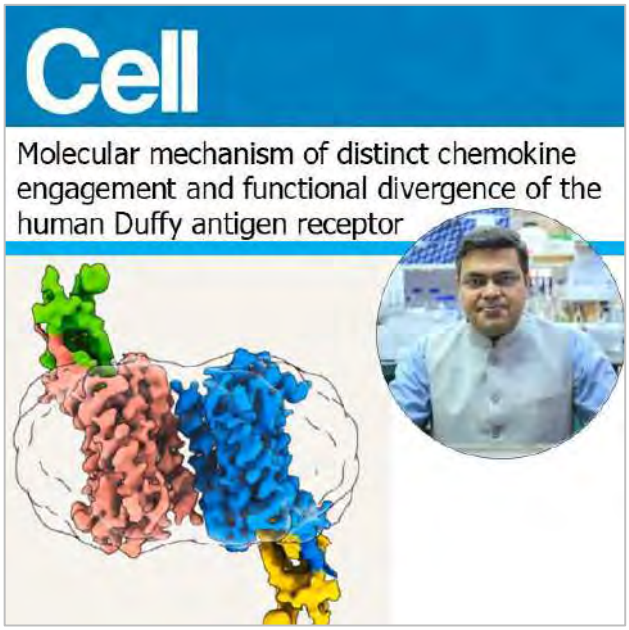
https://pubmed.ncbi.nlm.nih.gov/39115315/



Prof. Saravanan Matheshwaran & team through the study displayed decrease in **AntiMicrobial Resistance (AMR)** of mycobacterium tuberculosis by inhibiting its SOS activating LexA catalytic site. The study holds great promise to combat AMR.

https://pubmed.ncbi.nlm.nih.gov/39122002/

Research Highlights



An insightful study by **Prof. Arun Shukla** & team deciphering the cryo-EM structure of **Duffy antigen receptor** with its interacting chemokine- offering clues to its distinct pharmacological and functional properties.
https://www.cell.com/cell/fulltext/S0092-8674(24)00765

Student Achievement

Deepak Khushalani, PhD student of **Prof. Nitin Mohan**, was conferred with the Best Poster Award at the All India Cell Biology Conference 2024, held at ACTREC, Tata Memorial Centre Mumbai.

Umar Khalid, PhD student of Prof. Bushra Ateeq, was awarded the "Mangala Bamne Young Scientist Award for Oral Presentation" at the 43rd Annual Indian Association for Cancer Research (IACR) Conference 2024, held at IISER Pune.

Ayush Goel, PhD student of Prof. Bushra Ateeq, has been selected for the highly competitive Overseas Visiting Doctoral Fellowship (OVDF) under the Purdue University- Science and Engineering Research Board (SERB), India partnership program.

Student Achievements

Niranjan Chatterjee PhD student of **Prof. Santosh K Misra** received:

- The First prize in an oral presentation at the Emerging Technologies and Materials in Medicine 2024 (ETMM-2024) at the Centre of Excellence for Materials in Medicine, Gangwal School of Medical Sciences and Technology, IIT Kanpur (3-4 May 2024). The title of his talk was "A Nano-carbon-enforced Polymer Composite Follows Extracellular Cue from Muscular Micro-environment to Gain Therapeutic Capabilities".

- Received the Young Scientist Award for best oral presentation at the conference BIOTECH NEXUS 2024, held at SGVU, Jaipur, Rajasthan India, during 26-27th April 2024. The title of his talk was "A Nano-Carbon-Enforced Phase Separated Polymeric Network Gain Therapteutic Capabilities in the Musclar Micro-Environment".

Karthikeyan Kannan PhD student of **Prof. Nitin Gupta**, received the "Developing Neuroethology Award" from International Society for Neuroethology, which included a travel grant to attend the annual conference of the society in Berlin in July 2024.

Peeusa Mitra, PhD student of **Prof. Arjun Ramakrishnan,** presented a poster titled 'Understanding Trait Anxiety Through Foraging Decisions' at FENS (Federation of European Neuroscience Society) Forum held at Vienna, Austria in June, 2024.

Student Achievements

Talat Zahra PhD student of **Prof. Ashwani Kumar Thakur** was awarded the coveted **Gordon Research Conference Travel Grant** to present her work at GRC Barcelona, Spain, August 4th-9th, 2024.

- Conferred the **outstanding Poster presentation award** at the Indian-EMBO (European Molecular Biology Organization) Lecture course on 'Post-transcriptional regulation in ageing and age-related diseases', held at Shiv Nadar Institute of Eminence and IIIT Delhi, June 2024.

Sandarbh Kumar PhD student of **Prof. Santosh Kumar Misra** was awarded the Best Oral Presentation Award at the International Conference on Engineered Materials for Sustainable Development, 2024 , for his presentation titled: "A Personalized 3D Printed Device for Electrostimuli Driven Delivery of a Hydrophobic Drug Niclosamide for Oncotherapy".

Dr. Garima Chauhan, post-doctoral fellow in the lab of **Prof. Arjun Ramakrishnan** has been awarded the DST INSPIRE faculty fellowship starting June 2024.

Student Achievements

Harsh Arora, PhD student of **Prof. Arjun Ramakrishnan**, was awarded the **Rooma & Ajay Dubey Healthcare Innovation and Ideation (HII)** Fellowship in May, 2024. Fellowship supported the visit to Sree Chitra Tirunal Institute for Medical Science & Technology (SCTIMST), Thiruvananthapuram, Kerala in June, 2024 for a clinical immersion program.

Chetan Kandpal, PhD student **of Prof. Arjun Ramakrishnan**, presented a poster titled 'Social dynamics modulate conformity during patch foraging' at CCN (Cognitive Computational Neuroscience) conference held at MIT, Boston, USA in August, 2024. He was supported by a Travel grant from Emergent Ventures.

Rakshita Deshmukh, PhD student of **Prof. Arjun Ramakrishnan**, presented a poster titled 'N3 sleep ameliorates anxiety-induced amplified reward learning in dynamically changing environments' at CCN (Cognitive Computational Neuroscience) conference held at MIT, Boston, USA in August, 2024. She was supported by a Travel grant from Emergent Ventures.

Student Achievements

Ms. Triya Saha PhD student of **Prof. Ashok Kumar** bagged 1st position in the Clinical Trials category of Oral Paper Presentation Session at 64th Annual Conference of **National Academy of Medical Sciences** (NAMSCON-2024) at AIIMS Jodhpur, during 22-24 November 2024. The title of the oral presentation was "Tissue adhesive and minimally invasive sprayable exosome and polymer-based therapeutics for treating chronic MASLD".

Ekta Srivastava PhD student of **Prof. Ashok Kumar** received the **best MTech thesis award** at the International Conference on Advances and Challenges in Medical Technology Translation (TransMedTech-2024), Dec 12-14, 2024, organized by the Society for Biomaterials and Artificial Organs India (SBAOI). The title of her M.Tech thesis is "Electrically conducting aligned cryogels for spinal cord regeneration".

Ms. Ayushi Mairal PhD student of **Prof. Ashok Kumar** bagged 2nd position in the Clinical Trials category of Oral Paper Presentation Session at 64th Annual Conference of National Academy of Medical Sciences (NAMSCON-2024) at AIIMS Jodhpur, during 22-24 November 2024. The title of the oral presentation was "Probiotic organism derived extracellular vesicles within a thermo-responsive copolymer matrix: A novel therapeutic approach for inflammatory bowel disease.

Student Achievements

Ms. Moumita Chanda, PhD student of **Prof. Dhirendra S. Katti** has received the "Bajpai Saha award" - first prize in oral presentation category at **"International Conference on Advances and Challenges in Medical Technology Translation"** (TransMedTech 24) held during 12-14 Dec 2024 at Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST), Thiruvananthapuram, Kerala.

Ms. Saptomee Chakraborty PhD student of **Prof. Dhirendra S. Katti**, has received the RSC 3rd prize in poster presentation category at **"International Conference on Advances and Challenges in Medical Technology Translation"** (TransMedTech 24) held during 12-14 Dec". 2024 at Sree Chitra Tirunal Institute for Medical Science and Technology (SCTIMST), Thiruvananthapuram, Kerala.

Ms. Adrija Bose MTech student of **Prof. Dhirendra S. Katti** has received the **first prize** in SBAOI poster presentation category at **"International Conference on Advances and Challenges in Medical Technology Translation"** (TransMedTech 24) held during 12-14 Dec 2024 at Sree Chitra Tirunal Institute for Medical Science and Technology (SCTIMST), Thiruvananthapuram, Kerala.

Student Achievements

Ms. Purva Gupta, PhD student of **Prof. Ashok Kumar** has received the **Mehta Family Centre Best Flash Talk Award** in Regenerative Medicine at **PAN-IIT Meeting and Conference** on Engineering in Medicine, Dec 6-8, 2024 at IIT Kanpur. The title of the oral presentation was "Exosome ther apy in hepatic osteodystrophy management: Evaluating therapeutic efficacy across the bone-liver axis.

Mr. Ubaid Tariq PhD student of **Prof. Ashok Kumar** has received the **Thermo Fisher Scientific Best Flash Talk Award** in Regenerative Medicine at the **PAN-IIT Meeting and Conference** on Engineering in Medicine, Dec 6-8, 2024, at IIT Kanpur. The title of the oral presentation was "Antioxidant, injectable and adhesive polyurethane hydrogel attenuates oxidative stress and reperfusion injury in cardiomyocytes".

Mr. Piyush Kumar PhD student of **Prof. Santosh Misra** has received the **Merck Life Sciences Best Poster Presentation Award** in Regenerative Medicine at PAN-IIT Meeting 2024 and Conference on Engineering in Medicine organized by the Department of Biological Sciences and Bioengineering, Indian Institute of Technology Kanpur on 6-8th December 2024. The title of the poster was "Multiplexed paperbased electrochemical LDH biosensor: A high throughput screening tool for anticancer drug candidates".

Student Achievements

Best Thesis Award

Dr. Aman Mahajan PhD student of Prof. Dhirendra S. Katti has received the **3rd prize in the outstanding PhD thesis award** at "International Conference on Advances and Challenges in Medical Technology Translation" (TransMedTech 24) held during 12-14 Dec 2024 at Sree Chitra Tirunal Institute for Medical Science and Technology, Thiruvananthapuram, Kerala.

Niranjan Chatterjee, PhD student of Prof. Santosh Kumar Misra has been awarded the **Best Master's Thesis Award** by the Society for Biomaterials and Artificial Organs (India). The title of the thesis is - "Preparation, Characterization and Application of Porous Silica Particle as Biodegradable Therapeutic Carrier of Lesser Consequence on TGF- β1 Mediated Fibrosis via In Situ Metamorphosis".

Student Achievements

Gandhian Young Technology Award

Niranjan Chatterjee, PhD student of Prof. Santosh Misra, for **Gandhian Young Technological Innovation Award**, 2023, to Niranjan for his work on a portable microfluidic device.

Shantanu Sen PhD student of Prof. Sandeep Verma has been selected for the **'Gandhian Young Technological Innovation (GYTI) Award'** for the year 2023, for patented technology concerning detecting spurious aggregated insulin hormone in commercial injectable formulations.

Student Achievements

Shantanu Sen, PhD student of Prof. Sandeep Verma, has been selected among the top 3 winners at the prestigious **Falling Walls Lab** Event India, for "Breaking the Wall of Insulin Dosage Wastage", in the world-class pitching competition.

In conversation with .....

Niranjan Chatterjee PhD student of **Prof. Santosh Misra**, on his recent publication: "In situ carbonization metamorphoses porous silica particles into biodegradable therapeutic carriers of lesser consequence on TGF-β1 mediated fibrosis." Nanoscale 16.18 (2024): 8843-8850.

MFCEM: On the onset, congratulations Niranjan on your recent publication, and the entire team. We know that porous silica materials are widely used, with numerous applications in medicine and across analytic platforms. What motivated you to further explore modifying silica particles? Did you face any challenge?

Niranjan Chatterjee: Thank you very much! As you have correctly mentioned, there are diverse filed of applications for porous silica materials including drug delivery and platforms for biosensing. After careful exploration of the previously established characteristics in the field of silica based particulate systems, we felt the necessity of a kind of modifications which could provide advantages for biological applications like improved biodegradability and reduced toxicity. To achieve such functional properties, a modification with nano sized carbon particles was carried out inside the core of the silica particles.

The main challenge in this study was to ensure the strategy of optimum incorporation of nanosized carbon particles without changing regular core-shell architecture. It was anticipated that, either stoichiometric difference of nanosized carbon particles and silica precursor or strategical alteration might impact the silica particles which might result in loosening existing functional parameters in silica particles.

MFCEM: Could you briefly explain the nature of the modification of the silica particle that you undertook, and how does it stand out from the already existing modifications in use, particularly for therapeutic applications.

Niranjan Chatterjee: The kind of modification we executed in this project was based on incorporating carbon based nanoparticles in the core of silica particles. It was planned in such a way that the incorporated particles could interact with the silica species inside the core without hampering the ordered structural morphology of the silica particles. The used nanosized carbon particles were found to interact with silica species which resulted in an optimum stretching of chemical bonds of silica particles. This modification not only provided enhanced biodegradability as a biological benefit, but also, could avoid interaction with transforming growth factor β1 and thus reduced

the chances of fibrosis induction which is otherwise a detrimental side effects of such systems. It is worth noting that this modification didn't alter the structural morphology of silica particles. The previously reported modifications to silica-based system were mainly to improve the stability inside the physiological system, enhancing the targeting ability to the diseased tissue using different polymers, ligands etc. These are also important to cumulatively improvise the therapeutic applicability of the system.

MFCEM: In this study you have shown the effectiveness of the modified silica particle as a therapeutic carrier in cancer cell lines. Are you testing the same in preclinical animal models and further, do you envisage a wider application of these carbonized silica particles, what could they be?

Niranjan Chatterjee: Yes, currently we are trying to explore the specific way of using the carbonized silica particles to confer such beneficial properties for its biological applications. We are also trying to understand the types of variables associated with nanosized carbon particles involved with this process. Of course, our future goal is to validate the applications of carbonized silica particles as a therapeutic carrier to lungs through the intranasal route in preclinical animal models.

MFCEM: Thank you, Niranjan, for sharing with us your work, and we wish you success with your future undertakings.

In conversation with.....

Shantanu Sen PhD student of *Prof. Sandeep Verma,* on his recent study: "Synthesis of a highly thermostable insulin by phenylalanine conjugation at B29 Lysine". Communications Chemistry. 2024 Jul 23;7(1):161.

Shantanu Sen, is the recipient of the **'Gandhian Young Technological Innovation (GYTI) Award', 2024**. He has also been selected among the top 3 winners at the prestigious **Falling Walls Lab** Event India, for "Breaking the Wall of Insulin Dosage Wastage", in the world-class pitching competition.

MFCEM: Hi Shantanu! At the onset let me congratulate you and your mentor Prof. Sandeep Verma, on this immensely relevant study, and for the many recognitions for this spectacular innovation.

The figures are alarming- according to the IDF, currently, 537 million adults are living with diabetes, and every 3 in 4 adults with diabetes live in low- and middle-income countries. Worse is the fact that these numbers are predicted to rise further. With this in mind, could you please highlight for our readers the relevance of your study, after which we would talk about the science that went into it.

Shantanu Sen: Thank you for recognizing our contribution and providing us with this wonderful platform to talk about it. The relevance of our study lies in addressing a critical gap in the storage and transportation of commercial insulin, a life-saving medication for diabetic patients. Current insulin formulations require continuous refrigeration, which is challenging in low- and middle-income countries with unreliable power supply and limited cold-chain infrastructure. This dependency not only affects underprivileged communities but also poses challenges for privileged users. Our work on thermostable insulin, enhanced by protein conjugation technique, aims to eliminate these constraints, ensuring insulin remains effective for longer duration even under non-refrigerated conditions and thus providing independence for their carefree usage. This innovation has the potential to revolutionize insulin storage and distribution globally, making it more accessible and reducing wastage.

MFCEM: The thermostable phenylalanine-conjugated insulin, termed FHI in your study was one of the many modifications that you tried; could take us through the thought

process behind the choice of the modifications; what were the experimental challenges you faced? How did you overcome them?

Shantanu Sen: The choice of modifications was driven by the need to improve insulin's thermostability while preserving its biological efficacy. The chemical synthesis of this novel human insulin derivative involved conjugating a phenylalanine amino acid to the side chain amine of the $B29^{th}$ lysine residue of human insulin. This strategic incorporation of an additional aromatic amino acid at a specific position enhances the thermostability of the modified insulin by maintaining its structural integrity over extended periods, even under extreme unfavourable conditions.

Experimentally, synthesizing the modified insulin required precise chemical conjugation and concerns about compromising its biological efficacy. To address these, we optimized extensive reaction conditions and employed advanced techniques to predict and confirm the enhanced stability and preserved bioactivity of the modified insulin. These efforts were made possible through close collaboration among synthetic chemists, biologists, and computational experts, ensuring that the modified insulin remained effective under rigorous testing conditions.

MFCEM: Since the initial breakthrough by Authur Riggs that led to the creation of the first artificially synthesized insulin in the late 1970s, dedicated efforts continue to improve the overall efficacy of synthetic insulin as a therapeutic, such as, its sensitivity, selectivity, duration of action among others. What was the motivation to work on the stability of the protein? Where you mindful of not compromising the other properties of the insulin peptide? How did you strike a balance?

Shantanu Sen: The motivation arose from the critical need to address insulin's thermal instability, which is a major obstacle to its global accessibility. While improving insulin stability, we ensured that the modification did not interfere with its biological activities, such as glucose-lowering efficacy. To achieve this balance, we conducted extensive studies in cellular and animal models simulating diabetic conditions, confirming that the modified insulin retained its biological activity. Additionally, other experiments helped to ensure that the structural modifications did not disrupt the insulin's interaction with cellular receptors, preserving its therapeutic potential.

I believe the key to our innovation lies in the minimal modification approach—we found the ideal spot with the right amount of chemical modification.

MFCEM: Shantanu, the immense relevance of your study is further cemented by the many recognitions that the invention attracted. You were among the top 3 winners of the **Falling Walls Lab Event India**, for "Breaking the Wall of Insulin Dosage Wastage"; besides, you were selected for the **Gandhian Young Technological**

Innovation Award for the year 2023, for patented technology concerning detecting spurious aggregated insulin hormone in commercial injectable formulations. How important are these validations? Is the team, planning to take this invention to the market? could you elaborate.

Shantanu Sen: These recognitions stand as a testament to our research, emphasizing its practical impact and reinforcing confidence in its potential to tackle real-world challenges. Under the mentorship and guidance of Prof. Sandeep Verma, we are actively working to translate this innovation into a practical solution through our start-up, **STABLIN BIOSCIENCES PRIVATE LIMITED.** Our ultimate goal is to make these innovations widely accessible, especially in regions where cold-chain logistics are impractical, ensuring that no diabetic patient is deprived of life-saving medication.

One of the critical issues we also aim to address is the uncertainty surrounding insulin dosage quality—early-degraded insulin solution can appear as clear as fresh insulin, making it difficult for patients to visually identify without advanced testing. To tackle this, we are developing next-generation insulin variants and user-friendly methods for instant insulin quality detection before injecting.

Additionally, we are exploring applications of this research for other heat-sensitive therapeutics, such as vaccines, to overcome similar storage and distribution challenges.

MFCEM: Shantanu, thank you much for speaking to us, and wish you success for all future endeavours**.**

In conversation with Mihikaa Jain.....

Mihikaa Jain is a business development associate in San Francisco Bay Area, wherein she spearheads establishing business partnerships and corporate strategy for biotech startup, particularly in the cell & gene therapy space.

Mihikaa is an IIT Kanpur Alumnus, (2014-2019) and a BTech graduate in Bioengineering from department of Biological sciences and Bioengineering,

MFCEM: Hello Mihikaa, it is wonderful to connect.

For the sake of our readers, let me tell that you completed your undergrad from IIT Kanpur in Biological sciences and Bioengineering, and went on to do your masters in Translational Medicine and now you are a part of the biotech startup in the San Francisco Bay Area in the capacity of a Business Development Associate.

First and foremost, how do you find the biotech startup-ecosystem? From academics to Biotech/Healthcare industry, was the transition a natural progression? I think the first part of this question overlaps with the second question later. Let's combine the two?

Mihikaa Jain: The biotech startup ecosystem in the Bay Area is an exciting, dynamic space to navigate. I've had the privilege of interacting with a wide range of innovations—from optimizing backend healthcare processes to pioneering CRISPR therapeutics, developing portable MRIs, and leveraging AI in biotech. Two things stand out to me:

First, building a new therapeutic product often requires deep expertise. In biotech, it's common to see founders with PhDs and years of industry experience, whereas in other industries, many find it possible to achieve success in their entrepreneurial journey right after undergrad.

Second, I've found that people here are incredibly purpose-driven. Many have personal stories that fuel their passion, and this sense of purpose makes the community focused on problem-solving and delivering real outcomes.

As for my own journey, it hasn't been linear. I enjoyed the science at IIT Kanpur but quickly realized I didn't want to work in a lab. I was much very much interested in learning about new innovations, meeting people, and experiencing the quicker, tangible results of my efforts. I found myself drawn to the business side of things, which led me to Bain, where I spent a few years in consulting. That experience was transformative,

offering me immense growth and the chance to hone my business acumen across various industries.

After three years at Bain, I felt ready to apply my skills more directly to life sciences. That's when I decided to pursue a Master's in Translational Medicine at UC Berkeley and UCSF. The program was exactly what I needed—a deep dive into the intersection of technology and business in life sciences, from IP protection to FDA approvals.

Post-graduation, I transitioned into business development, starting with a platform company in cell and gene therapy. My time at Bain helped quite a lot in shaping my strategic thinking and commercial acumen, but I'm still learning and growing as I understand the specific nuances of doing business in biotech. I believe in the concept of being a "student for life," always pushing myself to explore new frontiers.

To summarize, the transition wasn't a natural progression—it was a deliberate choice to specialize on the business side of life sciences, which is why I pursued my Master's.

MFCEM: How do you evaluate the scope and reach of startups in the Biotech and Healthcare sector. What are the different ways one could be a part of the ecosystem? I am answering only the second part of this question.

Mihikaa Jain: There are multiple ways to get involved and be a part of the biotech/ healthcare startup ecosystem (even without building your own startup)

- Investing: Be a part of VC investing into early-stage biotech companies
    - Joining a venture studio or accelerator program are other related options
- Services: Providing consulting services for legal, finance, business strategy, marketing, PR, product design, manufacturing, etc. for biotech startup companies
    - An interesting role is with Tech Transfer Offices at universities to help spin off IP from academia into startups
- Work with a startup: The most talked about option probably, but with good reason. The cliché is true – a startup allows you to put on a lot of different hats, learn on the job very quickly and constantly develop new skillsets. It is also easy to transition from one function/ department to the other. One should think about the scale of the startup they wish to join depending on the risk appetite and expectations from the role.

MFCEM: Being part of a startup makes one realize the number of skillsets that are required besides one's formal training. How could someone starting young, equip oneself better? Do you wish there were a wider range of electives even at an undergrad level, for instance? Does having hands-on experience help?

Mihikaa Jain: Absolutely. Whether it's startups or the broader industry, there are so many on-the-job skills to learn, especially in non-technical roles. In technical fields like

R&D, your education plays a more prominent role in both success and hiring. But in non-technical roles—project management, business development, strategy—you quickly realize that soft skills like stakeholder management, prioritization, and time management are critical. These are typically learned through experience, not formal training.

At IIT Kanpur, I'm grateful for the chance to hold leadership roles in student bodies. These experiences shaped my soft skills early on, and I feel they have been instrumental in my professional success.

As for electives, I definitely think we need more options. When I was an undergrad, for instance, immunology wasn't part of the curriculum, despite being so relevant today for new age therapeutics. On the non-technical side, an elective on customer discovery or building business strategies for deep tech innovations would be incredibly valuable. I took a course like this during my Master's, and it proved to be very relevant later on.

MFCEM: Here in India, the biotech startup-sector is receiving much fillip. In academia too affirmative steps are being taken to provide necessary training in this space. For instance, IIT Kanpur, has set up the Mehta Family center for Engineering in Medicine, and has announces a new M.Tech. program in Biomedical Engineering. What would you like to tell your younger peers contemplating a career in the biotech and healthcare industry.

Mihikaa Jain: My advice to my younger peers:

1. Network: Talk to as many people in the industry as you can. Attend events, ask questions, and learn what various roles entail. The more conversations you have, the clearer it becomes what might interest you.
2. Keep an Open Mind: Early in your career, you might not always know what you want. If a role interests you and you connect with the people, give it a shot. Doing the job is often the only way to truly discover your interests and competencies. Don't be afraid to ask for more responsibility if you're doing well, and explore roles across different departments.
3. Trust the Process: Hindsight is 20/20, and you'll eventually find your path. Don't be discouraged if things don't work out right away—just keep going.

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Book Chapters

- Advances in Analytical Techniques to Analyse the Purity of Recombinant Proteins. Fundamentals of Recombinant Protein Production, Purification and Characterization. 1st Edition (ELSEVIER 2024) ISBN: 9780323983884. Ujwalkumar Trivedi, Sakshi Keshari, Chitral Chatterjee, Saravanan Matheshwaran*, Nagarajan Kayalvizhi, Muthukaligan Khrishnan and Neelamegam Rameshkumar

MFCEM Yearly Report 2024

Summary

Awards/Honors/Recognitions	Academy Membership	4
	Awards	7
	Administrative positions/Advisory-Review committee	5
Grants		11
Patents (Filed/Granted)		22
Invited Talks/Panel discussions		54
Conference/Workshops organized (Inperson and online)		12
Student Achievements (Awards/Honors/Recognitions)		28
Publications		84

PanIIT Meeting

Meeting of representatives of the Mehta Schools/Centres across IITs

A one day-meeting of representatives of the five Mehta Schools / Centers across IITs with Mr. Rahul Mehta, of the Mehta and some members of advisory boards was held on 5th December, a day prior to the Pan IIT meeting.

In attendance were Mr. Rahul Mehta of the Bhupat and Jyoti Mehta Family Foundation advisory board members: Prof. Shankar Subramanium, San Diego, Prof. Ananth Grama, Purdue University, Prof. Rajesh Gupta, University of California, San Diego; heads of Mehta Schools: Prof. Sanjib Senapathi, Bhupat & Jyoti Mehta School of Biosciences, IIT Madras, Prof. Amitabha Bandhopadhyay (in absence of Prof. Nitin Gupta) of Mehta Family center for Engineering in Medicine, IIT Kanpur, Professor Subramani Kanagaraj, Head of the Jyoti and Bhupat School of Health Sciences and Technology, IIT Guwahati, Prof. Debanga Raj Neog (in absence of Ratnajit Bhattacharjee) of Mehta Family School of Data Science and Artificial Intelligence, IIT Guwahati, Prof. Durga Toshniwal, Mehta Family School of Data Science and Artificial Intelligence, IIT Roorkee, Prof. Narayanan Chatapuram, Mehta Family School of Data Science and Artificial Intelligence IIT Pallakad; and Mr. Naveen Jha, head India operations, Mehta Family Foundation.

The meeting commenced with each head presenting a brief about the school/centre and their future vision. Post individual presentations there was a brain storming about the need to identify areas of overlapping interests and complementary expertise across the Mehta Schools/Centres such as to build and nurture multidisciplinary collaborations. To realize this it was suggested that in regular intervals inter-Mehta School/Centre meeting between PIs should be organized such as to facilitate academic exchanges and familiarize with each others research domains. It was also suggested that bridge between academia and industry particularly in the domain of drug discovery and diagnostics should be strengthened such as to allow creation of working pipelines across Mehta schools and the industry taking advantage of individual strengths.

It was also discussed in length the need to seek out global talents and provide enabling conditions for young researchers and/or established PIs who wish to move to establish research groups at the Mehta Schools/Centres at IITs and create vibrant nodes of academic excellence. Through the various discussions it was further reaffirmed, that top priority of the Mehta Centres was to create an outstanding pool of human resource,

not only ensuring their employability but also making them able enough to independently take up pressing challenges in the field of Biomedical and Data sciences.

It was unanimously agreed upon that periodic meetings of the Schools/Centres with each other and the Mehta Family Foundation as well as the advisory board members would be of immense help, to realign as well as to identify focus areas of collaborative research.

Pan-IIT Meeting & Conference on Engineering in Medicine 2024

The Pan-IIT Meeting and Conference 2024, on *Engineering in Medicine* was held from 6th to 8th December at IIT Kanpur. The meeting focused on 3 core areas of Engineering in Medicine, namely, Regenerative-, Molecular- and Digital Medicine. The conference cum meeting witnessed participation by 31 institutes including 25 heads of department, 40 national leaders in the field of biomedical sciences, and eight eminent international scientists.

The meeting was organized under the leadership of Profs Ashok Kumar and Rakesh Kumar Majhi, of the department of Biological Sciences and Bioengineering & Mehta Family center for Engineering in Medicine (MFCEM), IIT Kanpur. Director, IIT Kanpur, and Mr. Rahul Mehta, founder, Bhupat and Jyoti Mehta Family Foundation, was the chief patrons of the event, while the key sponsors included the Department of Science and Technology, Government of India; Department of Biotechnology, Government if India and Counsil of Scientific and Industrial Research, Government of India.

The Mehta Family Foundation (MFF) has emerged as the largest donor committed to advancing higher education in India. In collaboration with the Indian Institutes of Technology (IITs), the foundation supports pioneering fields such as bioengineering, health technology, data science, and artificial intelligence. For over 20 years, the Foundation has worked to advance education and healthcare, focusing primarily on Houston and India through strategic academic partnerships.By 2031, the foundation aims to empower over 12,000 students, including 4,500 B.Tech, 2,000 M.Tech, and 2,000 Ph.D. graduates, fostering a strong network of talent to drive India's technological and economic future.

The event was inaugurated by Shri. Ranjan Kumar (IAS) Secretary, Health and Family Welfare Department, Government of Uttar Pradesh. The guests of honour included Shri. Rahul Mehta, and Prof. L. S. Shashidhara, Director, NCBS, TIFR Bangalore. Prof. Manindra Agrawal, Director, Indian Institute of Technology Kanpur also presided over the event.

The three-day event witnessed numerous outstanding and insightful plenary and keynote talks by leaders in diverse fields of biomedical sciences. These included likes of Prof. Karl-Johan Malmberg Director, Precision Immunotherapy, University of Oslo; Prof. Andreas K. Nüssler, Director, Siegfried Weller Institute, University of Tuebingen; Prof. Shankar Subramaniam Professor, Bioengineering, Bioinformatics and Systems Biology University of California at San Diego; Prof. Jukka Seppälä Professor, Polymer Technology School of Chemical Engineering, Aalto University, Finland; Prof. Ananth Grama, Professor, Department of Computer Science, Purdue University; Prof. Huinan Hannah Liu, Professor, Department of Bioengineering, University of California at Riverside, USA; Prof. Shekhar Mande, Distinguished Professor, Savitribai Phule University, Pune and Dr. Pep Pamies, Chief Editor, *Nature, Biomedical Engineering.*

Spectacular talks, such as use of "*Electrospun nanofibers for highly sensitive analyte detection*" by Prof. Sandeep Verma, IIT K; "*Advanced 3D-printable biomaterial systems for treating bone related pathologies*" by Prof. Sumit Murab, IIT Mandi; or "*Automatic tumor contouring using artificial intelligence for better radiotherapy planning*" by Prof. Tanmay Basu, IISER Bhopal; enthralled the audience.

Besides scientific talks there were engaging sessions by Industry representatives such as by BD Biosciences, Zeiss Microscopy, Thermo Fisher Scientific; Nanotemper Technology GmbH among others. Talks by post-doctoral fellows across various focus areas in Biomedical sciences witnessed active discussion and participation. The participants also witness engrossing flash talks by PhD students on their ongoing research, besides engaging poster session displaying the cutting edge research. The conference concluded with the passing of the torch to orginizers of the next PanIIT meet at IIT Madras.

Glimpses of the Pan-IIT Meeting & Conference on Engineering in Medicine 2024

Inaugural Program: Director Prof. Prof. Manindra Agrawal presenting a token f appreciation to the chief guest, Shri Shri. Ranjan Kumar (IAS) Secretary, Health and Family Welfare Department, Government of Uttar Pradesh. Shri Rahul Mehta lighting the lamp. Launch of the PanIIT Brochure

Glimpses of the Pan-IIT Meeting

Students were awarded for best poster and oral presentation of their research work

Glimpses of the Pan-IIT Meeting

Gala Dinner and Cultural Events

Glimpses of the Pan-IIT Meeting

Gala Dinner and Cultural Events

Contact

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