

# BENGALURU AUGUST 1st-3rd THE LALIT, BENGALURU

ಬೆಂಗಳೂರು ಅಂಡಿಯಾ ನ್ಯಾಮೋ

Nanotechnology Sustainability Climate, Energy & Healthcare

# **EVENT COMPENDIUM**





**Event Curator** 



CASR



# Karnataka Science and Technology Promotion Society (KSTePS)

KSTePS - Karnataka Science and Technology Promotion Society is a registered autonomous organization established in 2013 under the Department of Information Technology, Biotechnology and Science & Technology (DST), Govt. of Karnataka. KSTePS aims at serving as a mechanism in supporting the preparation and implementation of policy initiatives of Department of Science and Technology and act as a nodal agency in channelizing the funding and in coordinating programs of the Department across the State.

KSTePS is Chaired by Secretary to Govt., Department of Information Technology, Biotechnology and Science & Technology with members drawn from various line Departments. Director, Dept. of Science and Technology is the Member Secretary and Managing Director.

## **Objectives:**

- To serve as a mechanism to support the Department of Science and Technology in the preparation and implementation of its policy initiatives.
- To act as a nodal agency or channelizing funding for programs and for coordination between various implementing agencies.
- To identify priority areas of science and technology, which are useful for long term development of the State, so as to develop core competency in such areas.
- To act as a nodal agency for development of Nano Park and to extend all support services for promotion of Nanoscience and Nanotechnology in Karnataka.
- To coordinate and liaise with organizations of the Government of India in working out collaborative and joint programs/ventures in the field of science and technology.
- To act as a facilitator and liaise with all concerned in establishment of science city, science centres and other types of scientific establishments across the State.

One of the important programs of KSTePS is the organization of Bengaluru India Nano Event as it is the next big technological surge impacting wide spectrum of Industry in the coming years. The aim of this event is to create a congenial ecosystem for the growth of this sunrise industry similar to the growth witnessed in Information Technology and Biotechnology sectors.

The Thirteenth edition of India's premier Nano-science and Nanotechnology Event Bengaluru India Nano 2024 will be held during **August 1-3**, **2024** with pre conference tutorials on 1st August at Hotel The Lalit Ashok, Bengaluru. This event is guided by eminent visionaries, who have made significant achievements and contributions in the field of Nano Science and Nanotechnology under the guidance of distinguished scientist **Prof. CNR Rao, FRS**, who is the Honorary President, Jawaharlal Nehru Centre for Advanced Scientific Research Centre (JNCASR) & Linus Pauling Research Professor.

## Contact:

Shri Pavan Kumar Malapati, IAS, Director, DST, GoK/ Managing Director, KSTePS, Dept. of Science and Technology, GoK, 'Vijnana Bhavana', 3rd Floor, #24/2, 21st Main Road, BSK II Stage, Bengaluru – 560070, Ph: 080 26711166

Email:ksteps.dst@gmail.com, www.ksteps.karnataka.gov.in

## Programme at a Glance



Pre-Conference Tutorials   Thursday, August 01, 2024							
Time	Hall						
	Lalit -	1&2	Lalit - 3 & 4				
10:30 AM - 11:45 AM	Tutorial 1 - Nano Characterisation Raman Spectroscopy for Nanomaterials Characerization		Tutorial 1 - Nano in Biology Convergence of Biology and Nanotechnology: An Introduction				
11:45 AM - 01:00 PM	Tutorial 2 - Nano Electron Mic Nanomaterials C	Characterisation roscopy for haracterization	Tutorial 2 - Nano in Biology Nanoscale Imaging – Tools & Technologies for Precision Diagnostics				
01:00 PM - 02.00 PM	Lunch & Networking Break						
02:00 PM - 03:15 PM	Tutorial 3 - Nar Semiconductor Techno	no Fabrication blogy: An Introduction	Tutorial 3 - Nano in Biology Nanomaterials for Next-Generation Regenerative Medicine				
03:15 PM - 04:30 PM	Tutorial 4 - Na Semiconductor Techr Nano-bio T	no Fabrication ology for Sensors to echnology	Tutorial 4 - Nano in Biology Science & Entrepreneurship in Nanomedicine				
Day 1   Friday, August 02, 2024							
08:00 AM onwards	Registration						
10:00 AM - 11:00 AM	Inauguration of the Event ( Kalinga -1 )						
11:00 AM - 11:30 AM	Inauguration of Exhibition and Poster ( Magadh )						
11:30 AM - 11:45 AM	Tea / Coffee Break						
11:45 AM - 12:30 PM	Plenary Lecture I - The Impact of Nano-Engineered Materials in Technology ( GBR )						
12:30 PM - 01:15 PM	Plenary Lecture II - A Two-dimensional Pathway towards     Nanotech Quiz ( Kalinga-1 )       Building Technologies with New Science and Materials ( GBR )     Nanotech Quiz ( Kalinga-1 )						
01:15 PM - 02:15 PM	Lunch & Visit to Expo & Poster						
02:15 PM- 04:00 PM	Nano for the Young ( Kalinga-1 ) - Mimicking nature with nanomaterials - Importance of asking the first and right question: The nanoscience and technology example - Nanomaterials: Basic Science and Technological Applications						
	Lalit - 1 & 2	Lalit - 3	GBR	Lalit - 4			
02:15 PM- 04:00 PM	Session 1 - Nano in Healthcare	Session 2 - Nano in Climate	Session 3 - Nano in Energy	Session 4 - GIA			
	Development Of A Vaccines/nanovaccines For Multi-drug Resistant Diarrhoea	Use of Nanotechnology for Mitigation of Climate Change	Currents inside Disconnected Lithium Batteries after Fast Charging	Germany Panel on Co-innovation with Industry Academia and Start-ups: "How to make the best out of the			
	Brain targeting Small Molecular Nanomedicines Nano-Composite Silk Hydrogel for Spatiotemporal, Targeted & On-Demand Controlled Release of Chemotherapeutics: An in Vivo Approach toward Suppressing Solid Tumor Growth	Aligning Clean Air & Climate Action: Selected Insights from A Decade of Atmospheric Chemistry Research Over South Asia	Lithium Storage Capability of Van der Waals Gap in the Alternatives to Graphite	Consulate General of the Kingdom of Netherlands - Nanotechnology Inspired Vaccine Delivery Systems - Ultrasound Medical			
		Knowns & unknowns about Aerosols Nano Objects in The Air Impacting Air Quality & Climate	Phonon-Glass Electron-Crystal like High Performance Thermoelectrics	Applications using CMUTs United States of America Empowering Innovation: An Open Invitation for Nanotechnology Collaborations in Pennsylvania			

## **Programme at a Glance**



04:00 PM - 04:15 PM		Tea / Coffee Break						
04:15 PM - 06:15 PM		Poster Interactive Session						
06:30 PM - 08:30 PM		Nano Excellence Awards & Cultural Programme followed by Networking Dinner ( Kalinga -1 )						
Day 2   Saturday, August 03, 2024								
10:00 AM - 10:45 AM		Plenary Lecture III - Can Water Microdroplets Make Soil? ( GBR )						
10:45 AM - 11:30 AM		Plenary Lecture IV - AI in Semiconductors ( GBR )						
11:30 AM - 11:45 AM		Tea / Coffee Break						
		Lalit - 1 & 2	Lalit - 3 & 4	GBR				
11:45 AM - 1:15 PM		Session 5 - Nano in Healthcare	Session 6 - Nano in Climate	Session 7 - Nano in Energy				
		3D Liver Platforms For In-Situ Disease Staging Water Oxidation and						
		Size-tailored Gold Nanoparticles: Novel Electroactuators to	Hydrogen Generation by Alkaline Micro Electrolyser	Designing Greener Energy Conversion System For A Sustainable Future				
		Guide Stem Cell Differentiation and as Bacteriotoxic Agents	Catalysis for Sustainable Fuels, Chemicals & Bioproducts in a Net-Zero Economy					
		Smart Nanointervention for Therapy	Nano's Big Contribution To Sustainable Agriculture And Climate Change Reversal	Batteries in Current Time				
01:15 PM - 02:15 PM	1	Lunch & Visit to Expo & Poster						
02:15 PM - 03:15 PI	M	Session 8 Applied Nanotechnology and the Importance of Materials Engineering	Session 9 - Making in India: Challenges & Opportunities in Manufacturing & Energy	Session 10 - Nano SparX				
03:15 PM - 03:30 P	M	Tea / Coffee Break						
03:30 PM - 04:30 P	M	Poster Session ( Magadh )	Session 11 - Healthcare & Medical Electronic	Session 12 - Nano SparX				
04:30 PM - 05:00 P	M	Nano SparX, Poster Awards & Valedictory Address (GBR)						

\*Subject to change

## **AERIAL VIEW**



#BIrIndiaNano



## Accelerating Progress Enriching Lives

Fuelling India's Growth Story





IdianO



We delight over three crore customers visiting our fuel stations
Deliver Indane cylinders to over 26 lakh households
Fuel over 2300 flights.
Our pipelines network transports 133 thousand metric

• Our pipelines network transports 133 thousand metric tonnes (TMT) of crude oil and 93 TMT of products.

• 16 thousand tank trucks travel almost 15 lakh km to deliver our products.

• Our refineries generate 20 Gigawatt of captive power and our bitumen carpets 130 kms of roads and highways of India.

India's largest fuel refiner and retailer

**ERVD** 

1

Operates largest energy pipeline network Operates nine refineries; 60000+ customer touch points

Leading player in s petrochemicals & natural gas

## When you need the smarts, the skills, and the scenic views.



## PENNSYLVANIA GETS IT DONE

Learn what PA is doing to support technology and innovation at PAGetsItDone.com

We're here for you. Contact paindiaoffice2@gmail.com.



## Unlock Limitless Potential with ACT Enterprise

Your Gateway to Seamless Connectivity and Unmatched Growth

In the fast-paced world of business, staying connected is not just a necessity; it's the lifeline of your enterprise. At ACT Enterprise, we understand the critical role that a robust internet connection plays in driving success. Elevate your business to new heights with our cutting-edge solutions designed to empower and propel your growth.

SOLUTIONS PROVIDED



### WHY CHOOSE ACT ENTERPRISE FOR YOUR BUSINESS?

- Experience our all-in-one package: Combining high-speed Internet leased lines, secure Wi-Fi access, and comprehensive managed services with security.
- O Unparalleled Reliability: Rely on us for uninterrupted connectivity, ensuring business continuity.
- Managed Services: Let us handle the complexities, so you can focus on growing your business.
- Expert Support: Our dedicated support team is always ready to assist you 24/7.

READY TO TAKE YOUR BUSINESS TO THE NEXT LEVEL? +91 9176993232 | eb.sales@actcorp.in | www.actcorp.in/business-broadband





## **Vision Group on Nanotechnology**

#### **Honorary Chair**

**Prof. C.N.R. Rao,** F.R.S. Honorary Chairman, VGNT, Linus Pauling Research Professor, Honorary President, JNCASR, Bengaluru

#### Member ·

#### Prof. Milan Kumar Sanyal

INSA Senior Scientist, Saha Institute of Nuclear Physics, Kolkata

#### Prof. Hirendra N. Ghosh

Professor, Institute of Nanoscience and Technology Habitat Centre, Punjab

#### Prof. Anil Kumar P.S.

Dean, Administration & Finance & Professor, Dept. of Physics, Indian Institute of Science, Bengaluru

#### Prof. S. V. Sreenivasan

Professor Joe C. Walter, Jr. Chair in Engineering, David Allen Cockrell Chair in Engineering, Cockrell Family Regents Chair in Engineering, The University of Texas at Austin Walker Dept. of Mechanical Engineering Cockrell School of Engineering, Austin, Texas

#### Mr. Puneet Mehrotra

Director, Nano Science and Technology Consortium, Noida, Uttar Pradesh

#### Prof. G U Kulkarni

President, Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bengaluru

#### Dr. Krishna Venkatesh

Director, Centre for Incubation, Innovation, Research and Consultancy (CIIRC), Jyothi Institute of Technology, Bengaluru

#### **Member Secretary**

**Dr. Ekroop Caur,** IAS Secretary to Govt. Department of Electronics, IT, Bt and S&T, GoK, Bengaluru

#### Chair

#### Prof. Navakanta Bhat

Chairman, VGNT, Dean, Division of Interdisciplinary Sciences/ Professor, Centre for Nano Science and Engineering (CeNSE), Indian Institute of Science, Bengaluru

#### Dr. S. Swaminathan

Director, Centre for Nanotechnology & Advanced Biomaterials SASTRA Deemed University, Thanjavur, Tamil Nadu

#### Dr. Praveen Kumar S.

Head of Scientific Divisions (HoD) Technology Missions Divisions (Nano Mission & Supercomputing Mission) DST, Gol, New Delhi

#### Dr. Ajit Sapre

President, The Research & Technology Group, Reliance Industries Ltd, Reliance Corporate Park, Navi Mumbai

#### Mr. Suraj Rengarajan

Director and Chief Technology Officer (CTO), Applied Materials India Private Limited, New Delhi

#### Prof. V. Ramgopal Rao

Vice-Chancellor, Birla Institute of Technology & Science (Pilani, Hyderabad, Goa, Dubai & Mumbai)

#### Dr. Shashishekar Adiga

Head, Materials & Simulations Samsung Institute of Advanced Technology, Bengaluru





## **Conference Executive Committee**

#### Chair

#### Prof. P.S. Anil Kumar

Dean, Administration & Finance, Professor, Dept. of Physics, Indian Institute of Science, Bangalore

#### Member .....

#### Prof. G. U. Kulkarni

President, Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Jakkur, Bengaluru

#### Prof. Ashok K Ganguli

Institute Chair Professor & Deputy Director (Strategy and Planning), Indian Institute of Technology, Delhi

#### Dr. Praveen Kumar Vemula

Associate Investigator, Laboratory of Self-Assembled Biomaterials & Translational Research, Institute for Stem Cell Science and Regenerative Medicine (inStem), GKVK Post, Bengaluru

#### **Prof. Udayan Ganguly**

Professor, Department of Electrical Engineering, IIT Bombay, Mumbai

#### Dr. S. Swaminathan

Director, CeNTAB Sastra Deemed University Thanjavur, Tamil Nadu

#### Prof. K. S. Narayan

Professor, Jawaharlal Nehru Centre for Advanced Scientific Research, (JNCASR), Bengaluru

**Dr. Suraj Rengarajan** Director and CTO Applied Materials India, New Delhi

#### Shri K Krishna Moorthy

President & CEO, India Electronics & Semiconductor Association, IESA, Bengaluru

#### **Member Secretary**

Shri Pavan Kumar Malapati, IAS Director, Dept. of Science & Technology, GoK Managing Director, Karnataka Science & Technology Promotion Society (KSTePS), Bengaluru

#### Prof. V. Ramgopal Rao

Fellow of IEEE, TWAS, INAE, INSA, IASc, NASI, Vice-Chancellor, Birla Institute of Technology & Science (Pilani, Hyderabad, Goa, Dubai & Mumbai)

#### Prof. S. Sampath

Professor, Department of Inorganic and Physical Chemistry, IISc, Bangalore

#### **Prof. Ambarish Ghosh**

Professor, Centre for Nano Science and Engineering (CeNSE), IISc, Bangalore

Shri Puneet Mehrotra Director, Nano Science & Technology Consortium, Noida, Uttar Pradesh

#### **Dr. B L V Prasad** Director, Centre for Nano and Soft Matter Sciences, Bengaluru

#### Dr. Shashishekar Adiga

Head, Materials and Simulations, Samsung Institute of Advanced Technology, Bengaluru

#### **Dr. Taslimarif Syed**

CEO and Director of C-CAMP Centre for Cellular and Molecular Platforms (C- CAMP), UAS-GKVK Campus, Bengaluru

#### Prof. M. Eswaramoorthy

Professor, Chemistry and Physics of Materials Unit, JNCASR, Jakkur, Bengaluru



10



#### DAY 01 1st AUGUST 2024 THURSDAY



Tutorial 1 - Nano Characterisation Raman Spectroscopy for Nanomaterials Characerization 10:30 AM - 11:45 AM Lalit - 1 & 2



Speaker

Prof. Chandrabhas Narayana

Director, Rajiv Gandhi Centre for Biotechnology, India

## Tutorial 1 - Nano in Biology Convergence of Biology and Nanotechnology: An Introduction

10:30 AM - 11:45 AM Lalit - 3 & 4



## Speaker

Prof. Uma Maheswari Krishnan, Ph.d

Professor, SASTRA Deemed University, India

## Tutorial 2 - Nano Characterisation Electron Microscopy for Nanomaterials Characterization

### Speaker

Prof. Ravishankar N

Chair and Professor, Materials Research Centre, IISc, Bangalore, India

## Tutorial 2 - Nano in Biology Nanoscale Imaging – Tools & Technologies for Precision Diagnostics

11:45 AM - 01:00 PM Lalit - 3 & 4

11:45 AM - 01:00 PM

Lalit - 1 & 2



## Speaker

Professor, Institute of Bioinformatics and Applied Biotechnology, India

Prof. M Vijayalakshmi

11





## Prof. Chandrabhas Narayana

Prof. Chandrabhas Narayana Director, Rajiv Gandhi Centre for Biotechnology, India

Materials Research Centre Indian Institute of Science, Bangalore 560012

#### Title: Raman Spectroscopy for Nanomaterials Characterization



#### Abstract:

When light interacts with matter, the major interactions are transmission, reflection, luminescence, and absorption. But there is another phenomenon called Scattering which is weak but very important for understanding physical properties of material. The inelastic Scattering or Raman Scattering is very important but extremely weak. But due to the avagadro number this still is significant and it has varied use in understanding Materials, which can be condensed matter, Chemicals, nanomaterials, biological Materials etc. This talk will introduce audience to the basics of Raman spectroscopy, instrumentation, and how it can be used to study nanomaterials.

#### Profile:

Professor Narayana specializes in Raman Spectroscopy. Though a trained condensed matter physicist, Prof. Narayan, developed a keen interest in Biology within a few years at JNCASR. His group is a pioneer in the use of Raman spectroscopy in a) drug-protein interaction, for drug screening applications and b) diagnostic applications. Many of his work in these areas are trendsetters in the inter-disciplinary research. Along with his interest in Biology, he also follows his interest in physics and chemistry. Overall his group has been one of the well-known groups in the country for use of Raman spectroscopy in the areas of Physics, Chemistry, and Biology.







#### Prof. Uma Maheswari Krishnan

Prof. Uma Maheswari Krishnan, Ph.D. Professor, SASTRA Deemed University, India



#### Title: Convergence of Biology and Nanotechnology: An Introduction

#### Abstract:

Nanotechnology is a domain that deals with materials with at least one dimension in the order of 10–9 m while biotechnology uses biological organisms or biosystems to produce biomolecules that can be used in different sectors. The intersection of these two fields has given rise to nanobiotechnology and bionanotechnology domains that have many transformative applications in various sectors especially in healthcare and electronics. Bionanotechnology harnesses the self-assembling characteristics of biomolecules to form nanostructures for novel applications that are not part of the native functions of these biomolecules. Nanobiotechnology, on the other hand, is a domain that uses synthetic nanoparticles and nanotechnology to regulate or elicit a desired response from a biological system. This session will highlight the key concepts used in developing such nano-bio and bio-nano systems, their applications in different sectors and their impact on sustainable living.

#### Profile:

Dr. Uma Maheswari Krishnan is a Ph.D. in Applied Chemistry from PSG College of Technology, Coimbatore. She had her post-doctoral training from the University of Texas Southwestern Medical Centre at Dallas, USA. She joined SASTRA in 2003 and has been associated with the Centre for Nanotechnology & Advanced Biomaterials (CeNTAB) since its inception. Development of stimuli-responsive intelligent therapeutics and point-of-care devices for diagnosis of clinically relevant markers and understanding molecular mechanisms of therapeutic formulations is a major focus of her research lab. Her group uses in silico, in vitro models, 3D spheroids and in vivo studies to establish the efficacy of these nanomaterials. She had successfully guided 14 Ph.D. candidates. She has over 265 publications in this area with an h-index of 56. She was an expert committee member on 'Nanobiotechnology' in the Department of Biotechnology, and is the Chairman of the Life Sciences sub-committee of the SERB-SURE scheme.





## Prof. Ravishankar N

Prof. Ravishankar N Chair and Professor, Materials Research Centre, IISc, Bangalore, India



#### Title: Electron Microscopy for Nanomaterials Characterization

#### Abstract:

In this tutorial, I will provide a brief introduction to electron microscopy and how it is an indispensable tool for materials characterization. I will talk about the principles and operation of a scanning electron microscope followed by the transmission electron microscope. The transmission electron microscope is a powerful instrument capable of providing atomic resolution imaging, diffraction and spectroscopy from the same localised region in a thin specimen. Combined with the ability to carry out in-situ experiments of various kinds, the instrument is transformed into a laboratory in itself, capable of addressing a wide variety of interesting and important problem. I will discuss some of the capabilities of the modern state-of-the-art microscope with examples from our recent studies. These will be to illustrate the power of the modern-day microscope rather than an extensive discussion of specific results.

#### Education/ B.Tech in Metallurgical Engineering, 1991 Experience Institute of Technology, BHU, Varanasi

- M.Sc. (Engg) and Ph. D. in Metallurgical Engineering, 1998
- Indian Institute of Science, Bangalore, India
- Post-doctoral Researcher, Univ. of Minnesota, 1998-2002
- Assistant Professor, Materials Research Centre, IISc, 2002-2008
- Visiting Professor, Rensselaer Polytechnic Institute, 2008-09
- Associate Professor, Materials Research Centre, IISc, 2008-2014
- Visiting Professor, TU, Hamburg, Germany, 2016-17
- Professor, Materials Research Centre, IISc, Mar 2014 date

#### Research Interests/Experience

- Fundamental studies on nucleation and growth
- Nanostructures for clean energy applications
- Use of advanced electron microscopy to solve materials problems
- Surfaces and interfaces in ceramics and metals
- Crystallography and thermodynamics of phase transformations

#### Positions held/Organization

14

- Editor, Journal of Materials Science, Springer Nature.
- Convenor, Advanced Facility for Microscopy and Microanalysis
- Research Council Member, CSIR-AMPRI, Bhopal
- Executive Council Member, Electron Microscope Society of India
- Zonal Chairman (South Zone), Electron Microscope Society of India

#### Number of Ph.D. students graduated: 20





## Prof. M Vijayalakshmi

Prof. M Vijayalakshmi Professor, Institute of Bioinformatics and Applied Biotechnology, India

#### Title: Nanoscale Imaging – Tools and Technologies for Precision Diagnostics

#### Abstract:

Rapidly expanding technologies and precision tools in nano scale imaging have impacted our understanding of biological phenomena and medical diagnosis to a significant extent. The integration of machine and deep learning algorithms, Large Language Models have augmented the capabilities in image analysis enabling early diagnosis and therapeutic predictions. This talk/tutorial will discuss the various technologies that enable imaging at the nanoscale and their applications for precise diagnosis.

#### Profile:

Dr.Vijayalakshmi Mahadevan is currently a Professor at the Institute of Bioinformatics and Applied Biotechnology (IBAB), Bangalore. Her research is focused on understanding disease epigenomics with a focus on cancer and neurodevelopmental disorders using next generation sequencing, high end imaging and machine learning approaches. She is a member of the Consortium on Autism Spectrum Disorders and collaborates extensively with clinicians, imaging experts and data science professionals. She also coordinates a Masters Degree Programme in Big Data Biology at IBAB, Bangalore. Prof.Vijayalakshmi obtained her Ph.D. from the NCBS-TIFR, Bangalore. She was a faculty at SASTRA University in the School of Electrical & Electronics Engineering and at the School of Chemical & Biotechnology till January 2016 as a TCS Chair Professor of Bioinformatics and Associate Dean of the School of Chemical & Biotechnology. Dr. Vijayalakshmi was a Research Mentor in the National Network for Mathematical and Computational Biology (NNMCB), India from 2013.



#### DAY 01 1st AUGUST 2024 THURSDAY



Tutorial 3 - Nano Fabrication Semiconductor Technology: An Introduction 02:00 PM - 03:15 PM Lalit - 1 & 2



Speaker Prof. Shankar Kumar Selvaraja

Professor, IISc Bangalore, India

## Tutorial 3 - Nano in Biology Nanomaterials for Next-Generation Regenerative Medicine

02:00 PM - 03:15 PM Lalit - 3 & 4



Speaker Prof. S. Swaminathan

Professor, SASTRA Deemed University, India

## Tutorial 4 - Nano Fabrication Semiconductor Technology for Sensors to Nano-bio Technology

03:15 PM - 04:30 PM Lalit - 1 & 2



## Speaker

Prof. Saurabh Chandorkar

Professor, IISc Bangalore, India

Tutorial 2 - Nano in Biology Science and Entrepreneurship in Nanomedicine



## Speaker

Dr. Praveen Kumar Vemula

Faculty, Institute for Stem Cell Biology and Regenerative Medicine (inStem), India 03:15 PM - 04:30 PM Lalit - 3 & 4







## Prof. Shankar Kumar Selvaraja

Prof. Shankar Kumar Selvaraja Professor, IISc Bangalore, India

### Title: Semiconductor Technology: An Introduction

#### Abstract:

In this talk, I will walk you through the exciting world of semiconductor technology. We shall discuss the micro and nano fabrication processes that result in nano-scale transistors and how such transistors are connected to realise electronic IC or chips. Though the final product is called electronic IC, electronics have very little to do in making those chips. Finally, we shall discuss the reason for the buzz around it now.

#### Profile:

Professor Shankar Kumar Selvaraja is an associate Professor at the Centre for Nano Science and Engineering in the Indian Institute of Science Bangalore. He is also the Chair of the National Nano fabrication Centre (NNfC) at IISc. Before joining IISc in 2014, he was with imec Belgium. He received his PhD for his work on wafer-scale fabrication technology for Silicon photonic integrated circuits from Ghent University-IMEC Belgium. He has published over 250 research articles in international journals and conferences and has ten patents. He is a recipient of the DST-SERB Early Carrier Researcher Award and the Visvesvaraya Young Faculty Research Fellowship Award from the Ministry of Electronics and Information Technology. His current area of research includes silicon photonic IC-enabled connectivity, computing, sensors, and quantum photonic integrated circuits



17





## **Prof. S. Swaminathan**

Prof. S. Swaminathan Tissue Engineering & Additive Manufacturing (TEAM) Lab Centre for Nanotechnology & Advanced Biomaterials (CeNTAB) School of Chemical & Biotechnology SASTRA Deemed University Thanjavur, Tamil Nadu

#### Title:

#### Nanomaterials for Next-Generation Regenerative Medicine

#### Abstract:

Regenerative medicine uses scaffolds, cells and or growth factors alone or in combination to engineering various tissues. Our lab focuses on the development of three-dimensional nanostructures that mimic the biological environment for the regeneration of tissues such as skin, nerve, infarcted heart, blood vessel, etc. Nanofibrous scaffolds have geometries that mimic the extracellular matrix closely and provide structural, mechanical, topographical and biological cues that are essential for the regeneration of tissue. This talk will cover some examples of our work in the area of scaffold-based tissue engineering as well as 3-D bioprinting

#### Profile:

Prof. S. Swaminathan is the Director for Centre for Nanotechnology & Advanced Biomaterials at SASTRA Deemed University, Thanjavur, Tamil Nadu. His research group focuses on regenerative medicine using nanomaterials and 3D bioprinting. Prof. Swaminathan received his Ph.D. in Chemical & Biological Engineering from Drexel University, Philadelphia, USA and worked at the Department of Orthopaedic Surgery, University of Virginia, Charlottesville, USA before returning to Indian in 2005.

Prof. Swaminathan has about 240 publications and 20 patents filed out of which 10 have been granted. He has received various prestigious awards – Government of Karnataka's Prof. CNR Rao Bangalore India Nanoscience Award (2022), MRSI-ICSC Superconductivity & Materials Science Annual Prize (2017), Materials Research Society of India, Young Career Award in Nanoscience & Nanotechnology (2015), Department of Science & Technology, Ministry of Science & Technology, Government of India, Materials Research Society of India Medal (2009), Materials Research Society of India and Innovative Young Biotechnologist Award (2006), Department of Biotechnology, Government of India.



18





## **Prof. Saurabh Chandorkar**

Prof. Saurabh Arun Chandorkar Ph.D. (Stanford), Assistant Professor



#### Title: Semiconductor Technology for Sensors to Nano-bio Technology

#### Abstract:

Just as the industrial age began with the invention of the steam engine, the invention of Nanofabrication ushered in the information age. Digital and Analog Integrated circuits are pervasive in our day-to-day life with applications ranging from communication, healthcare, modes of transport, industry and strategic sectors such as defense and space. In fact, the impact of nanofabrication has spilled over into development of cornucopia of sensors, energy harvesters such as solar cells, neuromorphic computers, quantum computers etc. which have enabled Internet of Things (IoT), Artificial Intelligence (AI) and Genomics.

#### Profile:

Dr. Saurabh Arun Chandorkar obtained his BTech in Mechanical Engineering from IIT Bombay in 2003. He received his M.S. and Ph.D. in Mechanical Engineering with a minor in Electrical Engineering from Stanford University in 2009. He worked as a postdoctoral fellow in the area of adaptive Nanoimprint lithography in the Electrical Engineering Department of Stanford University from 2009 to 2010. He worked in Intel Mask Production facility in an R&D group for 6 years where his efforts were directed toward providing complete turn-key solutions for newly emergent issues in mask technologies for 1276(11nm) and 1278 (7nm) nodes. He was awarded two Intel Logic Technology Development (LTD) Divisional awards. In 2017, he worked in Stanford University as a lecturer. He joined IISc Bangalore as an Assistant Professor in December 2017 where he conducts research on MEMS/NEMS with special interest in resonators, packaging solutions and advanced system development.





## Dr. Praveen Kumar Vemula

Dr. Praveen Kumar Vemula

Head of Research Associate Professor Institute for Stem Cell Science and Regenerative Medicine (inStem) Bengaluru, INDIA

#### Title: Science and Entrepreneurship in Nanomedicine

#### Abstract:

Nanomedicine plays pivotal role in developing novel technologies to address unmet clinical needs. Translational journey has two major parts, 1) developing first-in-class technologies and 2) further developing them as viable products to reach to the market through science-entrepreneurship. In this workshop, we will discuss key parameters that influence to practice successful science-entrepreneurship. Translational journey of few examples will be discussed in detail.

#### Profile:

Dr. Praveen Kumar Vemula is Head of Research, Associate Professor at the Institute for Stem Cell Science and Regenerative Medicine (inStem), Bangalore. He has completed Masters in Chemistry from Osmania University (1998), and obtained PhD from Indian Institute of Science, Bangalore (2005). He did postdoc research at City College of New York. Subsequently, he has worked as Ewing Marion Kauffman Foundation Entrepreneurial Postdoc Fellow at Harvard Medical School. His expertise is developing chemical technologies for medical applications. His work spans the fields of biomaterials, drug discovery, drug delivery, medical devices, and chemical biology.

Vemula has published ~90 peer-reviewed papers, has given >250 national and international invited lectures including 3 TEDx talks, and has >30 issued or pending national/international patents, which have been licensed to multiple biotech companies. Several technologies developed in his lab have formed the foundation for multiple products on the market, and currently under development. Based on his technologies he has formed 8 startup companies. Thus far, >25 products that are developed based on his technologies are in the market worldwide.

His work has been recognized by:

Institute of Chemical Technology-Royal Society of Chemistry (ICT-RSC) Innovation Award 2024 National Biotechnology Innovation Award-2023 DBT-Product, Process, Technology Development and Commercialization Award 2020

GYTI-SRISTI-BIRAC Award-2019





## DAY 2<sup>nd</sup> AUGUST 2024 FRIDAY

## **Inauguration of the Event**



10:00 AM - 11:00 AM Kalinga - 1

Shri Siddaramaiah Hon'ble Chief Minister of Karnataka

#### Prof. C.N.R. Rao, FRS

Honorary Chairman, VGNT, Govt. of Karnataka; National Research Professor & Linus Pauling Research Professor, Honorary President, JNCASR, Bengaluru

#### Shri N. S. Boseraju

Hon'ble Minister of Minor Irrigation and Science & Technology, Govt. of Karnataka

#### Dr. Kiran Mazumdar Shaw

Executive Chairperson & Founder Biocon Ltd; Chairperson, Vision Group on Biotechnology, Govt. of Karnataka

#### Shri Rizwan Arshad

Hon'ble Member of the Legislative Assembly, Shivajinagar Assembly Constituency, Karnataka

#### Prof. Navakanta Bhat

Chair, Vision Group on Nanotechnology, Govt. of Karnataka, Dean, Division of Interdisciplinary Sciences, Professor, CeNSE, IISc, Bangalore

#### Prof. P.S. Anil Kumar

Chair, CEC - Bengaluru INDIA NANO 2024, Dean, Administration & Finance, Professor, Dept. of Physics, IISc, Bangalore

#### Dr. Ekroop Caur, IAS

Secretary to Government Dept. of Electronics, Information Technology, Biotechnology and Science & Technology Govt. of Karnataka

#### Pavan Kumar Malapati, IAS

Director, Dept. of Science & Technology, Managing Director, Karnataka Science and Technology Promotion Society (KSTePS), Bengaluru





## Plenary Lecture I The Impact of Nano-Engineered Materials in Technology



## 11:45 AM - 12:30 PM Grand Ballroom



Session Chair

Prof G.U. Kulkarni

President JNCASR, India



## Speaker

## Prof. Pulickel Ajayan

Chair, Department of Materials Science and NanoEngineering , Rice University, USA



22 .....





## Prof. G. U. Kulkarni

Prof.Giridhar U. Kulkarni, FNASc, FNAE, FNA, FRSC, JC Bose Fellow President

Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Jakkur P.O., Bengaluru 560 064



#### Profile:

Prof. Kulkarni obtained his Ph.D. from Indian Institute of Science, Bangalore in 1992 and carried out postdoctoral research at IISc (92-93) and later at Cardiff University in a Unilever project. He joined JNCASR in 1995 as Faculty Fellow, and has been a Professor since 2008. Having been the Chair of Materials Unit till 2011, he has held Dean-Academic Affairs (11-13) as well as Dean-Faculty Affairs (13-15) positions before moving to Centre for Nano and Soft Matter Sciences (CeNS) as the Director. Prof. Kulkarni returned to JNCASR on Jan 2020, to take over as the President while continuing to hold Adjunct Professorship at CeNS. Prof. Kulkarni has been a visiting Scientist/ Professor at many Universities/ Institutions including Cardiff, Tokyo, TASC-INFM, Trieste; Scuola Normale Superiore, Pisa; Purdue, Institut de Sciences Moléculairesd' Orsay, Université Paris Sud and so on. He was an Adjunct Professor at Birck Nanotechnology Centre, Purdue University during 2009-2011. Prof. Kulkarni has supervised nearly 32 students towards degrees- 23 Ph.Ds, 9 Masters and has published over 326 publications in reputed journals.

Research Areas Twisted Multilayer Graphene Self Assembly based Molecular Devices Nano & Microcrystallites in Unconventional Lattices Alternate Electrodes for Optoelectronics Artificial Synaptic Networks for On-Synapse Intelligence

#### Fellowships and Honors

- Sudborough medal and the Best Thesis award from Chemical Sciences Division,
- Indian Institute of Science, 1993
- Material Research Society of India Lecture medal, 1999
- Sir C. V. Raman Young Scientist award, 1999
- B.M.Birla Science prize in Chemistry, 2002
- Chemical Research Society of India Lecture medal, 2003
- Prof. C.N.R. Rao Oration award, 2006
- MRSI-ICSC Superconductivity and Materials Science Annual Prize -2011
- Bangalore Nano National Award 2012
- Sheikh Saqr Senior Fellow 2012 14
- Fellow of the National Academy of Sciences, Allahabad
- Fellow of the Indian Academy of Sciences, Bangalore
- Fellow of the Asia Pacific Academy of Materials (APAM)
- International Senior Fellowship of University of Bayreuth 2016
- Adjunct Member of the faculty for S&T, Gulbarga University, Karnataka
- Prof. C.N.R. Rao Science award in 13th Kannada Science Conference, 2017
- MRSI-Distinguished Lectureship Award (2019-20)

- SASTRA-CNR Rao Award for Excellence in Chemistry & Materials Sciences (2019 20)
- Dr Raja Ramanna State Award 2019 -Karnataka State Council for S&T (KSCTC)
- The Prof. C.N.R. Rao National Prize for Chemical Research-2020, Chemical Research Society of India (CRSI)
- Hon. Fellowship of Karnataka S&T Academy, Bengaluru
- Adjunct Professor of the Centre for Nano and Soft Matter Sciences
- Kannada Rajyotsava Award 2021
- Member of NAAC General Council for 3-year term
- Member of UGC's Consortium for Academic Research & Ethics Committee-Empowered Committee
- Indian National Science Academy 2021
- Indian National Academy of Engineering 2021
- CNR Rao Prize Lecture in Advanced Materials 2022 by MRSI
- Society of Materials Chemistry (SMC)'s Gold Medal-2023
- J.C. Bose fellow (2023 ) by SERB
- Fellowship of the Royal Society of Chemistry 2024

23





## Prof. Pulickel Ajayan

Prof. Pulickel M. Ajayan Department of Materials Science and NanoEngineering Rice University, Houston, Texas, USA 77005

#### Title:

#### The Impact of Nano-Engineered Materials in Technology

#### Abstract:

The last two decades in engineering and sciences have seen spectacular discoveries in nanotechnology. Several of these exciting ideas are now being integrated into a broad range of technologies. This talk will focus on some of these developments and in particular on the challenges and opportunities in designing and synthesizing functional nanoengineered materials. The talk will discuss several classes of materials and the impact of bottom-up engineering on the design of material systems relevant for many areas of applications including energy, environmental, structural, chemical and electronics. Several aspects that include synthesis, processing and manufacturing of materials will be discussed to convey the goals of achieving functional nanoengineered materials with control and scale for future technologies.

#### Profile:

**Pulickel M. Ajayan** is a pioneer in the area of nanotechnology. He has published more than 1300 journal papers earning more than 215,000 citations and h-index of 220 (google scholar). His work covers diverse areas of materials including nanoparticles, carbon nanotubes, diamond, 2D materials, nanocomposite, energy storage materials and 3D printing. He is the Benjamin M. and Mary Greenwood Anderson professor of Engineering at Rice University and the founding chair of the department of Materials Science and NanoEngineering. He is the recipient of several awards such as the Spiers memorial award, MRS medal, Alexander von Humboldt-Helmoltz senior award, and lifetime nanotechnology award from the Houston Technology Center. He received Docteur Honoris Causa from the Universite Catholique de of Louvain and distinguished alumni recognition from his Alma Mater Banaras Hindu University and the Materials Science department at Northwestern University. His research is funded through several federal agencies and Industrial sponsors and has a research group of around 30-40 members and has close collaborations with several Institutions around the world.

Northwestern University, Evanston, IL; Ph.D in Materials Science and Engineering (December 1989) Banaras Hindu University, India; B. Tech. in Metallurgical Engineering (June, 1985)

Rice University, Materials Sci. and NanoEngineering Department, Houston, TX (2007-now) Benjamin M. and Mary Greenwood Anderson Chair in Engineering Founding Chair, Professor of Materials Science and NanoEngineering (primary appointment) Professor of Chemistry; Professor of Chemical and Biolmolecular Engineering **Rensselaer Polytechnic Institute, Materials Sci. and Engineering Department, Troy, NY** Assistant, Associate and Full Professor (1997-2007) Henry Burlage Chair Professor in Engineering (September 2004 - 2007) **Max-Planck-Institut fur Metallforschung, Stuttgart, Germany** Alexander von Humboldt Research Fellow (August 95 - December 96) **Laboratoire de Physique des Solides, Universite Paris-Sud, Orsay, France** Researcher au CNRS (May 93 - July 95) **Fundamental Research Laboratory, NEC Corporation, Tsukuba, Japan** Post-doctoral Researcher (April 90 - May 93)









## Plenary Lecture II

A Two-Dimensional Pathway Towards Building Technologies With New Science & Materials

## 12:30 PM - 01:15 PM Grand Ballroom



## Session Chair Prof G.U. Kulkarni

President JNCASR, India



## Speaker

## **Prof. Arindam Ghosh**

Professor Indian Institute of Science Bangalore, India







### **Prof. Arindam Ghosh**

Prof. Arindam Ghosh Professor, Indian Institute of Science Bangalore, India



#### Title:

#### A Two-Dimensional Pathway Towards Building Technologies with New Science and Materials

#### Abstract:

It is nearly twenty years since one atomic layer of carbon, which we call graphene, was separated from graphite and shown that it could lead to a new generation of electronic field-effect transistors. Soon after, new forms of such 'twodimensional' materials were discovered and led to a revolution that has now percolated to almost all conceivable sectors of technology, from electronics to health and environment, from composites to aviation, or from energy to quantum devices. Here, I shall talk about how the unique fundamental physics of graphene and its analogues led to the paradigm shift in several technologies, from electronics, opto-electronics and sensing, thermoelectricity, to neuromorphic designs. I shall emphasize the opportunity in designing new properties, probing fundamental concepts, and large-scale manufacturing, with this amazing class of two-dimensional solids.

#### Profile:

Arindam Ghosh is JRD Tata Chair Professor of Physics at the Indian Institute of Science in Bangalore, India. He did PhD at IISc, postdoctoral research at the University of Cambridge, UK, and had also been a Visiting Research Fellow at the T J Watson Research Centre of IBM, Yorktown Heights. His research involves both fundamental and applied aspects of 2D materials focusing on electrical transport and noise, light-matter interaction, and thermal management. He has graduated nearly 25 PhD students, published over 150 research papers, and serves on the editorial or advisory board of many international journals, conferences, and other professional bodies. He has been instrumental in the formulation of the quantum material and devices vertical of the National Quantum Mission in India. He is a member of all three National Science Academies in India, and received numerous prizes, including the Swarnajayanti fellowship (2009), Shanti Swarup Bhatnagar prize (2013) and the Infosys Prize for Physical Sciences (2020). He is also the co-founder and CEO of Quan2D Technologies PVT LTD, a deep-tech startup which aims at impacting multiple sectors from healthcare to civil applications through large scaling manufacturability of 2D materials.







## Nano for the Young



## 02:15 PM- 04:00 PM Kalinga - 1



## Speaker Prof. Ashok K Ganguli

Director & Professor of Chemical Sciences Indian Institute of Science Education and Research, Berhampur, India



## Speaker

Dr. B L V Prasad

Director Centre for Nano and Soft matter Research, India



## Speaker

## Prof. Umesh Waghmare

Professor, Jawaharlal Nehru Centre for Advanced Scientific Research, India





## Prof. Ashok K Ganguli

Prof. Ashok K Ganguli Director & Professor of Chemical Sciences , IISER Berhampur, Odisha 760003, India & Professor, Department of Chemistry IIT Delhi, New Delhi 110016, India



#### Abstract:

Throughout time, there have been multiple innovations in science & technology. One can only admire and be in awe of the human intellect which through observation of nature, understanding unusual phenomena and unravelling the science behind, creates applications/devices for improving the quality of life.

Nanomaterials and nanotechnology relate to particles and devices having features around 1-100 nanometer in length, which are very small and visible through the electron microscope (1 nanometer = 10-9 meter). Nanostructures occur widely in nature all around us and understanding these objects/features can lead to applications which can give tremendous benefits. An application worth mentioning is the nanomaterials causing the phenomenon of bioluminescence (e.g. in aquatic organisms such as Jellyfish and Anglerfish). Bioluminescence is caused by the chemical Luciferin (& its analogues). It has found to be more effective than other light energy producing processes such as fluorescence and incandescence. For example, butterfly wings can have different colours and provide optical illusion due to varying sizes of particles which are all in the order of nanoscale. In the animal world, nanotoes of beetle, fly, spider, gecko are known to have sticking power. Insects such as water striders are being able to "walk on water" without getting wet – possible due to anatomical features such as nanogrooves and microhairs. Also, it is possible many animals (e.g. shark skin) have superhydrophobic surfaces which allows waterdrop to roll along the surface without any friction and washes away dirt and bacteria with it.

Let us delve into this fascinating world of nano in nature and learn to create new objects / machines by mimicking such nanostructured features.

#### Profile:

28

Professor Ganguli is currently the Director and Professor of Chemical Sciences at IISER Berhampur. He is on Lien from IIT Delhi where he is a Professor of Chemistry. He was Deputy Director, IIT Delhi(2019-22) and was also the founding Director of Institute of Nano Science and Technology(Mohali, India) from 2013-2018. His main research interests are in the area of design of nanomaterials for energy conversion and also superconducting materials. He has published over 350 papers and has filed five patents(two granted). He is a recipient of the MRSI Medal, CRSI Silver Medal, National Award of Nano Science and Nanotechnology (DST), Bangalore India Nano Award 2017 (Karnataka Govt) and Distinguished Materials Scientist of the Year Award(2021) and several others. He is a fellow of all the three science academies of India.

Dr Ganguli was keenly involved in the formation of Delhi S&T Cluster (DRIIV) part of the initiative of PSA, Govt of India and was also part of the knowledge cluster at chandigarh(CRIKC). Dr Ganguli has very keen interest to promote outreach activities for underprivileged sections of society and has been to remotest schools and colleges (~400 in the last 10 years).







## Dr. B L V Prasad

Director, Centre for Nano and Soft Matter Sciences (CeNS) Arkavathi Campus, Survey No.7, Shivanapura, Dasanapura Hobli, Bengaluru - 562162 & Chief Scientist Physical/Materials Chemistry Division National Chemical Laboratory (CSIR-NCL) Dr. Homi Bhabha Road, Pune 411 008 INDIA



#### Title:

Importance Of Asking The First and Right Question: The Nanoscience and Technology Example

#### Abstract:

In the last few decades, nanoscience and technology has emerged as a promising field due to the unique optical, electronic, chemical and magnetic properties displayed by nanoscale materials rendering them to be suitable for diverse applications. The foundation of nanotechnology is based on the size and shape of nanoparticles which play a significant role in tuning their properties. This talk aims to bring awareness about the contemporary nanoscience related research and its applications by introducing the concepts of nanoscale, how small is a nanometre and the history of nanomaterials. It will also delve on natural phenomena that exemplify characteristics of nanoscale materials, with examples like butterfly wings, peacock feathers and Gecko's feet etc. Finally, it will highlight how Faraday with his deep insights unravelled the optical properties displayed by metal nanoparticles embedded in glass matrix and thus lead to the evolution of nanoscience as a new field of research.

#### Profile:

Bhagavatula L. V. Prasad is currently working as the Director of Centre for Nano and Soft Matter Sciences, Bengaluru. He also holds a position of Chief Scientist in the Physical/Materials Chemistry Division of National Chemical Laboratory (CSIR-NCL), Pune, India. He had his schooling and his early education in Vijayawada in Andhra Pradesh. Later he moved to Hyderabad Central University from where he obtained a Master of Science and PhD degrees in Chemistry. After two post-doctoral stints; one at Tokyo Institute of Technology (2 years JSPS fellowship and 1 year Research Associate ship) and second at Kansas State University (KSU; 2.5 years -NASA sponsored project); he joined NCL in 2003. In 2021 he has assumed the office of Director, Centre for Nano and Soft Matter Sciences, Bengaluru. His group is actively working in the general area of material synthesis and in particular nanoparticles and nanoscale materials. He has published close to 140 papers in international peer reviewed journals and has 8 international patents to his credit. He was invited as visiting professor by different universities in many countries, including Japan, USA, UK, France and Germany. 18 students have completed PhD under his supervision and another 6 are pursuing their PhD currently.





## **Prof. Umesh Waghmare**

#### Prof. Umesh Waghmare

Professor, Jawaharlal Nehru Centre For Advanced Scientific Research, India



#### Title:

#### Nanomaterials: Basic Science and Technological Applications

#### Abstract:

Graphene, one of the simplest yet exciting 2-dimensional nanomaterials, triggered remarkable research activity since 2004. We will introduce 2D nano-materials and their heterostructures with emphasis on their (a) electronic structure and (b) use in devices and technological applications. We will illustrate how the stacking of layers of various 2D nanomaterials opens up a large number of engineered 2D materials marked by the variation in their (a) structure (twist or mis-registry between the layers) and chemistry, and (b) exotic properties.

#### Profile:

Umesh Waghmare received a B Tech (with institute silver medal) in Engineering Physics from the IIT, Bombay (1990) and a PhD in Applied Physics from Yale University (1996). He worked as a post-doctoral research associate in physics department at Harvard University before joining Jawaharlal Nehru Centre for Advanced Scientific Research in 2000, where he is presently a Professor in the Theoretical Sciences Unit and a JC Bose National Fellow. He is presently distinguished adjunct professor at Temple University, and the President of the Indian Academy of Sciences.

His research interests include ab initio modeling and simulations of multifunctional materials, mechanical behavior, nanostructures, topological insulators and materials for energy and environment. He is an Associate Editor of NanoScale and NanoScale Advances.

He is a recipient of DuPont Young Faculty grant award (2003), MRSI medal (2004), B M Birla award for Physics (2005), DAE outstanding research investigator award (2009), IBM Faculty Award (2009), SS Bhatnagar prize in Physical Sciences (2010) and the Infosys Prize in Engineering and Computer Science (2015). He was recognized as a distinguished alumnus by IIT-Bombay in 2017. He is a Fellow of Indian Academy of Sciences, National Academy of Sciences, Allahabad, the Indian National Science Academy and Indian National Academy of Engineering.





## Session 1 - Nano in Healthcare



02:15 PM- 04:00 PM Lalit - 1 & 2

31



Session Chair

**Prof. Swaminathan** 

Professor & Director, SASTRA University

Development of a Vaccines/Nanovaccines for Multi-drug Resistant Diarrhoea



Speaker

Prof. Dhirendra Katti

Director, IIT Goa, India

Brain targeting Small Molecular Nanomedicines



### Speaker

Dr. Jiban Jyoti Panda

Associate Professor, Institute of Nano Science & Technlogy, Mohali, India

Nano-Composite Silk Hydrogel for Spatiotemporal, Targeted & On-Demand Controlled Release of Chemotherapeutics: An In Vivo Approach toward Suppressing Solid Tumor Growth



Speaker

**Prof. Biman B. Mandal** 

Professor, IIT Guwahati, India





### Prof. Dhirendra Katti

Prof. Dhirendra S. Katti Director IIT Goa, Goa - 403401 INDIA

#### Title:

#### Development of A Vaccines/Nanovaccines for Multi-Drug Resistant Diarrhoea

#### Abstract:

Globally, the leading cause of multi-drug resistant bloody diarrhea is Shigella, a group of Gram negative bacteria. It has resulted in multiple epidemics of shigellosis, an infectious diarrheal disease, causing thousands of deaths per year especially in low and middle-income countries including India. Unfortunately, there are no licensed vaccines available, primarily due to low or serotype-specific immunogenicity (>50 serotypes and sub-serotypes). Thus, conserved sub-unit vaccines utilizing recombinant Invasion plasmid antigens (Ipa) have been explored as cross-protective vaccine candidates. However, achieving cross-protection against Shigella dysenteriae 1(Sd1), which causes the most severe form of the disease, has been challenging. Therefore, a rational approach should involve conserved proteins of Sd1. IpaC is one such conserved immunogenic protein which is the least explored as an independent vaccine due to its instability. In order to improve cross-protection, potential immunogenicity and in preparation for a future pandemic/epidemic, the aim of the first part of our work was to stabilize recombinant Sd1 lpaC at various temperatures and assess its vaccine potential. To further reduce the frequency of dosing and hospital visits and hence increase possible patient compliance, in the second part, the minimum protective dose of the stabilized IpaC was formulated into a single dose intranasal nanoparticle based vaccinenanovaccine. In the third part, we developed multi-faceted biomimetic nanovaccines separately encapsulating antigens and/or immunostimulant of Sd1 origin which were surface modified to achieve improved cellular uptake and immunogenicity. As vaccination of parents to achieve passive-protection in progeny/infants is an attractive strategy, we also demonstrated the passive-protective potential of the developed nanovaccine. Overall, our work describes facile technologies to develop stable, non-invasive, cross-protective, minimalist vaccines for shigellosis

#### Profile:

32

Prof. Katti currently holds the position of Director, IIT Goa.He received his B.Sc. in Chemistry from Fergusson College, Poona University (1990); B.Sc.Tech in Chemical Technology from Institute of Chemical Technology (ICT), Mumbai (1993); and Ph.D. in Chemistry from Bombay University (1999) [worked at CSIR - Indian Institute of Chemical Technology (IICT), Hyderabad under Dr. A. V. Rama Rao, then Director, IICT]. He then worked at the laboratory of Prof. Cato T. Laurencin as a post-doctoral fellow at the Dept. of Chem. Engg., Drexel University, Philadelphia, USA (1999-2001) and subsequently as a Research Assistant Professor also at the Dept. of Chem. Engg., Drexel University (2001-2003). Dr. Katti then moved on as Assistant Professor (Tenure Track) at the Department of Orthopaedic Surgery and the Department of Biomedical Engineering at The University of Virginia, Charlottesville, USA (2003-2004). Dr. Katti returned to India in 2004 as Assistant Professor at the Department of Biological Sciences and Bioengineering (BSBE), IIT Kanpur and rose through the ranks to become Professor in 2012. He was Head of the BSBE Dept. from 2016-2019 and was the Gireesh Jankinath Chair Professorship from 2018-2021. He was the Chairman of JEE for 2019 and 2020 and helped conduct the JEE nationwide in India during the challenging times of COVID19. More recently, he was Dean of International Relations (2022-2024) and the Rajeeva and Sangeeta Lahri Chair Professor (2022-2024) at IIT Kanpur. Prof. Katti serves on the editorial board of Journal of Biomedical Nanotechnology (American Scientific Publishers) and Trends in Biomaterials and Artificial Organs (India) and served as the Associate Editor (Asia) of International Journal of Nanomedicine (Dove Press) 2009-2016. Prof. Katti is the recipient of the prestigious Tata Innovation Fellowship by Department of Biotechnology (2023) and is an elected Fellow of the Society of Biomaterials and Artificial Organs (FBAO) India (2023) and serves as the President of the Society for Tissue Engineering and Regenerative Medicine India (STERMI) (2024-2027). Prof. Katti has more than 200 publications (including book, book chapters, research publications, patents and conference papers) and has supervised 125 students (including undergraduate, postgraduate, post-doctoral fellows and project fellows)His research interests are in the areas of Biomaterials, Drug Delivery Systems, Tissue Engineering, Nano-biotechnology, Nanomedicine, Drug Target Identification, and Disease Model Systems.







### Dr. Jiban Jyoti Panda

Dr. Jiban Jyoti Panda Associate Professor, Institute of Nano Science and Technlogy, Mohali, India



#### Title: Brain Targeting Small Molecular Nanomedicines

#### Abstract:

Nanomedicine is the application of nanotechnology in the field of medical science. It involves applications of nanomaterials to construct nanotherapeutic agents to treat various disorders, to construct biomedical devices, and nanoelectronic biosensors. Future possible nanomedicine and molecular nanotechnology based applications may involve developing biological nanomachines for site-specific and on-demand therapy.

Effective treatment of CNS diseases including brain tumors, HIV and other neurodegenerative diseases has long been hampered by the inability of many drug molecules to cross the blood brain barrier (BBB). Highly restrictive tight junctions between the brain capillary endothelial cells are mainly responsible for the barrier properties and limit the transfer of almost all drugs from blood to brain. Recent strategies enhance the capacity of therapeutic molecules to cross the BBB by modifying the drug itself, or by coupling it to a vector for receptor or adsorption-mediated transcytosis. Our goal in the present work is to explore the ability of peptide/amino acids and their hybrid nanostructures for safe and effective delivery of drugs across the BBB for theranostic applications. Stimuli responsive nanocarriers for cancer specific delivery are also being developed. These nanostructures owing to their ease of synthesis and high biocompatibility will act as excellent carriers that selectively and aggressively target the CNS. Nanotheranostic systems for Alzheimer's disease have also been explored.

Key words: Theranostics, peptide, glioblastoma, blood brain barrier, Alzheimer's

#### Profile:

Dr. Jiban Jyoti Panda currently holds the position of Scientist E at INST, Mohali institute. In 2023, she attained membership in the International Science Council. Additionally, she was inducted as a member of the Indian National Young Academy of Sciences (INYAS) in 2022 and received recognition in the field of STEAM as one of the distinguished 75 women, earning a feature in the 2022 book "SHE-Is." Dr. Panda's notable achievements include being honoured with the Har Gobind Khorana Young Innovative Biotechnologist Award in 2021 and receiving the ICMR-DHR International Fellowship for Biomedical Scientists in 2019. She was also a recipient of the DBT-BIOCARE Award in 2017. She was a Visiting Research Scholar at the University of Colorado Denver (USA) in 2013, coupled with the distinction of being granted the Inspire Faculty Fellowship in the same year. Furthermore, Dr. Panda has been recognized on the international stage, securing the UNESCO-L'Oreal International Fellowship in 2011. In 2011, she was awarded the Young Scientist Award by the Organization of Pharmaceutical Producers of India (OPPI) and the American Association of Pharmaceutical Scientist (AAPS) Graduate Student Symposium Award in Formulation Design and Development (Chicago; USA). She is a neuroscientist with over 16 years of experience. Her research focuses on using nanoparticles for integrated diagnosis and therapeutics in CNS disorders, including Alzheimer's, glioblastoma, and cataract. Her lab develops multifunctional nanoparticles, particularly peptide-based, to target the CNS and modulate the Blood-Brain Barrier. Her lab also focuses on using nanoparticles as theragnostic agents against Alzheimer's, cancer, cataract by photothermal and photodynamic therapies.





## Prof. Biman B. Mandal

Prof. Biman B. Mandal Department of Biosciences and Bioengineering, Centre for Nanotechnology, Jyoti and Bhupat Mehta School of Health Sciences and Technology,

#### Title:

Nano-Composite Silk Hydrogel for Spatiotemporal, Targeted and On-Demand Controlled Release of Chemotherapeutics: An In Vivo Approach toward Suppressing Solid Tumor Growth

#### Abstract:

Conventional systemic chemotherapeutic regimens suffer from challenges such as nonspecificity, shorter half-life, clearance of drugs, and dose-limiting toxicity. Localized delivery of chemotherapeutic drugs through noninvasive spatiotemporally controllable stimuli-responsive drug delivery systems could overcome these drawbacks while utilizing drugs approved for cancer treatment. In this regard, we developed active nanocomposite silk-based drug delivery systems (DDS) exhibiting on-demand drug release in vivo. The resultant nanocomposite silk hydrogel showed electrical field responsiveness and near-infrared (NIR) laser-induced hyperthermal effect. The remote application of these stimuli in tandem or independent manner led to the increased thermal and electrical conductivity, which effectively triggered the intermittent on-demand drug release. In a proof-of-concept in vivo tumor regression study, the nanocomposite hydrogel showed drastic tumor regression upon regular stimulation of an electric field and NIR laser. Heart ultrasound and histology revealed no associated cardiotoxicity and our results suggested that such strategy might have high clinical translational potential.

#### Profile:

Dr. Biman B. Mandal is a Professor at Dept. of Biosciences and Bioengineering, IIT Guwahati, India. His present research is focused on studying natural biopolymers and in particular the use of silk as a biomaterial for tissue engineering and regenerative medicine applications. He holds a PhD from the Indian Institute of Technology Kharagpur, India and a Post-Doc from Tufts University, Boston USA. Prof. Mandal has published more than 204+ research articles with over 11,900+ citations and has an H-index of 61. He has 23 patents and licensed 05 healthcare technologies to Industry with 01 product in market. Prof. Mandal has received numerous National & International awards and accolades for his research contributions and most prominent ones are SWARNAJAYANTI Fellowship, B. M. BIRLA Prize, S. RAMACHANDRAN National Bioscience Award, INSA & NASI young scientist Medal(s), NASI-SCOPUS Award to name a few. Prof. Mandal is an Associate Editor of ACS Biomaterials Science and Engineering and Editorial Board member of 10 International high impact Journals.











## Session 2 - Nano in Climate

02:15 PM- 04:00 PM Lalit - 3

35



## Session Chair Prof. Suddhasatwa Basu

FIPI Chair Professor IIT Delhi and former Director IMMT, IIT Delhi, India

## Use of Nanotechnology for Mitigation of Climate Change



#### Speaker

Dr. Rajeevan Madhavan Nair

Former Secretary Ministry of Earth Science and Vice Chancellor , Atria University, India

Aligning Clean Air and Climate Action: Selected insights from a decade of atmospheric chemistry research over South Asia to foster transdisciplinary research



## Speaker

Prof. Vinayak Sinha

Professor, Indian Institute of Science Education and Research Mohali, India

Knowns and Unknowns about Aerosols... Nano Objects in The Air Impacting Air Quality and Climate



## Speaker

## Dr. Christian George

Directeur Adjoint, Institut de recherches sur la catalyse et l'environnement (IRCELYON), France





### Dr. Rajeevan Madhavan Nair

Dr. Rajeevan Madhavan Nair Former Secretary Ministry of Earth Science and Vice Chancellor , Atria University, India



#### Title: Use of Nanotechnology for Mitigation of Climate Change

#### Abstract:

Global warming is one of the biggest risks the whole world is currently facing. Global warming is caused by the increase in greenhouse gases released into the atmosphere by human activities such as industry, transport, construction and land use change. Observations show that the global mean surface temperature has risen by around 1.20°C in the last 150 years. A further increase to 1.5°C is predicted by 2050. Climate change is expected to impact many areas such as agriculture, water resources, energy, health and disaster management. All governments have now committed to systematically reducing greenhouse gas emissions to limit global warming to 1.5°C. The impact of global warming of more than 1.50°C is expected to be very devastating. The Indian government has committed to zero carbon emissions by 2070 and is investing heavily in renewable energy. A gradual transition to renewable energy may not be enough to achieve net zero emissions by 2070. We need to develop appropriate technology to mitigate climate change and the associated environmental problems. Nanotechnology and nanomaterials have a multifaceted role to play in finding solutions to mitigate global warming and limit its impact. In this presentation, I will talk about the basics of climate change, the associated impacts, the need for action to mitigate climate change and how nanotechnology can be used to solve some of the problems associated with climate change.

#### Profile:

Dr M. Rajeevan is currently working as Vice Chancellor at Atria University, Bengaluru. He has more than 38 years of research experience in weather and climate science. He retired from government service in 2021 after working in many research institutions and in the Ministry of Earth Sciences as Secretary to the Government of India.

Dr Rajeevan made significant research contributions on Indian monsoon variability and climate change. He has published more than 170 research papers with an h-index of 60 and more than 16500 citations. He has also edited two books for Springer: a) Climate Variability and Change over the Indian region b) Societal and Economic Impact of Earth Sciences.

Dr Rajeevan is a member of all three science academies of India and an academician of the International Academy of Astronautics, Paris. He is currently a member of the Research Board of the UN/World Meteorological Organisation (WMO)






# **Prof. Vinayak Sinha**

Prof. Vinayak Sinha Professor, Indian Institute of Science Education and Research Mohali, India



### Title:

Aligning Clean Air and Climate Action: Selected insights from a decade of atmospheric chemistry research over South Asia to foster transdisciplinary research

### Abstract:

In complex atmospheric emission environments such as urban agglomerates, multiple air pollution sources control the ambient chemical composition driving air quality and regional climate. In contrast to pristine sites, where reliance on single or few chemical tracers is often adequate to resolve pollution plumes and source influences, comprehensive VOC chemical fingerprinting of sources and identification of suitable set of VOC tracer molecules and emission ratios is warranted in complex emission environments. In my talk I shall present methods and results for characterization and development of "chemical fingerprints" of several major urban and agricultural emission sources active in South Asia such as paddy stubble burning, garbage burning, idling vehicular exhaust and evaporative fuel emissions. I shall share the results from source apportionment studies conducted using real time data and mathematical models that have been validated using the chemical fingerprints of major air pollution sources in Delhi, Kathmandu and Mohali. I shall conclude by discussing research needs that could be addressed using a transdisciplinary approach for waste to wealth conversion and cleaner air and energy access, co-benefitting climate and air quality.

#### Profile:

Professor Vinayak Sinha works at the Indian Institute of Science Education and Research Mohali. He completed BS-MS (Chemistry) from SSSIHL, Prashantinilayam, M.Tech (Analytical Chemistry) from IIT Delhi and PhD from Max Planck Institute for Chemistry in Mainz, Germany. He is an analytical and atmospheric chemist working on climate and air quality. Source apportionment, ozone and hydroxyl radical chemistry, molecular chemical fingerprinting of air-pollution sources and volatile organic compound analyses are key areas of expertise. His is an expert member of various international bodies such as the World Meteorological Organization Environmental Pollution and Atmospheric Chemistry Scientific Steering Committee and the International Commission on Atmospheric Chemistry and Global Pollution. He set up India's first proton transfer reaction mass spectrometry lab, where atmospheric composition and meteorology measurements for >100 species including VOCs at ppt-level sensitivity are being made continuously since 2011. He has published >132 scientific papers (including 82 peer reviewed international journal publications) with h-index≥35 and >3500 citations (SCOPUS).





# **Dr. Christian George**

Dr. Christian George, 1 Univ Lyon, Université Claude Bernard Lyon 1, CNRS, IRCELYON, F-69626, Villeurbanne, France

### Title:

### Knowns And Unknowns About Aerosols... Nano Objects In The Air Impacting Air Quality And Climate

### Abstract:

Aerosols and clouds are key players in tropospheric chemistry. These tiny particles suspended in the air, with a radius ranging from a few nanometres to tens of micrometres, impact atmospheric composition, represent one of the largest uncertainties in climatic projections and cause millions of deaths worldwide every year. Hence, they have enormous societal and economic consequences. Nonetheless, there is still a knowledge gap preventing us from describing the chemical evolution of aerosols and clouds during their atmospheric lifetime.

Indeed, our ability to assess the impact of aerosols on atmospheric physics and chemistry is still limited due to insufficient understanding of many processes associated with sources of particles, their chemical composition and morphology, and evolution of their composition and properties during their atmospheric lifetime. Indeed, atmospheric aerosols can be viewed as a complex conglomerate of thousands of chemical compounds forming a system that evolves in the atmosphere by chemical and dynamical processing including chemical interaction with oxidants.

This presentation will review partially our knowledge on aerosol physical chemistry and will tentatively make a bridge between atmospheric chemistry and processes at nano scales, as an invitation to interdisciplinary collaboration to fill some of the identified knowledge gaps.

### Profile:

Dr. Christian George received his PhD in Chemistry at the University of Strasbourg in 1993. He did his postdoctoral work at the Fraunhofer Institut für Toxikologie und Aerosolforschung. He then worked as a CNRS Research Scientist at the Centre de Géochimie de la Surface in Strasbourg, and then at the Laboratoire d'Application de Chimie à l'Environnement (LACE). In 2006, he became a senior scientist at the Institut de Recherches sur la Catalyse et l'Environnement de Lyon (IRCELYON). Since 2016, he assumes the position of Deputy Director of IRCELYON. He has served on numerous international scientific committees and panels, including IGAC and iCACGP, and is a double grantee of the prestigious European Research Council advanced grant scheme. His current research portfolio is based on studies bringing together atmospheric chemistry, environmental chemistry, physical chemistry, chemical kinetics, Photochemistry... for a better understanding of the processes occurring in the troposphere. A central aspect of this work is the participation in collaborations across many disciplines. Throughout his scientific career conducted at different locations and countries, he always tried to initiate innovative and original studies, opening new research directions in my field of research.





38





# Session 3 - Nano in Energy



39



DAY

N7

Prof. K.S Narayan

**Session Chair** 

Professor JNCASR, India

# Currents inside Disconnected Lithium Batteries after Fast Charging



# Speaker

Prof. Nitash Balsara

The Charles W. Tobias Professor in Electrochemistry, University of California, Berkeley, USA

# Lithium Storage Capability of Van der Waals Gap in the Alternatives to Graphite



# Speaker

Prof. R Kothandaraman

Professor , IIT Madras, India

Phonon-Glass Electron-Crystal like High Performance Thermoelectrics



### Speaker

# Prof. Kanishka Biswas

Professor, Jawaharlal Nehru Centre for Advanced Scientific Research, India





# **Prof. Nitash Balsara**

Prof. Nitash P. Balsara Chemical and Biomolecular Engineering Department University of California, Berkeley and Materials Sciences Division Lawrence Berkeley National Laboratory University of California, Berkeley

#### Title: Currents inside Disconnected Lithium Batteries after Fast Charging

### Abstract:

Nanoscale particles lie at the heart of lithium-ion batteries currently used to power both personal electronics and electric vehicles. During charging, lithium ions leave particles in the cathode, travel through an electrolyte that is contained in the pores, and intercalate into nanoscale graphite particles in the porous anode. We use operando synchrotron hard X-ray tomography to determine the current going into the particles after the battery is charged rapidly. Local current density outliers as high as 25mA/cm 2 are obtained 30 minutes after the charging is stopped. In some cases, electric vehicle batteries catch fire while they are parked and unconnected to a charging station. In other words, fires occur in spite of the fact that there is no current being fed to or extracted from the batteries. Our work may shed light on the processes that might be involved in such events.

#### Profile:

Nitash P. Balsara is a chemical engineer with a bachelor's degree from the Indian Institute of Technology in Kanpur, India in 1982. His graduate education began with a master's degree from Clarkson University. This was followed by PhD from RPI. After 2 post-docs at the University of Minnesota and Exxon, he joined the faculty of Department of Chemical Engineering at Polytechnic University in Brooklyn. In 2000 he accepted the job that he currently holds: a joint appointment as professor of Chemical Engineering at the University of California, Berkeley, where is currently the Charles W. Tobias Professor of Electrochemistry, and faculty scientist at Lawrence Berkeley National Laboratory. He has managed to hang on to both jobs. Along with his students and collaborators, he cofounded two battery start-ups, Seeo, Inc., and Blue Current.









### Prof. R Kothandaraman

Prof. Kothandaraman Ramanujam Department of Chemistry, Indian Institute of Technology Madras, Chennai 600036



### Title:

### Lithium Storage Capability of Van der Waals Gap in the Alternatives to Graphite

### Abstract:

Research in the Li-ion battery area is intense due to the need for environmentally benign and portable energy storage systems for use in the electrical, electronic, automobile, and aerospace industries. The recent advancements in this area made LiB the most suitable storage platform for powering mobile appliances and electric vehicles. LiBs are lightweight, energy-dense, compact, and offer long cycle life over conventional batteries such as Ni-Cd and lead-acid batteries. In my talk, I will discuss recent lightweight materials (> 510 mAh/g) developed in our laboratory that target replacing graphite anodes in LiBs.

### Profile:

Dr. Ramanujam has focused his expertise in applied electrochemistry on contributing to realize India-centric solutions for the ever-growing need of energy storage and conversion. His interest in applied chemistry is evident from the number of technologies he has developed. He developed 1kW/10kWh vanadium redox flow battery technologies for ONGC in Phase I, and 10kW/100kWh is ongoing in Phase II. Along with industry partner HEB, the 10kW stack was demonstrated in the Indi Energy Week at Goa. He licensed a modified Zn-Br2 battery to Archean Chemicals. His applied research fetched him two awards: Amara Raja Award 2021 from ECSI and the India Energy Storage Alliance's (IESA) Researcher of the Year-2024 award. Besides, he has received awards from well-known academic societies in India for his fundamental work: CRSI Bronze Medal 2023 and SMC-BARC Bronze Medal 2023. He has performed numerous outreach activities on popularizing electrochemistry through the ECS-IITM Student Chapter.





# Prof. Kanishka Biswas

Prof. Kanishka Biswas New Chemistry Unit & International Centre for Materials Science, Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Jakkur P.O., Bangalore 560064 (India)

### Title:

### Phonon-Glass Electron-Crystal like High Performance Thermoelectrics

### Abstract:

Achieving glass-like ultra-low thermal conductivity in crystalline solids with high electrical conductivity, a crucial requirement for high-performance thermoelectrics, continues to be a formidable challenge. A careful balance between electrical and thermal transport is essential for optimizing the thermoelectric performance. Despite this inherent trade-off, the experimental realization of an ideal thermoelectric material with a phonon-glass electron-crystal (PGEC) nature has rarely been achieved. We demonstrated high thermoelectric performance with a near room-temperature figure of merit, zT ~1.5 and a maximum zT ~2.6 at 573 K by optimizing atomic disorder in Cd doped polycrystalline AgSbTe2.1, 2 Cadmium doping in AgSbTe2 enhances cationic ordering, which simultaneously improves electronic properties by tuning disorder-induced localization of electronic states and reduces lattice thermal conductivity via spontaneous formation of nanoscale (~2-4 nm) superstructures. Recently, we showed that isovalent Yb-doping induced enhanced atomic ordering decreases the overlap between the hole and phonon mean free paths and consequently leads to a PGEC-like transport in AgSbTe2. A twofold increase in electrical mobility is observed while keeping the position of the Fermi level nearly unchanged and corroborates the enhanced crystalline nature of the AgSbTe2 lattice upon Yb doping for electrical transport, which leads to zT ~2.4 at 573 K. These achievements highlight the potential of our approach in enhancing the thermoelectric performance of the material by tuning its inherent atomic disorder which can be applicable to other thermoelectric materials.4

#### Profile:

Kanishka Biswas obtained his M.S. and Ph.D. (Int. Ph.D) (2009) degree (Advisor- C.N.R Rao) from the Solid State & Structural Chemistry Unit, Indian Institute of Science (IISc) and did postdoctoral research (Advisor- Mercouri G. Kanatzidis) (2009-2012) in Northwestern University, USA. He is a full Professor in the JNCASR, Bangalore. He is pursuing research in solid state & inorganic chemistry, thermoelectric energy conversion, 2D materials, topological quantum materials and perovskite halides. He has published more than 215 research papers, 2 books, 8 book chapters and 5 patents. He has citation over 21,500 and h-index of 69 (google scholar). He has received the Shanti Swarup Bhatnagar Prize in Chemistry in 2021 which is the most coveted science & technology prize in India. He is an elected Fellow of Indian Academy Sciences (FASc). He is an invited Fellow of Royal Society of Chemistry (FRSC), London, UK. He is recipient of Materials Science Annual Prize by ICSC- Materials Research Society of India (MRSI) (2020); Swarna-Jayanti Fellowship from DST (2019); Bronze Medal from Chemical Research Society of India (CRSI) (2019); Medal from MRSI (2017); Wiley Young Scientist Award from IUMRS-ICAM, Japan (2017); Young Scientist Medal from Indian National Science Academy (INSA) (2016); MRS Singapore Young Researcher Merit Awards (2016) and Young Affiliate of The Word Academy of Sciences (TWAS) (2015). He is an Executive Editor of ACS Applied Energy Materials, ACS. He is serving as advisory board member of various international journals including Inorganic Chemistry (ACS), Journal of Solid State Chemistry (Elsevier), Journal of Materials Chemistry (ARSC), iScience (Cell Press), Materials Horizon (RSC), JACS Au (ACS) and many other journals.









Session 4 - GIA

**Germany:** Panel on Co-innovation with Industry Academia and Start-ups: "How to make the best out of the ecosystem in Bengaluru" 02:15 PM- 04:00 PM Lalit - 4



# Moderated By

# Prof. Shankar Kumar Selvaraja

Professor, IISc Bangalore, India



# Panelist Kartik Hajela

Co-Founder and COO Log 9



# Panelist

CEO and Founder, NoPo Nanotechnologies, India

**Gadhadar Reddy** 







# Panel on Co-innovation with Industry Academia and Start-ups: "How to make the best out of the ecosystem in Bengaluru"

### Title:

Panel on Co-innovation with Industry Academia and Start-ups: "How to make the best out of the ecosystem in Bengaluru"

### Abstract:

The Industrial R&D Funding accounts to almost 70% of the total R&D expenditure (aiming for 3.5% of GDP R&D investment by 2025) in Germany.

This sets even for SMEs, who are the hidden champions of German Economy apart and help them carve their niche with cutting edge Industrial research and innovative products.

Bengaluru being the R&D Hub is home to many German companies like Infineon, Bosch, Siemens Healthineers, Mercedes, Continental just to name a few.

The innovation hubs of all these companies in Bengaluru are the largest R&D centres of these global concerns outside their home soil.

Tune in to our session @ Bengaluru Nano 2024 with Mr Kartik Hajela, COO of Log9 Materials, who have a partnership with the most well-known Germany industry of Bangalore, Bosch.

And the founder of the shining start-ups NoPo Nanotechnologies Private Limited Mr. Gadhadhar Reddy

The session will be moderated by Dr. Shankar Kumar Selvaraja, Associate Professor at CENSE at IISc.







# Kartik Hajela

Kartik Hajela Co-Founder and COO Log 9



45

#### Profile:

Mr. Kartik Hajela is a Co-Founder and serves as Chief Operating Officer, Co-Chief Executive Officer and Board Member at Log 9 Materials. He started up ventures from the early days of graduation before his corporate stint with ITC where he worked as a part of the new businesses team. He is listed in the Forbes U30 Asia, 2019. His passion for technology, new ideas, great problem-solving skills and diverse experience of starting up in various sectors make him an ideal mentor and leader. He is a Chemical Engineer from IIT Roorkee, batch 2017.





# **Gadhadar Reddy**

Gadhadar Reddy CEO and Founder , NoPo Nanotechnologies, India



### Profile:

Gadhadar Reddy is the CEO and founder of NoPo Nanotechnologies, a company that produces high-quality carbon nanotubes for various applications, especially in the space sector. He has over 12 years of experience in research and development, entrepreneurship, and innovation in the field of nanomaterials. He is a Chevening Scholar from the University of Oxford, a 35 under 35 in Space awardee, an India-France Young Leader, and a Singularity University alumnus.

His vision is to enable humanity to be a space faring species, by using carbon nanotubes as a key material that is light, strong, radiation resistant, and perfect for space. He has developed the NoPo HiPCO<sup>®</sup> process, a proprietary technology that produces carbon nanotubes continuously and efficiently. He has also launched CENCE<sup>™</sup>, a carbon nanotube enhanced carbon composite that offers superior performance and safety for composites. He has won several international competitions and recognition for his work, and has delivered a TEDx talk on the carbon age. He is passionate about solving global challenges with exponential technologies and creating a positive impact on the world.







# **Consulate General of the Kingdom of Netherlands:** Nanotechnology Inspired Vaccine Delivery Systems



# Speaker

Dr. Anish Chakkumkal

Associate Scientific Director, Johnson & Johnson Innovative Medicine, Netherlands 02:15 PM- 04:00 PM Lalit - 4





# Speaker

Dr. Dinesh Mysore Siddu

Group Leader, Advance Development and Al, Philips, India





# Dr. Anish Chakkumkal

Dr. Anish Chakkumkal Associate Scientific Director, Johnson & Johnson Innovative Medicine, Netherlands



### Title: Nanotechnology Inspired Vaccine Delivery Systems

### Abstract:

The session explores innovative approaches leveraging nanotechnology to enhance vaccine efficacy and delivery. Nanoscale materials offer unique advantages such as targeted delivery, controlled release kinetics, and improved stability of vaccine formulations. This session, framed within a Dutch context, will discuss recent advancements in the design principles of nanoparticle-based vaccines, their interaction with the immune system, and strategies to overcome challenges in manufacturing and regulatory approval. Case studies illustrating successful applications of nanotechnology in vaccine development will be presented, highlighting how these platforms can address current global health challenges such as antimicrobial resistance. The discussion aims to provide valuable insights into the future prospects of nanotechnology in revolutionizing vaccine delivery, contributing to the advancement of public health initiatives worldwide.

### Profile:

Dr. Anish Chakkumkal is a distinguished expert in bioconjugation technology and CMC within the biotech industry. With over a decade of experience, he has significantly contributed to large molecule development, particularly in combating antimicrobial resistance. Dr. Chakkumkal has held pivotal roles including leading cross-functional teams, managing development projects at CROs and CDMOs, and spearheading vaccine formulation innovations. His expertise extends to collaborating with Janssen Innovation centers, managing translational research grants, and overseeing regulatory compliance for vaccine production. Notable achievements include numerous patent applications and publications in high-impact journals, alongside receiving prestigious awards like the Janssen global R&D award for technical excellence. Dr. Chakkumkala's leadership is underscored by his capability in building and leading international project teams and fostering collaborative networks across diverse cultural landscapes.







# Dr. Dinesh Mysore Siddu

Dr. Dinesh Mysore Siddu Group Leader, Advance Development Team (EI-CI-AV- AD), Philips Innovation Campus, Bangalore



### Title:

### Ultrasound Medical Applications using CMUTs

### Abstract:

Ongoing research at Philips Innovation focuses on optimizing the integration of various nanomaterials with capacitive micromachined ultrasonic transducers (CMUTs) to enhance performance and expand application range. Efforts are directed towards developing cost-effective and scalable manufacturing processes for these advanced transducers Graphene-based CMUTs offer higher sensitivity and broader bandwidth.

Medical Imaging: Enhanced ultrasound sensors with nanomaterials provide higher resolution images, enabling better diagnosis and monitoring of medical conditions.

Wearable Devices: Flexible and lightweight sensors with nanomaterials are being developed for continuous health monitoring, such as wearable ultrasound patches for cardiac monitoring.

This technology promises higher sensitivity and broader bandwidth, crucial for improving medical diagnostics and industrial inspection. The talk will explore the integration of nanotechnology with CMUTs, highlighting advancements in ultrasound sensor technology and its implications for medical diagnostics and other applications within the Dutch healthcare and industrial sectors

#### Profile:

A self-directed and effective professional with over 24 years of experience in developing AI technologies for the healthcare industry, specializing in machine learning for medical images, text data, and clinical studies. With a career centered at Philips Innovation, he has filed more than 25 patent applications and published approximately 60 technical research papers in machine learning, pattern recognition, and image processing. In addition to his role at Philips, he serves as an adjunct professor at IIIT-Allahabad, mentoring doctoral students at Maastricht and VTU universities, contributing significantly to AI advancements within the Dutch healthcare technology sector.



### DAY 02 2<sup>nd</sup> AUGUST 2024 FRIDAY



# **United States of America:**

Empowering Innovation: An Open Invitation for Nanotechnology Collaborations in Pennsylvania

02:15 PM- 04:00 PM Lalit - 4



# Speaker

Gerald G. Lopez, Ph.D.

Ph.D., Director of Operations & Business Development / Center Associate Director, University of Pennsylvania, Singh Center for Nanotechnology, USA



### Speaker

Sushama Kanetkar

Representative Director for India, Pennsylvania Trade



### Speaker

Supriya Kanetkar

Representative Director for India, Pennsylvania Trade & Investment Office - India







# Gerald G. Lopez, Ph.D.

Gerald G. Lopez, Ph.D. Director of Operations and Business Development / Center Associate Director, University of Pennsylvania, Singh Center for Nanotechnology, USA

### Title:

Empowering Innovation: An Open Invitation for Nanotechnology Collaborations in Pennsylvania

### Abstract:

Pennsylvania invites researchers and innovators worldwide to engage in its nano-enabled ecosystem through its state-ofthe-art nanotechnology infrastructures from major cleanrooms to advanced characterization and metrology spaces. Dr. Lopez will highlight Pennsylvania's major institutions that are open access to the public and how they play (or seek to play) a role in US initiatives. On behalf of the University of Pennsylvania, he will talk about the Singh Center for Nanotechnology; how it serves as a strategic node of the National Science Foundation (NSF) National Nanotechnology Coordinated Infrastructure (NNCI) as the Mid-Atlantic Nanotechnology Hub (MANTH); and the steps it is taking with the Community College of Philadelphia to shape the future of semiconductor workforce development and beyond. Learn how to engage Pennsylvania and the growth opportunities it has to offer for collaborative research and innovation.

### Profile:

Dr. Gerald Lopez has 20+ years of experience spanning nanofabrication, operations, product development, and sales. He joined the University of Pennsylvania Singh Center for Nanotechnology in May 2015 and serves as the Director of Operations and Business Development and the Center's Associate Director. His role facilitates engagement and collaboration with the Center while managing day-to-day operations. Before Penn, he was a software developer and field applications engineer in the telecommunication and semiconductor industries, respectively. As an active member in electron beam lithography, Dr. Lopez co-founded the Meeting for Advanced Electron Beam Lithography (MAEBL–maebl.org) in 2017 and serves on the Steering Committee for the International Conference on Electron, Ion and Photon Beam Technology and Nanofabrication (EIPBN–eipbn. org). His Ph.D. and M.S. in Electrical & Computer Engineering are from the Georgia Institute of Technology with his B.S. in Computer Engineering from the University of Maryland, Baltimore County







### Sushama Kanetkar

Sushama Kanetkar, Representative Director for India, Pennsylvania Trade, India



#### Profile:

Sushama Kanetkar is Pennsylvania's Authorized Trade and Investment Representative for India since 2001. As a part of Commonwealth's trade promotion program, implemented through Office of International Business Development, her office works with Pennsylvania based companies to expand their reach, capacity and global competitiveness. Sushama has multi-faceted experience in the international trade and investment arena. She has worked with numerous Pennsylvania companies from a broad range of industries with variousstages of internationalization.







# Supriya Kanetkar

Supriya Kanetkar Representative Director for India, Pennsylvania Trade & Investment Office -India



### Profile:

Supriya Kanetkar is Pennsylvania's Authorized Trade and Investment Representative in India since 2001. Commonwealth of Pennsylvania's Trade and Investment program is implemented through the Office of International Business Development at PA Dept. of Community and Economic Development. As a part of OIBD's investment attraction program, Supriya works with Indian companies to help them set up facilities in Pennsylvania. During past several years Supriya has assisted numerous Indian companies to set up their operations in Pennsylvania.









# Nano Excellence Awards & Cultural Programme followed by Networking Dinner

06:30 PM - 08:30 PM Kalinga -1

### **Dignitaries:**

### Prof. C.N.R. Rao, FRS

Honorary Chairman, VGNT, Govt. of Karnataka; National Research Professor & Linus Pauling Research Professor, Honorary President, JNCASR, Bengaluru

### Shri N. S. Boseraju

Hon'ble Minister of Minor Irrigation and Science & Technology, Govt. of Karnataka

### Dr. Ekroop Caur, IAS

Secretary to Government Dept. of Electronics, Information Technology, Biotechnology and Science & Technology Govt. of Karnataka

### Pavan Kumar Malapati, IAS

Director, Dept. of Science & Technology, Govt. of Karnataka Managing Director, Karnataka Science and Technology Promotion Society (KSTePS), Bengaluru

### Prof. Navakanta Bhat

Chair, Vision Group on Nanotechnology, Govt. of Karnataka, Dean, Division of Interdisciplinary Sciences, Professor, CeNSE, IISc, Bangalore

### Prof. P.S. Anil Kumar

Conference Comittee Chair, CEC - Bengaluru INDIA NANO 2024 Dean, Administration & Finance, Professor, Dept. of Physics, IISc, Bangalore

### **Cultural Program:**

Khan Brothers Rafique khan & Shafique khan belongs to Dharwad Gharana the Linage of Sitar Ratna Rahimat khan, The duo have been regularly performing on most of the prestigious music festivals in different parts of the country and abroad and both are recipient of several prestigious awards from welknown music organisations and from government of India The performance on the evening on august 2nd will be sitar Duet and Hindustani classical and semi classical tunes and accompanied on Tabla by pt. Rajendra Nakod a most versatile and well known tabla virtuoso.

Sitar duet by: Usd Rafique Khan and Usd Shafique Khan Tabla accompaniment by: Pt Rajendra Nakod

Awards Presentation: Nano Excellence Awards Bengaluru INDIA NANO Innovation Award 2024 Karnataka DST Nanoscience Fellowship Awards Presentation of Exhibitor Awards







# Plenary Lecture III Can Water Microdroplets Make Soil ?



# 10:00 AM - 10:45 AM Grand Ballroom



# Session Chair

Prof. S. Sampath
Professor and Chair,

Dept. of Inroganic and Physical Chemistry , IISc Bangalore, India



# Speaker

Dr. T. Pradeep

Professor, IIT Madras, India







# **Prof. S. Sampath**

Prof. S. Sampath Professor and Chair Dept. of Inroganic and Physical Chemistry, IISc Bangalore, India



### Profile:

Srinivasan Sampath is a professor at the department of chemistry at the Indian Institute of Science where he is involved in researches on the interfacial properties of materials and surfaces. He is has done extensive work on the development of supercapacitors and nano bimetallics as well as on the investigation of their applications. He received the Bronze Medal of the Chemical Research Society of India in 2005. The Council of Scientific and Industrial Research awarded him the Shanti Swarup Bhatnagar Prize, one of the highest Indian science awards, in 2006 He was elected as a fellow by the Indian Academy of Sciences in 2009 and he became an elected fellow of the Indian National Science Academy in 2015.







### Dr. T. Pradeep

Dr. Thalappil Pradeep Indian Institute of Technology Madras, Chennai, 600 036, India

### Title: Can Water Microdroplets Make Soil?

### Abstract:

We demonstrate that common mineral particles spontaneously break down into nanoparticles within milliseconds when encapsulated in charged water microdroplets. In our experiments, micrometer-sized minerals such as quartz and ruby were transformed into nanoparticles ranging from 5 to 10 nanometers using electrospray-generated aqueous microdroplets. These droplets were then deposited on a substrate, facilitating the characterization of the nanoparticles. Simulations suggest that quartz experiences proton-induced slip that leads to particle scission, especially when reduced in size and exposed to an electric field. Additionally, the formation of silicate fragments was confirmed via mass spectrometry. This rapid weathering process could significantly contribute to soil formation, considering the widespread presence of charged aerosols in the atmosphere.

#### Representative references:

Transformation of nanodiamonds to onion-like carbons by ambient electrospray deposition, Deeksha Satyabola, Tripti Ahuja, Sandeep Bose, Biswajit Mondal, Pillalamarri Srikrishnarka, Murugesan Kannan, B. Krishnamurthy Spoorthi, and Thalappil Pradeep, J. Phys. Chem. C, 125 (2021) 10998–11006 (DOI: 10.1021/acs.jpcc.1c00166).

Ambient microdroplet annealing of nanoparticles, Angshuman Ray Chowdhuri, B. K. Spoorthi, Biswajit Mondal, Paulami Bose, Sandeep Bose, and Thalappil Pradeep, Chem. Sci., 12 (2021) 6370–6377 (DOI: 10.1039/d1sc00112d).

Spontaneous weathering of natural minerals in charged water microdroplets makes nanomaterials, B. K. Spoorthi, Koyendrila Debnath, Pallab Basuri, Ankit Nagar, Umesh V. Waghmare, and Thalappil Pradeep, Science, 384 (2024) 1012-1017 (DOI: 10.1126/science.adl3364)

### Profile:

Thalappil Pradeep is an Institute Professor at the Indian Institute of Technology Madras (IITM), Chennai, India. He is the Deepak Parekh Institute Chair Professor and is also a Professor of Chemistry. He studied at the University of Calicut, Indian Institute of Science (IISc), UC Berkeley, and Purdue. His research interests are in molecular and nanoscale materials. He is an author of over 550 scientific papers in journals and is an inventor of over 100 issued patents. He is involved in the development of affordable technologies for drinking water purification and some of them have been commercialized. His pesticide removal technology has reached about 10 million people. His arsenic removal technology, approved for national implementation, is delivering arsenic free water to about 1.3 million people every day. Along with his associates, he has incubated seven companies and three of them have production units. He is the recipient of several awards including the Shanti Swaroop Bhatnagar Prize, BM Birla Science Prize, National Award for Nanoscience and Nanotechnology, India Nanotech Innovation Award, JC Bose National Fellowship and National Water Award. He has won The World Academy of Sciences (TWAS) prize in Chemistry for the year 2018. Nation conferred the civilian award, Padma Shri on him in 2020. He is also a recipient of the Nikkei Asia Prize, Prince Sultan Bin Abdulaziz International Prize for Water, VinFuture Prize and ENI award. Recently, he has won the International Excellence Award of Karlsruhe Institute of Technology, Germany and the Fellowship of Schroff Foundation. He is a Fellow of all the science and engineering academies of India, TWAS, American Association for the Advancement of Science, African Academy of Sciences, US National Academy of Engineering and Academia Europaea. He is the author of the introductory textbook, Nano: The Essentials (McGraw-Hill) and is an author of the monograph, Nanofluids (Wiley-Interscience) and an advanced textbook, A Textbook of Nanoscience and Nanotechnology (McGraw-Hill). He is on the editorial boards of journals such as ACS Nano, Chemistry of Materials, Analytical Chemistry, Chemical Communications, Nanoscale, JPC Letters, etc., and was an associate editor of ACS Sustainable Chemistry & Engineering for ten years. He is now an Associate Editor of ACS Sustainable Resource Management. He has authored popular science books in English and Malayalam and is a recipient of Kerala Sahitya Akademi Award for knowledge of literature. He has received the Lifetime Achievement Research Award of IITM and Distinguished Alumnus Award of IISc. As part of philanthropy, he supports a school in his village where 500 students are on rolls.







# Plenary Lecture IV Al in Semiconductors



# 10:45 AM - 11:30 AM Grand Ballroom



# Session Chair

Prof. S. Sampath

Professor and Chair, Dept. of Inroganic and Physical Chemistry , IISc Bangalore, India



### Speaker

# **Balajee Sowrirajan**

Managing Director, Samsung Semiconductor India Research, India







# **Balajee Sowrirajan**

Balajee Sowrirajan Managing Director,Samsung Semiconductor India Research



### Title: Al in Semiconductors

### Abstract:

Over the past decade, Artificial Intelligence (AI) and Machine Learning (ML) has moved from theory to practice, becoming integral to our lives. One of the most exciting and rapidly evolving areas is Generative AI. It has the potential to revolutionize our interaction with technology, paving the way for intelligent systems to augment human potential in unprecedented ways. Generative AI is transforming each and every industry as well as impacting our lifestyle. It has now moved beyond sectors like engineering and making its impact on healthcare, finance, cybersecurity, customer service and beyond. As Gen AI continues to evolve, the semiconductor industry stands at the forefront of this transformation, driving unprecedented advancements in chip technology. The increasing demands are reshaping the semiconductor industry, presenting both significant challenges and opportunities. We have witnessed the impact on Compute, Data Storage, Memory and Power. Addressing the computational, memory, storage and power demands of Gen AI, would involve leveraging cutting-edge semiconductor technologies.

The synergy between Gen AI and semiconductor innovation promises to be a cornerstone of technological advancement in the coming years. After all, Gen AI is not just competing against other competitive models but also against the human brain, the final frontier of exploration and discovery

### Profile:

Balajee Sowrirajan is the Corporate Executive Vice President and MD, of Samsung Semiconductor India Research (SSIR) - the hub of semiconductor innovation in India. At SSIR, Balajee oversees the India operations of the Memory, System LSI, and Foundry business unit and drives both strategy and culture for innovation and inclusion. Balajee has played a pivotal role in paving the way for SSIR as a technology leader in the semiconductor industry in India, making it the largest Global R&D Centre for Samsung Semiconductor. He has brought in excellence in designs while guiding the Sensor & LSI team towards the development of key components for Mobile and Automotive Electronics businesses. Similarly, the memory business continues to maintain its top market share for close to three decades now, while the Foundry business has been able to retain the position as the second largest foundry supplier in the world under his leadership. With a Computer Science degree from BITS Pilani, Balajee has a corporate experience of over three decades. He started his career as a software engineer, before making the shift to VLSI (Very-large-scale integration) Design. Prior to SSIR, Balajee was associated with Texas Instruments, where he was elected as a Distinguished Member of the Technical Staff. In his free time, Balajee loves to spend time with his family and has a passion for photography.





# Session 5 - Nano in Healthcare



# 11:45 AM - 1:15 PM Lalit - 1 & 2



# Session Chair

Dr. Praveen Kumar Vemula

Faculty, Institute for Stem Cell Biology and Regenerative Medicine (inStem), India

# 3D Liver Platforms For In-Situ Disease Staging



# Speaker

**Prof. Neetu Singh** Professor & Head, Center for Biomedical Engineering, Indian Institute of Technology Delhi, India

# Size-tailored Gold Nanoparticles: Novel Electroactuators to Guide Stem Cell Differentiation and as Bacteriotoxic Agents



### Speaker

Prof. Bikramjit Basu

Professor, IISc Bangalore, India

# **Smart Nanointervention for Therapy**



.....

# Speaker

Prof. K. Uma Maheswari

Professor, Sastra University, India







# **Prof. Neetu Singh**

Prof. Neetu Singh Center for Biomedical Engineering, Indian Institute of Technology, Hauz Khas, New Delhi 110016

### Title: 3D Liver Platforms For In-Situ Disease Staging

### Abstract:

Among myriad health issues of the global populace today, the problems associated with better means of diagnosis, and repair and regeneration of organs, bones, cartilages, etc. remain a big challenge. The prospect of using nanoscience and nanotechnology as a tool to answer questions arising out of these healthcare issues are exciting and form the basis of this talk. More specifically, a nanotechnological 3D cell culture platform will be discussed. Non-alcoholic fatty liver disease (NAFLD) is a heterogeneous condition that encompasses a wide range of liver diseases that progresses from simple hepatic steatosis to the life-threatening stage of cirrhosis. However, due to the heterogeneity of this disease, comprehensive analysis of the several physicochemical and biological factors that drive its progression is necessary. Specifically, the changes in matrix elasticity due to collagen deposition as well as hepatic cell lipid accumulation as disease progresses to fibrotic stage. These changes in turn lead to variation in MMP-9 expression and pH levels. We have developed 3D in vitro liver disease models that enabled real-time in situ monitoring of these factors, thereby, enabling us to monitor liver disease-stages and their progression to late stages of NAFLD

### Profile:

Neetu Singh obtained her Bachelors and Masters degrees from University of Mumbai and her doctoral degree in chemistry from Georgia Institute of Technology, Atlanta, USA. She obtained her postdoctoral training at the Harvard-MIT Division of Health Sciences and Technology, USA. Prof. Singh returned to India and joined IIT Delhi as an Assistant Professor in the Center for Biomedical Engineering in 2014.

In her current program at IITD, she is establishing a research program that explores systematic probing into nanomaterials biological activity and formulates "design rules" for developing nanosystem for specific bio-medical & amp; healthcare applications. Her group at IIT Delhi is integrating concepts and skills from chemistry, materials science, and biology to design nano-structured materials with enhanced functionalities for applications in biomedical implants, disease diagnostics, tissue engineering and regenerative medicine.

Her scientific contribution has been recognized by several awards and honors. She is the recipient of "Innovative Young Biotechnologist award 2013" by Department of Biotechnology (DBT), India. In 2019, she received the Veena Arora young researcher award by IIT Delhi, which recognizes best research contributions at IIT Delhi by faculty below 40 years. She is the receipt of NASI-SCOPUS young Scientist award for "Women-in Science"-2019; DBT's Janaki Ammal Young scientist -2021 and Science and Engineering Research Board (SERB)-India, POWER Fellow 2021. She is also a mentor for an IITD start-up, "Kriya-Labs", that is bringing valorization to agro waste by technological solutions.

She is also an editorial advisory board member of the journal Bioconjugate Chemistry (a pioneering publication of American Chemical Society) and a new Springer journal - In Vitro Models.







### Prof. Bikramjit Basu

Prof. Bikramjit Basu Indian Institute of Science, Bangalore.



### Title:

Size-Tailored Gold Nanoparticles: Novel Electroactuators to Guide Stem Cell Differentiation and As Bacteriotoxic Agents

### Abstract:

The versatile synthesis of gold nanoparticles (GNPs) with a precise control over their size and surface chemistry is exploited in biomedical applications. This talk will demonstrate how tailoring the size and surface chemistry of GNPs can be exploited to direct stem cell differentiation and bacteriotoxic effects, implicated in prosthetic infection. The first half of the presentation is centered on utilizing citrate-capped GNPs with a median size of 20 nm as intracellular actuators coupled with alternating layer by layer assembly of electroconducting polyaniline and citrate-capped GNPs as extracellular actuators, in response to external electric field (EF) stimulation. UltrasmallAuNP with core diameters of 0.8 nm and 1.4 nm and a triphenylphosphine-monosulfonate (TPPMS) shell, (Au0.8MS and Au1.4MS) both have MIC and MBC of 25  $\mu$ M [Au]. Importantly, a 2-fold MIC dosage of Au0.8MS and Au1.4MS each cause around 80-90% reduction in the viability of Staphylococci enveloped in biofilms.

### Profile:

Dr. Bikramjit Basu is a Professor at the Indian Institute of Science, Bangalore, India, since 2011 and earlier served on the faculty of the Indian Institute of Technology Kanpur (2001- 2011). He is elected as a Fellow of all the National Academies of Engineering, Science and Medicine, including the Indian National Science Academy (2021), Indian Academy of Sciences (2020), American Ceramic Society (2019), National Academy of Medical Sciences (2017), Indian National Academy of Engineering (2015), and National Academy of Sciences, India (2013). Internationally, he is an elected fellow of International Union of Societies for Biomaterials Science and Engineering (2020), International Academy of Medical and Biological Engineering (2017), American Institute of Medical and Biological Engineering (2015), American Ceramic Society (2019), European Ceramic Society (2022) and World Academy of Ceramics (2024). He is a recipient of Shanti Swarup Bhatnagar Prize (2013) and Humboldt Research Award from the Alexander von Humboldt foundation (2022).







# Prof. Uma Maheswari Krishnan, Ph.D.

Prof. Uma Maheswari Krishnan, Ph.D. Centre for Nanotechnology & Advanced Biomaterials, School of Arts, Sciences, Humanities, & Education, SASTRA Deemed University, Thanjavur

### Title: Smart Nanointerventions For Therapy

### Abstract:

The advent of nanotechnology has transformed healthcare with the development of nanodimensional carriers that improve solubility and bioavailability of therapeutic agents apart from improving their chemical and colloidal stability. Introduction of selective surface functionalities to these nanoparticles can introduce desirable properties like improved circulation time, site-specific delivery, multi-modal therapy and 'on-demand' triggered release of the therapeutic agent. Multi-functional 'see and kill' systems that enable visualization of the diseased site and release the drug have also garnered attention in recent years. These advances enable reduction of undesirable side effects and frequency of administration apart from overcoming challenges faced by conventional therapeutics. This talk will highlight these facets of smart nanocarriers using examples of nanosystems developed in our laboratory for treatment of cerebral stroke and non-small cell lung carcinoma.

#### Profile:

Dr. Uma Maheswari Krishnan is a Ph.D. in Applied Chemistry from PSG College of Technology, Coimbatore. She had her postdoctoral training from the University of Texas Southwestern Medical Centre at Dallas, USA. She joined SASTRA in 2003 and has been associated with the Centre for Nanotechnology & Advanced Biomaterials (CeNTAB) since its inception. Development of stimuli-responsive intelligent therapeutics and point-of-care devices for diagnosis of clinically relevant markers and understanding molecular mechanisms of therapeutic formulations is a major focus of her research lab. Her group uses in silico, in vitro models, 3D spheroids and in vivo studies to establish the efficacy of these nanomaterials. She had successfully guided 14 Ph.D. candidates. She has over 265 publications in this area with an h-index of 56. She was an expert committee member on 'Nanobiotechnology' in the Department of Biotechnology, and is the Chairman of the Life Sciences sub-committee of the SERB-SURE scheme.







# Session 6 - Nano in Climate



11:45 AM - 1:15 PM Lalit - 3 & 4



# Session Chair

**Dr. Christian George** 

Directeur Adjoint, Institut de recherches sur la catalyse et l'environnement (IRCELYON), France

### Hybrid Metal Phosphonates As Electrocatalysts Towards Water Oxidation & Hydrogen Generation By Alkaline Micro Electrolyser



### Speaker

# Prof. Suddhasatwa Basu

FIPI Chair Professor IIT Delhi and former Director IMMT, IIT Delhi, India

# Catalysis for Sustainable Fuels, Chemicals & Bioproducts in a Net-Zero Economy



# Speaker

Professor, IIT Madras, India

**Prof. Vinu R** 

# Nano's Big Contribution To Sustainable Agriculture and Climate Change Reversal



# Speaker Dr. Pushplata Singh

Senior Fellow and Associate Director, The Energy and Resources Institute (TERI), India







### Prof. Suddhasatwa Basu

Prof. Suddhasatwa Basu Department of Chemical Engineering, Indian Institute of Technology Delhi, New Delhi 110016



### Title:

Hybrid Metal Phosphonates as Electrocatalysts towards Water Oxidation and Hydrogen Generation by Alkaline Micro Electrolyser

### Abstract:

Developing a low-cost effective, readily available, highly efficient electrocatalyst is essential to produce clean and sustainable energy. To regenerate the fuel cell energy resources and create an environmentally benign atmosphere, the conversion of water to hydrogen and oxygen via electrochemical hydrogen evolution reaction (HER) and oxygen evolution reaction (OER) are the key reactions and gaining huge interest over the years. One of the ways net zero goal can be achieved is by using hydrogen energy and fuel cell technologies. But these technologies should be economically viable and competitive to today's fossil fuel-based energy sources. Thus, the design and synthesis of the highly efficient and affordable electrocatalysts are crucial to address this matter by replacing the state-of-the-art PGM (Pt group of metals) catalyst. Among the porous materials, microporous metal phosphonates have gained immense attention because of hybrid material consisting of metal ions bonded to the organophosphonic acid ligands [1]. The ligand-bearing phosphonate groups are acceptable to create the coordination environment with several transition metals. Due to their strong affinity towards the metal centers, the phosphate and phosphonate moieties act as ligand sites/linkers to form a wide spectrum of nanoarchitectured materials [2]. Metal phosphonates are organic-inorganic hybrid porous nanoarchitectures, where organophosphonate ligands are used as a phosphorous source [2-4]. The bi-functionalized metal phosphonate based electrocatalyst can be used for overall water splitting in an alkaline medium due to its higher surface area with microporous channel and the synergistic effect of the highly active metal oxyhydroxide (MOOH) component on the pore wall [1-6]. Following this, a stateof-the-art water electrolyzer is condensed to a single chip by exploiting the benefits of microfluidics. A 3d-printing technique is used for the fabrication of the microchannels and non-noble microelectrodes. The microfluidic electrolyzer (µE) is membrane-less and demonstrated flexibility in operation concerning the choice of pH [7-10]. The membrane-less µE is operated in both acidic and alkaline pH. Improvement in the kinetics of water splitting is attained by using an asymmetric electrolyte configuration. The water splitting enhancement is attributed to the excess energy from electrochemical neutralization arising from the pH difference [10]. However, in either acidic or alkaline electrolyte, it is possible to use µE with micro fuel cell in tandem [8]. A fluid dynamic approach by optimizing the electrolyte flow rate was implemented to achieve the separation of H2 and O2 in the membrane-less configuration. The crossover of gas products across the microelectrodes is negligible, as confirmed by gas chromatography [11-12]. The membrane-less µE exhibited potential as a disruptive future technology for low-cost sustainable generation of H2 and O2. Keywords: water splitting, electrochemical reactor, micro electrolyser, hybrid materials, phosphonates.

#### Profile:

Prof. Suddhasatwa Basu completed Ph.D./MS in Chemical Engineering from Indian Institute of Science, Bangalore, and B.Tech. (Chem. Eng) from Calcutta University. He holds the Federation of Indian Petroleum Industry Chair Professor on Clean Energy at IIT Delhi. Earlier, He was the Director of CSIR-Institute of Minerals & Materials Technology, Bhubaneswar and the Director of Central Institute Mining & Fuel Research, Dhanbad. He has vast work experience on development of materials for energy conversion and storage devices, e.g., Hydrogen & Fuel Cells Technologies and Li-/Na- Ion Battery, Electrofuels, Wastes to Wealth technologies for Circular Economy. He has published more than 270 articles in high impact journals with H-index 52, 10 granted patents and 6 filed, and 2 technologies transferred to various industries. He is a Fellow of National Academy of Science of India, Indian National Academy of Engineering, Royal Society of Chemistry UK and received Herdillia Award, Dr A. V. Rama Rao Foundation's Research Award, SMC Gold Medal, MSRI Medal. He is Editor/Assoc Editor/Ed Board member of several international journals published by Willey, Springer-Nature, Oxford University Press and Am Chemical Soc.





### **Prof. Vinu R**

Prof. R. Vinu Professor of Chemical Engineering, IIT Madras, Chennai 600036

### Title: Catalysis for Sustainable Fuels, Chemicals & Bioproducts in a Net-Zero Economy

### Abstract:

The extensive and exhaustive use of fossil fuels to meet our daily energy, fuel and material needs contributes to climate change and poses a threat to sustainability. The production of biofuels such as bioethanol, biodiesel and sustainable aviation fuels, and bio- based platform molecules like phenols, levulinic acid, furan dicarboxylic acid,  $\gamma$ - valerolactone, etc. is a significant step to close the CO 2 cycle and greenhouse gas emissions, while attempting to keep the global average temperature rise within 1.5 o C. Heterogeneous catalysis plays a unique and critical role in achieving the right conversion and high selectivities to various important chemicals starting from lignocellulosic biomass agri residues, lignin and waste plastics.

This presentation will focus on deriving value-added C7-C9 phenols from lignin, which is a major by-product from paper and pulp industries and second-generation ethanol biorefineries. The use of bimetallic and bifunctional catalysts with noble metals (Pd, Pt, Ru) and transition metal oxides (of Al, W, Zr)-loaded on pyrolysis biochars and activated carbons for lignin hydrogenolysis and reductive catalytic fractionation of biomass will be discussed. The role of catalyst properties in tuning the product selectivity will be addressed, and the importance of combining experiments with quantum chemical density functional theory modelling of surface catalytic reactions to decipher the reaction mechanism will be emphasized.

#### Profile:

Dr. R. Vinu is currently a Professor in the Chemical Engineering department at IIT Madras, Chennai. He obtained a Ph.D. in Chemical Engineering from Indian Institute of Science, Bangalore, in 2010. Prior to joining IIT Madras in 2012, he was a postdoctoral researcher in Northwestern University, USA. At IIT Madras, he leads an active research group that focuses on thermochemical conversion of diverse feedstocks such as biomass, waste plastics, algae, municipal solid wastes and low- quality coals to liquid fuels and chemicals. He is also the Director & Co-founder of the deep tech start-up company, X2Fuels & amp; Energy Pvt. Ltd., incubated at IIT Madras Research Park, that focuses on the conversion of industrial and municipal wastes to fuels through hydrothermal liquefaction process. He has published 140+ research articles in reputed journals, 10+ book chapters, an edited book and 5 patents. He is the recipient of the Young Engineer Award of the IEI, Young Scientist/Associate Awards of the INSA, NASI, IAS, ICT Mumbai, and Early Career Recognition Awards for Teaching and Research from IIT Madras. He serves as one of the Editors of Journal of Analytical and Applied Pyrolysis, and in the Editorial boards of Biomass & Bioenergy, and Frontiers in Fuels.





66





# **Dr. Pushplata Singh**

Dr. Pushplata Singh Senior Fellow and Associate Director, The Energy and Resources Institute (TERI), India

#### Title: Nano's Big Contribution to Sustainable Agriculture and Climate Change Reversal

### Abstract:

Agriculture is a significant economic sector that contributes both directly and indirectly towards greenhouse gas emission and climate change. Globally, agriculture sector contributes to 80% of anthropogenic N20 emissions and 40% of CH4 emissions, mainly arising from increased application of nitrogen fertilizer, increased land use for rice cultivation, and burning of crop residues. More competent and practical systems for the management of carbon and nitrogen influx is needed for sustainable agriculture and environment. Nutrient use efficiency (NUE) of conventional N, P, K fertilizers and other micronutrient is very poor and is further reducing due to excessive usage. Nano-fertilizers with >90% NUE, in few grams, can be used to replace several kilograms of conventional nitrogen, phosphatic and other macro and micronutrients. Nano Urea, nano DAP and nano Phosphorous developed by TERI were tested for field efficacy at 79 locations across multiple agro-climatic zones in India and it was found that 25-50% of conventional nitrogen and phosphatic fertilizer can be substituted by nano fertilizers, while simultaneously gaining on crop yield and quality. Comparative real-time monitoring of CO2 and N20 emissions from maize plots treated with nano-fertilizer and conventional nitrogen fertilizer demonstrated potential of nano-fertilizers to reduce GHG emission. LCA of conventional and nano-fertilizers will further shed light on the ability of nano-fertilizers to contribute towards climate change reversal.

#### Profile:

Dr Pushplata Singh is working as Senior Fellow and Associate Director of the Nano Research and Commercial Production area of Sustainable Agriculture Division. With 23 years of experience in the Biotechnology sector, Dr Pushplata's expertise spans across areas such as Genome wide association studies, Genome analysis, improvement of biofertilizers, nutrient use efficiency, nano-fertilizers, nano-pesticides, application of nanomaterials for pharmaceuticals and other environmental applications. At TERI, she is involved in Nano Research and Commercial production (NCP); mitigation of greenhouse gas emission (GHG) from agriculture; improvement of soil organic carbon (SOC), improvement of biofertilizers, development of bio-control formulations, technologies for climate resilient agriculture and development of policies for Agriculture.

Dr Pushplata is a member of advisory committees including, BIS Metallurgical Engineering Department- Nanotechnologies Sectional Committee MTD 33 (mtd33), BioNanoNet (BNN) and International Initiative for Safe and Sustainable Nanotechnology (INISS). She holds a Ph.D. in Interdisciplinary Sciences with a major in Genetics from the University of Delhi, India.









# Session 7 - Nano in Energy

11:45 AM - 1:15 PM Grand Ballroom



# Session Chair

Shri Puneet Mehrotra

Director, Nano Science and Technology Consortium, India



# Speaker

Dr. Debashish Bhattacharjee

Vice President, Technology & R&D, Tata Steel Limited, India

# Designing Greener Energy Conversion System for A Sustainable Future



# Dr. Tharamani C N

Professor, IIT Ropar, India

# **Batteries in Current Time**



# Prof. Sagar Mitra

Professor, IIT Bombay, India







### Shri Puneet Mehrotra

Shri Puneet Mehrotra Director, Nano Science and Technology Consortium, India



### Profile:

Shri Puneet Mehrotra is a person who loves to be innovative and create new products and services that are useful and valuable to others. Throughout his life, he has strived, and continues to strive, to keep himself creative. He loves to collaborate and have associations with like-minded individuals and corporations who share similar visions and goals. For Shri Puneet Mehrotra, money is the outcome of one's work, and he believes that one should always cherish the work they intend to undertake. Success for him is a task well done, and he likes to live each day with his success goal and mantra: "Never accept defeat." He looks forward to associating with experienced and enterprising professionals to take his ventures to new horizons.





### Dr. Debashish Bhattacharjee

Dr. Debashish Bhattacharjee Vice President, Technology and R&D Tata Steel Limited



#### Profile:

Dr Debashish Bhattacharjee is B.E. in Metallurgical Engineering from Jadavpur University (1986); M. Tech in Metallurgy from IIT Kanpur (1989) and PhD in Materials Science & Metallurgy fromUniversity of Cambridge, UK (1993). He carried out two postdoctoral research engagements -one at the Rolls Royce University Technology Centre at Cambridge between 1993 and 1996 and the second at the University of Birmingham between 2000 and 2002. Joined Tata Steel R&D in 1996 and headed the function as Chief Research & Development and Scientific Services till 2009. In 2009, seconded to Tata Steel Europe as Group Director Research, Development & Technology for Tata Steel Group. Dr Bhattacharjee is an expert in development of materials and associated technologies. Holds over 50 international peer reviewed journal publications and over 20 patents. As Vice President Technology and R&D in Tata Steel, Dr Bhattacharjee is leading the development of sustainable technologies and materials. He sets direction and mentors teams to develop new processes, products and business in steels, polymer matrix composites, advanced ceramics and graphene. His personal contribution to technology development spans areas including mineral beneficiation, value from waste of mines and industrial plants, generation, storage and utilization of green hydrogen, carbon dioxide capture and utilization, application of artificial neural networks in process control and novel processes for coatings. He is enabling teams to collaborate across industry, academia and start-ups to scale up technologies and businesses. Under his guidance, pilot plants have been set up in carbon capture and usage, hydrogen has been used in large scale in a running blast furnace, valuable soil conditioner has been developed and being marketed from difficult-to-reuse steelmaking slag. Iron powder, a waste from the pickling process, is being developed into permanent magnets. High value carbon for battery anodes has been developed from coal tar pitch - a by-product of the cokemaking process. Under his mentorship, teams are working on upgrading low-grade ores and waste materials to obtain high value electrical vehicle battery cathode materials. He has developed businesses from scratch in advanced composites, advanced ceramics, and graphene In 4 years. Dr Bhattacharjee initiated and scaled up businesses in these materials from zero to around INR 500 crores annual revenue. Dr Bhattacharjee is Fellow of the Indian National Academy of Engineering and of the Indian Institute of Metals. He has been a Visiting Professor at the Imperial College London; at the University of Warwick UK and, at the University of Science and Technology Beijing, China. Dr Debashish Bhattacharjee is Chairman, Research Council of CSIR-IMMT, Bhubaneswar; Chairman CII ER Subcommittee and Taskforce on Start-ups, leading CII Advanced Materials Subcommittee; Chairman of Expert Committee on Industry Academia Connect Task Force (Bengal Chamber of Commerce); Member of Technology Advisory Group for Empowered Technology Group, Gol; Member of NABL Board. He is Director of Ceramat Private Ltd; Tata Steel Advanced Materials Ltd; Tata Steel TABB Limited. Dr Debashish Bhattacharjee is a recipient of National Metallurgist Award 2022.







### Dr. Tharamani C N

Dr. Tharamani C N Professor, IIT Ropar, India



#### Title: Nano's Designing Greener Energy Conversion System for a Sustainable Future

### Abstract:

Highly efficient and cost-effective hydrogen production (H2) promises to play a vital role in green energy production due to its high energy density, low-pollution, and renewable nature. The electrocatalytic decomposition of H2O to H2 and O2 considered to be the most sustainable method for pure H2 production, unfortunately, it stumbles due to potentially uphill and energy-consuming sluggish anodic oxygen evolution reaction (OER).1 Contrary to H2O isostructural hydrogen sulfide (H2S) possesses lower bond dissociation energy. Therefore, anodic sulfide oxidation reaction (SOR) will be more energy-efficient than OER. Presently, the Claus process is the most popular industrial technology for removing H2S, but energy wasted in the form of steam. Therefore, electrochemical conversion of environment pollutant H2S into H2 and S provide a way to remove pollutant H2S and also emerges as new energy source.2 However, the industrialization of such energy-efficient technology never meets the expectation in reality in the absence of cost-effective and robust electrocatalyst. Herein we have designed CoFeS2 based catalyst that exhibited lower onset potential of 0.23 V vs. RHE towards SOR, which is 1.25 V lower than OER. Notably, only a 1.2 V commercial battery easily derives H2S electrolysis, which is impossible for H2O splitting demonstrating the tremendous future prospective of H2S for cheaper hydrogen production for a sustainable economy.

Scheme 1. Schematic representation of H2S electrolysis into cathodic H2 and anodic S by CoFeS2.

#### References

1. Zhang, M.; Guan, J.; Tu, Y.; Chen, S.; Wang, Y.; Wang, S.; Yu, L.; Ma, C.; Deng, D.; Bao, X., Highly efficient H 2 production from H 2 S via a robust graphene-encapsulated metal catalyst. Energy Environ. Sci. 2020, 13 (1), 119-126. 2. Kumar, M.; Tharamani, C. Nagaiah, Journal of Materials Chemistry A, 2022, 10, 7048 - 7057

#### Profile:

Thara is currently an Associate Professor and Head, Department of Chemistry at IIT Ropar, India. Her research interests includes design and development of new materials with focus on energy conversion/storage, in-depth fundamental analysis by various electrochemical, spectroscopic, microscopic and scanning probe techniques. She is a recipient of several prestigious fellowships like Alexander von Humboldt Postdoctoral Fellowship, Germany and Ramanujan Fellowship by DST. She is a Fellow of Royal Society of Chemistry admitted through "Leaders in the field" scheme and also an elected Fellow of Indian Chemical Society. She is a recipient of CRSI-Bronze Medal 2023 and Silver Medal of CRS 2023 from the Society Chirantan Rasayan Sanstha, ECSI National Metrohm Award 2023 from Electrochemical Society of India and A.V. Rama Rao prize for women 2024 from Chemical Research Society of India. She is an Associate Editor of Chemistry of Materials(ACS), an Editorial Board Member of Electrocatalysis (Springer Nature) and Sustainable Energy and Fuels (Royal Society of Chemistry).





### **Prof. Sagar Mitra**

Prof. Sagar Mitra Professor, IIT Bombay, India



### Title: Batteries in Current Time

### Abstract:

The four most prominent battery technologies are predicted to rule the battery industry in the next decades namely, advanced cobalt-free Lithium-ion batteries, Li-Sulfur (Li-S) batteries, Sodium-ion and All-solid-state Batteries (ASSB). Currently, metal-S battery chemistry is attracted much attention due to its high energy proposition and most importantly it uses non-oxide-based cathode like sulfur. Safety due to overchargingassociated oxygen evolution and the manufacturing advantages compare to Li-ion and Na-ion technology, make the M-S technology much more adaptable. However, this chemistry suffers many problems including, polysulphides dissolution, shuttling effect, self-discharge, and lithium dendrites on the Li anode. These problems significantly deteriorate the electrochemical performance and cause a greater stability problem in M-S batteries. To solve the kineticissues, electrocatalysts have been proposed to promote the conversion of polysulfides and inhibit their diffusion to electrolyte. Here, I will discuss and compare the technology to existing know-how (metal-ion batteries) on the basis of my capacity and our lab developments.

#### Profile:

Sagar Mitra currently is a Professor in the Energy Science and Engineering Department, Indian Institute of Technology Bombay, India. Mitra has work experience in the semiconductor Industry at Replisaurus Technologies, Stockholm, Sweden as Principal Electrochemist from 2006 to 2009 and later joined IIT Bombay. Current research interest mainly focused on advanced materials and technology development for different energy storage applications, particularly in lithium-ion batteries, sodium-ion batteries, and metal sulfur batteries. Dr. Mitra has more than 150 publications in peer-reviewed journals and filed 30 patents in the area of different metal-ion batteries. Currently, the group is deeply engaged in lithium, sodium-ion battery, and metal sulfur battery cell prototyping. He involved in many committee's/panels from Govt. and non Govt. agency including Niti Aayog, PSA e-mobility roadmap committee, DST, MNRE, BIS, etc..Prof. Mitra is independent Director of Epsilon Carbon Inc., and founding Director of VoltrezTechnologies (a start-up company from SINE, IITB).








# Session 8

Applied Nanotechnology and the Importance of Materials Engineering

2:15 PM - 3:15 PM Lalit - 1 & 2



# Moderated By Dr. Suraj Rengarajan

CTO, Applied Materials, India



# Panelist

Dean of Research and Innovation, MS Ramaiah University of Applied Sciences, India



# Panelist Dr. Shankar Venugopal

Dr. Dheepa Srinivasan

VP, Mahindra, India



# Panelist

Dr. Dinesh Rangappa

Professor & Chairperson, Department of Applied Sciences (Nanotechnology), VTU, India







# Applied Nanotechnology and the Importance of Materials Engineering

#### Title:

Applied Nanotechnology and the importance of materials engineering.

#### Abstract:

As Moore's law has slowed in the Semiconductor Industry materials engineering has played a big role in advancing research and industrial applications.

This session will discuss the following:

- Perspectives from 2d materials and quantum technologies which are areas where nanotechnology will play a big role.
- A view from the Display and OLED industry where these technologies are driving advances
- Advanced packaging where materials plays a big role
- Sustainability challenges and materials technology solutions to address the Net Zero objective



74





# Dr. Suraj Rengarajan

Dr. Suraj Rengarajan MD and CTO Applied Materials India



#### Profile:

Dr. Suraj Rengarajan is the India CTO based in Applied Materials Bangalore, India. He started his career in Applied Materials, Santa Clara in 1997, where he held different roles ranging from process engineering, technology, program management, and product marketing for thin film deposition and metallization for interconnects, silicides and novel memories.

He moved to India in 2007 to set up the solar group for Applied Materials in India. Later he headed the engineering group for dielectric deposition.

Suraj holds a B.Tech from IIT Madras in Metallurgical Engg, and earned his M.S and PhD from the University of Texas at Austin in Materials Science. He has over 10 US patents and holds more than 15 publications.







## Dr. Dheepa Srinivasan

Dr. Dheepa Srinivasan Dean of Research and Innovation, MS Ramaiah University of Applied Sciences



#### Profile:

Dr. Dheepa Srinivasan is the Dean, Office of Research & Innovation, at Ramaiah University of applied Sciences. Dheepa has an M.Sc (Engg.) and a PhD, in Metallurgical Engineering, from the Indian Institute of Science, Bangalore. Dheepa has more than 24 years of total work experience in the area of gas turbine materials, leading the research and development of high temperature materials and manufacturing technologies for gas turbines. She has made significant contributions in materials science, that have enabled technologies in additive manufacturing, thermal spray coatings and advanced characterization. She is the inventor of several new technologies having over 35 patents, and has developed more than 50 technologies / process applications that are now running in several gas turbines and steam turbines. She is a pioneer in the area of metal Additive manufacturing and has developed several applications for metal additive manufacturing for gas turbine applications as well as healthcare applications via implants. She has also been very active in qualifying over 35 suppliers from India, for Gas Turbine and Oil & Gas sub sea drill and production components, in casting, forging and fabrication. She is a Six Sigma Black belt in engineering quality management. She has been continually active in teaching and training in a bid to impart an industrial edge to engineering education.

She is Fellow Indian National Academy of Engineering and the First Woman Fellow of the American Society of Metals (ASM International), from India. She is the recipient of the Distinguished Alumnus Award from the Indian Institute of Science, and Woman Engineer of the Year, INAE.







# Dr. Shankar Venugopal

Dr. Shankar Venugopal VP, Mahindra



#### Profile:

At the forefront of Mahindra & Mahindra's technological transformation, Shankar Venugopal's role as Vice President is grounded in leading innovation and intellectual property initiatives. His expertise in technology scouting and R&D management has enabled the company to pioneer sustainable urban mobility solutions and knowledge management systems that drive business growth and technical capability building.

As the Dean of the Mahindra Technical Academy, he is committed to nurturing talent and fostering a culture of innovation. His work in creating strategic technology visions, coupled with a proven track record in materials innovation and new product development, aligns with the mission to deliver value through innovation. The team's collaborative efforts have positioned them as leaders in re-skilling mobility engineers for the future of the automotive industry.





# **Dr. Dinesh Rangappa**

Dr. Dinesh Rangappa Professor & Chairperson, Department of Applied Sciences (Nanotechnology), VTU, India



#### Profile:

Prof. Dinesh Rangappa received doctoral degree Dr. Engg., (Materials Science and Engineering) from Tokyo Institute of Technology, Yokohama, Japan. He pursued postdoctoral research at the Institute for Multidisciplinary Research for Advanced Materials (IMRAM), Tohoku University, Sendai, and AIST, Tsukuba, Japan. He was awarded with prestigious JSPS Research Fellow award at AIST, Tsukuba Japan. He has worked as a Senior Scientist at ARCI, Hyderabad and then he joined as a Professor and R&D Director at EWIT, Bangalore. Presently he has been serving as Founder Professor and Chairperson, Dept. of Applied Sciences (Earlier Nanotechnology), VTU, Muddenahalli Campus, and also a Member of the Academic Senate, VTU Belagavi. Prof. Dinesh Rangappa has significantly contributed to developing various nanomaterials and devices along with a novel process for bulk production of nanomaterials, nanocomposites engineering nanomaterials for energy storage, sensors and photovoltaic, photocatalysis, Green H2 generation, photoluminescent, inorganic Nano-pigment, wastewater treatment, and biomedical applications. He has extensively worked on high-capacity Li-ion battery electrode materials and device fabrication. He has established a state-ofthe-art research Center for Nanotechnology at VTU, VIAT, Muddenahalli Campus.

Dinesh Rangappa has published nearly 170 publications in national and international journals/proceedings, Guest edited 5 special issues in Elsevier and Springer journals, Edited 2 books, written 17 book chapters, and 11 patents Published/granted. He has earned about 4500 citations, 84 i10-index, and 30 h-index for all his research publications. Prof. Dinesh Rangappa has been awarded "Prof. Satish Dhawan State Award for Young Engineers – 2014" on his outstanding performance in the field of Engineering science from Govt. of Karnataka and Fellow of Royal Society of Chemistry FRSC - ( 2022), Fellow of Intuition of Engineers, FIE (2021), Amar Raja Award 2023 by The electrochemical society of India and many more.





# DAY 03 3<sup>rd</sup> AUGUST 2024 SATURDAY



# Session 9 Making in India: Challenges & Opportunities in Manufacturing & Energy

2:15 PM - 3:15 PM Lalit - 3 & 4



# Moderated By

Dr. Shashishekar Adiga

Director and Head of NextGen Projects, Samsung Semiconductor India Research, India



# Panelist Dr. Suman Basu

Section Head - Battery Pack (AVP), Reliance Industries Limited, India



# Panelist

Dr. Sudhir Dapurkar

Lead Scientist, Tata Chemicals, Innovation Centre, India



# Panelist

# **Capt. Purushothama Bhat**

General Manager, Head of Flight Test & Operations, TATA Advanced Systems Limited, India



# Panelist

K Krishna Moorthy

President and CEO, IESA, India







# Making in India: Challenges & opportunities in Manufacturing & Energy

#### Title: Making in India: Challenges & opportunities in Manufacturing & Energy

#### Panel Abstract:

Join us for an insightful panel discussion on the topic of "Making in India: Challenges and Opportunities for High-Tech Manufacturing in India", featuring esteemed panelists from the industry. We will focus on two high value sectors 1) Making Lithum-ion batteries and 2)Semiconductor manufacturing, both of which are yet to take-off in India with need for significant investments, yet offer a golden opportunity to shape our country's economic future in an unprecedented way.







# Dr. Shashishekar Adiga

Dr. Shashishekar Adiga Director and Head of NextGen Projects, Samsung Semiconductor India Research, India



#### Profile:

Results oriented technology leader with experience in building and managing world-class teams to deliver technology solutions. Experienced in providing strategic, operational and technical leadership to drive customer-centric solutions.

Seasoned materials scientist with 20 years experience in energy storage, flexible electronics, thermal management, nanotechnology, and chemistry

Strong aptitude for conceiving new ideas, providing proof-of-concept by modeling and working with experimentalists to help realize new materials/technology

Proven track record and demonstrable experience in Technology Evaluation, IP Generation (10 U. S. Patents and 25+ applications); Strong publication record (40+)





# Dr. Suman Basu

Dr. Suman Basu Section Head - Battery Pack (AVP), Reliance Industries Limited, India



#### Profile:

Suman Basu is a mechanical engineer by training. He moved to electrochemistry during his PhD at the Pennsylvania State University. His PhD thesis is on hydrogen fuel cell modelling, working in the project of Toyota, which he continued in General Motors. He has been working on Li-ion battery pack design, development, simulation and state estimation for more than a decade in companies like GM, Samsung, Mahindra and Reliance. Battery packs of several successful electric three wheeler and cars like Treo, e-Verito, XUV400 were developed or improved by Suman's team. At present he is working on stationary battery pack development in Reliance Industries Limited. He has several international publications and patents.







# Dr. Sudhir Dapurkar

Dr. Sudhir Dapurkar Lead Scientist – Energy Science, Tata Chemicals Limited, Innovation Centre, Pune



#### Profile:

Dr. Sudhir Dapurkar, has over 15 years of experience in industrial research and is currently leading the development of energy materials and processes at Tata Chemicals, Innovation Centre, Pune. Dr. Dapurkar joined Tata Chemicals in 2009 after completing his Postdoctoral Fellowships at the University of Stuttgart, Germany (2004-2006), and at the National Institute of Advanced Industrial Science and Technology, Sendai, Japan (2006-2008). He has worked in the areas of heterogeneous catalysis, nanochemistry, and energy materials. He holds Ph.D. in Chemistry from the Indian Institute of Technology (IIT) Bombay, Mumbai. Dr. Dapurkar has authored over 30 original research publications and is an inventor in 10 patent applications.





# Capt. Purushothama Bhat

Capt. Purushothama Bhat General Manager, Head of Flight Test & Operations, TATA Advanced Systems Limited, India



#### Profile:

Group Captain Karkada Purushothama Bhat is an Air Force veteran and has served in IAF for 23 eventful years. Presently he is a General Manager in Tata Advanced Systems Limited (TASL) and heads the Flight Testing and Operations vertical.

He is a graduate of the prestigious Air Force Test Pilots School and holds a Master's degree (M Tech) in Flight Test Engineering. He is also an alumnus of Indian Institute of Management Ahmedabad (IIMA). Gp Capt Bhat is a qualified Flight Test Engineer (FTE) on Fixed Wing Platforms. He has flown in more than 15 types of fighters and transport aircraft and has diverse experience in Weapon systems Integration, Aircraft Performance Evaluation, aircraft stability and control at the Aircraft Systems and Testing Establishment (ASTE), Bangalore.

He was the lead FTE for Field evaluation of Rafale, Eurofighter and Gripen aircraft as part of the IAF's Multirole Combat Aircraft (MRCA) program. He was the flight test director and part of the first flight crew for India's only indigenous transport aircraft program- SARAS, being developed by National Aerospace Laboratories (NAL). He was commended by Ministry of Science and Technology for his contribution to SARAS program in 2017. He is also the recipient of Defence Innovation award from Raksha Mantri in 2023.

In his present role at TASL, he is a key link in aerospace R&D programs and leads high performance teams for indigenous design, development and testing of various manned as well as unmanned airborne systems for military applications.







# **K Krishna Moorthy**

K Krishna Moorthy President and CEO, IESA, India



#### Profile:

Electronics Engineer with over four decades of global experience in Hardware System Design, ASIC and SoC's and wireless telecommunications in Asia-Pacific, USA and Europe. Recognized for commitment to guality and continuous improvement and demonstrated ability to lead cross-functional teams across different regions and countries and cultures. Extensive experience in managing projects and leading R&D teams that developed and launched Wireless and broadband communication systems in Defense, Aerospace and Telecommunications as well as Semiconductor products like ASIC's and SOC's Analog/Mixed signal products and IP's in Deep sub micron technology nodes. Held many senior positions like Director of Engineering, Managing Director, Corporate VP level reporting to the CEO in MNC's, holding board level position, all with a demonstrated success of working in Indian Corporates and MNC 's in Electronics systems & semiconductors industry. His core skills are in ESDM, Particularly High speed IP & Product design management, Secure and Agile Communications, Application-Specific Integrated Circuits (ASIC) design, Aerospace and Defense systems design & engineering, People practices and Corporate finance. Also held the position of Honorary Vice Chairman and Chairman of IESA, the professional body of about 500+ Indian Electronics and semiconductor companies which connected him well with Policy manking entities in the government and made him to contribute to many inititiatves of the Centre and states. He is currently the CEO & Presindent of India Electronics & Semiconductor Association. He is the winner of IEEE TEchnologist of the year award and many other accolades, and is credited with the 1st ASIC designed in India which went to Volume production for use in startegic elecronics





Session 10 & Session 12 Nano SparX



2:15 PM - 3:15 PM Lalit - 3 & 4



# **Dr. Sudip Roy**

Jury

Chief Executive Officer and Founder Prescience Insilico Pvt. Ltd., India



# Jury Krishnan Venkateswaran Ph.D.

Head Technology and Innovation Resil Chemicals/ Vista Autocare, India



# Jury

Chandramouli Bhaskaran

Partner Ingroup Consulting Services, India

Presenters : **Anant Neer** Shakti Systems Pvt. Ltd.

# **Krishnadas Ganapathy**

Pradaan Innovation Labs LLP

#### Murari Vimano

**Dr** Anshu Dandia Trinano Technologies Pvt. Ltd.

# Sai Shiva Teja Panchadhara

**Shilps Sciences** 







# **Dr. Sudip Roy**

Dr. Sudip Roy Chief Executive Officer and Founder Prescience Insilico Pvt. Ltd.



#### Profile:

Dr. Sudip Roy is Chief Executive Officer and Founder of Prescience Insilico Private Limited, a company specializing in the application of deep tech in computational life sciences and material science domains.

Dr. Roy earned his PhD in Chemical Sciences from the University of Saarland in Germany and completed post-doctoral research at Technical University Darmstadt, Germany. He is a Chevening Fellow, having studied the management of research, science, and innovation at the University of Oxford, and has been elected as a Fellow of the Royal Society of Chemistry.

Before founding Prescience Insilico Private Limited, Dr. Roy led Quantum and High-Performance Computing at Amazon Web Services, served as a technology manager at Intel, and headed R&D at Akamara Biomedicine as Associate Vice President. Additionally, he has experience as a senior researcher in computational chemistry and materials sciences at Shell R&D. Dr. Roy began his career as a scientist at the CSIR-National Chemical Laboratory in Pune, where he led a computational chemistry and materials science group.





# Krishnan Venkateswaran Ph.D.

Krishnan Venkateswaran Ph.D. Head Technology and Innovation Resil Chemicals/ Vista Autocare



#### Profile:

Innovation Leader, R&D Visionary, Strategy and Capability builder, Teacher & Creator of high performing empowered R&D teams, Champion & Catalyst in creating science and technology platforms for purposeful innovations. Over 30 years of experience in crafting concepts based on scientific advancements, leading discovery, design and deploy to customers & stakeholders.

- Teaching and mentoring young minds both in academia and industry as faculty.
- As a key member of senior-most leadership, represented R&D in strategic and operational management committees of ITC Ltd as Chief Science & Technology lead in crafting business relevant R&D programs and securing funding.
- Envisioned and led R&D programs in multiple domains, agri-sciences, agro-forestry, nutrition, health & hygiene, driven by a leading-edge proteomics, genomics, bioinformatics and plant sciences & biology capability, built ground up over a decade.
- Scientific expertise and talent development at ITC Life Sciences & Technology Centre for the company, leading the Diversity, Inclusion and Culture initiatives for the organization.
- Developed a robust Intellectual property strategy for the organization that enabled filing over 900 patents by ITC over a decade and being rated as the most innovative corporation in the fast-moving consumer products segment in India.
- Led science and technology platforms in core Personal Wash and Personal Care categories in ITC Ltd and Unilever (in India and in UK).







# Chandramouli Bhaskaran

Chandramouli Bhaskaran Partner Ingroup Consulting Services



#### Profile:

Apart from being a Partner in a Consulting Firm, Baskaran is also a Member of a Board Committee of HDFC Bank.

He had been a career banker for 25 years spanning across Bank of America, HDFC Bank and Yes Bank where he was part of the Senior Management Team that was responsible for Operations, Technology, Transformation, Business Development and Corporate Strategy. Switching over from core Banking, he had an opportunity to associate himself with a Premium Private Equity Company in India. As the Global Chief Operating Officer of Intelenet Global Services, one of the flagship companies of Blackstone India. He was responsible for service delivery from 32 sites across 6 countries. His 13 years stint in this BPM company enabled him gain substantial business insights of diverse business verticals such as Healthcare, Hospitality, Travel, Banking and Financial Institutions across the globe. He is a Maths graduate and a Chartered Associate of Indian Institute of Bankers.







# Session 11 Healthcare & Medical Electronic



# 03:30 PM - 04:30 PM Lalit - 3 & 4



# Moderated By

# **Dr. Taslimarif Syed**

CEO and Director, C-CAMP Centre for Cellular and Molecular Platforms (C- CAMP), India



# Panelist

# Dr. Aditya Kulkarni

Founder and CSO, Avammune Therapeutics, India



# Panelist

# Dr. Ashwin Lal

Founder & CEO, Shilps Sciences, India



# Panelist

# Dr. Subhasis Sarangi

Founder, SAIMAF Healthcare, India



# Panelist

Md Lateefuddin Shariff

Director - India DM Lead, AstraZeneca, India







91

# **Healthcare & Medical Electronic**

#### Title: Healthcare & Medical Electronic

#### Panel Abstract:

This panel will explore the transformative impact of nanotechnology on health, highlighting innovations in drug delivery, diagnostics and other applications. Experts will discuss cutting-edge research, practical applications, and future directions. Topics will include targeted drug delivery systems, nanoscale diagnostic tools, and nanomaterials. Emphasis will be placed on how these advancements can improve patient outcomes, reduce healthcare costs, and address current medical challenges. Attendees will gain insights into the latest developments and their potential to revolutionize health and medicine.





# **Dr. Taslimarif Syed**

Dr. Taslimarif Syed CEO and Director, C-CAMP Centre for Cellular and Molecular Platforms (C- CAMP), India



#### Profile:

Dr. Taslimarif Saiyed is the CEO and Director of C-CAMP from 2009 till present. His initial training has been in neurosciences, where he received his PhD from Max-Planck Institute for Brain Research, Germany from 2002-2006 and followed it up by postdoctoral training at University of California San Francisco (UCSF) from 2006-2009. At the same time, he also underwent training in management for Biotech and Innovation from QB3 at UC Santa Cruz, UC Berkeley and UC San Francisco from 2007-2009. He has also completed a biotech management program for biotech executives at Wharton School of Management in the year 2012. In the Bay area, he served as a Management Consultant with QB3 New Biotech Venture Consulting and in an individual capacity, he also consulted for many biotech firms in the US.

Dr. Saiyed is an Adjunct Faculty at Indian Institute of Technology (IIT) Madras and alsoAmrita Institute - School of Biotechnology since 2015. He also heads the Discovery to Innovation Accelerator program at C-CAMP. He is actively involved in promoting innovation in lifescience / healthcare by supporting translation of discoveries to application, entrepreneurship and technology development.







# Dr. Aditya Kulkarni

Dr. Aditya Kulkarni Founder and CSO Avammune Therapeutics, India



#### Profile:

Aditya is the Founder and CSO at Avammune Therapeutics. He previously co-founded Aten Porus Lifesciences and Oraxion Therapeutics, R&D companies focused on drug discovery. Aditya is the inventor of Oraxion's technology platform that was eventually licensed to a US based biotech company at a valuation of \$125 MM. He has co-authored >20 papers and filed several international patents in the various areas of drug discovery and drug delivery technologies. He has been a recipient of several scholarships during his Masters and PhD and was also awarded the H. C. Brown Award for Outstanding Organic Research at Purdue University in June 2012. His work has been profiled in several media outlets such as Chemical & Engineering News (US), Economic Times (India) and Forbes India. Aditya has a PhD in Bioorganic Chemistry from Purdue University (USA), MS in Chemical Biology from Leeds University (UK), and B.Sc in Chemistry from Christ University (India).





#### **Dr. Ashwin Lal**

Dr. Ashwin Lal Founder & CEO, Shilps Sciences, India



#### Profile:

Dr. Ashwin Lal is the Founder-CEO of Shilps Sciences. He did his M.Sc. Physics (Integrated) from IIT Kanpur PhD from EPFL (Switzerland) and postdoc from McGill University (Canada). He has 20 years of experience in building high tech scientific instruments. He has worked and guided projects on microfluidics scanning probe microscopes nano-positioning systems MEMS controls and cryogenics. Dr. Lal was the CTO and co-founder of i2n Technologies a Bangalore based nanotechnology company that makes indigenous scanning probe microscopes. Earlier he has also worked at Applied Materials (Singapore) and Cranes Software (Bangalore). At Shilps Sciences Dr. Lal leads the development of novel microfluidics for single cell analysis. His team is also building an Atomic Force Microscope for life science applications. Shilps Sciences is a life science startup based in Bangalore India. Founded in December 2013 the vision is to build enabling tools for upcoming and novel therapeutics. At Shilps we are building a product that automates isolation analysis and retrieval of single cells. Single cell isolation and expansion into monoclonal cell lines is an important step in gene editing cell based therapies and biologics. The yield and productivity of cell lines depends on the efficiency of screening large cell populations to identify cells with desired characteristics. Our proprietary technology 'open droplet microfluidics' is an intuitive platform for precise tracking and manipulation of single cells. We have started early engagements with clients to develop protocols for various cell engineering applications.







# Dr. Subhasis Sarangi

Dr. Subhasis Sarangi Founder & CEO SIAMAF Healthcare Pvt. Ltd.



#### Profile:

Dr. Subhasis Sarangi is the founder of SIAMAF Healthcare. He has extensive experience in medical device technology, nanomedicine, bioengineering, and instrumentation. He received his PhD from Indian Institute of Science, where he studied superconductivity and nanomagnetism. His postdoctoral research at the University of Houston and Texas Medical Center was focused on cancer nanomedicine. Before founding SIAMAF Healthcare, he worked as the principal investigator of the Imaging Systems Laboratory at St. John's Medical College Hospital & Research Institute. At SIAMAF Healthcare, he is developing magnetic nanotechnology and AI for radiation free cancer diagnosis and therapy. His current interest lies in deeptech and affordable solutions to unsolved problems in healthcare.







# **Md Lateefuddin Shariff**

Md Lateefuddin Shariff Director - India DM Lead AstraZeneca, India



#### Profile:

Mr. Lateefuddin Shariff, Director of Clinical Data Management at AstraZeneca India Pvt Limited. He holds a Master of Science in Biotechnology and MBA in Human Resource Management. Mr. Lateefuddin Shariff spent 19 years working with various Pharmaceutical and Healthcare organizations. He is passionate towards delivering life changing medicines and transforming healthcare. Mr. Lateefuddin Shariff has a proven track record in delivering time-sensitive, high-profile projects in Oncology, Cardiovascular Renal & Metabolism and Biopharmaceuticals therapy areas.







# **Valedictory Address**



04:30 PM - 05:00 PM Grand Ballroom

#### **Dignitaries:**

**Dr. Devi Shetty** Founder, Narayana Hrudayalaya Pvt. Ltd.

#### Shri N. S. Boseraju

Hon'ble Minister of Minor Irrigation and Science & Technology, Govt. of Karnataka

#### Pavan Kumar Malapati, IAS

Director, Dept. of Science & Technology, Govt. of Karnataka Managing Director, Karnataka Science and Technology Promotion Society (KSTePS), Bengaluru

#### Prof. Navakanta Bhat

Chair, Vision Group on Nanotechnology, Govt. of Karnataka, Dean, Division of Interdisciplinary Sciences, Professor, CeNSE, IISc, Bangalore

**Prof. P.S. Anil Kumar** Conference Comittee Chair, CEC - Bengaluru INDIA NANO 2024 Dean, Administration & Finance, Professor, Dept. of Physics, IISc, Bangalore

Awards Presentation: Nano SparX Poster Awards







# EXHIBITOR'S DIRECTORY







# **ACT Enterprise**

Name of the Exhibitor Address	: ACT Enterprise : 1st And 3rd Floor, Golden Heights, 59th C Cross Rd, 4th M Block, Rajajinagar, Bengaluru - 560010, Karnataka, India
Contact Person	: Mr. Bhushan Dhade
Designation	: Deputy General Manager - Enterprise Business
Mobile	: +91-9513577200
Email	: bhushan.dhade@actcorp.in
Website	: https://www.actcorp.in/businessbroadband
Sector	: Electronics

#### Profile:

ACT Enterprise, Being one of the nation's largest Class A Internet Service Providers, ACT serves more than 2+ million internet customers in 24 cities across India with world-class internet services. Our enterprise solution is designed exclusively to boost business agility and enhance the productivity of our clients with an internet connection that is much more efficient, reliable and scalable than home internet. With a decade of experience in delivering fiber optic technology, we power close to 15000+ enterprise customers in across 24 cities in India

# **APPLIED MATERIALS INDIA PVT LTD**



Name of the Exhibitor	: Applied Materials India Pvt. Ltd.
Address	: 2nd Floor, Explorer Building ITPL Whitefield Road, Bangalore - 560066, Karnataka, India
Contact Person	: Mr. Praveen Kaushik
Designation	: Manager - Government Affairs
Mobile	: +91-9958796000
Email	: praveen_kaushik@amat.com
Website	: https://appliedmaterials.com
Sector	: Electronics

## Profile:

100 .....

Applied Materials India is a strategic partner and an enabler of India's semiconductor, display, and solar manufacturing ecosystems. We provide the organization with engineering design, cutting-edge innovation in materials science and engineering, and support services through our partner ecosystem in India. We also play a key role in our global Information Technology (IT) infrastructure by offering digital solutions, services and hosting the company's second-largest data center





# ADVANCED RESEARCH CENTRE FOR POWDER METALLURGY AND NEW MATERIALS (ARCI)



Name of the Exhibitor	: Inetrnational Advanced Research Centre for Powder Metallurgy and New Materials (ARCI)
Address	: Balapur P.O., Hyderabad - 500005, Telangana, India
Contact Person	: Dr. Srinivasan Anandan
Designation	: Scientist-F
Mobile	: +91-9989677949
Email	: anandan@arci.res.in
Website	: https://www.arci.res.in
Sector	: Environment/ Energy

ARCI is an autonomous R&D Centre of Department of Science and Technology (DST), Government of India located in Hyderabad, Telangana. ARCI has been setup with a mission to develop unique, novel and technocommercially viable technologies in the area of advanced materials and subsequently transfer them to Indian industries. ARCI has formed Centres of Excellence in many generic thrust areas related to materials and materials processing, like nanomaterials, ceramics, engineered coatings, fuel cells, carbon materials, sol-gel coatings, laser materials processing, solar energy and automotive energy materials. ARCI has developed various state-of-the-art technologies and has completed 44 technology transfers to several companies.

# **BIOSPECTRUM INDIA & BIOSPECTRUM ASIA**



## Profile:

Profile:

BioSpectrum India & BioSpectrum Asia : BioSpectrum India & Asia is a leading source of news and insights in the biotechnology and life sciences sector in Asia and World. With a focus on advancements, trends, and key developments in the field, BioSpectrum India serves as a valuable platform for professionals, researchers, and enthusiasts to stay informed about the latest happenings in the Indian biotech industry. www.biospectrumindia.com www.biospectrumasia.com





# BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI (BITS PILANI)



Name of the Exhibitor	: Birla Institute of Technology and Science, Pilani (BITS Pilani)
Address	: BITS, Pilani - 333031, Rajasthan, India
Contact Person	: Ms. Priyanka Goyal
Designation	: Chief of Staff & Lead Incubation
Mobile	: +91-8955479457
Email	: priyanka.goyal@pieds-bitspilani.org
Website	: https://www.bits-pilani.ac.in/about/bits-foundation/
Sector	: Others

Profile:

Birla Institute of Technology & Science, Pilani (BITS Pilani) is a deemed university in Pilani, Rajasthan, India. It focuses primarily on higher education and research in engineering and sciences. BITS Pilani is one of the first six institutes in India to be granted Institute of Eminence status BITS has held its own over decades becoming a globally-recognised centre of knowledge, academic and research excellence because of the inherent culture and values that are instilled into each person.

# **BITS BioCyTiH FOUNDATION**

Name of the Exhibitor	: BITS BioCyTiH Foundation
Address	: BITS Pilani, KK Birla Goa Campus, Goa - 403726, Goa, India
Contact Person	: Dr. Madhusushana murthy Joish
Designation	: Senior Manager Infra and Operations
Mobile	: +91-9024686600
Email	: ceo@biocytih.co.in
Website	: https://biocytih.co.in/
Sector	: Environment/Energy

## Profile:

BITS BioCyTiH Foundation (BBF), a Section 8 Company of BITS Pilani, was incorporated on March 10, 2021. It facilitates deep technologies in the "Bio-Cyber Physical Systems (Bio-CPS)" domain, aiming to promote research, innovation, skill development, and training to provide affordable solutions in healthcare, agriculture, water, and environmental sectors. BBF operates in Pilani, Hyderabad, and Goa, with state-of-the-art infrastructure, including a Incubator, IoT, Bio Lab, Bio-Sensor, Device Fabrication, Omics NGS, Flexible & Printed Electronics, and Data and Systems Security Labs. BBF has over 35 startups, 34 advanced technologies in portfolio. combining technical expertise and market leadership for a distinct advantage.







# **CENTRE FOR NANO AND SOFT MATTER SCIENCES (CeNS)**



Name of the Exhibitor	: Centre for Nano and Soft Matter Sciences (CeNS)
Address	: Arkavathi, Survey No.7, Shivanapura, Dasanapura Hobli, Bengaluru - 562162, Karnataka, India
Contact Person	: Dr. Goutam Ghosh
Designation	: Scientist
Mobile	: +91-9007873603
Email	: censoffice@cens.res.in
Website	: /https://www.cens.res.in/en/
Sector	: Others

#### Profile:

The Centre for Nano and Soft Matter Sciences (CeNS) is an autonomous research institute under the Department of Science and Technology (DST), Government of India. DST provides core support to the centre through a grant-in-aid for basic and applied research in nano and soft matter sciences. CeNS adopts an openminded approach to R&D in nanoscience and technology, intertwined with soft matter principles, emphasizing Intellectual Property and technology translation. The campus features stateof-the-art facilities, including the Materials Laboratory, Tata Steel Advanced Materials Research Centre (TSAMRC), Technology Business Incubator project-Greenhouse, sophisticated synthesis laboratory, and faculty laboratories.

# **CURRENT SCIENCE ASSOCIATION**

# **CURRENT SCIENCE**

Name of the Exhibitor	: Current Science Association : CV Raman Avenue Sadashiynagar, Bengaluru - 560080, Karnataka, India
Cantaat Daraan	. Ov Kanan Avenue oddasinvingar, bengalara - oooooo, Kamataka, mala
Contact Person	: mr. roganarasimna by
Designation	: Admin Assistant
Mobile	: +91-9632837127
Email	: narasimha@ias.ac.in
Website	: https://www.currentscience.ac.in/
Sector	: Others

## Profile:

Current Science, published every fortnight by the Association in collaboration with the Indian Academy of Sciences, is India's leading interdisciplinary science journal. The journal was started in 1932, under the editorship of C.R. Narayan Rao, with the support of the then stalwarts of Indian Science, C.V. Raman, Martin Forster, and Birbal Sahni, among others. The journal completed the 100th volume in 2011 and the 125th in 2023. Besides full-length research articles and shorter research communications, the journal publishes review articles, scientific correspondence and commentaries, news and views, comments on recently published research papers, and opinions on scientific activity.







# **GLOBAL MARKETING SERVICES**

Name of the Exhibitor	: Global Marketing Services
Address	: 1, Sharadanagar, Uttarahalli Main Road, Vasanthapura, Bangalore - 560061, Karnataka, India
Contact Person	: Mr. Kishore M M C
Designation	: CEO
Mobile	: +91-9845471451
Email	: kishore@gms-india.com
Website	: https://gms-india.com
Sector	: Electronics
Profile:	

Global Marketing Services [GMS] is a leading solution provider for your semiconductor process engineering and product development requirements. GMS was founded in 2001 and started its operations in Bangalore. We offer a one-stop shop and comprehensive R&D solution, from ideation and concept development to prototyping. The IITs, ISRO, DRDO, DAE, CSIR and numerous significant public and private organizations like Bharat Electronics [BEL), etc. are just a few of the labs and institutes where our solutions and equipment have been utilized. We have been successful for the past 20 years and these accomplishments driven by excellence were made possible by the robust connections we have with our clients and partners around the world.

# HUBER PROCESS CONTROL SYSTEM INDIA PVT LTD



Name of the Exhibitor	: Huber Process Control System India Pvt Ltd
Address	: "Anagha", Sy No 3/2, Old Sy No. 3, Veer Raghavana Palya Village, Bengaluru - 560097, Karnataka, India
Contact Person	: Mr. Ravindra Prasad
Designation	: Director
Mobile	: +91-9886659576
Email	: contact@huber-india.com
Website	: https://www.huber-online.com
Sector	: Manufacturing

## Profile:

104

High precision temperature control solutions We are a leading supplier of high precision temperature controlsolutions for research and industry. Worldwide, our products ensure precise temperature control in laboratories, pilot plants and production processes. Our product range offers innovative solutions for almost all tasks in the field of liquid temperature control from -125 to +425 °C. In addition, we develop and produce circulators as well as classic heating and cooling thermostats. For numerous applications in the automotive, chemical, pharmaceutical, aerospace, semiconductor and biotechnology industries, we supply customized special equipment, which is realized in close cooperation with our customers.







# **INVATI CREATIONS PRIVATE LIMITED**

Name of the Exhibitor	: Invati Creations Private Limited
Address	: 63R, Mahanirban Road, Kolkata - 700029, West Bengal, India
Contact Person	: Mr. Mukeshh Agarwal
Designation	: Director
Mobile	: +91-9819730407
Email	: info@invati.in
Website	: https://www.invati.in
Sector	: Others

#### Profile:

Invati Creations Private Limited Founded by alumni of IIT Kharagpur & IIM Kolkata, Invati Creations PrivateLimited has emerged as a nanotechnology invention company. The founders have more than 75 international patents on Nanotechnology and various other fields. We offer a novel Nano Mineral Solution for food fortification to combat anaemia and mineral deficiency, especially in women and children in India. Our research team is also pioneering Lithium-Ion (LFP) batteries, aiming for 3000-5000 charge cycles with fast charging. We are testing new cathode materials for advanced fast-charging capabilities. For more information, contact us at info@invati.in.

# INDIAN OIL CORPORATION LIMITED



Name of the Exhibitor	: Indian Oil Corporation Limited
Address	: Indian Oil Corporation R&D Centre, Sector 13, Faridabad - 121007, Haryana, India
Contact Person	: Mr. Taneja Deepak
Designation	: Deputy General Manager (Corporate Communications)
Mobile	: +91-9999693621
Email	: tanejad@indianoil.in
Website	: https://www.iocl.com
Sector	: Environment/Energy

## Profile:

Indian Oil Corporation Ltd. is a leading integrated Fortune 500 energy company in Indian and one of the largest state owned oil and gas organizations in the country. IndianOil plays a pivotal role in India's energy landscape, driving economic growth, and ensurng energy security for the nation with a rich legacy in a commitment to innovation and sustainability. Over the years IndianOil has evolved into a comprehensive hydrocarbon enterprise with global footprints and its business operations spans the entire hydrocarbon value chain, encompassing exploration, production, refining, marketing & distribution of petroleum products. IndianOil takes immense pride in its unwavering commitment to serve the nation and its energy security.







# I-STEM, IISC, BENGALURU

Name of the Exhibitor	: I-STEM, IISc, Bengaluru
Address	: I-STEM, Behind Satish Dhawan Auditorium, Bengaluru - 560012, Karnataka, India
Contact Person	: Mr. R J Manjunatha
Designation	: Operation Manager
Mobile	: +91-7760985419
Email	: spushpa@istem.co.in
Website	: https://https://www.istem.gov.in/
Sector	: Others

Profile:

I-STEM is a National Portal, which assists researchers to locate the specific facility(ies) they need for their R&D work. The portal also assists in shortlisting and identifying the facilities based on distance and time of availability.

# JAWAHARLAL NEHRU CENTRE FOR ADVANCED SCIENTIFIC RESEARCH (JNCSR)

Name of the Exhibitor	: Jawaharlal Nehru Centre for Advanced Scientific Research
Address	: Jakkur Post, Bengaluru - 560064, Karnataka, India
Contact Person	: Dr. K. Panneer Selvam
Designation	: Coordinator, R&D and F&E
Mobile	: +91-9449822651
Email	: coord_rd@jncasr.ac.in
Website	:https://www.jncasr.ac.in
Sector	: Others

## Profile:

106

Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR) is a multidisciplinary research institute situated in Jakkur, a locality north of Bangalore, India. It is relatively young yet well-known around the Globe.Our mandate is to pursue and promote world-class research and training at the frontiers of Science and Engineering covering broad areas ranging from Materials to Genetics.It provides a vibrant academic ambience hosting more than 300 Researchers.The Centre is an autonomous institution under the Department of Science and Technology, Government of India and is a deemed to be university.





# NATIONAL RESEARCH DEVELOPMENT CORPORATION (NRDC)



Name of the Exhibitor	: National Research Development Corporation (NRDC)
Address	: 20-22, Zamroodpur Community Center, Kailash Colony Extn., New Delhi -110048, India
Contact Person	: Mr. VK Jain
Designation	: Senior Manager Purchase
Mobile	: +91-9717377114
Email	: vkjain@nrdc.in
Website	: https://www.nrdcindia.com
Sector	: Others

#### Profile:

National Research Development Corporation (NRDC) was established in 1953 by the Government of India, with the primary objective to promote, develop and commercialize the technologies / know-how / inventions / patents / processes originating from various national R&D institutions / Universities. NRDC is fully owned by Government of India and is registered under the Companies Act, 1956, and is now being administered under Section 8 of the Companies Act, 2013. NRDC is presently under the administrative control of the Department of Scientific & Industrial Research (DSIR), Ministry of Science & Technology (MoS&T), Bharat Sarkar.

# PARK SYSTEMS INDIA PVT LTD



Name of the Exhibitor	: Park Systems India Pvt Ltd
Address	: Second floor, 86, Gokul towers, M S Ramaiah Road, Gokula, Bengaluru -560045, Karnataka, India
Person	: Mr. Vamsi Bendalam
Designation	: Marketing Specialist
Mobile	: +91-8074841244
Email	: psin@parksystems.com
Website	: https://https://www.parksystems.com/
Sector	: Manufacturing

## Profile:

Park Systems Corporation is the industry leader in manufacturing nanoscale microscopy and metrology solutions. Its comprehensive range of products includes atomic force microscopy (AFM), white light interferometry, infrared spectroscopy, and ellipsometry systems. The company's commitment to excellence has resulted in the development of several groundbreaking innovations, including True Non-Contact Imaging, 3D metrology, and fully automated AFM systems that are able to cater to both research and industrial needs. Park Systems products offer extensive application potential within the fields of scientific research, nanoscale engineering, semiconductor fabrication, and quality assurance.





# **PENNSYLVANIA TRADE & INVESTMENT OFFICE - INDIA**



#### pennsylvania DEPARTMENT OF COMMUNITY & ECONOMIC DEVELOPMENT

Name of the Exhibitor	: Pennsylvania Trade & Investment Office - India
Address	: 201, Infantry court, 130, Infantry Road, Bengaluru - 560001, Karnataka, India
Contact Person	: Ms. Supriya Kanetkar
Designation	: Director
Mobile	: +91-9900126600
Email	: paindiaoffice2@gmail.com
Website	: https://dced.pa.gov/
Sector	: Others
Profile:	

You often hear you can't have it all, but in Pennsylvania, you'll start believing you can. Here you'll find an experienced and skilled workforce, best-in-class higher education institutions ready to partner with industry, a prime East Coast location, and exceptional quality of life. We are the most economically diverse state in the country. Our \$915 billion GDP makes us the sixth largest economy in the U.S. and a leading global economic hub. From corporate headquarters (we're home to 24 Fortune 500 companies), to state-of-the-art R&Dfacilities, to startups and more than one million small businesses, our business environment empowers companies to be revolutionaries in their industry and redefine success.

# **M S RAMAIAH INSTITUTE OF TECHNOLOGY**



Name of the Exhibitor	: M S Ramaiah Institute of Technology
Address	: MSRIT Post, MSR Nagar, Bengaluru - 560054, Karnataka, India
Person	: Dr. Madhu G M
Designation	: Professor
Mobile	: +91-9845381349
Email	: gmmadhu@msrit.edu
Website	: https://www.msrit.edu
Sector	: Others

## Profile:

M.S. Ramaiah Institute of Technology was founded by Dr. M. S. Ramaiah in 1962 under the aegis of the Gokula Education Foundation with the objective of serving society through quality technical education. Today, MSRIT offers 18 undergraduate programs, 13 postgraduate programs and PhD programs. More than 70% of Faculty are with PhD. All the eligible programs are accredited by the NBA. The institute is also accredited with an 'A+' grade by the NAAC, since March 2021. MSRIT has consistently ranked among the top 100engineering colleges in India according to the National Institutional Ranking Framework (NIRF), achieving the 78th rank among 1314 top engineering institutions in 2023 and 23rd rank for school of Architecture.




**RAY NANO SCIENCE** 

& RESEARCH CENTRE

#### **RAY NANO SCIENCE AND RESEARCH CENTRE LLP**

Name of the Exhibitor	: Ray Nano Science And Research Centre LLP	
Address	: Behind Phoenix Food, Near Bullet Train, Bedwa-Mogar Road, Anand - 388306, Gujarat, India	
Contact Person	: Mr. Siddharth Doshi	
Designation	: Director	
Mobile	: +91-9825067427	
Email	: sd@raynanofertilizer.com	
Website	: https://www.raynanofertilizer.com	
Sector	: Agriculture	

#### Profile:

Ray Nano Science & Research Centre LLP specializes in nanotechnology research and development. Our team of highly skilled scientists, engineers, and researchers is committed to exploring the vast potential of nanotechnology across various sectors, including Agriculture, Health-care, Animal-Husbandry, and Materials science. We aim to translate our research into practical solutions that address real-world challenges.

#### SASTRA DEEMED UNIVERSITY



Name of the Exhibitor	: Sastra Deemed University
Address	: Tirumalaisamudram, Thanjavur - 613401, India
Contact Person	: Mr. Nirmal Narayanan Kumar
Designation	: Incubation Manager
Mobile	: +91-9444826033
Email	: ablest@sastra.ac.in
Website	: https://www.sastra.edu
Sector	: Others

#### Profile:

SASTRA is one of India's premier institutions, offering UG, PG, and doctoral programs in Engineering,vManagement, Law, Sciences, Humanities and Education. SASTRA is re-accredited by NAAC (4th cycle) with an A++ grade (3.76/4.00) and is a Category I Institution based on UGC's categorization. SASTRA's interdisciplinary centres integrate research in Engineering, Life Sciences, Physics and Chemistry. SASTRA houses high end facilities like Microscopy & Spectroscopy besides an animal house with live imaging facility, BSL-3, NGS and ISO-13485:2016 compliant clean room facility. The FIRST and ABLEST Incubators, supportedby DST and BIRAC, foster startups in niche technological areas like VR, IoT, 3D printing, robotics, AI and medtech devices.





#### **CENTRE FOR SEMICONDUCTOR TECHNOLOGIES (SemiX) IIT BOMBAY**



Name of the Exhibitor	: Centre for Semiconductor Technologies (SemiX) IIT Bombay
Address	: EE Annx, 2nd Floor, Indian Institute of Technology Bombay, Powai, Mumbai - 400076, Maharashtra, India
Contact Person	: Mr. Shekhar O
Designation	: Senior Technical Assistant
Mobile	: +91-9324160931
Email	: office.semix@iitb.ac.in
Website	: https://www.semix.iitb.ac.in/semix/
Sector	: Electronics

#### Profile:

110 .....

IIT Bombay Center for Semiconductor Technologies, SemiX was established in 2022. The word "Semi" stands for Semiconductors and "X" represents the integration of various semiconductor solutions – materials, equipment, devices, circuits, packaging, and software. IIT Bombay has pioneered semiconductors research in India with the establishment of the Center for Excellence in Nanoelectronics (CeNS) where world-class semiconductor research was developed. The Skilled Manpower Development Program (SMDP) was hosted to support large-scale chip design research and training. IIT Bombay alumni power top semiconductor industries nationally & worldwide.

#### SMARKLABS MEDIA PVT. LTD.



: Smarklabs Media Pvt. Ltd.
: L62/ 1 Second Floor Connaught Place, Delhi - 110001, India
: Mr. Sameer Srivastava
: Director
: +91-9205904678
: editor@startupreporter.in
: https://www.startupreporter.in
: Others

Rising media tech company to help businesses in promoting their products and services







#### **STM JOURNALS**

Name of the Exhibitor	: STM Journals
Address	: A-118, 1st Floor, Sector-63, Noida - 201301, Uttar Pradesh, India
Contact Person	: Mr. Sanjeev Singh
Designation	: Technical Scientific Officer
Mobile	: +91-9810662669
Email	: info@reinste.com
Website	: https://stmjournals.in/
Sector	: Others

#### Profile:

STM Journals (An imprint of Consortium e-learning Network Pvt. Ltd.) publishes over 270+ journals on behalf of Researchers around the world in the areas of science, technology and medical. We pride ourselves on our personalised service tailored to the individual needs of each of our partners. Specialising in print and electronic journal publishing, STM is committed to technical and editorial innovation combined with traditional values of quality and collaboration.

#### VISVESVARAYA TECHNOLOGICAL UNIVERSITY (VTU)



Name of the Exhibitor	: Visvesvaraya Technological University
Address	: Jnana Sangama, Belagavi - 590018, Karnataka, India
Contact Person	: Dr. Dinesh Rangappa
Designation	: Professor & Chairperson
Mobile	: +91-9632764659
Email	: dineshrangappa@gmail.com
Website	: https://www.vtu.ac.in
Sector	: Others

#### Profile:

Visvesvaraya Technological University (VTU), Belagavi, Karnataka, spread over 116 acres built in modern architectural elegance, provides abundant facilities to its students. There are 215 engineering and architecture colleges. VTU boasts more than 3 lakh students pursuing 42 UG & 94 PG programmes, 923 research centres with 9000+ research scholars pursuing doctorate and M.Sc. (Engr.). VTU is accredited and recognized by prestigious bodies like UGC, NIRF, AICTE, NAAC, and AIU, and recognized by World Education Services. It has regional campuses at Mysuru, Belagavi, Bengaluru, Muddenahahalli, Talkal, Kalburgi and Dandeli where B.Tech., M.Tech. MBA, MCA, M.Plan., M.Sc., Research Programs and Skill Development programs are offered.



#### **STARTUP PAVILION**



BENGALURI

#### **BANGALORE BIOINNOVATION CENTRE (BBC)**

Name of the Exhibitor	: Bangalore Bioinnovation Centre (BBC)
Address	: Helix Biotech Park, Electronic City Phase 1, Banagalore - 560100, Karnataka, India
Contact Person	: Mr. Malathesh L
Designation	: Manager Operations and Technical
Mobile	: +91-8073438372
Email	: malathesh@bioinnovationcentre.com
Website	: https://www.google.com/search?q=bangalore+bioinnovation+cene&ie=UTF-8&oe=UTF-8&hl=en-in&client=safariint (a) and (b) and (
Sector	: Others

#### Profile:

The Bangalore Bioinnovation Centre (BBC), a government initiative in Bangalore, Karnataka, fosters biotech innovation and entrepreneurship. Established by the Department of IT, BT and S&T, Government of Karnataka, and the DBT, Government of India, BBC provides state-of-the-art infrastructure, mentorship, and funding support. It focuses on various life sciences domains, supporting startups in healthcare, Medtech, agriculture, and more. Since 2016, BBC has generated over 70 patents and 6,000 jobs, attracting global corporate investment and international recognition. By nurturing startups, BBC drives innovation, economic growth, and societal impact in the biotech sector, both locally and globally.

#### **BENLYCOS PVT. LTD.**

BENLYCOS

Name of the Exhibitor	: Benlycos Pvt. Ltd.
Address	: Plot No-10A, Kiadb Industrial Area, Electronic City Phase Ii, Electronic City, Bangalore - 560100,
	Karnataka, India
Contact Person	: Mr. Sajith Kandiyil
Designation	: CEO
Mobile	: +91-9739255007
Email	: sajith@benlycos.com
Website	: https://www.benlycos.com
Sector	: Electronics

#### Profile:

Benlycos as a company is focused on solving the last mile internet connectivity for speed, availability,reliability and security. We have devised a mechanism of combining multiple forms of available internet connections at any given location and improving the above mentioned four aspects of the connection. The solution works by having a VPS deployed on the cloud to monitor and manage the data transfer between the router that works as the CPE and any internet location the end user would like to access. Being a two-point solution gives us unmatched reliability and the same TCP session can be kept alive though any of the available connections that are present and functional. We have 3 product lines by name Zifilink, Bloom and Clover launched.





Inspired Innovations

**BIOPROBE LAB** 

#### **BIOPROBE LAB PVT. LTD.**

Name of the Exhibitor Address	: Bioprobe Lab Pvt. Ltd. : #709, 4th Cross, Prasanth Nagar, 2nd Stage Bhogadi, Chmaraja Mohalla, Mysuru - 570026, Karnataka, India
	Karnataka, India
Contact Person	: Dr. PADMAJA RJ
Designation	: Chief Executive Officer
Mobile	: +91-9845835956
Email	: prd@bioprobelab.in
Website	: https://www.bioprobelab.in
Sector	: Agriculture

#### Profile:

Mr. Pratyush Sahay, Dr. Padmaja, and Dr. Kaunain R. Roohie, are the Co-founders of BIOPROBE LAB PVT. LTD., a product and service based company. The Core vertical's are 1. Developing technology in terms of techo-organic fertilizers (Spandana Higrow, Spandana Nutriplus, Fasal Sampada and Amoil) for Agriculture 2. Petoil and vaccines for Animal husbandry 3. We have developed first nano-liquid bioactive peptide based feed for spawns (Matsyavahini Activez) in fisheries for boosting immunity, reducing stress, no antibiotics usage and zero percent mortality in developing fingerlings and fishes. We have been awarded NAAVIC-RABI NEO and KBITS Grant for developing farmer friendly prototype for detection of sub-clinical Mastitis in Bovine population.

#### **CORENANO LLP**



: Corenano LLP
: NO 15, G Floor, 10th Cross, Gokula 1st Stage, Bengaluru - 560054, Karnataka, India
: Ms. Kavya N N
: Director and Co Founder
: +91-9620877266
: kavya@nanoedukit.com
: https://nanoedukit.com/
: Others

#### Profile:

Nanotechnology based education Kit is the first nanotechnology based education kit from India at an affordable price (MRP 200 INR) to create scientific awareness among the school students and college students. Introducing nanotechnology to school students is vital, as it sparks curiosity and offers a glimpse into the future of science and technology, inspiring the next generation of innovators. School students can make silver and gold nanoparticles using this kit. Our innovative DIY kit utilizes a solid state metal reducing agent based on a granted patent licensed from the lab of Dr Chetan Singh Thakur, Associate Professor, NeuRoNICS lab, Department of Electronic Systems Engineering, Indian Institute of Science, Bengaluru.







#### DURMERIC NATURACEUTICALS PVT. LTD.

Name of the Exhibitor	: Durmeric Naturaceuticals Pvt. Ltd.	
Address	: Room No. 14, NABARD MABIF, Agricultural College And Research Institute, Madurai - 625104,	
	Tamilnadu, India	
Contact Person	: Mr. Srikanth Balasubramanian	
Designation	: Co Founder and MD	
Mobile	: +91-9740830022	
Email	: hidurmeric@gmail.com	
Website	: https://www.onedropwellness.in	
Sector	: Healthcare	

#### Profile:

We at Durmeric Naturaceuticals believe in improving Health thru Daily Nutrition. With this Purpose in mind , our start up makes daily nutrition & wellness a simple daily habit by providing a "Convenience on the Go" product to our consumers. We are incubated at IIT Kanpur,NABARD MABIF and BITS Pilani Goa and we make Nano extracts of Herbs & Spices. As the extracts are in Nano form , the bio availability of the active ingredient in the Herb or Spice is higher and hence it is more powerful with lesser usage with better body absorption. Our product can directly be added into water, any beverage or food and are excellent ingredients for the Nutraceutical, Ayurvedic, Cosmetic , Agriculture and teh Functional F&B industry

#### **EMVEGA TECHNOLOGIES PRIVATE LIMITED**



: Emvega Technologies Private Limited
: #470-P, Peenya Industrial area, Peenya 4th phase, Bangalore - 560058, Karnataka, India
: Mr. Anush B N
: Founder and Director
: +91-8310184747
: anushbn@emvega.com
: https://www.emvega.com
: Electronics

#### Profile:

India's value-based company with a futuristic vision of independent INDIA. The base of the company stands on the implementation of ATHAMNIRBHAR BHARATH to provide a better and valued living for fellow Indian engineers and citizens. The current area of work is bringing out a sustainable lifestyle through Electric vehicles, ESDM, IOT (Industry 4.0 and 5.0), and predictive algorithms. Each sector of focus has its own vision and mission apart from the vision and mission of the company.







#### **GOPAFY - SMART BUSINESS SOLUTIONS**

Name of the Exhibitor	: Gopafy - Smart Business Solutions
Address	: 9th Main, 2nd Cross, JC Nagar, Kurubarahalli, Bangalore - 560086, Karnataka, India
Contact Person	: Mr. Vinod Reddy
Designation	: Founder & CEO
Mobile	: +91-8904686807
Email	: gopaitservices@gmail.com
Website	: https://gopafy.com
Sector	: Others
Profile:	

Gopafy is a cutting-edge provider of business solutions, specializing in leveraging technology to drive efficiency, innovation, and growth for organizations of all sizes. Our mission is to empower businesses with smart, data-driven solutions that streamline operations and enhance overall performance.

#### JK NANOSOLUTIONS PVT. LTD.

**J** NANOSOLUTIONS

Name of the Exhibitor	: JK Nanosolutions Pvt. Ltd.
Address	: NO 15, G Floor, 10th Cross, Gokula 1st Stage, Bengaluru - 560054, Karnataka, India
Contact Person	: Dr. Kiruba Daniel
Designation	: Director and Co Founder
Mobile	: +91-9442330984
Email	: kirubadaniel@jknanosolutions.com
Website	: https://www.jknanosolutions.com
Sector	: Environment / Energy

#### Profile:

JK Nanosolutions is a Nanotechnology based startup company from the city of Bengaluru, Karnataka, Indiainvolved in the development & deployment of cutting-edge Nanotechnology based products for the rapid, single-step, low-cost treatment & recycling of waste water, industrial effluents, sewage water. Our startup has successfully treated & reused more than 500 million liters of water. Product has been implemented in state govt, central govt PSU and in private industries. Lakes of Nanakramguda in Hyderabad, Telangana and Shivapura, near Peenya, Bengaluru has been treated successfully by us using the CSR initiative of Phoenix Group and Tata Trust. We won Elevate by Startup Karnataka, Design Impact Award by Titan Ltd, Tata Trust.







#### LV SURYA TECH LLP

Name of the Exhibitor	: LV Surya Tech LLP
Address	: T-172 Concorde Silicon Valley, Bangalore - 560100, Karnataka, India
Person	: Mrs. Lata Vishwanath
Designation	: Managing Director
Mobile	: +91-7022409311
Email	: knvishwanath@gmail.com
Website	: https://www.lvsuryatech.in
Sector	: Environment/Enerav

#### Profile:

LV Surya Tech LLP specializes in harnessing solar energy through innovative products such as sun simulators, solar rooftops, pumps & sprayers, catering to both renewable energy and agricultural applications, and Vitamin D enrichment for the food and animal feed industry. Located in Bangalore, Karnataka, India, the company is committed to delivering high-quality solar solutions to enhance sustainable practices. Their experienced team, led by Managing Director Lata Vishwanath and Managing Partner KN Vishwanath, along with Project Advisor Dr C Ramachandra, strives to advance eco-friendly technologies. They also provide consultancy to Management systems and leverage Al solutions. For more information, visit www.lvsuryatech.in

#### **MAVOLO RESEARCH CENTRE**

Name of the Exhibitor	: Mavolo Research Centre
Address	: 29/A, 27th Main Rd, Sector 5, 1st Sector, HSR Layout, Bengaluru, Karnataka 560102
Contact Person	: Mr. Ankur Bansal
Designation	: CEO
Mobile	: +91-9787093848
Email	: ankur.bansal@mavololabs.in
Website	: www.mavololabs.in
Sector	: Healthcare

#### Profile:

Profile: We are building Gadget charging brand for the present generation charging need.





## Meerkats.World

#### **MEERKATS INNOVATIVE TECHNOTOOLS PRIVATE LIMITED**

Name of the Exhibitor	: Meerkats Innovative Technotools Private Limited
Address	: UGF4, Building 48, Hasanpur, Delhi - 110092, India
Contact Person	: Ms. Sonali Tatke
Designation	: Co-Founder
Mobile	: +91-9371013919
Email	: ashish@meerkats.world
Website	: https://meerkats.world
Sector	: Environment/ Energy
Profile:	

Meerkats.World is at the forefront of nanotechnology innovation, specializing in advanced thermal interfaces for electronics. Our flagship product, CV22, is the world's first nanoscience metallic thermal interface designed to extend the lifespan of electronic devices. By optimizing thermal management, CV22 significantly reduces e-waste and conserves valuable materials, contributing to a more sustainable future. Recognized globally by UNIDO and appreciated at COP28, we are committed to driving environmental impact through cutting-edge technology. Discover how we are revolutionizing electronics for a greener tomorrow.

#### **NEUOME TECHNOLOGIES PRIVATE LIMITED**

1	

Name of the Exhibitor	: Neuome technologies private limited
Address	: VV Towers, Beretana Agarhara, Electronic City, Bangalore - 560100, Karnataka, India
Contact Person	: Mr. Anand Babu Vangala
Designation	: Head of Regulatory Affairs
Mobile	: +91-9848188342
Email	: anand@neuome.com
Website	: https://Neuome.com
Sector	:
Profile:	

Neuome Technologies Private Limited is a niche biotech innovation startup with proprietary technologies, and assays with wide applications in the molecular diagnostics space. We are a sustainable platform for therapeutic, prophylactic or diagnostic technologies developing Lifesciences R&D innovations. We Endeavor to make a difference Founded by an interdisciplinary scientist with impeccable credentials from leading global universities International collaborations in place with principal investigators in the U.S and E.U regions Strategic plan with a scalable business model built on validated technologies, and patenting strategy.





#### **NEUORIGAMI AUTOMATION INDIA PRIVATE LIMITED**



Name of the Exhibitor	: Neuorigami Automation India Private Limited
Address	: Techpark Building Ground Floor BVB Campus Vidyanagar Hubbali-580031 Hubbali Karnataka
Contact Person	: Mr. Sagar Virapannavar
Designation	: Managing Director
Mobile	: +91-8123897365
Email	: neuorigamiautomationindia@gmail.com
Website	: https://neuorigamiautomation.com/
Sector	: Healthcare

#### Profile:

To become a premier Med-tech company in the country to design and manufacture the besthealth care devices at an affordable price. In-Spire is an automatic respirator which automates the AMBU bag and provide breathing assistance to the patients. It is equal to moderate or low ventilator providing continuous ventilation in supporting the life of the patient.

#### **NEWCHEM SUNRAYSIA**



Name of the Exhibitor	: Newchem Sunraysia	
Address	: 401, Samraat Qubism, Gangapur Road, Nashik, 420013 Maharashtra	
Contact Person	: Mr. Yannick Rebello	
Designation	: Business Development	
Mobile	: +91-8956496943	
Email	: yannick@theorganicstory.com	
Website	: https://Sunraysia.co.in	
Sector	:	
Profile:		

Newchem sunraysia is a manufacturer for effervescent tablets which deal into fertilizer and pesticides all in tablet form







#### NOPO NANOTECHNOLOGIES INDIA PVT. LTD.

Name of the Exhibitor	: NoPo Nanotechnologies India Pvt. Ltd.
Address	: No 26D, Veerasandra Industrial Area, Electronic City PO, Bangalore - 560100, Karnataka, India
Contact Person	: Dr. Shivanand Nannuri
Designation	: Senior Engineer
Mobile	: +91-8310777411
Email	: shivanandhnannuri@gmail.com
Website	: https://www.noponano.com/
Sector	:
Profile:	

Specialises in manufacturing small diameter single-walled carbon nanotubes (SWCNT) for applications ranging from electronics, sensors, semiconductors, EV batteries, medical, filtration and others.

#### SCITECHESY RESEARCH & TECHNOLOGY PRIVATE LIMITED

HES		1	P
ITEC	S	RI	78
S			Ö
			/

Name of the Exhibitor	: Scitechesy Research & Technology Private Limited
Address	: Plot no. 14. Ecotech II, Udyog Vihar Extension, Greater Noida - 201310, Uttar Pradesh, India
Contact Person	: Dr. Fanindra Pati Pandey
Designation	: Founder & MD
Mobile	: +91-9044811530
Email	: director@scitechesy.com
Website	: https://www.scitechesy.com
Sector	: Manufacturing
Profile:	

SRT, India's leading nano-material company, specializes in producing nano metals like silver, zinc, graphene,copper, and gold nanoparticles. Our goal is to become India's top nanotechnology manufacturer. Recognized by DIPP and holding MSME status, SRT was incubated at BHU's Bionest with seed funding from Startup India and BIA. We received further support from BIRAC's BIG Grant, mentored by C-CAMP, a major milestone in 2021. Additionally, ICICI Foundation named us one of India's top 10 startups out of 1300 in its IMPACT Startup grant. In 2024, we launched our manufacturing unit in Ecotech II, Greater Noida.





## NANOSTRUCTURES PROPERTIES, PROCESSING, AND APPLICATIONS (ELSEVIER BOOK)

Name of the Exhibitor	: Nanostructures Properties, Processing, and Applications (ELSEVIER BOOK)
Address	: Panjab University, Department of Chemical Engineering & Nanotechnology, Chandigarh - 160014, India
Contact Person	: Prof. Gaurav Verma
Designation	: Professor
Mobile	: +91-9872492858
Email	: gauravvermas@gmail.com
Website	: https://www.sciencedirect.com/book/9780128200483/nanostructures
Sector	: Others

Profile:

Nanostructures: Properties, Processing, and Applications is oriented around the Structure-Property-Processing-Applications and Performance lifecycle of materials development at the nanoscale. Through analogies and nillustrations, the book explains the complex fundamentals in the areas of nanoscience and nanotechnology in an accessible way using novel analogies. The structures of metallic, polymeric, ceramic, hybrid, novel and natural nanomaterials are covered in depth to provide a broad-based understanding to the reader. This is an important information source for early career researchers and engineers wanting to understand the fundamentals of nanostructured materials, and what their major applications are.

#### SEMICONDUCTOR FABLESS ACCELERATOR LAB



Name of the Exhibitor	: Semiconductor Fabless Accelerator Lab
Address	: 1st Floor, KWINGS, HSR Layout, Bengaluru - 560102, Karnataka, India
Person	: Mr. Kaip Sridhar
Designation	: CE0
Mobile	: +91-9845046645
Email	: sruthi@sfalcoe.com
Website	: https://www.sfalcoe.com
Sector	: Electronics

Profile:

Semiconductor Fabless Accelerator Lab (SFAL), is a K-Tech CoE for Fabless community. An initiative funded by the Department of Electronics, IT, Bt and S and T of Government of Karnataka through its Karnataka Innovation Technology Society (KITS), in collaboration with India Electronics and Semiconductor Association (IESA) towards developing and enhancing the fabless ecosystem in India. Focus of SFAL is around enabling fabless startups, across India and encourage creation and development of Products/IPs from India.









#### **TRINANO TECHNOLOGIES PVT LTD**

Name of the Exhibitor	: TriNANO Technologies Pvt Ltd
Address	: 907, Ellora Fiesta, Sector – 11, Plot No. 8, Opp Juinagar railway station Juinagar (W), Navi Mumbai
Contact Person	: Mr. Abhijith PP
Designation	: Technical Manager
Mobile	: +91-8075710239
Email	: abhijith@tri-nano.co
Website	: https://tri-nano.co/
Sector	: Environment/ Energy

Profile:

TriNANO Technologies developed innovative solid state nanocoating made of inorganic ceramic material with three main properties such as light trapping, self-cleaning and anti-reflection. Our nanocoating optimizes the performance of every solar panel regardless of its make, type, age or location. We increase energy output, extend panel life and minimize cleaning requirements, ensuring sustainable and efficient solar power generation from day one from our coating.

#### **VNIR BIOTECHNOLOGIES PRIVATE LIMITED**



Name of the Exhibitor	: VNIR BIOTECHNOLOGIES PRIVATE LIMITED
Address	: Bangalore Bioinnovation Centre, Helix Biotech Park, Electronic City, Phase I Bangalore, Karnataka
Contact Person	: Dr. Jagadeesh Daler
Designation	: Co-Founder & Coo
Mobile	: +91-7972669852
Email	: jagadeesh@vnir.life
Website	: https://www.vnir.life
Sector	: Healthcare
D (1)	

Profile:

VNIR Biotechnologies is a deep science startup focused on delivering imaging and diagnostic solutions. VNIR leverages its core strength in conceiving, designing, and synthesizing novel molecular probes which specifically recognize different targets from healthy and diseased cells. Backed by a decade of scientific research and patents, VNIR offers a wide range of non-toxic products that allow detecting Alzheimer's at antibody quality to salmonella in foods, imaging organelles like mitochondria to sensitive reactive oxygen species. VNIR is on a path of continuous innovation to develop niche products for life sciences and agriculture. VNIR is glad to be delivering world-class innovative products, proudly made in India for the World.

Notes	

Notes	

Notes	



#### Ranked





All India Innovation Rank Band 11-50



#### **Programs Offered**

#### Undergraduate Programs

MSRIT offers the following 4 year Bachelor's Degree programs in

#### Aerospace Engineering

Artificial intelligence and Bata Science
Artificial Intelligence and Machine Learning
Biotechnology
Civil Engineering
Chemical Engineering
Computer Science & Engineering
Computer Science & Engineering (Artificial Intelligence And Machine Learning)
Computer Science & Engineering (Cyber Security)
Electrical & Electronics Engineering
Electronics & Communication Engineering
Electronics & Instrumentation Engineering
Electronics & Telecommunication Engineering
Industrial Engineering & Management
Information Science & Engineering
Medical Electronics Engineering

Mechanical Engineering

#### 5 Year Bachelor's Degree in Architecture

#### **Programs Offered**

#### Master of Technology (M.Tech) Programs

Aerospace Engineering
Artificial Intelligence
Biotechnology
Computer Network Engineering
Computer Science & Engineering
Data Sciences
Digital Electronics & Communication
Robotics & Artifical Intelligence
Robotics & Artifical Intelligence Structural Engineering
Robotics & Artifical Intelligence Structural Engineering VLSI Design & Embedded Systems

#### Postgraduate Programs

Master of Business Administration (MBA)

Master of Computer Applications (MCA)

#### A tribute to a Noble soul



#### Dr. M.S. Ramaiah (1922 - 1997)

Founder Chairman, Gokula Education Foundation

We offer our humble tributes to our venerable founder Chairman, Karmayogi Dr. M S Ramaiah, a renowned philanthropist, educationist and visionary who Established the Gokula Education Foundation in 1962 and M S Ramaiah Institute of Technology (MSRIT) was started in the same year envisioning the need for quality technical education towards taking India ahead.

MSRIT has celebrated the centenary birth anniversary of founder chairman Dr. M S Ramaiah and Diamond Jubilee year of M S Ramaiah Institute of Technology (MSRIT) during 2022-23. At this juncture, we at MSRIT reiterate our commitment to creating world-class technical professionals who strongly reflect the universal human values of integrity, honesty, and character as they go on to contribute to the nation and the world at large.

#### **Research Programs**

Research programs leading to Ph.D/M.S are available in the following departments.

Architecture
Biotechnology
Chemical Engineering
Chemistry
Civil Engineering
Computer Science & Engineering
Electronics & Communication Engineering
Electrical & Electronics Engineering
Electronics & Instrumentation Engineering
Electronics & Telecommunication Engineering
Industrial Engineering & Management
Information Science & Engineeringmedical
Masters of Business Administration (MBA)
Master of Computer Applications (MCA)
Mechanical Engineering
Mathematics
Physics



# Temperature Control Ranging from Inspired by temperature -125°C to +425°C



Huber Process Control Systems India Pvt. Ltd. Contact: 08023647966 Mail ID: contact@huber-india.com Website: www.huber-onilne.com

ವಿಶ್ವೇಶ್ವರ	ರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ	
		5
VIDVESVC (A Chota Liniuani		EL YEAR
ರಣತ ಮಹೋತ್ಸವ (A State Universit	Sangama', Belagavi - 590018, Karnataka	Jubilee
E E E E E E E E E E E E E E E E E E E	B.Tech. Courses at VTU Campuses	S S
अद्भर रंगांच्य JNANA SANGAMA जानसंग	Belagavi Campus : Visvesvaraya Technological Univ	versity
S Shadada	'Jnana Sangama', Belagavi – 590 018, UG (B.Tech.) Programs CET Code: E279	Intake
	1. B.Tech. in Robotics & Automation	60
	2. B.Tech. in Computer Science and Business System	120
Some of the	3. B.Tech. in Computer Science & Engineering	120
accomplishments	5. B.Tech, in Electronics and Computer Engineering	60
of VTU :	6. B.Tech. in Electronics Engineering	60
	(VLSI Design & Technology)	
	Kalaburagi Campus : Rajapur, Kusnoor Road Kalaburagi-5	85 106.
	UG (B.Tech) Programs CET Code: E289	Intake
Ministry of Education Rankings	1. B. Tech.in Artificial Intelligence & Data Science	60
Government of India	2. B. Tech in Computer Science & Engineering	120
52 <sup>™</sup> Rank in	5. B. rech in Electronics and Computer Engineering	60
Engineering Category	Mysuru Campus : Hanchya Sathagalli Layout Near Ring Road, Mysuru-570 019.	2
63 <sup>rd</sup> Rank in	UG (B.Tech.) Programs CET Code: E290	Intake
University Category	1. B.Tech. in Artificial Intelligence & Data Science	60
	2. B.Tech. in Electronics & Communication Engg.	60
92 <sup>m</sup> Rank in	3. B.Tech. in Mechanical Engineering	60
Overall Category	4. B.Tech. in Computer Science & Engineering	120
95 <sup>th</sup> Rank in	Muddenahalli Campus : Visvesvaraya Institute of Adva Technology Centre (VIAT) Muddenahalli Chikkhalla	ance nura
Management Category	UG (B.Tech.) Programs CET Code: E278	Intake
	1. B.Tech. in Aeronautical Engineering	60
ARTIAMOE	2. B.Tech. in Electronics & Computer Engineering	60
ON INNOVATION ACHIEVEMENTS	3. B.Tech in Mechanical & Smart Manufacturing	30
VTU enters the	4. B.Tech in Robotics & Artificial Intelligence	60
ARIIA in a	5. B.Tech. in Computer Science and Engineering	120
Band – Performer	6. B.Tech. in Electronics and Communication Engineering	60
Categoly.	Offers MBA, MCA, M.Tech. & M.Plan. Programs in all car	npuses
2 Strive India Research Examiners	ONLINE PROGRAMS BY VTU	
Classics Awards 2021	Undergraduate Programs	
	•BBA in Digital Marketing	
Prestigious Indian	BCA in Data Analytics     BCA in Data Sciences	
Research Excellence	Postgraduate Programs Apply@vtu-online.	net .ac.in
Citation Awards 2021	MBA in Business Analytics     MBA (HRM / FM / MM)	
by Clarivate	•MCA in Artificial Intelligence & Data Science	
	MCA in Cyber Security & Cloud Computing	
Education Biccontion Biccontion	Postgraduate Diploma Programs     PGD in Cyber Security & Cloud Computing	
Aurige of an environment of a series Management of a series Management of a series Charles Constraints, Co	•PGD in Big Data Analytics	
Bagged prestigious award	•PGD in Software Testing     •PGD in (Financial Analytics/ Marketing Analytics/ HR Ar	alytics)
"Excellence in Distance Learning	•PGD in (Investment Management /Risk Management /	ary rics)
Programs" by Economic Times	Financial Management/ Retail Management)	
for the year 2024.	Linpowering minus Any where, Anythine	

. .



India's most comprehensive Exhibition for the Bulk, Fine & Specialty Chemical Industry

International Exhibition on Chemical Process Technology, Equipment & Supplies International Exhibition on Chemical Warehousing, Transport & Logistics

#### APRIL 29-30, 2025 | HALLS 2, 3 & 6 | BEC | MUMBAI

#### **EXHIBITOR PROFILE:**

- Agrochemicals & Intermediates
- Contract Manufacturing, Custom Synthesis and Research
- Consultancy Services
- Data Management
- Dyes, Pigments, Textile Chemicals
- Fine Chemicals
- Flavours, Fragrances, Aroma Chemicals
- Home and Personal Care Ingredients
- Oil & Gas
- Organic and Inorganic Chemicals
- Paint, Coating, Inks
- Pharmaceuticals (API's, Intermediates)
- Plastics Additives
- Speciality Chemicals
- Water Treatment Chemicals
- Other Specialty Chemicals

#### EXHIBITOR PROFILE:

- Process Equipment & Technology
- Automation & Process Control
- Environment, Health & Safety
- Packaging Technology
- Engineering Services
- Analytical & Scientific Instruments
- Consulting Services
- Financial & Insurance Services

#### **EXHIBITOR PROFILE:**

- Freight Forwarders
- Industrial Parks
- Logistics Service Providers
- Material Handling Equipment
- Ports & Terminals
- Storage Tanks & Containers
- Transportation Vehicles & Accessories
- Warehouse Management

## Booking for ChemExpo India 2025 is NOW OPEN

For more information contact: **Mr. Rohit Pande,** Project Head - ChemExpo India **Mobile:** +91-98202-24550 **Email:** rohit@chemexpoindia.com

#### Connect with us:



in chemexpoindia

#### 🚯 ChemExpoIndia 🛛 🌀 chemexpo\_india

## **STM Journals**

STM Journals, an imprint of Consortium e-Learning Network Private Ltd. is a leading premier research provider in the realms of scientific, technical, medical, law, and management with a rich portfolio of over 275 journals.



#### Why Choose Us?

- Your research matters
- Global Platform
- Publish with prestige
- Networking opportunity
- Interdisciplinary Focus
- Special Issues
- Peer review

- Fast Track review
- Editorial board Expertise
- Publication Ethics
- Indexing and Abstracting
- Access to data and resources
- Language editing services
- DOI Facility



journalspub.com



stmconferences.com



apid.journalslibrary.com

Law & Management

Computer security

Human Rights

**Business** Law

Real estate



#### Engineering

- Computers IT
- Electrical & Electronics
- Architecture & Civil
- Chemical
- Mechanical



#### **Multidisciplinary Domain**

- Biotechnology
- Nanotechnology
- Mechatronics
- Applied Mechanics



#### **Medical & Nursing**

- Medical
- Nursing
- Pharma
- Pharmacology
- Pharmaceutical Sciences



#### Humanities

- Social Science
- Education
- Culture
- Literature





#### Science

- Chemistry
- Life Sciences
- Physical Sciences



www.bengaluruindianano.in

## Torch Bearer of NANO TECHNOLOGY IN AGRICULTURE





NANO Fertilizer



NANO Bio Stimulants



NANO Nutrients



NANO Polymer Composites



NANO Dispersions

 INDUSTRIES WE SERVE

 Image: Agriculture
 Image: Animal Husbandary
 Image: Animal Science
 Image: Animal Science</td

Our vision is to design fertilizers & nutrients through innovation and collaboration in Nano technology to improve the efficiency and sustainability of global agriculture sector.



#### CONTACT US

🛛 support@raynanofertilizer.com 🕻 +91 7284 096 666

Ray Nano Science & Research Centre, C7 & 8 opp. Fine Cast, G.I.D.C., Vithal Udyognagar: 388121 Dist: Anand, Gujarat, INDIA.

SCAN QR CODE



www.ravnanofertilizer.com



## World's #1

### semiconductor and display equipment company

We are the leader in **materials engineering** solutions used to produce virtually every new chip and advanced display in the world. Our expertise in modifying materials at atomic levels and on an industrial scale enables customers to transform possibilities into reality. At Applied Materials, our innovations **Make Possible® a Better Future**.





Scan the QR Code to know more about us!

We are an equal opportunity employer.

© 2024 Applied Materials, Inc. All rights reserved. Applied Materials, the Applied Materials logo and Make Possible are trademarks of Applied Materials, Inc. in the U.S. and other countries.