Faculty Development Program

VIT®
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

Discussion Points

- Designing Organic Transistors for High Performance. Process Development and Electromechanical Stability in Flexible Devices
- Materials and Devices for Biodegradable Electronics. OFETs with Natural Material Components
- Design and development of piezoresistance material for specific enhancement of sensor parameter for biomedical application
- Design and development of capacitance pressure sensors for touch tactile & mechanical
- Introduction to low dimensional materials, their properties and possible use in electronic industry
- Introduction to the fascinating aspect of quantum technology and quantum computation
- Strong light-matter interactions in 2D materials
- Optoelectronic devices from low-dimensional semiconductors
- Novel methods of engineering and manipulating oxide heterostructures at low dimensions
- Thickness, composition, and superlattice of different oxide layers to explore a wide range of properties, such as electrical, magnetic, and optical
- Emerging 2-D materials: Electrical and Optical Properties
- Single Photon Sources based on Low dimensional materials. Photodetectors using Low dimensional materials
- Interdisciplinary field of solid state ionics, which focuses on the development of energy storage devices that do not require liquids
- Explore various models for ionic transport, examine electronic processes in ionic solids, and analyze mixed electronic-ionic conduction
- An overview of global energy demand and sources, emphasizing the importance of renewable energy
- Fundamentals of photovoltaic technology, including the physics of silicon solar cells, material properties, fabrication processes & efficiency metric
- encompass the various light management techniques, such as anti-reflective coatings,

	plasmonic effects, and photon management strategies - potential for next-generation solar cells, sustainability in manufacturing processes, and the role of policy in shaping the future of energy - Discuss the development of Li ion batteries, Na ion batteries, and current state of the art developments. - Introduction to supercapacitors, explain how batteries and supercapacitors can complement each other

	**Resource Person 1 - Details** **Name :** Ramesh M Thamankar **Designation :** Associate Professor Sr., Centre for Functional Materials **University/ Company :** VIT, Vellore **Address :** India, 632014.
	**Resource Person 2 - Details** **Name :** Dr Anshuman Dalvi **Designation :** Professor, Physics Department **University/ Company :** Birla Institute of Technology Pilani, Pilani **Address :** India, 333031.
	**Resource Person 3 - Details** **Name :** Dr Sanjay Kumar Ram **Designation :** Associate Professor, School of Arts and Sciences **University/ Company :** Amrita Vishwa Vidyapeetham Amritapuri , Amritapuri **Address :** India, 690525.
	**Resource Person 4 - Details** **Name :** Dr Shree Prakash Tiwari **Designation :** Professor, Electrical Engineering **University/ Company :** IIT Jodhpur, Jodhpur **Address :** India, 342037.
	**Resource Person 5 - Details** **Name :** Palla Penchalaiah **Designation :** Associate Professor Grade 1, School of Electronics Engineering **University/ Company :** VIT, Vellore **Address :** India, 632014.
	**Resource Person 6 - Details** **Name :** Krishnamoorthi C **Designation :** Associate Professor Sr., Centre for Nanotechnology Research **University/ Company :** VIT, Vellore **Address :** India, 632014.
	**Resource Person 7 - Details** **Name :** Ankur Rastogi **Designation :** Assistant Professor Grade 2, Centre for Functional Materials **University/ Company :** VIT, Vellore **Address :** India, 632014.
	**Resource Person 8 - Details** **Name :** Dr Surendra Babu Anantharaman **Designation :** Assistant Professor, Metallurgical and Materials Engineering **University/ Company :** IIT Madras, Chennai **Address :** India, 600036.

Resource Person's Profile :

1. Profile of Ramesh M Thamankar

Dr. Ramesh Thamankar is currently working as Associate Professor at Centre for Functional Materials, Vellore Institute of technology Vellore in India. He received his Ph.D. in 2004 from Freie University, Berlin, Germany focusing on understanding the magnetism at low dimensions. From there on he worked at Department of Physics, University of California, Riverside, USA and worked on the design and fabricating the CNT based spin valves for spintronics applications.

2. Profile of Dr Anshuman Dalvi

I received my M.Sc. from the School of Physics at D. A. University, Indore in 1997, and my Ph.D. from the IIT, Kanpur in 2003, under the supervision of Prof. K. Shahi. After that, I continued at the Department of Physics, IIT Kanpur, as a CSIR project scientist for almost a year. In June 2004, I joined the Physics department at BITS-Pilani as a Lecturer. From January 2006, I worked as an Assistant Professor. I have been working as a Professor of Physics since July 2018.

3. Profile of Dr Sanjay Kumar Ram

Dr. Sanjay K. Ram currently serves as Associate Professor at the Department of Physics, School of Arts and Sciences, Amrita Vishwa Vidyapeetham, Amritapuri. Dr. Sanjay K. Ram is an experimental physicist with over 25 years' experience, including extensive work at various leading European and Indian research institutions. His expertise spans a diverse range of fields, which can be described under: Advanced Material Sciences, Nanotechnology, Nanofabrication, Photonics and Electronic Devices.

4. Profile of Dr Shree Prakash Tiwari

Shree Prakash Tiwari had joined IIT Jodhpur in 2011 where he is currently working as Professor in Department of Electrical Engineering. Prof. Tiwari received his Ph.D. in 2008 from EE Department at IIT Bombay. At IIT Jodhpur, he leads the Flexible Large Area Microelectronics Research Group, with focus towards exploration of devices and systems for eventual biodegradability and green electronics. He has co-authored over 130 research articles, including more than 65 in journals of high repute.

5. Profile of Palla Penchalaiah

Dr.Penchalaiah Palla is an Associate Professor at Vellore Institute of Technology Vellore. He is an expert in his field of low-dimensional electronics and optoelectronics design, simulation, and fabrication, and he has published numerous articles in top international journals. He is an active member of various professional societies (IEEE EDS, IETE, and ISTE) and has delivered talks at national and international conferences.

6. Profile of Krishnamoorthi C

Dr. Krishnamoorthi C earned PhD from Indian Institute of
Technology Madras. Later worked as Research Scientist at GE Global Research Center at Bengaluru and as Research Fellow at National University of Singapore, Singapore. Currently working as Associate Professor of Applied Physics at Vellore Institute of Technology Vellore, India. Current research interest are development of wearable physical sensors for biomedical and robotic applications, Magnetic Nanoparticles for biomedical applications.

7. Profile of Ankur Rastogi

Dr. Ankur Rastogi is an Assistant Professor at the Centre for Functional Materials, VIT. He obtained his Doctoral degree in Physics form Indian Institute of Technology, Kanpur in 2014. His research background includes interface engineering of functional materials, magnetism, spin transport, and thermoelectrics in complex oxides, and device fabrication and characterization. He has authored over 25 research publications in reputed journals.

8. Profile of Dr Surendra Babu Anantharaman

Dr. Anantharaman is an Assistant professor at Indian Institute of Technology Madras. He has completed his PhD in 2019 from Materials Science and Engineering, Swiss Federal Institute of Technology Lausanne, Switzerland. His research work mainly involves experimental on materials synthesis, device fabrication, and characterization. In addition, theoretical calculations and simulations to understand the bottlenecks in the device performance will be focused.

This faculty development program (FDP) has been conceptualised keeping in mind the diverse and intense development in the area of materials science applied to futuristic devices and energy technologies. Additionally, the eventual goal is to develop and demonstrate newer process technologies for reducing the impact on environment. In the recent past, there has been tremendous interest in developing materials for the flexible electronics, especially for the consumer electronics applications. These include future display devices, wearables, sensors and devices for biomedical applications. Taking advantage of the ability to conform to more organic shapes, electronic capability can then be incorporated into more consumer and industrial products, and combined with rapid advancements in data analytics and artificial intelligence, bring digital intelligence to the greater world. Alongside, there has been inexorable drive towards ever smaller semiconductor devices, which is currently at 5 nm. These devices are building blocks of products ranging from cell phones to personal computers, to supercomputers. In the past decade, 2-D materials have received a lot of attention and have emerged as possible replacement for semiconductor device technologies beyond the scaling limits of silicon. The 2-D materials are picking up attention in applications beyond classical computing, into the quantum technologies and computing. In parallel, there has been a lot of research on materials for future energy technologies that would replace conventional technologies based on Li-ion batteries. Furthermore, there have been tremendous developments on materials for energy harvesting and energy storage technologies. The FDP will focus on (i) the recent developments in the flexible electronics from materials to devices (ii) the recent developments in the 2D materials for future electronics (iii) the advances in next generations of energy technologies, including the future solid state batteries.

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Coordinator's: **Prof. RAJAN KUMAR PANDEY 16406 - Associate Professor Sr. - SENSE**
Prof. SAURABH NAGAR 16390 - Assistant Professor Sr. Grade 1 - SENSE