Report

Date: March 13, 2024
Time: 4:30 PM (IST)
Location: Committee Room, Department of Electronics Engineering, IIT (BHU), Varanasi
Organized by: IEEE Nanotechnology Council, Electron Devices Society, IETE Varanasi Sub-centre, AP-S, MTT-S Student Branch Chapter IIT (BHU), and Department of Electronics Engineering, IIT (BHU), Varanasi.

Introduction:
The IEEE technical talk on "**Introduction to Nanomaterials for Sensing Applications**" brought together researchers and engineers in the field of electronics. The event aimed to highlight the fundamental principles behind nanomaterial-based sensors, including the types of nanomaterials commonly used, their synthesis methods, and the mechanisms of sensing. Additionally, it will explore some key examples of nanomaterial-based sensors and highlight their potential advantages and challenges in sensing applications.

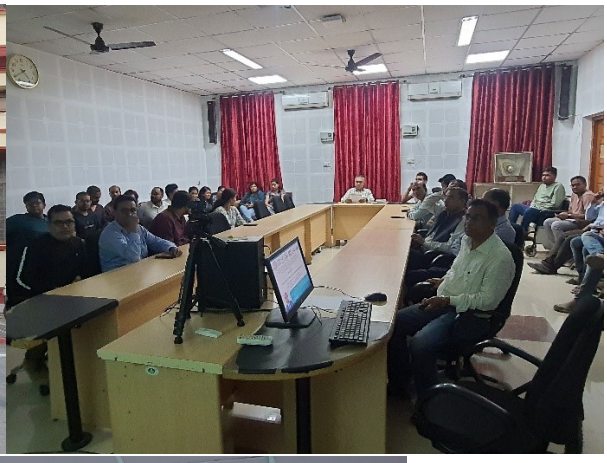
Opening Remarks:
The event commenced with opening remarks by Dr. Manoj Kumar Meshram (Professor and HOD, Department of Electronics Engineering IIT-BHU), expressing gratitude to the speakers and attendees for their participation.

Speaker Presentations:
Professor Satyabrata Jit delivered a series of insightful presentations, generously sharing their extensive expertise and research findings. The presentation delved into the origins of nanotechnology, tracing its roots back to seminal works by Richard Feynman and the inception of the concept of "nanotechnology" in 1959. Prof. Jit elaborated on the evolution of nanomaterials, emphasizing natural nanostructures like the Brazilian crystal, Lycurgus cup, cytomegalovirus, viral capsid, peacock wing, butterfly wings, and others, which paved the way for ground-breaking advancements in materials science and nanotechnology. The talk covered different types of nanomaterials commonly used in sensing applications, including nanoparticles, nanowires, nanotubes, and 2D materials like graphene. Each type of nanomaterial possesses distinct properties that can be tailored for specific sensing requirements. Building upon this historical foundation, the talk transitioned to an exploration of the unique properties of nanomaterials that make them highly suitable for sensing applications. Jit explained how the fundamental characteristics of nanomaterials, including their high surface-to-volume ratio, quantum effects, and tunable properties, confer exceptional sensitivity and selectivity in sensing devices. Furthermore, Prof. Jit discussed various synthesis methods for producing nanomaterials, such as chemical vapour deposition, sol-gel, and self-assembly techniques. Understanding these methods is crucial for controlling the size, morphology, and composition of nanomaterials, which directly influence their sensing performance. Throughout the presentation, examples of nanomaterial-based sensors for environmental monitoring, healthcare diagnostics, and food safety applications were discussed, illustrating the wide-ranging potential of nanotechnology in sensing. Finally, the discussion emphasized the relevance of nanomaterials in developing sensing technology, as well as continuing research efforts targeted at enhancing the performance and scalability of nanomaterial-based sensors.

Closing Remarks:
The event concluded with closing remarks from Dr. Somak Bhattacharyya (Associate Professor, Department of Electronics Engineering IIT-BHU), expressing gratitude to the speakers and attendees for their contributions to the technical talk. In a fitting conclusion, we had the honour to have Dr. Manoj Kumar Meshram (Professor and HOD, Department of Electronics Engineering IIT-BHU) present a memento of appreciation to Dr. Satyabrata Jit.

The report includes several pictures capturing the key moments of the talk.


DEPARTMENT of
ELECTRONICS ENGINEERING
IIT (BHU)




What is Nanomaterial or Nanostructured Material?
Nanomaterials or Nanostructured Materials are, in principle, a set of particles or substances of which at least one dimension is between 1 nanometer (10^{-9} meter) and 1000 nanometres but is usually 1—100 nm (the usual definition of nanoscale)
List of Some Nanostructures
Nanofilm
Nanocages
Nanocomposite
Nanofabrics
Nanofiber
Nanoflake
Nanoflower
Nanoribbon
Nanoring
Nanofoam
Nanomesh
Box-shaped
Nanoparticle
Nanopillar
Nanopin film
Nanoplatelet
Nanorod
Nanowire
Nanosheet
Nanoshell
Nanotip
Quantum dot
Quantum heterostructure
Sculptured thin film

IETE Varanasi Sub-centre, MTT-S, AP-S, AESS, EDS, and Nanotechnology Council Student Branch Chapters and Department of Electronics Engineering, IIT(BHU), Varanasi, UP

Presents

Technical Talk

on

"Introduction to Nanomaterials for Sensing Applications"

Time:16:30 PM (IST), Date: 13th March 2024

Venue: Committee Room, Department of Electronics Engineering, IIT(BHU), Varanasi, UP.

Speaker : **Prof. Satyabrata Jit**

Senior Professor (HAG Scale), Department of Electronics Engineering,
Indian Institute of Technology (BHU), Varanasi, INDIA.

Name	Signature	IEEE membership (YES/NO)
RAVI KUMAR		NO
Deepak Ram		Yes
Sagar Bhattacharya		YES
Rupam Bhasak		YES
Urvashi Singh		No
Ravi Mali		yes
Roopesh Sengl		YES
Ashok Kumar		YES
Richa Baranwal		Yes
Upadesh		YES
Brijesh Bharti		Yes
Ajeet Singh Verma		Yes
PRAVEEN SINGH RATHORE		YES
Deepak Ram		Yes
Kirti		Yes
Pratibha Verma		Yes
Rahul kumar Gond		No
Shashwat Tripathi		No
Akshar Shishodia		No
Vishnu Kr. Mishra		Yes
Prem Prakash Manglam		No
SOMAK BHATTACHARYYA		YES
Shivam Verma		Yes
Bharat		Yes
Amit Kumar Singh		Yes