DEPARTMENTS

Student News Spring 2023

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Student Chapter News

ECS Indian Institute of Technology Madras Student Chapter

The student chapter's December 10, 2022, inaugural event brought 150 participants to the T. T. Jagannathan Auditorium at the Indian Institute of Technology Madras (IIT Madras). The chief guest, Professor **A. K. Shukla** (Honorary Professor, Indian Institute of Science, Bengaluru) inaugurated the student chapter. Prof. **V. Kamakoti** (Director, IIT Madras) presided over the event. Prof. **R. Gopalan** (Adjunct Professor, Department of Metallurgical and Materials Engineering, IIT Madras; former regional director, International Advanced Research Centre for Powder Metallurgy and New Materials [ARCI]) and Dr. **Rajendran N** (Head, Department of Chemistry, Anna University) attended as well. Faculty Advisors Prof. **Kothandaraman Ramanujam**, Prof. **Ramanathan S**, Prof. **Raghuram Chetty**, and Dr. **Raman Vedarajan** formally welcomed participants.

To enhance the audience's electrochemistry knowledge, a workshop was organized to accompany the inaugural event. Prof. Shukla's Plenary Lecture, "Fueling Future Cars' Sustainability," entranced the audience of young researchers and students. The quality of the question and answer session reflected their interest. Prof. Gopalan presented the first keynote lecture, "Electrochemistry-driven Materials for Electric Vehicle Applications." The talk began with a discussion of basic battery materials and advanced to real-life EV applications. Students were intrigued by this global hot topic and expressed their doubts and concerns in the Q&A session. Prof. Rajendran N delivered the second talk, "Electrochemistry: The Life-line in Biomaterials Development." He introduced his research area and presented his work on material synthesis, characterization, and application in body implants—which surprised students.

Based on students' feedback about the inaugural event, we decided to organize an industry visit to observe electrochemistry processes in person. On December 30, the chapter visited the ARCI IIT Madras research park. The visit's goal was to view the functioning of fuel cells and their application in power generation and transportation. The students visited facilities that included the synthesis, fabrication, processing, finishing, and characterization labs. The visit encouraged their participation in future chapter activities.

For more information on the chapter, visit the chapter's website.

Participants at the December 10, 2022, ECS Indian Institute of Technology Madras Student Chapter Inaugural Event.

International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI) Project Scientist **Sundararajan Ramakrishnan** *explains fuel cells to visiting chapter members.*

The ECS Indian Institute of Technology Madras Student Chapter visits the International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI).

ECS Jawaharlal Nehru University New Delhi Student Chapter

The chapter's mission is to promote interest in and advancement of the design and application of cutting-edge nanotechnology and nanoscience-based biosensors/sensors, especially diagnostics. Our third event, *Sensors for Society*, took place on January 12, 2023, in the Jawaharlal Nehru University (JNU) New Delhi Convention Centre committee room. The goal was to provide an ideal academic platform for researchers to disseminate their research and develop technologies and directions in nanobiotechnology, electrochemistry, sensors (gas, bio, and wearable), materials science, and biomedical engineering. The Electrochemical Society (ECS) was the chief funder of the symposium, which was free of charge for attendees.

Prof. **Bansi D. Malhotra** (former Scientist, National Physical Laboratory and Delhi Technological University), who is known in India as the father of biosensors, gave the opening presentation, on the role of sensors and biosensors in the development of a nation and in a society's wellbeing. He discussed current technologies for sensors/biosensors in diagnostics, future possibilities, and limitations.

The valuable and enlightening views of Guest of Honor Prof. **Satish Chandra Garkoti** (Rector-1, JNU, New Delhi) inspired symposium participants. The second Guest of Honor, Ms. **Mallika Gope** (Director, National Accreditation Board for Testing and Calibration Laboratories [NABL]), delivered a plenary presentation on NABL's mission and vision. Their goal is to strengthen the accreditation system accepted across the globe by providing high-quality, value-driven services, fostering the APAC/ILAC MRA (Asia Pacific Accreditation Cooperation/International Laboratory Accreditation Cooperation Mutual Recognition Arrangement), empanelling competent assessors, creating awareness among stakeholders, initiating new programs supporting accreditation activities, and pursuing organizational excellence.

The chapter's faculty advisor, Dr. **Pratima Solanki** (Assistant Professor, JNU) and Prof. **Bijoy K. Kunar** (Chairperson, Special Centre for Nanoscience [SCNS], JNU), gave a short introduction on the student chapter.

Keynote speakers discussed the role of electrochemical sensors/biosensors as promising diagnostic technology that can detect biomarkers in body fluids such as sweat, blood, feces, or urine. They provided insight into the types of electrochemical biosensors and their applications, the importance of gas sensor devices in healthcare, and challenges and future outlook. In "Semiconductor Nanostructure-based Gas Sensors toward Human Health Monitoring," Dr. **Mrinal Pal** (Chief Scientist and Head, Central Glass and Ceramic Research Institute, Kolkata) described developing a breath analyzer for monitoring human health, which can significantly impact society. In "Soaring High: Salivary Nitrite Biosensors," Dr. **Niroj Kumar Sethy** (Scientist, Defence Institute of Physiology & Allied Sciences, and Defence Research and Development Organisation) described the development of point-of-care devices using salivary nitrite biosensors for screening people from low altitudes' preparedness for high altitude ascents. Ms. **Prachi Kukreti** (Deputy Director, NABL) discussed the process for accrediting testing laboratories. In "Chemi-resistive Gas Sensors," Dr. **Akash Katoch** (Assistant Professor, Centre for Nanoscience & Nanotechnology, Panjab University, Chandigarh) explained the formation of various core-shell-based nanofiber nanocomposites and their applications in gas sensing. Dr. **Debabrata Mishra** (Assistant Professor, University of Delhi) reviewed his research on "Development of Spin-based Biosensors using CISS Effect." A discussion on electrochemical sensors/biosensors, including challenges, knowledge gaps, and solutions, followed the keynote talks.

We thank the following JNU faculty members who served as oral session chairs:

- Dr. **Kavita Arora** (Assistant Professor, Advanced Instrumentation Research Facility [AIRF] and School of Computational & Integrative Sciences [SCIS])
- Dr. **Poonam Mehta** (Assistant Professor, School of Physical Sciences)
- Dr. **Priya Gupta** (Associate Professor, Atal Bihari Vajpayee School of Management and Entrepreneurship)
- Dr. **Ranjana Arya** (Assistant Professor, School of Biotechnology)

We also thank Dr. **G. B. V. S. Lakshmi** (Research Associate, SCNS) and Dr. **Tulika Prasad** (Assistant Professor, AIRF, SCNS) who evaluated the poster session.

The symposium included presentations by chapter members and other researchers. Six oral talks and six posters reflected the interdisciplinary nature of the event and chapter members' widespread fields of interest in topics such as gas sensors, biosensors,

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Participants at the ECS Jawaharlal Nehru University New Delhi Student Chapter's third one-day symposium, Sensors for Society, *held at the Jawaharlal Nehru University Convention Centre.*
Photo Credit: Gaurav Sahu, Nano-Bio Laboratory

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biomolecules, and theoretical modeling. Tea and lunch breaks and poster sessions allowed researchers from different groups to connect, make new friends, engage in scientific discussions, and network.

Young and budding scientists in the field responded enthusiastically to the fruitful, informative, and encouraging technical sessions. We received reports that the symposium was a satisfactory day of learning, fun, and making new connections. By hosting this event, our student chapter provided a valuable resource for scientists and engineers entering the interdisciplinary field of electrochemical biosensors. We built bridges between different sensor institutes in India and encouraged interdisciplinary dialogue in electrochemistry, sensors, and biosensors.

The chapter and event's organizing committee convey hearty thanks to JNU Honorable Vice-Chancellor, Professor **Santishree D. Pandit**, and Rector, Prof. Satish Chandra Garkoti, for obtaining administrative approval to organize *Sensors for Society* offline on campus. Thanks to the joint efforts of the chapter's faculty advisor, Dr. Partima Solanki, and chapter members, five invited speaker, and around 100 attendees/researchers from different Indian research groups attended the symposium. We thank the many researchers who participated and made it successful; participants and our partners for supporting our third symposium; and the constant efforts of chapter President Mr. **Amit K. Yadav**, Secretary **Damini Verma**, Treasurer **Navneet Chaudhary**, Vice-President **Reena Sajwan**, and the whole Nano-Bio Laboratory. We look forward to our next symposium!

Nano-Bio Laboratory members and chapter officers who organized the Sensors for Society *symposium are, from left to right, Secretary Dr.* **Damini Verma***; Dr.* **G. B. V. S. Lakshmi***; Faculty Advisor Dr.* **Partima Solanki***; President* **Amit K. Yadav***; Dr.* **Awadesh K. Verma***; Treasurer* **Navneet Chaudhary***; and* **Gaurav Sahu**.
Photo Credit: Dr. Tulika Prasad, Assistant Professor, AIRF and SCNS, JNU

ECS Jawaharlal Nehru University New Delhi Student Chapter officers are, from left to right, Secretary **Damini Verma***; Faculty Advisor* **Partima Solanki***; President* **Amit K. Yadav***; and Treasurer* **Navneet Chaudhary**.
Photo Credit: Gaurav Sahu, Nano-Bio Laboratory

ECS Purdue University Student Chapter

After a two-year hiatus, with the lifting of COVID restrictions, the chapter kicked off fall 2022 with a series of in-person seminars based on a common theme, *Modeling, Characterization & Analytics in Electrochemical Energy Systems* (MoChA). The first invited speaker, Dr. **Jordi Cabana** (Professor, Department of Chemistry, University of Illinois at Chicago [UIC]; and member, Joint Center for Energy Storage Research, Argonne National Laboratory), presented "Progress in the Analytical Capability of X-rays to Locate Chemical Phenomena in Battery Materials." Hosted by the chapter for the entire day, he met Prof. **Partha Mukherjee**, the chapter's lead faculty advisor, and interacted with chapter officers and members over lunch. The second invited speaker, **Jeffrey Dick** (Professor, Purdue Department of Chemistry), spoke on "Probing and Promoting Unique Chemistry in Water Micro and

ECS Purdue University Student Chapter lunch with invited speaker Dr. **Jordi Cabana** *and from left to right:* **Kaustubh G. Naik** *(member),* **Susmita Sarkar** *(Executive Advisor),* **Anuththara Alujjage** *(Communications Director), Dr.* **Avijit Karmakar** *(member),* **Sourim Banerjee** *(Secretary), Dr.* **Jordi Cabana**, **Debanjali Chatterjee** *(President), and Dr.* **Kingshuk Roy** *(member).*

Prof. **Partha P. Mukherjee** *(ninth from the left); invited speaker, Prof.* **Jeffrey Dick** *(eleventh from the left); and the Energy and Transport Sciences Laboratory group.*

Nanodroplets." The chapter is delighted to welcome Prof. Dick as a member of its Advisory Board. The semester's final invited talk was **Brian Tackett** (Professor, Purdue Department of Chemical Engineering) on "Modeling Reaction, Convection, and Diffusion for the Electrocatalytic CO_2 Reduction Reaction in Fundamental and Applied Systems."

Chapter President **Debanjali Chatterjee** and Vice President **Aditya Singla** took the lead in recruiting students from lab groups working in electrochemistry across various disciplines, such as mechanical engineering, chemical engineering, and chemistry. New members included undergraduates and first-year graduate students.

A successful 2023 chapter event was held in February, the *MoChA Poster Symposium*, Purdue's first-ever symposium on electrochemical sciences and engineering, where undergrads, graduate students, and postdoctoral scholars across several disciplines are invited to showcase their research on electrochemistry in energy storage and conversion. In the spring, the chapter will participate in *Purdue NanoDays*, a free event organized by Purdue's Birck Nanotechnology Center to introduce K–12 students, teachers, and parents to the field of nanoscale science through activities and games.

The chapter thanks The Electrochemical Society for providing this impactful platform for scientific outreach and Lead Faculty Advisor Prof. **Partha P. Mukherjee** for his time and invaluable guidance in conceptualizing these events. The chapter also thanks *Interface* readers and kindly asks them to follow the chapter's Twitter handle @EcsPurdue for updates on their latest activities.

Invited speaker Prof. **Brian Tackett** *presents "Modeling Reaction, Convection, and Diffusion for the Electrocatalytic CO_2 Reduction Reaction in Fundamental and Applied Systems."*

ECS Purdue University Student Chapter officers recruit new members over coffee and crêpes. From left to right: Vice President **Aditya Singla***; newly recruited member, Purdue Chemistry grad student* **Vanshika Gupta***; and President* **Debanjali Chatterjee.**


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