

CECRI NEWS

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National Science Day

National Science Day (NSD) is being celebrated in India on February 28th every year to commemorate the discovery of **Raman Effect** on this day in 1928 by Indian Physicist **Sir C.V. Raman**. **CSIR-Central Electrochemical Research Institute (CSIR-CECRI)**, Karaikudi, a pioneering and exclusive institute for electrochemical research established about 75 years ago in 1948, organizes every year a number of events in celebrating and popularizing National Science Day. The NSD-2024 events included competitions such as Essay, Poster, Oral, Science Photography, Graphical Abstract & Working Model Exhibitions for AcSIR PhD Scholars, Project Assistants, B. Tech. Students, and other staff members of CSIR-CECRI. All these activities were focused towards **Indigenous Technologies for Viksit Bharat**, the **Theme of NSD for 2024** designated by the Government of India.



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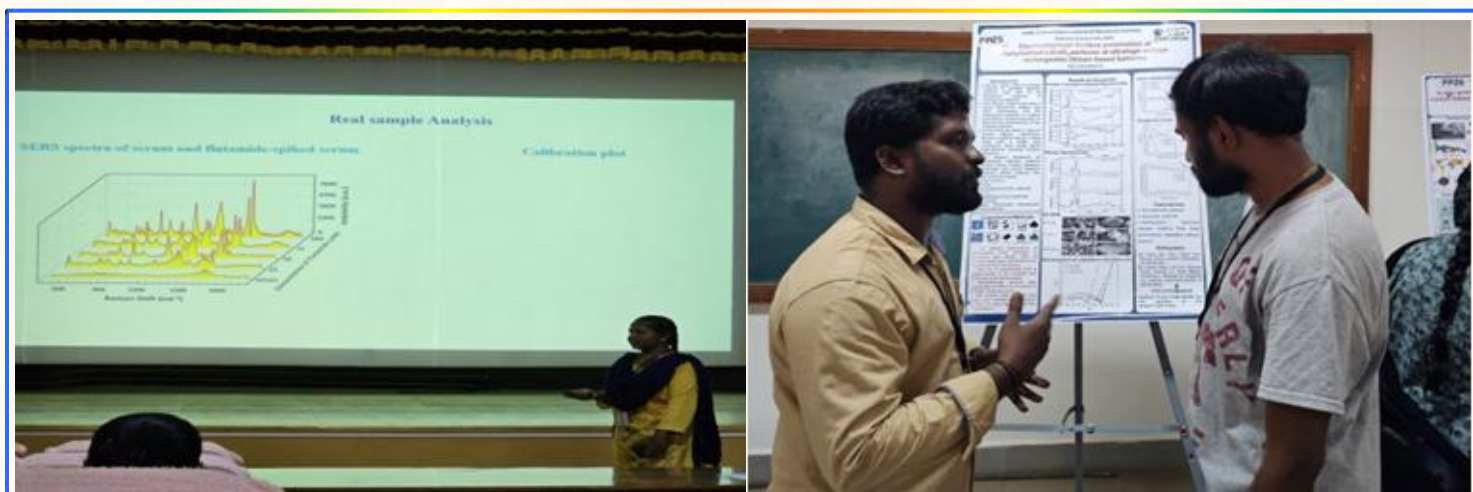
Distinguished Prof. Suresh Bhargava, Dean, Research & Innovative Research Partnerships (India), The Royal Melbourne Institute of Technology (RMIT) University, Australia delivered the **National Science Day Lecture** at CSIR-CECRI, Karaikudi on February 26, 2024. The event began with invocation followed by Welcome Address by Dr. Subbiah Alwarappan, Principal Scientist, CSIR-CECRI.

Dr. K. Ramesha, Director, CSIR-CECRI delivered the presidential address in which he recalled the struggles and perseverant efforts of Sir C.V. Raman towards his achievements in science especially the Nobel Prize winning work. In spite of all his intimidating issues, Sir C. V. Raman was inspired and determined to pursue his passion in finding solutions to scientific problems, he remarked. He called upon the scholars to exuberate passion and perseverance in their area of research and not to be deterred by the problems they encounter in the path towards the results, he added.

Prof. Bhargava, in his NSD Lecture on ***Building with Bubbles: Creating Unique Nano Surfaces for***

Different Applications highlighted his group's research outcome in this niche area and the exciting prospects lying ahead in its multifarious applications. At the beginning, he fondly remembered his active association with CSIR in various R&D and academic programmes with a special mention on the signing of **Memorandum of Understanding** between the **Academy of Scientific and Innovative Research (AcSIR) and The Royal Melbourne Institute of Technology (RMIT) University, Australia**. He also recognized and acknowledged the invaluable contributions of his mentors, Prof. CNR Rao and Dr. R.A. Mashelkar, to the Indian Science and Society as a whole.

Prof. Bhargava also informed the audience, particularly the young researchers, on the multiple options of pursuing their research career at RMIT, Australia mainly on the many student exchange programs on offer. He claimed that RMIT is at par with any of the Technical Universities in the World with its state-of-the-art research infrastructure and facilities. The MoU between AcSIR and RMIT eases the entry for research scholars in CSIR, he added.



At the end of his illuminating lecture, he divulged his **RRR** mantra for success [*Recognise, Remember, Reciprocate*] and answered the queries of the scholars with intrinsic details. The lecture turned out to be an eye-opener and ignited the passion for doing perseverant research among the scholars.

Prize distribution ceremony ensued the NSD-2024 Lecture in which the winners in the various competitions organized by CSIR-CECRI in commemoration of NSD-2024 were awarded with prizes and merit certificates by the dignitaries.

Events Organized by CSIR-CECRI for NSD-2024

ESSAY COMPETITION

This event was organized exclusively for the B.Tech. (Chemical & Electrochemical Engineering) students of CSIR-CECRI in which a large number of students actively participated. The competition provided a platform to explore and articulate the significance of indigenous technologies towards Viksit Bharat.

POSTER PRESENTATION

This competition, conducted for research scholars and staff members, was highly engaging and enriching event as the participants showcased their innovative work through posters. This event paved way for dissemination of their research findings and also fostered collaboration, exchange of ideas and new networking opportunities among the participants.

WORKING MODEL

In this competitive exhibition of working models, AcSIR PhD scholars exhibited their experimental findings which enabled gathering of feedback,

validation of the concept and tweaking for moving ahead with its development and deployment.

ORAL PRESENTATION

All the scholars (in their 3rd to final years) were given this opportunity to present their topic of choice with a special emphasis on the theme of NSD-2024. The participants shed light on highly interesting unexplored areas and impressed the audience with their oratorical skills. Competitions like these will sharpen their skills and prepare them with immense self-belief to present before larger audiences.

TED TALK

TED Talk was open for all the PhD scholars and project staff on trending topics. The presented topics were so engaging and overarching the goal of ideas worth spreading. The presenters were encouraged to present innovative and thought-provoking concepts that have the potential to inform, inspire or spark meaningful discussions on many emerging trends including AI, Social Media, etc.

SCIENCE PHOTOGRAPHY & GRAPHICAL ABSTRACT

PhD scholars and project staff were encouraged to use their imagination and creativity in showcasing the best electron microscopic images from their research work through Science Photography competition. Expressing the work in a pictorial representation is an art and this Graphical Abstract creation competition was conducted to motivate the scholars thereby enhancing their visual and creative thoughts.

The event ended with a Vote of Thanks by Dr. P. Murugan, Sr. Principal Scientist and AcSIR Coordinator, CSIR-CECRI.



Inauguration of ECS Student Chapter at CSIR-CECRI

On October 12, 2023, the Board of Directors of **The Electrochemical Society (ECS)** approved the chartering of five new **Student Chapters**, including one at CSIR-CECRI, bringing the total number of Chapters around the world to 136. On February 28, 2024, **Dr. S.A. Ilangoan**, Former Deputy Director, Vikram Sarabhai Space Centre (VSSC), Thiruvananthapuram inaugurated the **ECS-CECRI Student Chapter** at CSIR-CECRI, Karaikudi and delivered the Inaugural Lecture on **Powering the Batteries: A Promising Approach**. This Chapter will function as an official platform for research scholars from AcSIR and B.Tech. Students of CSIR-CECRI to share their interests and engage in activities that promote electrochemical and solid-state science and technology, which aligns with the academic goals and institutional values of CSIR-CECRI.

Earlier, **Mr. Sai Sitharth**, B.Tech. IV Year, elected President of ECS-CECRI SC, welcomed the gathering. **Dr. K. Ramesha**, Director, CSIR-CECRI in his presidential address thanked ECS for this interesting initiative which will serve as a launching pad for many

of the inspiring & innovative ideas of B.Tech. students and research scholars of CSIR-CECRI. He also delineated the positive impact of collaborative learning in his research career. **Dr. N. Lakshminarasimhan**, Sr. Principal Scientist, CSIR-CECRI and Faculty Advisor, ECS-CECRI SC informed the gathering about the mission of ECS and the future plans of the ECS-CECRI Student Chapter.

Dr. Ilangoan unveiled the logo and website of the student chapter (www.ecscecristudentchapter.com) and in his illuminating inaugural lecture talked about the current challenges in advancing battery technology, especially on the technical difficulties of engineering batteries & supercapattery for futuristic applications requiring high power and high energy.

The event served as a catalyst for future endeavors, providing a platform for learning, collaboration and growth within the electrochemical community. The event ended with a Vote of Thanks by **Ms. C. Jesica Anjeline**, AcSIR Scholar, elected Secretary of the ECS-CECRI SC.



Exclusive Training Programme for BPCL

CSIR-CECRI, Karaikudi conducted an Exclusive Training Programme on ***Cross Country Pipelines-Cathodic Protection and Survey Methods*** for BPCL Engineers and Senior Officials from all over India during January 29 - February 2, 2024 at Karaikudi. **CSIR-CECRI** is the **Knowledge Sharing Partner** on Corrosion and Materials Protection for BPCL Pipelines which is looking for capability enhancement in pipeline corrosion and mitigation measures. The Training Programme included 21 theory and 12 practical classes covering basic aspects of corrosion, testing & monitoring, pipeline metallurgy & failure analysis, coatings, biological corrosion, cathodic protection (CP), design of CP, stray current, instrument & maintenance of CP systems, CP case studies, and trouble shootings in CP systems. During the Inauguration, **Dr. K. Ramesha**, Director, CSIR-CECRI thanked BPCL for relying on CSIR-CECRI for many decades and the continued trust in choosing as the Knowledge Sharing Partner. *CSIR-CECRI's core strength lies in its corrosion mitigation and materials protection initiatives*, he added. **Mr. Pardeep Goyal**, Executive Director (Pipelines), BPCL graced the

occasion as Chief Guest and in his address, he expressed his gratitude to CSIR-CECRI for organizing a timely training programme on a topic which remains a perennial problem in pipelines. *CSIR-CECRI is equipped with world-class expertise and infrastructure to deal with any issues related to Corrosion mitigation and Materials Protection*, he remarked. All the participants eagerly took part in the training and engaged themselves with all the faculty members enthusiastically. The well-planned and detailed programme went off well and was well received by the trainees who updated themselves both theoretically and practically. During the Valedictory Event, **Dr. V. Saraswathy**, Chief Scientist and Head, Corrosion and Materials Protection Division gave a glimpse of the on-going R&D activities at CSIR-CECRI with respect to all aspects of Corrosion Science & Engineering and provided a summary of the training programme. **Dr. K. Ramesha**, Director, CSIR-CECRI delivered the Valedictory Address and distributed the Certificates to the participants. The Event ended with a Vote of Thanks by **Dr. Rakesh Barik**, Principal Scientist, CMPD, CSIR-CECRI.



Business Development and CSIR Theme Leads

- ❖ FBR Project Presentation under CLP Theme [Feb 3]
- ❖ Discussion on printable photovoltaics with Powered Electron Pvt. Ltd. [Feb 5]
- ❖ Meeting with BHEL on R&D collaboration [Feb 6]
- ❖ Meeting on Redox Flow Battery [Feb 8, 9]
- ❖ Meeting with MRPL on R&D collaboration [Feb 8]
- ❖ Meeting with Caterpillar on R&D proposals [Feb 14]
- ❖ Expert Committee meeting of 3rd Tranche FBR/NCP Project Proposals – Healthcare Theme [Feb 15]
- ❖ Meeting with ONGC on Project Proposals [Feb 22]
- ❖ Meeting with Axiom Gen Next India Pvt. Ltd. on R&D collaboration [Feb 28]

Official Events

- ❖ Upgradation Meeting for JRF to SRF [Feb 6]
- ❖ Laboratory Strategic Group Meeting [Feb 8, 20]
- ❖ Performance Review of newly recruited Technical Assistant and Technician (1) [Feb 5]
- ❖ International Mother Tongue Day [Feb 21]
- ❖ Meeting of the Safety Committee [Feb 21]
- ❖ Meeting of the HoDs [Feb 29]
- ❖ Meeting of the CECRI Ladies Forum [Feb 29]

Skill Development Activities

Skill Development Training Programmes:

- ❖ A Skill Development Training Programme on ***Biosensor: Design and Applications*** was organized by CSIR-CECRI during Feb 9-13, 2024. A total of 48 participants took part in this training programme.
- ❖ A Skill Development Training Programme on ***Photolithography based Micro-fabrication of Sensors*** was organized by CSIR-CECRI during Feb 19-23, 2024. A total of 43 participants got trained.

JIGYASA:

- ❖ Students of the following schools and colleges visited CSIR-CECRI, Karaikudi and witnessed the on-going R&D activities thereby gaining valuable insights:
 - 65 students & 2 faculty members from National Institute of Food Technology, Entrepreneurship




and Management, Thanjavur [Feb 7].

- 170 students & 7 teachers from Vairams Matric. Hr. Sec. School, Rajagopalapuram, Pudukkottai [Feb 8]
- 59 students & 3 faculty members from Lakshmi Ammal Polytechnic College, K.R.Nagar, Kovilpatti [Feb 9]
- 103 students & 4 faculty members from Padmavani Arts & Science College for Women, Salem [Feb 20]
- 81 students & 4 teachers from Jeevana School, Ponmeni Jayanagar, Madurai and 24 Students with 2 faculty members from Jawahar Science College, Neyveli [Feb 21]
- 54 Students & 3 faculty members from Lakshmi Bangaru Arts and Science College, Melmaruvathur [Feb 26].

CFE and AcSIR Highlights

- ❖ University Theory Examinations for B.Tech. students [Feb 6, 9]
- ❖ Meeting on B.Tech. - VIII Semester Project Work [Feb 12]
- ❖ Armageddon-24 - Annual Sports Meet for B.Tech. Students [Feb 29 - Mar 1]
- ❖ Synopsis Submission by Mr. Arun Karmakar, AcSIR Scholar - *Surface Engineering of Transition Metal based nano-structures for Water splitting application* (Guide: Dr. Subrata Kundu) [Feb 13]
- ❖ Scholar Meeting under the Science Club of CSIR-CECRI [Feb 15]
- ❖ Synopsis Submission by Mr. S. Sudalaimani, AcSIR Scholar - *Electrified liquid-liquid interface strategies for sensing non-redox biomolecules* (Guide: Dr. K. Giribabu) [Feb 19]
- ❖ III DAC Meeting of Mr. Amuthan Dekshinamurthy (Guide: Dr. V. Saranyan) [Feb 19]

Honours and Awards

- ❖  **Mr. Bonagiri Sai Charan**, AcSIR Scholar (Guide: Dr. Deepak Pattanayak) has won the **Best Paper Award** in the **International Conference on Powder Metallurgy and Particulate Materials + Exhibition 2024 (PM-24) at Hyatt Regency, Pune** during February 25-28, 2024 for the work *Melt pool analysis of selective laser melted aluminum alloy AlSi10Mg*.
- ❖  **Ms. Ann Mary Mathew**, AcSIR Scholar (Guide: Dr. Deepak Pattanayak) has won the **Best Paper Award** in the **International Conference on Powder Metallurgy and Particulate Materials + Exhibition 2024 (PM-24) at Hyatt Regency, Pune** during February 25-28, 2024 for the work *Thermal regulation of Ce³⁺ / Ce⁴⁺ ratio over titania nanostructure layered Titanium surface with enhanced biological properties for biomedical applications*.
- ❖  **Mr. Armand Gutemberg Kamaha Tchekep**, DBT TWAS & AcSIR Scholar (Guide: Dr. Deepak Pattanayak) has won the **Best Poster Presentation Award - 2nd Prize** in the **International Conference on Electrochemistry for Industry, Health and Environment (EIHE 2024) at VIT Vellore** during February 7-10, 2024 for the work *Exfoliated graphene oxide supported AuNPs/MWCNTs for interference-free and highly sensitive dopamine electroanalysis*.

Snapshots



Skill Development Training Programme on Biosensor: Design and Applications



Skill Development Training Programme on Photolithography based Micro-fabrication of Sensors



Valediction of Exclusive Training Programme for BPCL



International Mother Tongue Day Event



Armageddon-24 - Annual Sports Meet for B.Tech. Students

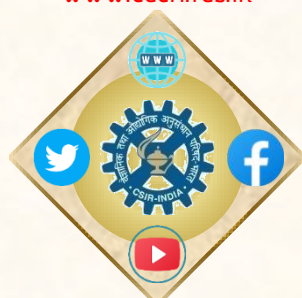


TECHNOLOGY COMPENDIUM OF CSIR-CECRI

- ❖ Indigenous Li-ion battery
- ❖ Indigenous Sodium Ion Battery
- ❖ Performance Improved Lead Acid Battery
- ❖ CO₂ capture under flue gas conditions
- ❖ Integrated Corrosion Monitoring Sensor Gadget accessible through a Mobile App
- ❖ Thermal Barrier Coatings for Strategic Applications
- ❖ Electrochemical Production of Sodium Hypochlorite as a Disinfectant (against COVID-19)
- ❖ Tri-layered reusable face mask with antibacterial coating
- ❖ Polymer Electrolyte Membrane (PEM) fuel cell
- ❖ Triboluminescent Coating and Smart Camera for Crack Detection in Structural Components
- ❖ Electrochemical Defluoridation of Drinking Water
- ❖ Solar Powered Proton Exchange Membrane (PEM) Based Water Electrolyser for Hydrogen Generation
- ❖ Cement-Polymer Composite Coating System for Corrosion Protection of Reinforcing and Prestressing Steels
- ❖ Solid Lubricant Coatings for Brahmos Missile Application
- ❖ Li Spheres for Torpedo Applications
- ❖ Electrowinning and Recovery of Tin from Primary Ore and Secondary Sources
- ❖ Electroplating of Gold, Copper and Nickel, Chromium, Zinc-Nickel Alloy; Anodizing of Aluminium; Electropolishing of Stainless Steel
- ❖ Electro-catalytic Conversion of CO₂ and butadiene to Adipic Acid; CO₂ to Formic Acid; CO₂ to Oxalic Acid.
- ❖ Farmer Friendly Soil Health (predictive) Analyzer
- ❖ Three Coat System for Steel Structures
- ❖ Inhibitor Cement Slurry Coating for Rebars
- ❖ Electrochemical Preparation of DL-Homocysteine Thiolactone Hydrochloride from DL- Homocystine
- ❖ Electrochemical Perfluorination of Sulfolane to Perfluro Butane Sulfonyl Fluoride
- ❖ Electrochemical Preparation of Calcium Lactobionate and Calcium Gluconate
- ❖ Electrochemical Production of KIO₃
- ❖ Degradable Amorphous Alloy Coatings by Sputtering for Bioimplants
- ❖ Multicoat Protective Schemes for Concrete Structures and Bridges
- ❖ Moisture Compatible Coating for Cooling Towers
- ❖ Temporary Protective Coating for Maraging Steel & 15CDV6
- ❖ Corrosion Resistant Thermal Coating for Hydroclaves
- ❖ Al-Zn-In Galvanic Alloy Anode for Cathodic Protection
- ❖ Formulation of Neutral Paint Removing Jelly
- ❖ Corrosion Resistant Inhibitive Admixtures for Portland Pozzolana Cement
- ❖ Inhibitor Admixture for Concrete
- ❖ Cost Effective Metallic Coatings to Rebars Embedded in Concrete Structures
- ❖ Redox Active Polymer Encapsulated Lamellar (REL) Compound based Anticorrosive Coating for Reinforcement Bars
- ❖ Extraction of Calcium, Magnesium by Molten Salt Electrolysis
- ❖ Extraction of Zinc oxide and Metallic Zinc from Galvanizer Ash
- ❖ Extraction of Rare Earths and Alloys by Molten Salt Electrolysis

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