



A monthly newsletter of CSIR-CECRI
—compilation of significant happenings—

Launch of India's first Virtual Science Lab

Dr. Jitendra Singh, Hon'ble Union Minister of State for Science & Technology inaugurated the country's first Virtual Science Lab for children under the CSIR Jigyasa programme which will help millions of students connect with scientists across the country. This unique facility, developed by CSIR in partnership with IIT Bombay, facilitates classroom learning with laboratory research for school students. Dr. Singh during the inauguration stated that the Virtual Lab is a new beginning and that the platform will help take science to all segments of students in every corner of the country. He also added that the lab is also in tune with the National Education Policy (NEP), where students are allowed to choose any subject and the concept of streams has been disbanded.



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“ **"JIGYASA" is one of the major initiatives taken up by CSIR at national level for further widening and deepening its Scientific Social Responsibility (SSR). On the one hand, this programme would explain the culture of curiousness and scientific nature on the other.** ”

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This new facility will immensely benefit the student community, especially from Kendriya Vidyalayas, Navodaya Vidyalayas and Government Schools, catching them young and igniting their interest in Science. Dr. Singh also said that our Hon'ble Prime Minister Shri. Narendra Modi during a CSIR Society meeting last year had appreciated the **Scientist-Student Connect Programme, Jigyasa**, while at the same time stressing the importance of developing virtual labs.

Following the visionary thoughts of our Hon'ble Prime Minister, this Virtual Lab has been conceptualized with a target audience of children between the ages of 11-18 years, studying in classes VI to XII, and who would like to explore Science via real-time activities.

Virtual Lab would facilitate quality research exposure and innovative pedagogy to help students drive their scientific curiosity with the help of an online interactive medium. The platform will consist of simulated experiments, pedagogy based content, videos, chat forums, animations, gaming, quiz, facility sharing, webinars and more.

All of the content will initially be made available in English and the availability of content in Hindi and other regional languages will be increased in due course in order to reach out to every nook and corner of the country.

A major highlight of this virtual lab will be the virtual tour of CSIR laboratories with an explicit showcase of their research infrastructure. The platform will also allow students to interact with scientists and learn from them.

Dr. Jitendra Singh recalled that the "Jigyasa" since its launch in 2017, was successful in connecting nearly 3,00,000 students and more than 5,000

teachers with CSIR and they have benefited directly through visits to CSIR labs.

He added that majority of the CSIR labs are participating in this program and subsequently **MoU** has been signed with Jawahar Navodaya Vidyalayas and also with Atal Tinkering Labs of NITI AAYOG. The Minister said, even during the Covid-19 pandemic, online interactions and webinars for school students were conducted on several topics with more than 2 lakh cumulative views.

The major stakeholders for the programme are academic based community consisting of MHRD, CSIR Scientists/Faculties, Ph.D. research students, school and junior college students, Sansthas, NGOs, Kendriya Vidyalaya Sangathan, Navodaya Vidyalaya Samithi. State Government Schools, Independent outreach faculties and institutions carrying out successful outreach activity for school and junior college students are the potential stakeholders as well as beneficiaries.

The key highlights of the virtual lab are: Open source platform; Access content in regional languages; Scientist / Researchers Support; Knowledge Upgradation for Teachers and Students; Project based support; Fun based Gaming; Need based Videos and Animation; Simulation Experiments; Promote scientific temperament; Science based webinars; Student Entrepreneurship; Student-Expert forums; Student to Student forums; Simplified content; Availability to technical assistance; Build confidence and motivation.

Being a flag-bearer of CSIR Jigyasa Programme, **CSIR-CECRI**, with the help of its Scientific and Technical Cadre, has so far successfully conducted more than 100 events under the banner of Jigyasa and more than 20000 students have been benefited directly/indirectly.



Business Development Leads

- ❖ Meeting with M/s. Godrej Consumer Products Ltd., Mumbai on mapping potentials areas of Interest and Technology Transfer [Nov 02]
- ❖ Meeting with Tata Chemicals Ltd. on CECRI's Technologies/Knowhow/Projects [Nov 08-13]
- ❖ Meeting with NALCO Research & Technology Centre, Bhubaneswar on the Project Proposals on Aluminium Air / Metal Air Battery [Nov 09].
- ❖ Discussion on Green Initiatives in Marine Sector proposed by Cochin Shipyard Ltd. [Nov 10]
- ❖ Visit of Team from Taipei Economic and Cultural Center - Discussion on Energy Storage [Nov 15]
- ❖ Demonstration on CPCC Technology to M/s. Mahavir Coatings [Nov 23]
- ❖ Demonstration on Inhibitor Solutions to M/s. Mahavir Enterprises [Nov 25]
- ❖ Project Review Meeting (Online) with M/s. Surat Lignite Power Plant Ltd. [Nov 26]
- ❖ Discussion with Titantech LLC, Bengaluru on Projects related to Quantification of Gases [Nov 29]
- ❖ Online Discussion on Collaborative R&D with Tata Steel Ltd. [Nov 30]

List of Newly Sanctioned Projects

Projects Sanctioned	Sponsor	Principal Investigator(s)	Budget (Rs. in Lakhs)	Start Date	End Date
Protective Coatings for Pamban Railway Bridge	M/s. Rail Vikas Nigam Ltd., Chennai	Dr. C. Arunchandran	8.60	15 Nov 2021	14 Mar 2022
Cathodic Protection Design for Underground Water Pipelines	M/s. Kerala Water Authority, Kollam	Mr. M.S. Karthikeyan	3.78	15 Nov 2021	13 May 2022
Utilization of Gases from Salt Splitting EM Cell for their use and Fuel Cell Application	CSIR-IMMT, Bhubaneswar	Dr. D. Kalpana	9.85	15 Nov 2021	14 Mar 2023

Updates on CSIR-ICeNGESS, Mission, Theme and Major Projects

- ❖ ICeNGESS:
 - Internal Meeting between CSIR-CECRI and CSIR-SERC [Nov 02]
 - Meeting between Director, CSIR-CECRI and Dr. V.K. Saraswat, Hon'ble Member of Niti Aayog on the progress and way forward action plans related to ICeNGESS project [Nov 10]
- Dry Room Team Meeting [Nov 17]
- ❖ Energy Mission:
 - CSIR's Hydrogen Energy Mission Program: Online Meeting of the Expert Group [Nov 01]

Centre for Education and AcSIR Highlights

AcSIR:

- ❖ Scrutinizing Committee Meeting for Admission (January 2022 Session) [Nov 15]
- ❖ DAC Meeting for Mr. N.K. Murugasenapathi (Guide: Dr. P. Tamilarasan) [Nov 23]
- ❖ DAC Meeting for Ms. S. Narmatha (Guide: Dr. R. Thangamuthu) [Nov 24]
- ❖ DAC Meeting for Ms. K.A. Esther Jebakumari (Guide: Dr. P. Tamilarasan) [Nov 26]
- ❖ Viva Voce Examination for Mr. V. Maruthapandian (Guide: Dr. V. Saraswathi) [Nov 29]

- ❖ DAC Meeting for Ms. Ann Mary Mathew (Guide: Dr. Deepak K. Pattanayak) [Nov 30]

Centre for Education:

- ❖ B.Tech. (Chemical & Electrochemical Engineering) Orientation Programme - 2021 [Nov 01]
- ❖ Meeting of Faculty Members [Nov 09]
- ❖ Meeting to finalize lapsed seats in B.Tech. First Year Admission [Nov 12]

Vigilance Awareness Week 2021

In pursuance of the directives from the Chief Vigilance Officer (CVO), CSIR, Vigilance Awareness Week was observed at CSIR-CECRI from 26.10.2021 to 01.11.2021 with the theme “स्वतंत्र भारत @ 75: सत्यानिष्ट से आत्मनिर्भरता / Independent India @ 75: Self Reliance with Integrity”. The Vigilance Awareness Week began with administering an integrity pledge on 26.10.2021. Apart from the employees, their families, vendors, suppliers, contractors, stakeholders, students, citizens etc. were also encouraged to take e-Pledge by visiting Daily Bulletin and CSIR-CECRI website wherein a link to Central Vigilance Commission’s (CVC) website was provided to take the Pledge online. e-Pledge certificate issued to Director, CSIR-CECRI by CVC, New Delhi was displayed at the entrance of the organisation to motivate all other employees to take e-Pledge.

Posters and banners (in trilingual form) on the theme of fighting ‘corruption’ were displayed in various locations in CSIR-CECRI campus to sensitize vigilance awareness among public so as to promote a corruption-free society. Essay writing and Slogan Writing competitions were conducted to the staff

members on the theme of Vigilance Awareness Week-2021 and the prize winners were honoured.

As advised by CVC, wide publicity was given to “Complaints under PIDPI (*Public Interest Disclosure and Protection of Informers*)”. Two posters in this regard were printed in English and Tamil and both posters were placed together at the main building and entrance of the Institute. Further, as advised by the CVC, as part of Vigilance Awareness Week 2021, CSIR-CECRI focused on internal (Housekeeping) activities in campaign mode.

Vigilance Awareness Week 2021 Lecture was arranged on 29.11.2021 (Online). Shri. K.M. Sridhar, Controller of Administration welcomed and introduced the Chief Guest to the audience. The Chief Guest, Shri. Justin Mohan, IFS, Secretary, National Biodiversity Authority, Chennai, delivered the VAW-2021 Lecture. He outlined the importance of Vigilance Awareness and its need among the public servants. His speech was interesting as well as highly informative. The lecture ended with a vote of thanks by Shri. Y. Nagoorgani, Assistant Section Officer.



Skill Development Activities

Skill Development:

- ❖ Faculty Development Training Programme (Online) on *Electroanalytical Techniques for Bio-Sensing Applications* [Sponsored by AICTE Training and Learning Academy (ATAL)] for the Faculty Members at various Academic Levels [Nov 22-26, 2021].
- ❖ One Week Online Skill Development Training Programme on *Electrochemical Power Sources: Lead Acid Battery-Care & Maintenance* [Nov 8-12, 2021] - postponed to December 2021.

Connect with Scientists Webinar Series:

The following lectures were arranged as a part of on-going Webinar Series (CSIR-JIGYASA):

1. *Electrifying Organic Synthesis* by Dr. M. Kathiresan [Nov 11]
2. *All about Lead Acid Batteries* by Dr. Sundar Mayavan [Nov 18]
3. *Photo Functional Materials for Solar Energy Conversion* by Dr. A. Pandikumar [Nov 25]

Official Events

- ❖ MRSI: Online Meeting of Technical Sub-Committee Co-Chairs of the Theme Symposium on *Batteries, Fuel Cells and Supercapacitors* [Nov 01]
- ❖ 32nd Annual General Meeting of MRSI & Third Indian Materials Conclave: Meeting of Co-Chairs of the Theme Symposium on *Batteries, Fuel Cells and Supercapacitors* [Nov 02]
- ❖ International Conference on *Advanced Materials and Manufacturing for Sustainable Future* on November 13, 2021: Pre-discussion meeting with Panelists on Sustainability (Cradle to Grave) - Participation of Director, CSIR-CECRI [Nov 10]
- ❖ 87th Annual Meeting of the Indian Academy of Sciences: Pre-Discussion Meeting on Symposium on *Electrochemical Energy Storage and Sustainability* - Participation of Director, CSIR-CECRI [Nov 10]
- ❖ R&D Collegium to review the progress of On-going In-House Projects under CECRI@75 [Nov 11]
- ❖ Online Meeting on CSIR Energy Audit [Nov 12]
- ❖ Online Meeting of the 29th Engineering Apex Committee organized by Engineering Services Division, CSIR HQ - Participation of Director, CSIR-CECRI [Nov 16]
- ❖ First Meeting (Online) of the Sub-Group on *Mobility* by CII National Committee on *Technology, R&D and Innovation* - Participation of Director, CSIR-CECRI [Nov 16]
- ❖ Walk-in-Interview for Engagement of Project Personnel [Nov 16]
- ❖ Community Radio Recording Programme by Alagappa University on CSIR-CECRI's contribution to the Society - Talk by Director, CSIR-CECRI (in Tamil) [Nov 18].
- ❖ CSIR-Fundamental & Innovative Research in Science of Tomorrow (CSIR-FIRST) Scheme: Meeting of Project Evaluation Committee - Participation of Director, CSIR-CECRI as a Member [Nov 22, 23]
- ❖ Meeting of the Sub-Group on *Mobility* by CII National Committee on *Technology, R&D and Innovation* - Participation of Director, CSIR-CECRI as a Member [Nov 22]
- ❖ ReBAT-One Day Industrial Meet on *Lithium Battery Recycling* organized by CSIR-NML, Jamshedpur: Director, CSIR-CECRI made a presentation on *LIB Manufacturing & Recycling in India* [Nov 25]
- ❖ Online Meeting of DG-CSIR with all Directors of CSIR Labs [Nov 25]
- ❖ Farewell and Felicitation Function for the Retiree (Shri. S. Selvaraj, Lab Attendant (2), Security Section) [Nov 30]

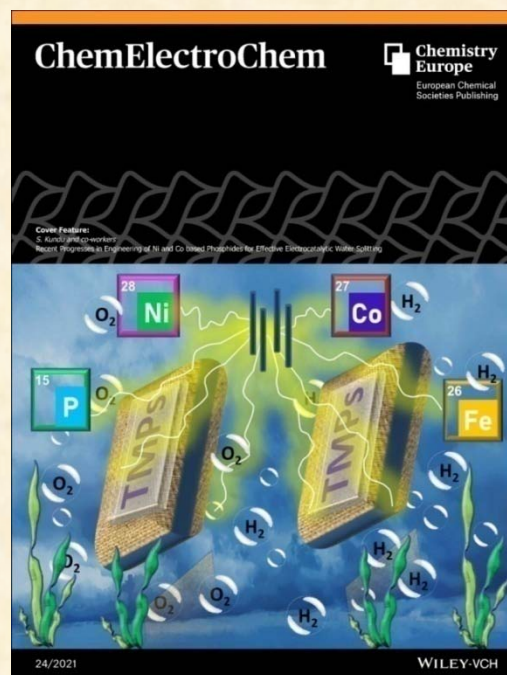
Hindi Praveen Exam

Hindi Praveen exam was held in two sessions (Paper I & II) in the FN & AN of 15.11.2021. The following staff members attended:

1. श्री के. रंजित कुमार/ Shri K. Ranjith Kumar
2. डॉ. ए. मनोकरन/ Dr. A. Manokaran
3. डॉ. सी. जयभारती/ Dr. C. Jeyabharathi
4. डॉ. जी. आनंद बाबु/ Dr. G. Anand Babu
5. डॉ. जे. रवींद्रन/ Dr. J. Ravindran
6. श्री. के. आरुमुगसामी/ Shri K. Arumugasamy
7. डॉ. एम. पांडियराज/ Dr. M. Pandiaraj
8. डॉ. एसएम. गणेशन/ Dr. SM. Ganesan
9. श्री. वी. गोपालकृष्णन/ Shri V. Gopalakrishnan

Recent Research Publications

- ❖ *Recent progresses in engineering of Ni and Co based phosphides for effective electrocatalytic water splitting*
K. Sangeetha, K. Karthick, S. Sam Sankar, Arun Karmakar, M. Ragunath, Krishnendu Bera and Subrata Kundu
Chem Electro Chem [*in press* - to be featured in the Cover Page]
<https://doi.org/10.1002/celec.202101501>
- ❖ *Enhanced efficiency of DSSC by lyophilized tin-doped molybdenum sulfide as counter electrode*
S. Mahatoa, P. Nandigana, B. Pradhan, B. Subramanian and S.K. Panda
Journal of Alloys and Compounds 894 (2021) 162406
<https://doi.org/10.1016/j.jallcom.2021.162406>
- ❖ *Regulating the heteroatom doping in metallogel-derived Co@ dual self-doped Carbon onions to maximize electrocatalytic water splitting*
E. Saha, K. Karthick, Subrata Kundu and J. Mitra
Journal of Materials Chemistry A (2021) [*in Press*]
<https://doi.org/10.1039/D1TA06639K>
- ❖ *In-situ synergistic 2D/2D MXene/BCN heterostructure for superlative energy density supercapacitor with super-long life*
K. Nasrin, V. Sudharshan, K. Subramani, M. Karnan, and M. Sathish Small (2021) 2106051
<https://doi.org/10.1002/smll.202106051>
- ❖ *Enhancement of OER kinetics of less explored beta-MnO₂ via nickel doping approaches in alkaline medium*
K. Bera, A. Karmakar, K. Karthick, S. Sam Sankar, K. Sangeetha, M. Ragunath and Subrata Kundu
Inorganic Chemistry (2021) [*in Press*]
- ❖ **Book Chapter Published:**
Chapter Title: Size-and shape-selective synthesis of DNA-based nanomaterials and their application in surface-enhanced Raman scattering; Book Title: Microbial interactions at nanobiotechnology interfaces: molecular mechanisms and applications; Publisher: Wiley VCH; Authors: K. Karthick and Subrata Kundu; Publication Date: 29 Sep 2021
<https://doi.org/10.1002/9781119617181.ch2>



The Cover Feature illustrates the artistic view of designing strategies for 3d transition metal phosphides (TMPs) for the total water splitting application in terms of their activity and stability.

Recent progresses in engineering of Ni and Co based phosphides for effective electrocatalytic water splitting - K. Sangeetha, K. Karthick, S. Sam Sankar, Arun Karmakar, M. Ragunath, Krishnendu Bera and Subrata Kundu, Chem Electro Chem (<https://doi.org/10.1002/celec.202101501>)

Superannuation



Shri. S. Selvaraj

Lab Attendant (2), Security Section superannuated on November 30, 2021 after a long illustrious service

New Members in CSIR-CECRI Family

- ❖  **Mr. A. Kishor Kumar** has joined CSIR-CECRI Family on 01.11.2021 as Security Assistant in Security Section

- ❖  **Mr. M.M. Karthikeyan** has joined CSIR-CECRI Family on 08.11.2021 as Junior Secretariat Assistant (F&A) in Finance and Accounts Section

Snapshots



Knowhow Transfer - Inhibitor Solution



Knowhow Transfer - CPCC Technology



Visit of Taipei Economic and Cultural Center Team



Faculty Development Training Programme on Electroanalytical Techniques for Bio-Sensing Applications



Administration of National Integrity Pledge



Vigilance Pledge taking by Staff Members in Electroplating & Metal Finishing Division



Farewell to Retiree

TECHNOLOGY COMPENDIUM OF CSIR-CECRI

- ❖ Indigenous Li-ion battery
- ❖ Indigenous Sodium Ion Battery
- ❖ Performance Improved Lead Acid Battery
- ❖ 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 (ICSC) for Rebars
- ❖ Electrochemical Preparation of DL-Homocysteine Thiolactone Hydrochloride from DL-Homocysteine
- ❖ 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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<https://www.facebook.com/1CSIR.CECRI>

<https://www.youtube.com/CSIR-CECRI-KKDI>