

# Global Conference for Decarbonization of Energy and Materials (GC-DEM2023)



PHYSICAL PRESENTATIONS

27 December – 29 December 2023

Lecture Theatre 301

NTU Alumni @One north, 11 Slim Barracks Rise, #06-07,  
Singapore 138664.



## **GCDEM-2023 PHYSICAL PRESENTATION**

For clarity, only the name of the speaker is shown in the program below. For the full list of authors of each presentation, please refer to the abstracts saved in the thumb drive.

### **27 DECEMBER 2023 WEDNESDAY**

#### **Morning Session**

Registration: 08:00 – 17:00

Opening Remark

09:00 – 09:10

Prof. Seeram Ramakrishna, National University of Singapore  
Chair-GCDEM2023

09:10 – 09:15

Dr. Goutam Kumar Dalapati, National University of Singapore  
Convener-GCDEM2023

#### **Session 1**

##### **Energy Storage Devices**

Session Chairs:

Prof. Terence Wong (NTU Singapore) and Prof. Ashraf Uddin (UNSW-Australia)

09:15 – 09:45 Plenary 1

Prof. Stefan Adams, Department of Materials Science and Engineering  
National University of Singapore  
Low-density ion Conductors for High Energy Density Batteries

09:45 – 10:10 Invited 1

Dr. R. Prasada Rao, Center for Nanofibers and Nanotechnology  
Department of Mechanical Engineering, National University of Singapore, Singapore  
Lithium Sulfur Batteries for High Energy Density Applications

10:10 – 10:25 Oral

Fathima Ali Kayakool, University of Hyderabad, India  
Multi-layered Graphene Prepared from the Recycled Battery Graphite as an Efficient Cathode  
Material in Al-ion Battery

10:25 – 11:00 **Tea Break and Group Photo**

11:00 – 11:10

**Distinguished/Young Scientist Awards**

**&**

**Empowering Women Awards Presentation**

## **Session 2 Photovoltaic Technology**

Session Chairs:

Dr. R. Prasada Rao (NUS-Singapore) and Prof. Udai P Singh (KIIT University-India)

11:10 – 11:35 Invited 2

Prof. Ashraf Uddin, University of New South Wales-Sydney, Australia

Progress in Perovskite Solar Cells: Interface Engineering and Stability

11:35 – 12:00 DS1

Prof. Fangyang Liu, Central South University (CSU), China

Hydrometallurgy Strategy for Lead Halide Perovskite Photovoltaic Materials

12:00 – 12:25 YS1

Dr. Mahesh Suryawanshi, University of New South Wales-Sydney, Australia

Sustainable Materials for a Clean Energy Future

12:25– 12:50 YS2

Dr. Sai Kishore Ravi, City University of Hong Kong, Hong Kong

Solar Energy Beyond PV: Tackling Water-Energy Challenges with “Solar-to-X”

12:50 – 13:50 **Lunch Break & Networking**

**Afternoon Session**

## **Session 3**

### **Empowering Women Presentation**

Session Chairs:

Prof. Mahnaz Shafiei, Swinburne University of Technology, Australia and

Prof. V. Sridevi, A.U. College of Engineering, Andhra University, India

13:50 – 14:15 EW1

Dr. Debalaya Sarker, UGC-DAE Consortium for Scientific Research, Indore, India

Autonomous Experimental & Computational Discovery of Energy Materials

14:15 – 14:40 EW2

Dr. Reshma Raveendran, Shiv Nadar Institution of Eminence, Delhi-NCR, India

Solution-Processed Organic Field Effect Transistors with Elastomeric Gate Dielectric

14:40 – 15:05 EW3

Dr. Deepshikha Arora, Singapore University of Technology and Design (SUTD), Singapore

Self-assembly and Oriented Attachment and Precise Positioning of Semiconductor Nanocrystals

15:05 – 15:20 Oral

Ms. Chinthalapudi Naga Lakshmi, Indian Institute of Technology Tirupati, India

Comparison of Microwave-assisted and Hydrothermal Synthesis of  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>/ZnO/perlite Nanocomposites for the Photocatalytic Degradation of Antibiotic

## **Tea Break & Networking**

15:20 – 15:35

### **Session 4**

#### **Industry Presentation**

Session Chair: Dr. Sourav Mitra, National University of Singapore

15:35 – 16:25

Dr Che Boyang, Analytical, Raman, Fluorescence Spectroscopy and Correlative Studies For Decarbonization Research

Mr. Steven Pang, Spectroscopy Business Manager, Agilent Technologies Singapore  
Innovative Solutions for Decarbonization of Energy and Materials by Agilent

Mr. Xu Zaiqiang, Deputy General Manager, Einst Technology  
Precision in Microscopy, Insight through Spectroscopy

Kan Kok Chew, Rtec Instruments

### **Session 5**

#### **AI, big data, IoT, 5G &**

#### **International Conference on 6G Communications Networking and Signal Processing**

Session Chair: Prof. Terence Wong, NTU-Singapore

16:25 – 16:50

Invited

Dr. R. Sujatha, Vellore Institute of Technology, Vellore-632014, India  
Autonomous Vehicular Communication in a V2X Network using LoRa Edge Computing for an Intelligent Transportation System

Oral

16:50 – 17:05

Dr. Shahid Mehraj Shah, Dept. of ECE, NIT Srinagar  
Achievable Rates for Finite Alphabet Constellation Over Non-Gaussian Noise Channel

Oral

17:05 – 17:20

Dr Sunitha K.A. SRM University AP, India  
An Improved Multiple Face Recognition System for Crowd Monitoring Applications Based on Transfer Learning Approach

Oral

17:20 – 17:35

Dr. Revathi S  
National Institute of Technology, Puducherry, India  
Investigations on Jamming and Black Hole Cyber Attacks in Wireless Sensor Networks: An Industrial Case Study

## **Session 6**

### **POSTER Session of GCDEM2023 (A0 poster size)**

17:35 – 18:15

PS1

Dr. Srikanta Karmakar

University of Calcutta, Kolkata-700009, India

Metal Halide Perovskite Nanocrystal Electrodes Based High Energy Density Supercapacitor for Real Life Applications

PS2

Dr. Amit Mallik

University of Calcutta, Kolkata 700009, India

Functionalized Graphene Oxide with Copper Nanomaterials for Advanced Supercapacitor Devices

PS3

Dr. Xiaodai Sharon Lim, National University of Singapore, Singapore

Upcycling Fish Scales Through Heating for Steganography and Rhodamine B Adsorption Application

PS4

Ms. Ritika Sharma, Central University of Himachal Pradesh-176206, India

Coconut Husk Waste-derived Nitrogen-doped Mesoporous Carbon Nanomaterial as an Efficient and Sustainable Energy Storage Devices

PS5

Ms. Ashna K. Pramod, Sudip K. Batabyal

Amrita Vishwa Vidyapeetham, India

Putting Light on the Ion Migration of Perovskite: Ionophotovoltaics with Lead-free Perovskite

PS6

Mr. Muhammad Farhan Hanafi, Universiti Kuala Lumpur, Malaysian

Photocatalytic Degradation of Phenolic Compounds Using Microwave-assisted Mesoporous Zinc Nanoparticles Supported with Titanium

PS7

Ms. Hongye Guan, University of Electronic Science and Technology of China, China

Implantable, Biodegradable, and Flexible Drug-Loaded Nanofibers for Medical Applications

## **CONFERENCE DINNER**

27 DECEMBER 2023

Time: 6.30 pm – 9.30 pm

Venue: 1 Orchid Club Road, #01-21/22,

Social Clubhouse Orchid Country Club Singapore 769162

Bus will depart from the Venue at 6.30 pm.

**28 DECEMBER 2023 THURSDAY**

**Morning Session**

**Session 7**

**Waste Management and Sustainability**

Session Chairs:

Dr. Yasukazu Kobayashi, National Institute of Advanced Industrial Science and Technology (AIST), Japan and Dr. Anil K. Suresh, SRM University-AP, India

09:00 – 09:25 Invited 3

Dr. Mayur Shirish Jain, Indian Institute of Technology Indore (IITI), India

Integrated Waste Management: A Holistic Approach through the Confluence of Anaerobic Digestion, Biochar, and Composting in Circular Economy Exploration

09:25 – 09:50 Invited 4

Dr. Sujit Sen, National Institute of Technology Rourkela, India

Sustainable and Effective CO<sub>2</sub> Fixation into Biobased Cyclic Carbonate

09:50 – 10:15 YS3

Dr. Norzahir Sapawe, Universiti Kuala Lumpur, Malaysia

New Insights of Wastewater Treatment via Photocatalytic Degradation using Novel Hybrid Catalyst

10:15 – 10:30 Oral

Akshay, University of Hyderabad, India

Hierarchical Porous Carbon with a High Specific Surface Area and Specific Capacitance from Biomass-derived Waste

10:30 – 11:00 **Tea Break and Networking**

**Morning Session**

**Session 8**

**Waste Management and Sustainability**

Session Chairs:

Prof. Sajal Biring, Ming-Chi University of Technology, Taiwan and Dr. Andrew B. Wong, National University of Singapore, Singapore

11:00 – 11:25 DS2

Dr. Sui Zhang, National University of Singapore, Singapore

Towards Ultrathin Membranes for Post-combustion Carbon Capture

11:25 – 11:50 DS3

Prof. Raju Kumar Gupta, Indian Institute of Technology-Kanpur, India

Sustainable Technologies for Wastewater Remediation Applications

11:50 – 12:15 Invited 5

Prof. V. Sridevi, A.U. College of Engineering, Andhra University, India

Synthesis of Biochar from Agricultural and Plastic Wastes Using a Sustainable Microwave Pyrolysis Approach

12:15 – 12:45 Invited 6

Dr. Anil K. Suresh, SRM University-AP, India

Biowaste to Resource-supported Catalysts: An Emerging Sustainable Strategy for Heterogeneous Catalysis

12:45 – 13:00 Oral

Mr. Mohd Afshan, Institute of Nano Science & Technology, India

Porous Carbon Template Decorated with MOF-Driven Bimetallic Phosphide: A Suitable Heterostructure for the Production of Uninterrupted Green Hydrogen via Renewable Energy Storage Device

13:00 – 14:00 **Lunch Break & Networking**

**Afternoon Session**

**Session 9**

**Sustainable Materials & Sensors**

Session Chairs:

Dr. Sui Zhang, National University of Singapore, Singapore &

Dr. Norzahir Sapawe, Universiti Kuala Lumpur, Malaysia

14:00 – 14:25 Invited 7

Prof. Sajal Biring, Ming-Chi University of Technology, Taiwan

Fabrication, Engineering, Science, and Applications of Anodic Aluminum Oxide membranes in chemical and gas sensing

14:25 – 14:50 Invited 8

Prof. Mahnaz Shafiei, Swinburne University of Technology, Australia

Nanomaterial Enabled Hydrogen Gas Sensors

14:50 – 15:15 YS4

Dr. Siow Woon Ng, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

Tailoring and Coatings on 1D and 3D Structures for Sensing and Catalytic Applications

15:15 – 15:40 Invited 9

Dr. Dilbag Singh, Central University of Himachal Pradesh, India

Parthenium hysterophorus Derived Nanostructures as an Efficient Carbocatalyst for the Electrochemical Sensing of Mercury(II) Ions

15:40 – 15:55 Oral

Ms. Debichhanda De, Ming Chi University of Technology, New Taipei City, Taiwan

Efficient Detection of Contaminants in Beverages by Surface Enhanced Raman Spectroscopy (SERS) for Healthcare Applications

15:55 – 16:15 **Tea Break and Networking**

**Session 10**

**Sustainable Energy and Storage**

Session Chairs:

Dr. Mahesh Suryawanshi, University of New South Wales-Sydney, Australia &

Dr. Sai Kishore Ravi, City University of Hong Kong, Hong Kong

16:15 – 16:40 Invited 10

Prof. Udai P Singh, KIIT University, Bhubaneswar, India

Advances in Kesterite Based Thin Film Solar Cells and Future Ahead

16:40 – 17:05 Invited 11

Dr. Supravat Karak, Indian Institute of Technology, Delhi, India

Machine Learning Assisted Development of High Efficiency Non-fullerene Organic Solar Cell:  
A growing synergy

17:05 – 17:30 Invited 12

Prof. Alfred Ngowi, Central University of Technology (CUT), Free State. South Africa

Decarbonizing the Built Environment through Improved Energy and Materials Circularity  
Performance: The Role of Artificial Intelligence

17:30 – 17:45 Oral

Mr. Bhawandeep Sharma, Guangdong Technion-Israel Institute of Technology, China

Assessment of Eco-friendly Zeotropic Fluids in Organic Rankine Cycle for Renewable Energy  
Harvesting



**29 DECEMBER 2023 FRIDAY**

**Morning Session**

**Session 11 Sustainable Energy**

Session chairs:

Prof. Raju Kumar Gupta, Indian Institute of Technology-Kanpur, India &

Dr. Siow Woon Ng, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

09:00 – 09:25 YS5

Dr. Kalyan Ghosh, University of Cambridge, UK

Triboelectric Nanogenerators for Green Hydrogen Harvesting and Skin-like Touch Sensing

09:25 – 09:50 YS6

Dr. Yasukazu Kobayashi, National institute of advanced industrial science and technology (AIST), Japan

CaH<sub>2</sub>-Assisted Molten Salt Synthesis of Nano-structured Alloys for Catalyst Application

09:50 – 10:15 Invited 13

Dr. Yee-Fun Lim, Institute of Sustainability for Chemicals, Energy and Environment (ISCE2), Agency for Science Technology and Research (A\*STAR), Singapore

Electrocatalytic Production of Fuels and Chemicals

10:15 – 10:30 Oral

Mr. Santosh Bimli, Indian Institute of Technology Indore, India

Perovskite BaSnO<sub>3</sub> Nanoparticles for Solar-driven Bi-functional Photocatalytic Activity: Wastewater Treatment and PEC Water Splitting

10:30 – 11:00 **Tea Break and Networking**

**Session 12 Sustainability**

Session chairs:

Dr. Yee-Fun Lim, Institute of Sustainability for Chemicals, Energy and Environment (ISCE2), A\*STAR, Singapore & Prof. Vadali V. S. S. Srikanth, University of Hyderabad, India

11:00 – 11:30 Plenary 2

Prof. Ghim Wei Ho, National University of Singapore, Singapore

Photothermal-assisted Catalysis Hydrogen and Water Production

11:30 – 11:55 YS7

Dr. Andrew B. Wong, Department of Materials Science and Engineering and Department of Chemical and Biomolecular Engineering, National University of Singapore

Towards Controlling the Microenvironment in Electrochemical CO<sub>2</sub> reduction

11:55– 12:20 Invited 14

Dr. Venkata Girish Kotnur, School of Engineering Sciences and Technology, University of Hyderabad

Novel Superhard (MoNbTaW)<sub>N</sub> coatings

12:20 – 12:35 Oral

Ms. Sameena R. Mulani, Indian Institute of Technology Indore, India

Infrared Active Narrow Bandgap Ni doped LaFeO<sub>3</sub> Nanoparticles Embedded Microspheres for Solar Steam Generation of Salinated and Contaminated Water

12:35 – 12:50 Oral

Mr. Sayak Chakravorty, Indian Institute of Technology Indore, India

Exploring the Scope of Pretreated Soya Residues as a Soil Conditioner Through In-situ Carbonization

12:50 – 13:05 Oral

Ms. Harita Pant, University of Hyderabad, India

Pt-free Metal Oxide Graphenaceous Composites as Electrocatalysts: a New Perspective on Fuel Cell Technology

13:05 – 14:00 **Lunch Break & Networking**

**Afternoon Session**

**Session 13 Energy Storage**

Session chairs:

Dr. Dilbag Singh, Central University of Himachal Pradesh, India &

Dr. Kalyan Ghosh, University of Cambridge, UK

14:00 – 14:25 YS8

Dr. Arunabh Ghosh, Associate Director - Cell Design & Cell Process Engineering

Battery Innovation Centre, OLA Electric Technologies, India

Towards Efficient & Cost-effective development of safer lithium-ion batteries

14:25 – 14:50 Invited 15

Dr. Binson Babu, Shiv Nadar University, India

Gel-polymer Electrolytes for Hybrid-ion Capacitors

14:50 – 15:15 Invited 16

Dr. Shaikshavali Petnikota, Department of Forest Biomaterials and Technology, Swedish University of Agricultural Sciences (SLU), Sweden

Microwave Exfoliated Few-Layered Graphene Cathode for Aluminium Batteries

15:15 – 15:30 Oral

Mr. Ranjith Reddy Patthi, University of Hyderabad, Hyderabad, India

Fe<sub>3</sub>O<sub>4</sub>/Reduced Graphene Oxide for Enhanced Peroxidase Activity

15:30 – 15:45 Oral

Mr. Sugato Panda, Indian Institute of Technology Indore, India

Effects of Scale Shift on Biomethane Potential of Untreated Soybean Straw: Understanding the Inhibition Casual Loop

15:45 – 16:00 **Tea Break and Networking**

## **Afternoon Session**

### **Session 14 Renewable energy and Sustainability**

Session chairs:

Dr. Binson Babu, Shiv Nadar University, India

& Prof. Supravat Karak, Indian Institute of Technology, Delhi, India

16:00 – 16:25 Invited 17

Prof. Vadali V. S. S. Srikanth, University of Hyderabad, India

Green Energy Technologies: Hype or Reality?

16:25 – 16:40 Oral

Mr Terapalli Avinash, College of Engineering, Andhra University, India

Catalytic Microwave-assisted Co-pyrolysis Paraffin Wax and Rice Straw: Analysis of Products and Synergy Effects

16:40 – 16:55 Oral

Mr. Nowduru Ravikiran, University of Hyderabad, India

Sustainable Kilogram-scale Conversion of Tire Pyrolysis Waste Into Nanosized Onion-like Carbons with Extraordinary Lubricant-additive Properties

16:55 – 17:10 Oral

Mr. Sarthak Patnaik, Indian Institute of Technology Bombay, India

Lithium Recovery from End-of-Life Lithium Iron Phosphate Batteries

17:20 – 17:30 **Oral and Poster Award Presentation**

17:30–17:40 Closing remarks for physical conference and announcement of next GCDEM2024

# Acknowledgment



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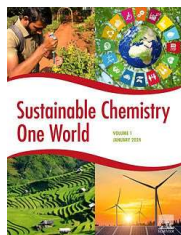


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