

CONFERENCE REPORT

ACESMM-2026

International Conference on Advances in Chemical Energy Systems:
From Materials to Mechanisms



SLC (University of Delhi)
SHYAM LAL COLLEGE
NAAC A++ & NIRF 43rd

Department of Chemistry under the aegis of IQAC
organizes
International Conference
ACESMM-2026
(Hybrid Mode)

Advances in Chemical Energy Systems: From Materials to Mechanisms
April 15-16, 2026

Dr. Mohana Krishna Reddy Mudiam
Director, Institute of Pesticide Formulation Technology (IPFT)
Gurugram India

Prof. Balaram Pani
Dean of Colleges, University of Delhi

Prof. Gurmeet Singh
Former VC, Puducherry University

Dr. Ajay Kumar
Scientist F/ADDL Director, DESIDOC, DRDO
Ministry of Defence

Prof. Rajeev Gupta
HoD, Dept of Chemistry, University of Delhi

Chief Patron
Smt. Savita Gupta
Chairperson, SLC Governing Body

Patron
Prof. Rabi Narayan Kar
Principal, SLC

Multipurpose Hall, Shyam Lal College

Organized by
Department of Chemistry
Under the Aegis of IQAC
Shyam Lal College (NAAC A++ | NIRF 43rd)
University of Delhi

April 15–16, 2026 | Hybrid Mode
Shahdara, Delhi – 110032

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Executive Summary

The Department of Chemistry, Shyam Lal College (NAAC A++, NIRF 43rd), University of Delhi, successfully organized ACESMM-2026 — the International Conference on Advances in Chemical Energy Systems: From Materials to Mechanisms — on April 15–16, 2026. Conducted in hybrid mode at the Multipurpose Hall of Shyam Lal College, Shahdara, Delhi, the conference brought together eminent scientists, researchers, educators, and students from across India and abroad to deliberate on the most pressing challenges and emerging opportunities in chemical energy systems.

The two-day event featured keynote and plenary addresses by leading researchers from distinguished institutions including Nagaland University, CSIR-NEIST Jorhat, KU Leuven (Belgium), and the Institute of Nano Science and Technology (Punjab), alongside invited talks by faculty from several colleges of the University of Delhi. The conference encompassed oral and poster presentations by young researchers, and concluded with a Valedictory Ceremony graced by the Head of the Department of Chemistry, University of Delhi.

ACESMM-2026 served as a high-quality platform for academic exchange, student mentorship, and research visibility, aligned with the objectives of the Internal Quality Assurance Cell (IQAC) and the National Assessment and Accreditation Council (NAAC). The event significantly reinforced Shyam Lal College's standing as a centre of research excellence and academic innovation within the University of Delhi.

About the Conference

Theme and Scientific Context

The theme of ACESMM-2026 — ‘Advances in Chemical Energy Systems: From Materials to Mechanisms’ — was conceived to address one of the most critical challenges of our time: the global transition towards sustainable and clean energy. Chemistry lies at the heart of this transition, providing the molecular-level understanding and material innovation required for technologies such as hydrogen production, CO₂ electroreduction, advanced catalysis, and energy harvesting from unconventional sources.

The conference deliberately spanned the continuum from materials design to mechanistic understanding, recognising that true progress in energy science demands both the synthesis of novel functional materials and a deep understanding of the chemical mechanisms that govern their performance. This integrative approach distinguished ACESMM-2026 from narrower disciplinary events and attracted a diverse and distinguished group of contributors.

Organising Institution

Shyam Lal College, established in 1964, is one of the premier constituent colleges of the University of Delhi. Accredited NAAC A++ and ranked 43rd in the NIRF 2024 rankings, the college has a distinguished tradition of academic excellence and community engagement. The Department of Chemistry, which organized this conference under the aegis of the IQAC, has a strong research culture encompassing physical chemistry, computational chemistry, materials science, and green chemistry.

Objectives and Expected Outcomes

Stated Objectives

ACESMM-2026 was designed to fulfil the following academic and institutional objectives:

- To provide an interdisciplinary forum for researchers working across chemical energy systems, catalysis, materials science, electrochemistry, and allied areas.
- To expose undergraduate and postgraduate students to frontier research, inspiring them to pursue careers in science and technology.
- To facilitate meaningful interaction between scientists from national research laboratories, university departments, and international institutions.
- To promote awareness of critical themes in energy science — hydrogen generation, CO₂ utilisation, corrosion science, nanocomposites, and microfluidics — that are directly relevant to India's sustainability goals.
- To create a permanent academic record through the publication of an Abstract Book, enabling dissemination of research findings.
- To build institutional capacity by engaging students as active participants, volunteers, and presenters.

Expected Outcomes

The conference was expected to generate measurable outcomes including: (i) strengthened research networks between participating institutions; (ii) inspiration for collaborative grant applications and joint publications; (iii) enhanced motivation among student participants to engage in independent research; and (iv) documented evidence of institutional research activity for NAAC, IQAC, and University compliance.

Day-wise Proceedings

Day 1 – Wednesday, April 15, 2026

Registration (9:15 – 10:00 am)

Participant registration was conducted at the Department of Chemistry corridor from 9:15 am. Student volunteers managed the registration desk with efficiency, distributing conference kits, name badges, and programme booklets. The enthusiastic queue of researchers and students from multiple institutions, present from the early morning hours, was a testimony to the widespread interest in the conference.



Participants registering at the conference desk on Day 1

Inaugural Session

The Inaugural Ceremony of ACESMM-2026 was held on the morning of April 15, 2026 (10:00–11:30 am) in the Multipurpose Hall, Shyam Lal College. The ceremony was conducted with traditional solemnity and academic distinction, in the presence of faculty members, student delegates, and invited guests.

Lamp-Lighting Ceremony

In keeping with the time-honoured tradition of Indian academic institutions, the conference commenced with the lighting of the ceremonial lamp (Deepa Prajvalana), symbolising the kindling of knowledge and the dispelling of ignorance. The lamp was lit by the Principal, distinguished guests, and senior faculty, accompanied by the rendering of a Saraswati Vandana by students of the department.



Distinguished Guest lighting the ceremonial lamp



Principal, Prof Rabi Narayan Kar, participating in the lamp-lighting ritual



Senior faculty at the inaugural lamp ceremony



Organizing team and faculty assembled at the inaugural lamp ceremony

Welcome Address by the Principal

The Welcome Address was delivered by **Prof. Rabi Narayan Kar**, Principal of Shyam Lal College and Patron of the conference. Welcoming the Chief Guest, the Distinguished Guest, the Keynote Speaker (joining online), the Teacher-in-Charge Dr. Ompal Singh Yadav, and the visiting faculty and student delegations from across the colleges of the University of Delhi, the Principal expressed his delight at the strong showing of young chemists assembled for the oral and poster presentations. He took particular care to acknowledge Prof. Gurmeet Singh's long-standing mentorship of the University of Delhi Chemistry Department — recalling the first national conference they had organised in collaboration during Prof. Singh's tenure as Head — and thanked him for his continuing guidance to younger researchers. Reflecting on the spirit of the National Education Policy 2020, Prof. Kar observed how fourth-year undergraduate students at the college were now engaged in genuine research projects, several of which he had personally followed, and welcomed the opportunity that such a conference provided for these students to receive expert mentorship and contribute to society. He concluded by thanking the organising committee, the student volunteers who had brought the event together in remarkably short time, and the participants joining online, and wished the conference every success.

Address by the Distinguished Guest

Shri Ajay Kumar — Scientist 'F' and Additional Director at the Defence Research and Development Organisation (DRDO), Ministry of Defence — addressed the gathering as Distinguished Guest. A renowned researcher in the field of mathematics and quantum cryptography and a recipient of the Scientist of the Year award, he brought to the dais a perspective shaped by both fundamental research and national service. In his address, he underscored the increasingly critical importance of sustainable chemical energy systems in addressing the interlinked challenges of energy security, environmental sustainability, and national development, and welcomed ACESMM-2026 as exactly the kind of platform required to foster meaningful dialogue and collaboration across academia, research laboratories, and industry. He concluded with a memorable charter for young researchers built on three pillars — **curiosity, integrity, and hard work**. "*Curiosity must be your compass,*" he urged, encouraging participants to keep asking the *how, what, and why* of their research, and to hold uncompromisingly to integrity in all that they do.

Keynote Address

The Keynote Address was delivered online by **Prof. Gurmeet Singh**, Former Vice Chancellor of Pondicherry University, and a distinguished academician of the University of Delhi, where he served as Professor and Head of the Department of Chemistry and mentored generations of researchers. Recognised for his contributions to corrosion science, electrochemical energy systems, and advanced functional materials, Prof. Singh has been honoured with several prestigious awards and has held visiting and chair professorships in Taiwan and Japan. Many faculty members at Shyam Lal College and across the University of Delhi count themselves among his former students.

Welcoming the conference at a time when the world is grappling with serious energy concerns, Prof. Singh retraced the research evolution of the University of Delhi's Department of Chemistry over nearly three decades — beginning with mid-1990s work on ligand chemistry, moving through the synthesis and size-tuning of nanoparticles into bionanotechnology, and onward into quantum chemistry and electrochemistry, where the department now enjoys international recognition. Drawing the lesson from this trajectory, he urged the young audience to engage with conferences seriously rather than treat them as formalities — to interact with experts, identify their own research direction, and pursue funded projects through agencies such as SERB — and reminded them to aspire to become not only good scientists but also good teachers. He closed with warm appreciation

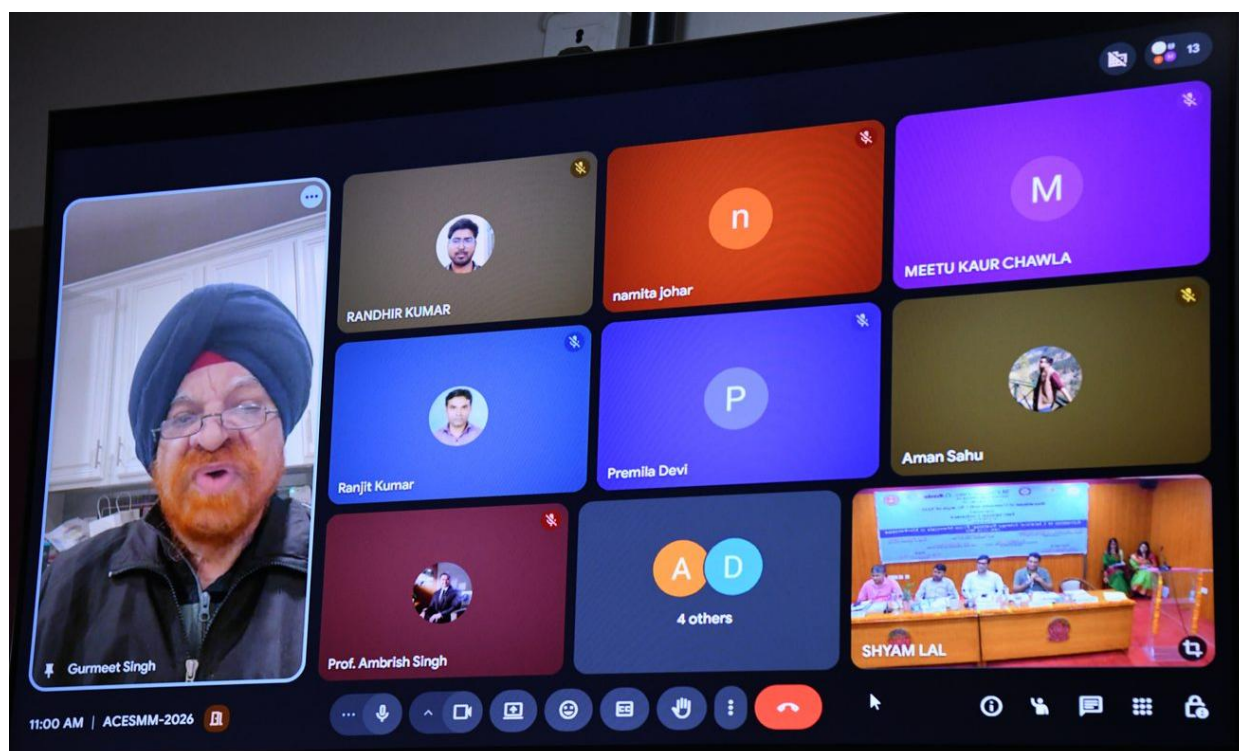
for the leadership of Prof. Rabi Narayan Kar, crediting his vision for the college's remarkable progress and its recent NAAC A++ accreditation.

Address by the Chief Guest

Dr. Mohana Krishna Reddy Mudiam, Director of the Institute of Pesticide Formulation Technology (IPFT), Gurugram, and Chief Guest of the inauguration, delivered a thought-provoking address that wove together fundamental science, applied research, and national policy. He opened with Einstein's reformulation of energy — that it can be neither created nor destroyed, only transformed — and traced this principle through the Indian Railways' own energy transition from steam to diesel, electric, and gas-based propulsion.

Framing energy in the present moment, Dr. Mudiam observed that the question has become strategic rather than merely technical: the geopolitics of energy now reaches from international supply chains right down to the household LPG cylinder. Against this backdrop, he surveyed the Government of India's major missions — the National Green Hydrogen Mission, the National Solar Mission, the ethanol blending and biodiesel programmes, and the National Mission on Sustainable Agriculture — and illustrated the logic of the circular economy with examples such as biopesticides recovered from orange peels and bio-binders derived from rice husks for road construction.

To the young researchers in the hall, he offered a pointed message: the present era is one of **product and patents**, not merely *publish or perish* — “*think product first, and publications will follow.*” He described IPFT's complete research-to-market pipeline, from synthesis through GLP-certified toxicology, field trials, and pilot-plant scale-up to regulatory transfer, and extended a warm collaboration invitation to Shyam Lal College, encouraging students to visit the institute and engage with its state-of-the-art analytical facilities. He concluded by reminding the audience that “*science for society*” must remain the guiding principle of all scientific research.



Prof. Gurmeet Singh delivering the Keynote Address online (visible on conference screen)



Formal release of the ACESMM-2026 Abstract Book



Dignitaries displaying the Abstract Book during the inaugural ceremony

A significant highlight of the inaugural ceremony was the formal release of the ACESMM-2026 Abstract Book by the distinguished guests. The Book, containing the abstracts of all plenary, invited, and contributed presentations, was released on stage and represents a permanent academic record of the conference.



Chief Guest addressing the audience



The Multipurpose Hall filled to capacity during the Inaugural Session



Faculty, organizing committee, and delegates in a group photograph



Faculties with the guests.

Inaugural Ceremony (10:00 – 11:30 am)

The Inaugural Ceremony, described in detail in the preceding section, was followed by a High Tea that offered delegates an opportunity for informal networking before the commencement of scientific sessions.



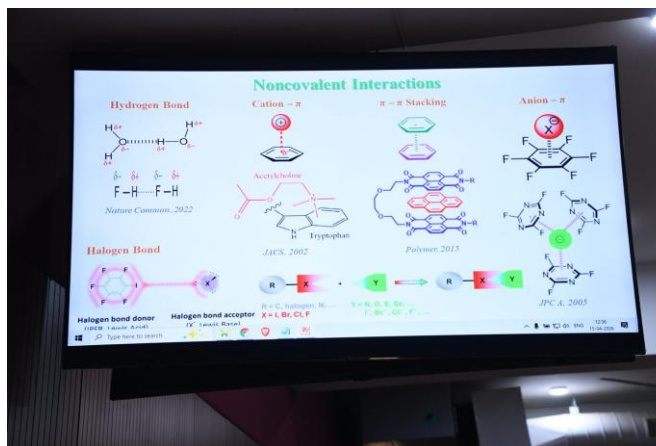
The conference dais and banner in the Multipurpose Hall



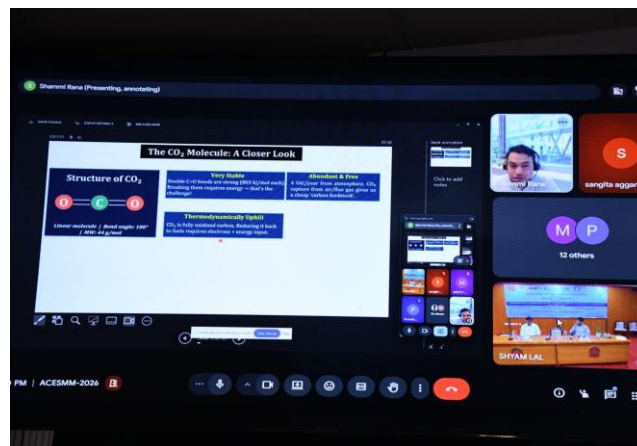
Dr. Ajay Kumar, addressing the audience in inaugural session

Plenary Session I (12:00 – 1:45 pm)

Plenary Session I was chaired by Dr. Ravindra Kumar (Department of Physics, University of Delhi). Three high-quality plenary lectures were delivered in this session, covering themes of corrosion chemistry, quantum chemical interactions, and electrochemical CO₂ reduction.



A presentation slide on non-covalent interactions during Plenary Session I



Dr. Shammi Rana (KU Leuven) presenting online on CO₂ electroreduction

Lunch (1:45 – 2:45 pm)

A networking lunch was hosted at the Porch Area, providing delegates with an occasion for informal interaction with speakers and fellow researchers.

Technical Session I: Oral Presentations (2:45 – 5:30 pm)

Contributed oral presentations were held simultaneously in the Board Room and the Seminar Room. Young researchers from multiple institutions presented their ongoing and completed research, receiving incisive feedback from faculty evaluators. The session covered a broad range of topics, including computational chemistry, catalysis, nanomaterials, and environmental science.



A participant delivering an oral presentation in the Board Room



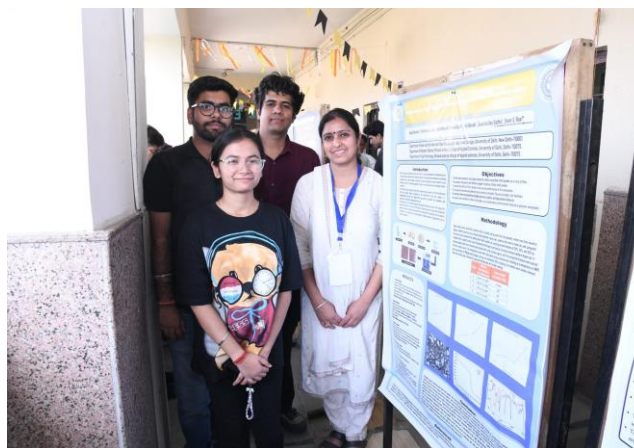
Session chairs evaluating oral presentations

Technical Session I: Poster Presentations (2:45 – 5:30 pm)

Poster presentations were conducted simultaneously in the MPH Corridor. Presenters displayed their research on standardized boards and engaged with visiting faculty and delegates in focused one-to-one discussions. The quality and diversity of posters reflected strong engagement across chemistry sub-disciplines.



A student explaining research findings at the poster session



Participants with their research poster in the MPH Corridor



Poster presenter in discussion with Principal, SLC

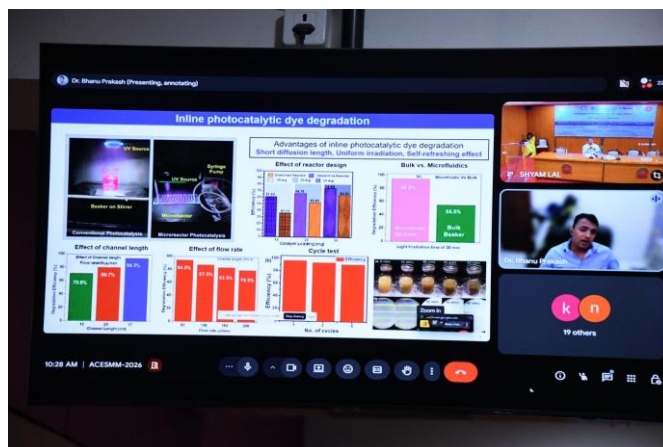


Poster presenter in discussion with Principal, SLC

Day 2 – Thursday, April 16, 2026

Plenary Session II (9:30 – 10:50 am)

The second day commenced with Plenary Session II, chaired by Prof. Ramananda Singh (Kirori Mal College, University of Delhi) and Dr. Sanjay Kumar (Department of Chemistry, Shyam Lal College). Two plenary lectures on carbonaceous single-atom catalysts and emerging microfluidics technologies were delivered, both by speakers participating online.



Dr. Bhanu Prakash (INST, Punjab) presenting microfluidics research online.



A full house in the Multipurpose Hall during Day 2 plenary proceedings

Invited Talks (11:20 am – 1:00 pm)

Five invited talks were delivered in the post-tea segment of Day 2, chaired by Dr. Chandra Mohan (K.R. Mangalam University, Delhi). Spanning themes from green chemistry and nanoparticle synthesis to medicinal chemistry and environmental remediation, the invited talks enriched the scientific programme with their thematic breadth and institutional diversity.



Dr. Kavita Yadav, Prof Ramananda & Dr Sanjay (Session Chairs) during Day 2



Faculty and delegates attentively following the lectures



Student asking questions

Technical Session II: Oral & Poster Presentations (1:45 – 3:00 pm)

A final round of contributed oral and poster presentations was held on the afternoon of Day 2. These sessions provided a second cohort of young researchers with the opportunity to present their work and receive expert feedback before the Valedictory Ceremony.

Distinguished Speakers and Lecture Highlights

ACESMM-2026 featured a distinguished panel of nine plenary and invited speakers drawn from leading research institutions across India and Belgium. The following section presents a concise scientific summary of each lecture based on the submitted abstracts.

Keynote Address

Prof. Gurmeet Singh / *Former Vice Chancellor, Pondicherry University (Online)*

Importance of Energy

Prof. Gurmeet Singh delivered an inspiring keynote address on the multidimensional importance of energy in contemporary civilisation. He articulated the urgency of transitioning to clean and sustainable energy sources, contextualised within India's growing energy demands and international climate commitments. Drawing on a career spanning energetic materials and energy systems research, his address provided the intellectual framing for the scientific deliberations of the two-day conference and inspired young researchers to contribute meaningfully to the global energy challenge.

Plenary Lectures

Prof. Ambrish Singh / *Nagaland University*

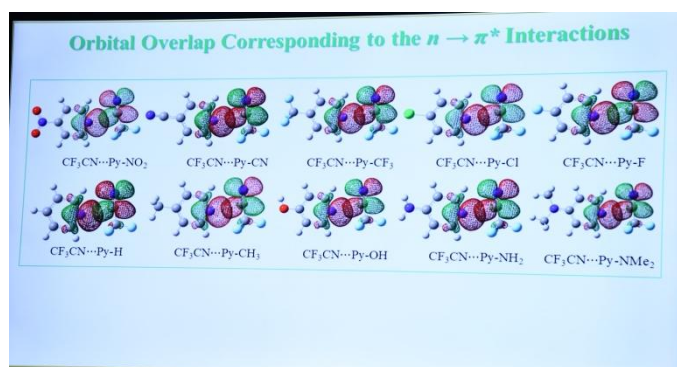
Development and Study of Corrosion Inhibitors for Mitigation of Acidizing Corrosion in Oil Fields

Prof. Ambrish Singh presented a comprehensive study on the molecular design, synthesis, and evaluation of corrosion inhibitors targeted at acidizing corrosion in oil fields — a problem of substantial industrial and economic significance. His research explored the interaction of inhibitor molecules with metal surfaces in aggressive acid environments, employing a combination of electrochemical methods, surface characterization, and quantum chemical calculations to elucidate the mechanistic basis of inhibition. The study offered actionable insights for industrial corrosion management and highlighted the critical role of coordination chemistry in materials protection.

Dr. Mrityunjay Kumar Tiwari / *Department of Chemistry, University of Delhi*

Probing the Effect of Substituents on $n \rightarrow \pi^$ Interactions in Organic Nitrile-Pyridine Complexes: A Quantum Chemical Study*

Dr. Tiwari presented a rigorous quantum chemical investigation of $n \rightarrow \pi^*$ interactions in organic nitrile-pyridine complexes, systematically probing the influence of substituent identity and position on the energy, geometry, and charge-transfer character of these non-covalent interactions. Using high-level ab initio and DFT methods, the study demonstrated that electron-donating and electron-withdrawing substituents modulate interaction strength through a combination of inductive, resonance, and steric effects. The findings carry significant implications for the rational design of supramolecular assemblies, crystal engineering, and drug-receptor binding models.



Dr. Shammi Rana | KU Leuven, Belgium (Online)

Metalloporphyrin Monolayers as Tunable Platforms for CO_2 Electroreduction

In an internationally distinguished contribution from KU Leuven, Belgium, Dr. Shammi Rana presented a landmark study on self-assembled monolayers of physisorbed metalloporphyrins (iron and copper) on graphite electrodes as structurally well-defined model systems for the electrochemical CO_2 reduction reaction (CO_2RR). High-resolution scanning tunnelling microscopy (STM) revealed crystalline monolayers with uniform active-site distribution and periodicities of approximately 1.5 nm. Isotopic labelling experiments confirmed CO product origin from added CO_2 . Bicomponent monolayers enabled systematic composition-activity studies, demonstrating a direct correlation between catalytic component coverage and Faradaic efficiency. The work represents a significant advance in establishing structure-activity relationships for electrocatalytic CO_2 conversion.

The screenshot shows a Zoom meeting interface. The main window displays a presentation slide titled "The CO_2 Molecule: A Closer Look". The slide content includes:

- Structure of CO_2** : Linear molecule | Bond angle: 180° | MW: 44 g/mol
- Very Stable**: Double C=O bonds are strong (603 kJ/mol each). Breaking them requires energy \rightarrow that's the challenge!
- Abundant & Free**: 4 Gt/year from atmosphere. CO_2 capture from air/blue gas gives us a cheap 'carbon feedstock'.
- Thermodynamically Uphill**: CO_2 is fully oxidised carbon. Reducing it back to fuels requires electrons + energy input.

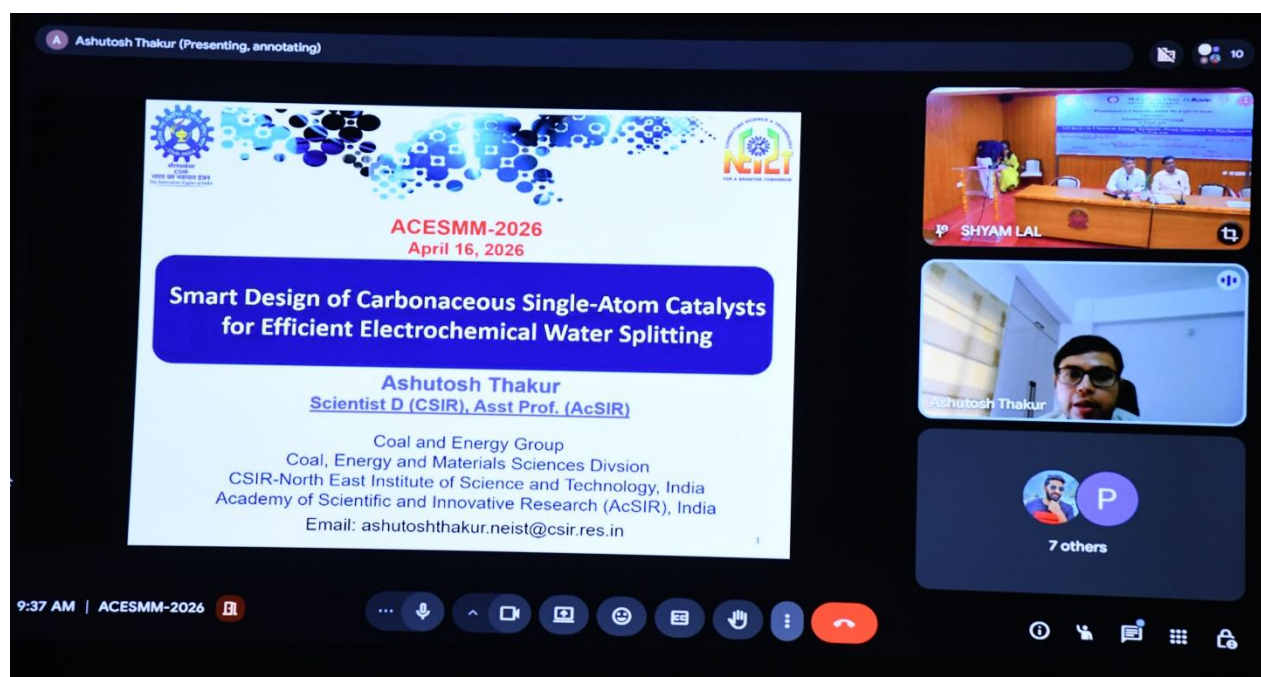
The Zoom interface also shows a grid of participants, including Shammi Rana, sangita aggarwal, and a group of 12 others. A video thumbnail at the bottom shows a panel discussion with SHYAM LAL.

Dr. Ashutosh Thakur | CSIR-NEIST, Jorhat, Assam / AcSIR, Ghaziabad

Smart Design of Carbonaceous Single-Atom Catalysts for Efficient Electrochemical Water Splitting

Dr. Thakur presented a cutting-edge study on the rational design of carbonaceous single-atom catalysts (SACs) for electrochemical water splitting — the most promising pathway to green hydrogen production. His group developed an innovative inorganic template- and acid-base-treatment-free synthesis strategy that addresses the critical challenge of metal species agglomeration during high-temperature carbonization. The resulting SACs demonstrated reduced overpotentials,

minimised metal loading, and superior long-term stability compared to conventional benchmarks. The work advances the frontier of SAC technology and provides practical design principles for scalable green hydrogen generation.



Dr. Bhanu Prakash | *Institute of Nano Science and Technology, Knowledge City, Punjab (Online)*
Emerging Microfluidics: Applications in Energy and Healthcare

Dr. Bhanu Prakash delivered a wide-ranging and innovative talk on the applications of microfluidic technologies in two societally critical domains: healthcare diagnostics and energy harvesting. His group has developed flexible paper-based point-of-care (POC) devices for ultrasensitive dopamine detection in urine and cystic fibrosis diagnosis through sweat analysis. In the energy domain, his team has created piezoelectric microfluidic systems that convert fluidic motion into usable electrical power, alongside high-sensitivity viscosity sensors. The talk illustrated how microfluidics, as a versatile platform technology, can simultaneously address healthcare equity and clean energy challenges.



Invited Lectures

Prof. Netrapal Singh / *Dr. Harisingh Gour Vishwavidyalaya, Sagar, Madhya Pradesh*
Role of Carboxamide-Based Ligands in Green Chemistry for Sustainable Development

Prof. Netrapal Singh discussed the design and application of carboxamide-based ligands in green chemistry frameworks, emphasising their potential for sustainable catalysis, metal ion sequestration, and environmentally benign synthesis routes. The talk highlighted the versatility of carboxamide coordination chemistry in generating functional materials with applications in remediation and catalysis.

Dr. Nutan Rani / *Miranda House, University of Delhi*

Phytomediated Synthesis of ZnO Nanoparticles and Their Emerging Applications

Dr. Nutan Rani presented her group's work on the green, phytomediated synthesis of zinc oxide (ZnO) nanoparticles using plant extracts as bioreducing and capping agents. The nanoparticles were characterized for morphology, crystal structure, and optical properties and evaluated for applications in photocatalytic dye degradation, antibacterial activity, and sensor development. The study exemplifies the synergy between green chemistry principles and materials science.

Dr. Nikhil Kumar / *Chaudhary Charan Singh University, Meerut*

Phytochemical Constituents and Pharmacological Activities of Cannabis sativa in Human Health and Environment

Dr. Nikhil Kumar provided a detailed scientific overview of the phytochemistry and pharmacological potential of *Cannabis sativa*, contextualised within both its therapeutic relevance and environmental applications. He reviewed the diverse bioactive compounds — cannabinoids, terpenoids, flavonoids, and phenolics — and their interactions with the endocannabinoid system, drawing on evidence for their roles in pain management, neuroprotection, anti-inflammation, and cancer therapy. The talk also addressed the plant's phytoremediation potential and sustainable industrial uses.

Dr. Subhash Chandra Mohapatra / ARSD College, University of Delhi

Synthesis and Structural Characterization of Bis-benzimidazole Based Copper(II) Nanohybrid Solid Complexes: Antimalarial and Anticancer Proficiency

Dr. Mohapatra presented the synthesis, structural elucidation, and biological evaluation of bis-benzimidazole-based copper(II) nanohybrid solid complexes. Comprehensive characterization using spectroscopic and diffraction methods confirmed the coordination mode and structural integrity of the complexes. Biological screening revealed promising antimalarial and anticancer activity, with structure-activity correlation suggesting that the copper(II) centre and bis-benzimidazole scaffold cooperate to produce cytotoxic effects. The study advances the medicinal inorganic chemistry of copper complexes.

Dr. Charu Chandra / Dyal Singh College, University of Delhi

Eco-Friendly Bio-Enzymes from Agricultural Waste for Water Remediation Applications

Dr. Charu Chandra presented an engaging account of her group's work on the preparation of eco-friendly bio-enzymes from agricultural and kitchen waste, and their application in water remediation. The talk traced the fermentation-based protocol for converting fruit peels, jaggery, and water into a multipurpose biological cleaner rich in active microbial metabolites. Laboratory studies demonstrated the efficacy of these bio-enzymes in reducing chemical oxygen demand (COD), neutralising pH, and degrading common pollutants in contaminated water samples. The work exemplifies a low-cost, scalable, and circular-economy approach to environmental remediation, well aligned with the principles of green chemistry and the United Nations Sustainable Development Goals.

Technical Sessions Summary

Oral Presentations

Technical Sessions I and II comprised contributed oral presentations by young researchers from institutions across Delhi and India. The Board Room and Seminar Room hosted simultaneous parallel sessions, enabling a larger number of participants to present their work. Each presentation was allotted a fixed time slot followed by a question-and-answer period, evaluated by a panel of faculty members.

The oral presentations spanned a diverse range of themes including computational investigation of corrosion inhibitors, DFT and MD simulation studies, synthesis and characterization of metal complexes, photocatalytic materials, nanohybrid composites, and green synthesis methodologies. The quality of presentations was notably high, with several participants demonstrating exceptional clarity and depth in their research communication.



A UG student presenting in the oral session



Session Co-ordinators (Dr. Aditi Puri and Dr. Raghavendra M.) and evaluating faculty panel

Poster Presentations

The poster sessions, held in the MPH Corridor across both days, formed a vibrant and interactive segment of the conference. Participants displayed research posters on standardised boards and engaged in direct, in-depth discussions with evaluating faculty and fellow delegates. The corridor was alive with intellectual exchange, as researchers from diverse sub-disciplines explained their methodologies, results, and conclusions to interested visitors.

Research topics presented through posters included: DFT and MD simulation studies on inhibition efficiency of triazoles on Fe(110) surfaces; fabrication of $\text{CuFe}_2\text{O}_4/\text{ZnWO}_4$ nanocomposites for photocatalytic ciprofloxacin degradation; synthesis of polymer composites using bast shell powder as a natural filler; computational studies on proton transfer in protic ionic liquids; and applications of nanomaterials in sensor development. The breadth of themes reflected the interdisciplinary character of the conference.

Major Research Themes

The collective body of presentations at ACESMM-2026 identified several cross-cutting research themes of current national and international significance:

- Electrochemical energy conversion — water splitting, CO₂ reduction, and fuel cell-related chemistry
- Corrosion science and materials protection — molecular inhibitor design and computational modelling
- Functional nanomaterials — photocatalysts, nanocomposites, metal-organic frameworks, and single-atom catalysts
- Green chemistry and sustainable synthesis — phytomediated methods, agricultural waste valorisation, and biodegradable materials
- Medicinal and biological chemistry — metal complex bioactivity, phytochemistry, and pharmacological profiling
- Computational chemistry — DFT, MD simulation, quantum chemical interaction studies, and potential energy surface analysis
- Microfluidics and point-of-care diagnostics — energy harvesting and biomedical sensing applications

Participation Overview

ACESMM-2026 attracted a diverse and geographically distributed body of participants, befitting its status as an international conference. The hybrid mode further extended participation beyond physical boundaries, enabling researchers from distant locations — including an international participant from Belgium — to contribute fully to the scientific proceedings.

Parameter	Details
Conference Mode	Hybrid (In-person + Online)
Duration	Two Days (April 15–16, 2026)
Plenary / Keynote Speakers	6 (including 1 International — Belgium)
Invited Speakers	5 (from institutions across India)
Session Chairs	6 (from University of Delhi & affiliated colleges)
Oral Presentations	Multiple sessions (Board Room & Seminar Room)
Poster Presentations	Multiple sessions (MPH Corridor, both days)
Participating Institutions	Institutions from Delhi, UP, MP, Assam, Punjab, Nagaland, Israel & Belgium
Student Participation	Undergraduate, Postgraduate & Research Scholars
Abstract Book	Published and formally released at inauguration

The conference maintained a strong focus on student engagement. Student delegates from Shyam Lal College and affiliated institutions constituted a significant proportion of the audience, participating in both scientific sessions and poster presentations. The hybrid format enabled online attendees, visible through the conference video platform, to follow and interact with all sessions in real time.

Institutional Impact

Enhancement of Research Culture

ACESMM-2026 made a tangible contribution to the research culture of Shyam Lal College and its associated institutions. By bringing globally significant scientific themes to the campus — including electrochemical water splitting for green hydrogen and CO₂ electroreduction — the conference reaffirmed that frontier research is not the exclusive preserve of elite research universities, but is accessible and relevant to every committed scientific community.

Student Exposure and Mentorship

The direct exposure of students to eminent researchers — through in-person interactions as well as live online sessions — was among the most impactful outcomes of the conference. Students witnessed research communication at a high professional standard, took part in Q&A exchanges with leading scientists, and received expert evaluation of their own presentations. Experiences of this kind are of lasting value in the academic development of young scientists.

Industry-Academia Interaction

The participation of Shri Ajay Kumar (Scientist F, DRDO, Ministry of Defence) as Distinguished Guest signified meaningful engagement with the defence and applied science sector. Additionally, the conference's focus on practically relevant themes — corrosion inhibition, hydrogen production, water remediation, and pharmaceutical chemistry — naturally bridges academic research and its industrial applications.

International Academic Visibility

The participation of Dr. Shammi Rana from KU Leuven, Belgium as a plenary speaker lent ACESMM-2026 genuine international stature. The online format made this participation seamless and demonstrated the college's capability to engage international research communities. This international visibility is directly relevant to NAAC and NIRF indicators of institutional quality.

Networking and Collaboration Opportunities

The conference created a dense network of academic connections among participants from institutions spread across multiple states and disciplines. The informal networking sessions — during high tea and lunch — and the interactive poster sessions were particularly effective in fostering genuine, sustained collaborations. Several participants expressed interest in establishing research linkages with the Department of Chemistry, Shyam Lal College.

Capacity Building in Science Education

ACESMM-2026 contributed directly to the capacity-building mission of the institution by training student volunteers in event management, scientific communication, and professional conduct; providing a practical research communication platform for young presenters; and exposing the student body to the diversity of career trajectories available in chemistry research.

Outcomes and Recommendations

Key Outcomes

ACESMM-2026 generated the following documented outcomes:

- ✓ Successful conduct of a two-day international hybrid conference with participation from multiple Indian states and one international institution (Belgium).
- ✓ Formal publication and release of the ACESMM-2026 Abstract Book, providing a permanent academic record.
- ✓ Recognition of outstanding young researchers through Best Oral Presentation and Best Poster Presentation awards.
- ✓ Enrichment of student learning through direct interaction with eminent researchers from national and international institutions.
- ✓ Documentation of active research culture for NAAC, IQAC, Annual Report, and University submission purposes.
- ✓ Creation of a strong institutional precedent for hosting research conferences at the undergraduate-postgraduate interface.

Recommendations

Based on the experience and impact of ACESMM-2026, the organizing committee recommends the following for institutional consideration:

- Institutionalise an annual conference series in the Department of Chemistry to maintain research momentum and community engagement.
- Expand sponsorship outreach to include DST-SERB, CSIR, DBT, and industrial sponsors for enhanced financial sustainability and speaker diversity.
- Develop a proceedings volume or special issue in a peer-reviewed journal to provide participants with a publication opportunity arising from their conference contributions.
- Establish a formal Memorandum of Understanding (MoU) with one or more participating institutions to formalise research collaboration and exchange.
- Create a dedicated conference archival page on the college website to ensure permanent documentation and wider dissemination.

Valedictory Session

The Valedictory and Closing Ceremony of ACESMM-2026 was held on the afternoon of April 16, 2026 (3:00–4:15 pm) in the Multipurpose Hall, Shyam Lal College. The hall was filled to capacity with delegates, faculty, and students who gathered to celebrate the successful conclusion of two days of intensive scientific engagement.

Valedictory Address by Prof. Rajeev Gupta

The valedictory session of the two-day international conference was graced by the Chief Guest, who delivered an inspiring and thought-provoking address to a gathering of faculty members, researchers, and students. Sharing the dais with the Principal, **Prof. Rabi Narayan Kar**, along with **Dr. Ompal Singh Yadav**, **Dr. Sanjay Kumar**, and other esteemed faculty colleagues, the Chief Guest commended the College for its initiative in nurturing a research-oriented culture at the undergraduate level.

Opening his address, he expressed genuine delight at the enthusiastic participation of young students, particularly through the poster presentations, which he described as a refreshing testament to the spirit of enquiry being cultivated on the campus. He underscored the timeliness of the *National Education Policy's* emphasis on integrating education with research, observing that undergraduate research — long overdue in the Indian academic landscape — must now be wholeheartedly embraced. He dispelled a common misconception by reminding the audience that research is neither the exclusive privilege of postgraduate scholars nor confined to the sciences alone; rather, it is an approach, a perspective, and an analytical disposition that extends across disciplines as varied as the social sciences, finance, space, artificial intelligence, and data science.

Turning to the conference theme, the Chief Guest offered illuminating reflections on the inseparable bond between chemistry and energy. Citing the geopolitical significance of energy resources, he highlighted how command over energy supply chains has become a defining instrument of global influence. He introduced the audience to the fascinating concept of the **nine designated colours of hydrogen** — green, grey, blue, red, and purple among them — explaining that each colour denotes the pathway by which the gas is produced. *Green hydrogen*, generated through environmentally benign routes such as water splitting, was singled out as the cleanest fuel of the future, yielding only water as its byproduct.

The Chief Guest also shared glimpses of his own research on *metal–organic frameworks*, wherein challenging chemical transformations are accomplished using sunlight, air, and water in place of conventional reagents. Looking ahead, he forecast a dramatic transition away from petrol- and diesel-based vehicles within the coming decades, citing the global proliferation of electric vehicles, the adoption of hydrogen-fuelled cars at the *Central Salt and Marine Chemicals Research Institute, Bhavnagar*, and the solar-powered campus of *Lovely Professional University* as early harbingers of this transformation. He further drew attention to ongoing research aimed at miniaturising lithium batteries and extending their operational lifespan.

In a particularly captivating segment, he illustrated the staggering potential of futuristic **data storage** by contrasting conventional silicon-based memory chips, which hold data of the order of 10^1

gigabytes, with *DNA-based storage*, theoretically capable of housing up to 10^{10} gigabytes — sufficient to archive the entire data of a metropolis on a single chip.

In conclusion, the Chief Guest urged students to read widely, engage with the research blogs of leading international universities and Nobel laureates, and resist the lure of social-media distractions. He warmly congratulated the Chemistry Department, in particular **Dr. Ompal Singh Yadav**, **Dr. Sanjay Kumar**, and the entire organising team, for their commendable efforts in conducting this international conference, and extended his best wishes for its continued success. The session closed with a formal vote of thanks, which echoed his message that research is fundamentally “*an approach, a perspective, and a keenness to understand things in greater depth.*”



Prof. Rajeev Gupta delivering the Valedictory Address



A faculty member addressing the valedictory gathering



Prof. Rajeev Gupta and Dr. Ompal S. Yadav at the valedictory dais



A packed Multipurpose Hall during the Valedictory Ceremony



Faculty and delegates during the Valedictory Session



Participants attentively following the valedictory proceedings

Presentation of Tokens of Appreciation

Tokens of appreciation in the form of mementos and shawls were presented to the distinguished guests and invited speakers, in keeping with the traditions of Indian academic hospitality. These gestures acknowledged the invaluable contributions of the speakers to the intellectual richness of the conference.



Presentation of a token of appreciation to Prof. Rajeev Gupta by the organizing committee

Prize Distribution: Best Oral and Poster Presentations

A highlight of the Valedictory Ceremony was the formal distribution of prizes for the Best Oral Presentation and Best Poster Presentation. The awards, announced following deliberation by the panel of evaluating faculty, recognised young researchers who had demonstrated exceptional scientific merit, clarity of communication, and quality of research. The prize distribution ceremony was received with enthusiastic applause, reflecting the competitive spirit and mutual encouragement that characterised ACESMM-2026.



Prize and certificate distribution to an outstanding presenter during the Valedictory Ceremony

Vote of Thanks and Closing Remarks

The Vote of Thanks was delivered by the Convenor of the conference on behalf of the organizing committee. All contributors — sponsors, distinguished guests, invited speakers, session chairs, student volunteers, and support staff — were acknowledged with gratitude. The closing remarks affirmed the department's commitment to continuing the tradition of ACESMM as a platform for advancing chemical energy science in India.



A grand group photograph of all participants, faculty, and student volunteers at the conclusion of ACESMM-2026

Acknowledgements

The successful organization of ACESMM-2026 was made possible through the generous support and committed contributions of numerous individuals and institutions. The organizing committee expresses its deep and sincere gratitude to:

Prof. Rabi Narayan Kar, Principal, Shyam Lal College: for his visionary patronage, institutional support, and unwavering encouragement throughout the planning and execution of the conference.

The IQAC, Shyam Lal College: for providing the institutional framework and quality assurance support under whose aegis the conference was organized.

All Invited and Plenary Speakers: for their distinguished scholarly contributions, which formed the intellectual core of ACESMM-2026.

Session Chairs and Evaluators: for their meticulous and fair evaluation of oral and poster presentations, and for their expert moderation of scientific discussions.

Our Sponsors — DRDO (DMSRDE, Kanpur), Sapala Organics Pvt. Ltd., and Metrohm India Pvt. Ltd.: for their generous financial sponsorship and material support, which enabled the conference to be conducted at the highest level of quality. (See dedicated Sponsors page.)

All Faculty Members, Department of Chemistry, Shyam Lal College: for their enthusiastic participation, administrative support, and collaborative spirit in organizing this event.

Student Volunteers: for their tireless dedication, professionalism, and cheerful service, which ensured the smooth conduct of every aspect of the conference.

Administrative and Technical Support Staff: for their behind-the-scenes contributions to registration, audio-visual management, hospitality, and logistics.

All Delegates and Participants: for their active and engaged participation, which gave the conference its scientific vitality and collegial spirit.

Our Sponsors

The Department of Chemistry, Shyam Lal College gratefully acknowledges the generous financial and material support extended by the following sponsoring organisations, whose patronage was instrumental to the successful conduct of ACESMM-2026.



Defence Research and Development Organisation (DRDO)

Defence Materials and Stores Research and Development Establishment (DMSRDE), Kanpur

The Defence Research and Development Organisation, India's premier defence research agency under the Ministry of Defence, operates a network of over fifty laboratories nationwide. Its Defence Materials and Stores Research and Development Establishment (DMSRDE), Kanpur, is the lead laboratory for materials research, specialising in high-performance textiles, polymers, composites, and protective systems — including ballistic and NBC protection, camouflage technologies, and cold-weather gear — for the Indian Armed Forces. *DMSRDE, Kanpur – 208 013, Uttar Pradesh | www.drdo.gov.in*



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Founded in 2005 and now part of Cohance Lifesciences (a global CDMO), Sapala Organics, Hyderabad, is India's leading pioneer in nucleic acid and medicinal chemistry. The company specialises in the custom synthesis of modified phosphoramidites, heterocyclic compounds, lipids, and PEG derivatives, and offers CRO and CDMO services to academia, biotech start-ups, pharmaceutical companies, and mRNA vaccine innovators worldwide. *Hyderabad – 500 081, Telangana | www.sapalaorganics.com*



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Founded in 1943 in Herisau, Switzerland, Metrohm is among the world's most trusted manufacturers of high-precision instruments for chemical analysis, with a presence in more than eighty countries. Metrohm India has served the Indian analytical community for over two decades, offering the complete range of Metrohm titration, ion chromatography, voltammetry, NIR and Raman spectroscopy, and electrochemical workstation instruments, supported by a dedicated applications laboratory in Chennai. *Mahape, Navi Mumbai | www.metrohm.com/en_in*

Conclusion

ACESMM-2026 stands as a significant milestone in the academic history of the Department of Chemistry, Shyam Lal College, University of Delhi. In bringing together scientists from diverse disciplines, institutions, and geographies under the banner of chemical energy systems, the conference demonstrated that a constituent college of the University of Delhi is fully capable of organizing, hosting, and intellectually anchoring an event of international standing.

The conference achieved every one of its stated objectives: it provided a high-quality scientific forum; it exposed students to frontier research; it facilitated industry-academia interaction; and it produced a permanent academic record in the form of the ACESMM-2026 Abstract Book. The calibre of the invited speakers, the quality of the contributed presentations, the hybrid format that bridged physical and geographical distances, and the seamless professionalism of the organizing team collectively ensured that ACESMM-2026 not only met but exceeded the expectations of its participants.

Looking ahead, the organizing department is committed to building on the intellectual and institutional momentum generated by ACESMM-2026. It is hoped that the networks, collaborations, and ideas seeded at this conference will bear fruit in the form of joint research, publications, and future events that continue to advance the frontiers of chemical energy science. ACESMM-2026 has firmly established Shyam Lal College as a proud contributor to India's growing scientific enterprise.

Photo Gallery

A visual documentation of ACESMM-2026: International Conference on Advances in Chemical Energy Systems

Conference Venue and Inauguration



Conference banner standee at the entrance



Traditional floral rangoli display welcoming delegates



Student-crafted ACESMM-2026 display board, Dept. of Chemistry



Organizing committee at the college campus



Chief Guest lighting the inaugural lamp



Distinguished Guest at the ceremonial lamp



Patron participating in the lamp-lighting ceremony



Faculty members at the inaugural lamp ceremony



Inaugural Session



The decorated conference dais before commencement of the Inaugural Session



Formal release of the ACESMM-2026 Abstract Book



Dignitaries with the Abstract Book on stage



Student asking a question during the technical session



Shri Ajay Kumar, Scientist F, DRDO, addressing the Inaugural Session

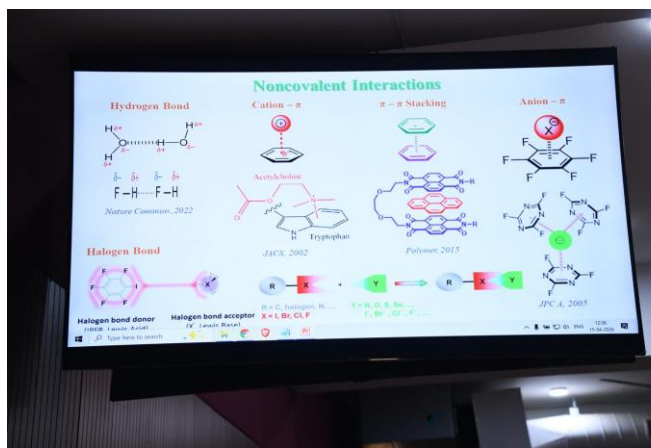


Prof. Gurmeet Singh (Keynote) joining online; online participants on screen

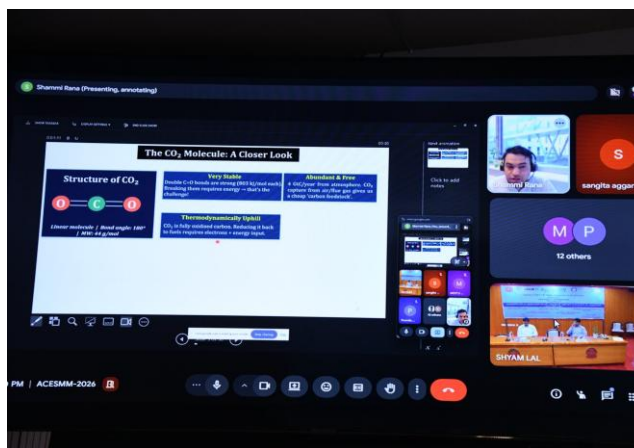


The Multipurpose Hall with full attendance

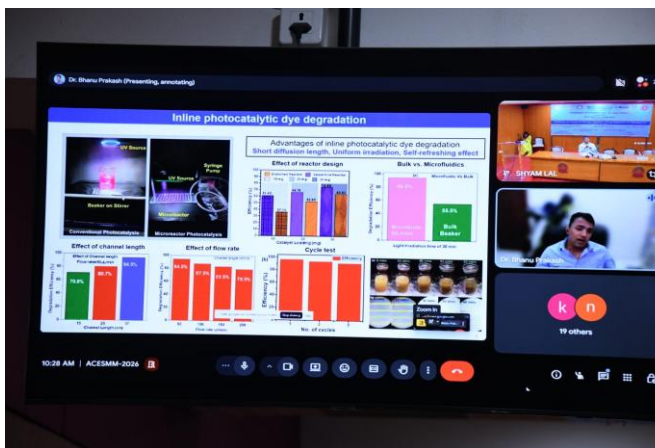
Scientific Sessions



Presentation slide on non-covalent interactions



Dr. Shammi Rana presenting CO₂ electroreduction research online



Dr. Bhanu Prakash (INST, Punjab) presenting microfluidics research online



A plenary speaker at the podium on Day 2



Day 2 Session Chairs



During the Inaugural Session (University Kulgeet) on Day 1



Faculty and delegates attentively following the Day 2 sessions



A full Multipurpose Hall during Day 2 proceedings

Technical Sessions



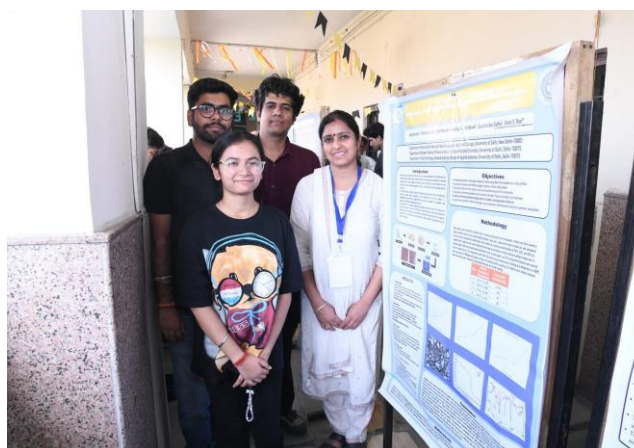
A research scholar during an oral presentation



Faculty panel evaluating oral presentations



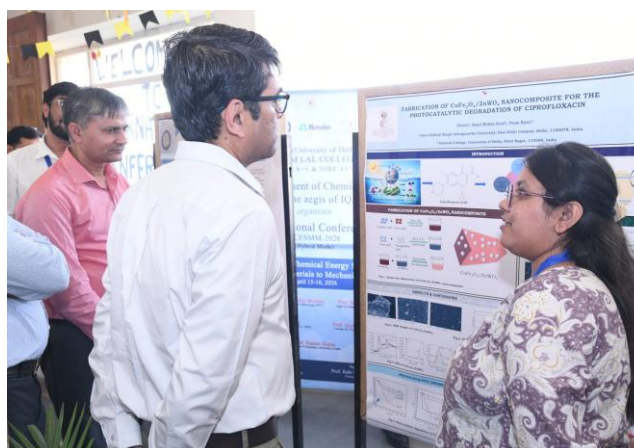
Student presenting at the poster session



Participants with their research poster



Principal, SLC interacting with a student during the poster presentation



Principal, SLC engaging with a poster presenter on Day 1



Presentation of a plant sapling as a token of appreciation to a speaker (Dr. Mrityunjay Tiwari)



Principal, SLC addressing the valedictory assembly

Valedictory Session and Group Photographs



Prof. Rajeev Gupta delivering the Valedictory Address



Prof. Rajeev Gupta and Dr. Ompal S. Yadav at the dais



Participants at the Valedictory Ceremony



Presentation of shawl and planter to a distinguished guest



Organizing committee faculty on the conference stage



Faculty and organizing committee — Valedictory group photograph



All participants, faculty, and student volunteers — grand group photograph, ACESMM-2026



Faculty and student volunteers — Inaugural Session of ACESMM-2026

Annexure I: Programme Schedule

ACESMM-2026 | April 15–16, 2026 | Multipurpose Hall, Shyam Lal College, University of Delhi

DAY 1 — WEDNESDAY, APRIL 15, 2026	
Time	Event / Activity
9:15 – 10:00 am	Registration
10:00 – 11:30 am	Inaugural Ceremony: Lamp Lighting Welcome Address by Principal Abstract Book Release Distinguished Guest Address Keynote Address Chief Guest Address
11:30 am – 12:00 pm	High Tea and Networking
12:00 – 12:35 pm	Plenary Lecture I — Prof. Ambrish Singh (Nagaland University) Corrosion Inhibitors for Mitigation of Acidizing Corrosion in Oil Fields
12:35 – 1:10 pm	Plenary Lecture II — Dr. Mrityunjay Kumar Tiwari (Dept. of Chemistry, University of Delhi) $n \rightarrow \pi^*$ Interactions in Organic Nitrile-Pyridine Complexes: A Quantum Chemical Study
1:10 – 1:45 pm	Plenary Lecture III — Dr. Shammi Rana (KU Leuven, Belgium — Online) Metalloporphyrin Monolayers as Tunable Platforms for CO ₂ Electroreduction
1:45 – 2:45 pm	Lunch Porch Area
2:45 – 5:30 pm	Technical Session I: Oral Presentations (Board Room Seminar Room) Poster Presentations (MPH Corridor)

DAY 2 — THURSDAY, APRIL 16, 2026	
Time	Event / Activity
9:30 – 10:10 am	Plenary Lecture IV — Dr. Ashutosh Thakur (CSIR-NEIST, Jorhat — Online) Smart Design of Carbonaceous Single-Atom Catalysts for Efficient Electrochemical Water Splitting
10:10 – 10:50 am	Plenary Lecture V — Dr. Bhanu Prakash (INST, Punjab — Online) Emerging Microfluidics: Applications in Energy and Healthcare
10:50 – 11:20 am	Tea Break
11:20 – 11:40 am	Invited Talk — Prof. Netrapal Singh (Dr. Harisingh Gour Vishwavidyalaya) Role of Carboxamide-Based Ligands in Green Chemistry for Sustainable Development
11:40 am – 12:00 pm	Invited Talk — Dr. Nutan Rani (Miranda House, University of Delhi) Phytomediated Synthesis of ZnO Nanoparticles and Their Emerging Applications
12:00 – 12:20 pm	Invited Talk — Dr. Nikhil Kumar (CCS University, Meerut) Phytochemical Constituents and Pharmacological Activities of Cannabis sativa

12:20 – 12:40 pm	Invited Talk — Dr. Subhash Chandra Mohapatra (ARSD College, University of Delhi) Synthesis of Bis-benzimidazole Based Copper(II) Nanohybrid Complexes
12:40 – 1:00 pm	Invited Talk — Dr. Charu Chandra (Dyal Singh College, University of Delhi) Eco-Friendly Bio-Enzymes from Agricultural Waste: Water Remediation Applications
1:00 – 1:45 pm	Lunch Porch Area
1:45 – 3:00 pm	Technical Session II: Oral Presentations (Board Room) Poster Presentations (MPH Corridor)
3:00 – 4:15 pm	Valedictory Ceremony: Addresses Prize Distribution Vote of Thanks
4:15 – 4:30 pm	High Tea

Annexure II: List of Distinguished Speakers

#	Name	Talk Title	Institution	Role
1	Prof. Gurmeet Singh	<i>Importance of Energy</i>	Former VC, Pondicherry University	Keynote Speaker (Online)
2	Prof. Ambrish Singh	<i>Corrosion Inhibitors for Oil Fields</i>	Nagaland University	Plenary Speaker
3	Dr. Mrityunjay Kumar Tiwari	<i>n→π* Interactions in Nitrile- Pyridine Complexes</i>	Dept. of Chemistry, University of Delhi	Plenary Speaker
4	Dr. Shammi Rana	<i>Metalloporphyrin Monolayers for CO₂ Reduction</i>	KU Leuven, Belgium	Plenary Speaker (Online)
5	Dr. Ashutosh Thakur	<i>Carbonaceous Single-Atom Catalysts</i>	CSIR-NEIST, Jorhat / AcSIR	Plenary Speaker (Online)
6	Dr. Bhanu Prakash	<i>Emerging Microfluidics</i>	INST, Knowledge City, Punjab	Plenary Speaker (Online)
7	Prof. Netrapal Singh	<i>Carboxamide Ligands in Green Chemistry</i>	Dr. Harisingh Gour Vishwavidyalaya, Sagar	Invited Speaker
8	Dr. Nutan Rani	<i>Phytomediated Synthesis of ZnO NPs</i>	Miranda House, University of Delhi	Invited Speaker
9	Dr. Nikhil Kumar	<i>Phytochemistry of Cannabis sativa</i>	CCS University, Meerut	Invited Speaker
10	Dr. Subhash Chandra Mohapatra	<i>Bis-benzimidazole Cu(II) Complexes</i>	ARSD College, University of Delhi	Invited Speaker
11	Dr. Charu Chandra	<i>Bio-Enzymes from Agricultural Waste</i>	Dyal Singh College, University of Delhi	Invited Speaker

End of Report

Department of Chemistry, Shyam Lal College, University of Delhi | ACESMM-2026