

INDIAN INSTITUTE OF CHEMICAL ENGINEERS
(NORTHERN REGIONAL CENTRE)

July 1, 2023

ANNUAL REPORT 2022-23
(1st July 2022 – 30th June, 2023)

Dear Members,

It is a great honour to serve this esteemed Institute as the Honorary Secretary since July 2021. I thank NRC for bestowing this responsibility on me. The surge in activities during the preceding year shows the wholehearted efforts of the Northern Regional Centre members.

The Executive Committee elected for the year 2021-2023 is as under.

Chairman	Dr. S. Nand	Vice Chairman	Prof. Anil Verma
Honorary Secretary	Mr. C.P. Srivastava	Honorary Joint Secretary	Dr. Dhiraj Kumar Garg
Honorary Treasurer	Mr. Amit Jain		
Members	Prof. Anil K. Saroha	Prof. V.K. Srivastava	Prof. S.S. Sambi
	Mr. Abhijit Bikas Pal	Mr. Subhash Tandon	Dr. Siddhartha Mukherjee
	Dr. Anomitra Chakravarty	Mr. Anshuman Agrawal	
Co-opted Members	Dr. S.N. Chakravarty	Mr. Shyam Bang	

Activities of NRC

During the year 2022-23, we have organized number of activities on behalf of IChE (Northern Regional Centre) and also jointly with other organizations as mentioned below.

S. No.	Date	Venue	Title	
1	30/07/2022	Auditorium, IChE(NRC)	49th Annual General Meeting of Northern Regional Centre	
			TOPIC	SPEAKER
			Flow-Chem revolution: Seamless scale-up from Lab to 10000 TPA	Mr. C.K. Sethia, Manager Sales – AFR, Corning Reactor Technologies, Corning Technologies India Pvt Ltd

Some photographs during the program –



2	17/09/2022	Auditorium, IChE(NRC)	LECTURE SERIES – “LEARNING WITH THE LEADERS”	
			TOPIC	SPEAKER
			An Overview of Electric Vehicle and Role of Chemical Engineers	Prof. Anil Verma, Department of Chemical Engineering, Indian Institute of Technology (IIT) Delhi

Some photographs during the program –



3. Foundation Day of Indian Institute of Chemical Engineers (Northern Regional Centre), New Delhi

The Foundation Day program was held on 28th January, 2023 in the Auditorium, IICHe-NRC, C-27, Qutab Institutional Area, New Delhi – 110016. During this occasion, one lecture was organized.

Prof. Daljit Singh, Former Counsellor (Science & Technology), Embassy of India, Washington DC, USA presented a paper on “Inculcating Critical Thinking and Creativity - The Berkeley Experience”. The presentation was appreciated by all the participants especially the students participating in the programme.

During the Foundation Day celebration, merit-cum-means Scholarships were distributed to 20 students from UIET-CSJMU, MNIT-Jaipur, SLIET-Longowal, IIT-Roorkee, AMU-Aligarh, IIT-Kanpur and NIT-Hamirpur.

Some photographs during the Foundation day program –



4. Seminar on ‘Recent Developments in Catalysis in Process Industry’ held on 21-22 March, 2023 in Auditorium, IChE-NRC, New Delhi

FAI in collaboration with Indian Institute of Chemical Engineers (IChE) organized a two-day Seminar on ‘Recent Development in Catalysis in Process Industry’, during 21-22 March 2023 at New Delhi. The Seminar was inaugurated by Mr. Gaurav Mathur, Managing Director, Chambal Fertilisers and Chemicals Limited, New Delhi. Mr. Arvind Chaudhary, Director General, FAI, New Delhi delivered the special address. Dr. S. Nand, Additional Director General, FAI and Chairman, IChE-NRC and Mr. C.P. Srivastava, Honorary Secretary, IChE-NRC were also present. The Seminar was attended by more than 90 participants from fertilizer, refinery and petrochemicals industries including a large number of students and faculty from academic institutes.



Executives from left to right are Dr. S. Nand, Mr. Arvind Chaudhary, Mr. Gaurav Mathur and Mr. C.P. Srivastava

Mr. Gaurav Mathur, in his inaugural address mentioned that on 21st March 2006, Mr. Jack Dorsey founded twitter which catalyzed the social media. It happens to be March 21st when developments in catalyst are being discussed. He highlighted that the catalyst development helped to reduce the ammonia synthesis pressure from 600 atm in 1960s to about 150 atm at present. The catalysts not only played significant role in improving the industrial processes like ammonia and nitric acid but also in day-to-day life such as catalytic converters in cars. He pointed out that while the need for decarbonization of ammonia production like blue ammonia production by carbon capture and sequestration through physical process and deep underground storage are emerging, there is limitation in underground storage withholding capacity for long. Therefore, areas of conversion of carbon dioxide to useful chemicals should be explored.



Mr. Mathur mentioned that process intensification is another area which helps in cost optimization and economic production. He gave an example of ammonia converter which is quite a large equipment. Reducing the size of equipment can help in saving large energy in upstream and compression. He further mentioned that application of catalysts in biochemical processes can play an important role. One of the areas of interest is to improve organic carbon content in soil. He complimented the IChE and FAI for organizing the Seminar. He hoped that there would be cross learning amongst participants from different industries while students can learn from real life experiences.

Earlier, Mr. Arvind Chaudhary, highlighted the importance of human resource and FAI’s activities around it. He mentioned that FAI has joined hands with IChE-NRC in organizing the programme on the important subject of catalyst. He pointed out that a variety of catalysts are used in production of ammonia and sulphuric acid. The Seminar would provide opportunity to present and discuss the latest developments in

the area. It also provides opportunity for interaction between different industries on the one hand and between industry and academia on the other.



Mr. Chaudhary mentioned that catalysts manufacturers would be sharing information on the latest developments and newer catalysts. At the same time, they will also receive feedback from user industry. Academic and research institutions have important role in carrying out both basic and applied research in the areas of surface science and material science. Testing of catalysts at bench scale is also important aspect of catalyst research. Therefore, the Seminar provides good opportunity to researchers to share their latest findings. He hoped that all will benefit from the two-day event and specially the students present from different institutions.



Earlier, Dr. S. Nand, welcomed the guests, invitees and delegates. He informed about IChE is a body of chemical engineering professionals which works for development of the discipline in the country. In addition to providing various fora for exchange of information, IChE also conduct exams to award membership which is equivalent to bachelor 's degree in chemical engineering. The institute also recognizes the achievements of the Chemical Engineers for their work in research and industry. One of the other major objectives of the Institute is to bring the faculty, scientists and students from academic and research institutes and practicing engineers together. He informed about the some of the recent programmes organized by IChE which included a Seminar on Green Hydrogen and Green Ammonia which was attended by more than 200 delegates/specialists from all over the world.

He pointed out that catalysts have helped to provide food, energy and all the comfort of life with production of various useful materials. Catalysts also have a very important role in maintaining the clean environment. He hoped that the presentations arranged from catalyst manufacturers, user industries and researchers would be beneficial to all.



Mr. C.P. Srivastava, presented a vote of thanks at the conclusion of the Inaugural Session. He thanked the guests for sparing their valuable time and addressing the participants. He thanked the FAI and Executive Committee of IChE-NRC and office bearers of IChE-NRC for their support to the programme.

The Seminar was divided into five sessions. The **Session I on Catalysts for Ammonia Production** was chaired by Mr. G.K. Gautam, Director (Technical), IFFCO, New Delhi. Five papers were presented in the Session on 'Overview of Ammonia Production in India' by Mr. Manish Goswami, FAI, New Delhi; 'Magcat SMR Catalyst to Increase Hydrogen Production' by Mr. Abhinav Deshwal, UNICAT, Catalysts Technologies, Noida; 'Catalyst Developments in Reforming and Shift Duties' by Mr. Rajesh Garg, Sud-Chemie India Pvt. Ltd, New Delhi; 'Sustaining de carbonization through next Generation Catalyst' by Mr. Sanghadeep Gautam, Haldor-Topsoe, Faridabad and 'Operating Experience with the Latest Primary Reformer Catalyst Replacement in Ammonia Plant' by Mr. B.P.S. Mehta, IFFCO, Kalol.

The **Session II on R&D in Catalysts for Fuel Production** was chaired by Mr. Ajay N. Deshpande, Ex. Director (Tech), EIL, New Delhi. Three research papers were included in the Session viz. 'Novel Catalyst for Sustainable Fuel Production' by Dr. Saleem Akhtar Farooqui, CSIR-IIP, Dehradun, 'Turning Catalyst Design Pathways: A Holy Grail for Rational Design of Industrial Functional Materials' by Dr. Manjesh Kumar, Department of Chemical Engineering, IIT Delhi and 'Treatment Catalyst for Improved Performance of LCO Hydrocracker' by Mr. Debasis Sarma, RIL, Jamnagar.

The **Session III on Operating Experience of Plants- Case Studies** was chaired Mr. R.K. Chopra, Managing Director, Kribhco Fertilizers Limited, Noida. The case studies were presented on 'Operating Experience of Shift and Synthesis Catalysts in Ammonia Plant' by Mr. Satish Kumar Singh and Mr.

Abhishek Singh, Chambal Fertilizers & Chemicals Ltd., Gadepan; ‘Operational Experience of Catalyst of Secondary Reformer in IFFCO Aonla’ by Mr. Chandan Kumar Mishra, IFFCO, Aonla and ‘Experience of Primary Reformer and Shift Catalysts in Ammonia Plant’ by Mr. P. Senthil Nayagam, SPIC, Tuticorin.

Session IV titled **Other Topics** was chaired by Dr. S. Nand. The Session included two papers viz. ‘Recent Developments in Sulphuric Acid Catalyst’ by Mr. G.M. Patel, Ex-Executive Director, GSFC, Vadodara and ‘Thermo-Catalytic Conversion of Lignin for Synthesis Gas and other Products’ by Mr. Kaustabh Goswami, Guru Gobind Singh Indraprastha University, New Delhi.

The **Session V** on **Energy Transition through Catalysts** was chaired by Mr. V.K. Goyal, Ex- Executive Director, NFL, Noida. The papers presented during the session included Bi-reforming of Biogas for Producing Green Hydrogen by Mr. Vijayaraj M, IOC R&D Centre, Faridabad; Empowering Transition with KBR Technologies by Mr. Ankit Apoorv, KBR, Gurugram; and Next Generation Catalyst for Sustained Growth by Mr. Gautam Pandey, Honeywell UOP, Gurugram.

All presentations were well received followed by a lively question and answer session.



Prof. S. Basu delivering valedictory address. Other seen in picture from left to right are Mr. Manish Goswami, Dr. S. Nand and Mr. C.P. Srivastava

Prof. S. Basu, Department of Chemical Engineering, IIT, Delhi and Ex-Director, CSIR-Institute of Minerals and Materials Technology, Bhubaneswar, delivered the valedictory address in the concluding session. He complimented the organizers for covering all the important areas in catalysts. He expressed that catalysts are the heart of a chemical plant. Business of chemical industry has changed significantly in last 100 years. With the developments in technology, the shape of fertilizer, process, and petrochemical industries would be different in next couple of years. The energy source for fuel would shift from conventional fossil fuels to solar and wind. In case of fine chemicals, polymers, paints, synthetic fibers etc. the feedstock will change from fossil fuel to biomass. Other areas of biomass application would include integration of plants of cement with bio-refinery, Fisher Tropsch chemistry for production of higher hydrocarbons, etc. He also emphasized that due to emphasis on decarbonization, there will be lesser use of conventional energy sources. To conserve energy, we will require catalysts that can help carry out reactions under ambient conditions.

Prof. Basu underlined that the cost of renewable energy would reduce significantly in coming years which requires development of a new electrochemical catalyst. The developments can lead to even deposition of single atom of active material. There is new avenue for development of electrochemical catalysts and photocatalysts which are at laboratory scale now. The use of these catalysts can help in low cost production of green ammonia. However, the developments in conventional catalyst is also not saturated as there is always scope for imparting new characteristics to existing catalysts.

Earlier, Mr. C. P. Srivastava welcomed Prof. Basu and gave a brief account of two days proceedings.

Dr. S. Nand in his address, pointed out that during the recent world health crisis, importance of food and fuel were well recognized. Agriculture played a pivotal role in meeting the food requirement of large

population. Catalysts played important role in fertilizer production which are key to agricultural productivity and catalyst helped in production of high quality environment friendly fuels. He mentioned that various sessions deliberated on the catalysts role in production of ammonia, sulphuric acid, refineries, petrochemicals, green energy, etc. He hoped that all who attended the Seminar were benefited.

Mr. Manish Goswami, Chief (Technical), FAI, New Delhi presented a vote of thanks at the conclusion of the Seminar. He thanked Prof. Basu for insightful address. He thanked chairmen of the five sessions, all the presenters, the Executive Committee of IChE-NRC for their time and efforts and participants in making the Seminar such a success.

5	13/05/2023	Auditorium, IChE(NRC)	LECTURE SERIES – “LEARNING WITH THE LEADERS”	
			TOPIC	SPEAKER
			Blue hydrogen – production, costs, benefits, and drawbacks	Mr. Subodh Sarin, Director, Process Economics Program, S&P Global
			Solvent-based recycle of waste plastics	Mr. Rajiv Narang, Executive Director, Process Economics Program, S&P Global
			Plastic circularity with focus on advance recycling	Mr. Rahul Bhutani, Director (Industry Processes and Cost Analytics), S&P Global

Some photographs during the program –



6. PROGRAMME WITH LOVRAJ KUMAR MEMORIAL TRUST (LKMT):

LKMT in association with IChE-Northern Regional Centre, conducted an Annual Memorial Lecture and a Conclave i.e. LKMT Conclave-2022 as per details below:

6.1 LKMT CONCLAVE – 2022 ON ‘INDIA AIMING FOR A CIRCULAR ECONOMY’ -

The Lovraj Kumar Memorial Trust Conclave on ‘India aiming for a Circular Economy’ was held on Friday, the 14th October, 2022 from 16:00 hrs to 19:00 hrs (IST) via virtual mode, in association with Federation of Indian Petroleum Industry (FIPI) and Indian Institute of Chemical Engineers (Northern Regional Centre). About 178 participants have attended the conclave.

The speakers and titles of presentations were as follows:

Dr. Ajit Sapre Group President R&D, Reliance Industries Ltd Mumbai	Technology developments for a Circular Economy: One perspective
Dr. Ruchi Agrawal Sustainable Agriculture Division, TERI-Deakin Nano-Biotechnology Center (TDNBC), The Energy and Resources Institute (TERI)	Sequestration of Biogenic Carbon: A Roadmap to Net Zero via Circular Bio- Economy
Dr. Anjan Ray Director, CSIR-Indian Institute of Petroleum, Dehradun	The role of bio-based lubricants in climate change mitigation
Dr. S. Nand Additional Director General Fertiliser Association of India (FAI), New Delhi	Circular Economy in Fertilizer Sector
Prof. Anil K. Gupta Founder, Honey Bee Network, SRISTI, GIAN & NIF; Visiting Faculty, IIMA & IITB, Academy Professor, ACSIR	Grassroots innovators: pioneers of circular economy
Prof. Ganapati D. Yadav National Science Chair (SERB/GOI) & Emeritus Professor of Eminence, Former Vice Chancellor Institute of Chemical Technology, Mumbai (Virtual presentation from USA)	The Net Zero Goal & Sustainability: Adoption of Green Hydrogen Technologies, CO ₂ refineries and Biomass Valorization
Dr. Jennifer Holmgren Chief Executive Officer LanzaTech, USA (Virtual presentation from USA)	Gasification and Carbon Capture & Transformation

6.2 LOVRAJ KUMAR MEMORIAL LECTURE 2022

The 29th Annual Memorial Lecture of Lovraj Kumar Memorial Trust was delivered by Mr. Shyam Saran, President, India International Centre & Formerly Secretary, Ministry of External Affairs, Govt. of India, on the topic “Energy Transition and Climate Change – The Race for our Planet’s Survival” on 24th November, 2022 at Civil Services Officers’ Institute (CSOI), Vinay Marg, New Delhi.

The audience for the lecture included participants from various organizations, institutes, industries, members of our Trust and Government departments. From the feedback received from participants indicates that they appreciated the contents of the lecture. Some digital media has also covered the lecture.

Some photographs during the memorial lecture –



7. Activities of Student Chapters

During recent year, IChE has taken a decision that the Regional Centres will be the mentor and guide of the student’s chapters. Based on that, IChE-NRC takes keen interest in the student’s chapters. Following are the details of the activities of student’s chapters in NRC:

Sl. No.	Student Chapter	Coordinator	Activity Report
1.	DCRUST, Murthal	Dr. Manju Rani	No activity reported
2.	Delhi Technological University	Dr. Manish Jain	No activity reported
3.	Shiv Nadar University	Dr. Priyanka Katiyar	No activity reported
4.	USCT - GGSIPU	Dr. Deepak Garg	Activity Report attached
5.	AMU Aligarh	Dr. Parvez Khan	No activity reported
6.	Galgotias University* *It is come to our notice that the chapter is not working anymore.	Dr. Gagnesh Sharma	No activity reported

8. AMIIChE Examinations

IChE Associate Membership Examination is being conducted twice a year, usually during March and September, simultaneously at different centers in India.

NRC conducted two IChE Association Membership Examinations - one in **November 2022** and the other one in **March 2023**.

Number of candidates appeared for Nov' 2022 Exams	-	29
Number of candidates appeared for March' 2023 Exams	-	35

9. Publications

- 29th Lovraj Kumar Memorial Lecture
- All the events presentations and photographs are available on our website www.iichenrc.org. The same is continuously updated.

10. New Members

An updated list of members' directory is available on our website. The present status of membership of NRC is as under.

TOTAL NRC MEMBERS AS PER LIST RECEIVED FROM HQ	488
New Members added during June 2022 to June 2023	7
<u>New Members:</u> <ul style="list-style-type: none">■ Mr. Pradeep PR (LM-73313)■ Dr. Karan Gupta (LM-73319)■ Dr. Priyanka Katiyar (LM-73346)■ Mr. Himadri Sekhar Ghosh (LM-73348)■ Mr. Rajan Kanwar (LM-73464)■ Ms. Ritu Goswami (LM-73465)■ Mr. Rakesh Kumar Gandotra (LM-73466)	

11. Scholarships

In response to our circular inviting applications from Government colleges in the northern region, we received 38 applications and out of this, 20 students (16 B. Tech/ B.E. Students and 4 M. Tech/M.E. Student) were awarded the Golden Jubilee Scholarship for the year 2022-23. Out of the awardees, one scholarship** has been instituted by G. J. Samaj Kalyan Nyas. Scholarship cheque of Rs. 20,000/- each and certificates were awarded to the following students during the Foundation Day celebration of NRC held on 28th January 2023 at IChE-NRC, New Delhi -

Total number of applications received - 38

Selected Students - **20**

B.Tech/B.E. Students - 16

M.Tech/M.E. Students - 4

The recipients of the Scholarship were awarded the scholarship amount and certificates were distributed during the Foundation Day programme of NRC held on 28th January 2023 as below:

Sl.No.	Student's Name	University	Year in which studying	Scholarship Amount (₹)
1	Ms. Garima	UIET CSJM University, Kanpur	III (B.Tech)	30000
2	Ms. Sweety Patel	UIET CSJM University, Kanpur	IV (B.Tech)	30000
3	Ms. Manisha Mourya	UIET CSJM University, Kanpur	IV (B.Tech)	30000
4	Mr. Khoob Chandra Rajput	MNIT Jaipur	IV (B.Tech)	30000
5	Mr. Dheeraj Upadhyay	MNIT Jaipur	IV (B.Tech)	30000
6	Mr. Shanki Kumar Rawat	SLIET Longowal	III (B.E)	30000
7	Mr. Aniket Prajapati	MNIT Jaipur	III (B.Tech)	30000
8	Ms. Vandna	IIT Roorkee	III (B.Tech)	30000
9	Mr. Muhemmed Irshad Chakkiparamban	AMU Aligarh	IV (B.Tech)	30000
10	Mr. Satyam Kushwaha	SLIET Longowal	III (B.E)	30000
11	Ms. Anshika Choudhary	IIT Roorkee	III (B.Tech)	30000
12	Mr. Akshat Jain	IIT Kanpur	II (B.Tech)	30000
13	Mr. Dhruv Kumar	IIT Roorkee	III (B.Tech)	30000
14	Mr. Karan Chanana	SLIET Longowal	III (B.E)	30000
15	Mr. Nikhil Singh Jadon	NIT Hamirpur	II (B.Tech)	30000
16	Mr. Pradeep Kumar Bagri * (Awarded GJ Samaj Kalyan Nyas Scholarship)	IIT Kanpur	II (B.Tech)	20000
17	Ms. Saufishan T.A.	AMU Aligarh	II (M.Tech)	30000
18	Mr. Mujeeb Ahmad	AMU Aligarh	II (M.Tech)	30000

19	Ms. Anushka Gupta	AMU Aligarh	II (M.Tech)	30000
20	Mr. Md. Tausif Akram	AMU Aligarh	II (M.Tech)	30000

12. IChE (NRC) Award for best M.Tech / M.E. in Chemical Engineering and/or allied discipline from AICTE/UGC recognized institution/universities (2022-23)

The Executive Committee of NRC has approved the scheme for award of ‘best M.Tech/ M.E. Thesis’ for one student for yearly basis. The objective of the award is to motivate students and faculty for doing exemplary research work in M.Tech/ M.E. for betterment and advancement of society in general and Chemical Engineering particular. At present the applications would be invited every year from AICTE/UGC recognized institutes/colleges in the NRC region. The proposal would be evaluated by an expert committee constituted for this purpose. The weightage would be given to industry based research projects. This would encourage the quality enhancement of students. The award of Rs. 50,000/- would be given to one student from AICTE/UGC recognized institutes and colleges in the NRC region. We have invited the applications for the award for the year 2022-23, and the last date for submitting the application is 31st July 2023.

13. FINANCIAL SUPPORT / SPONSORSHIPS

13.1 IChE (Northern Regional Centre) Award during CHEMCON

IChE NRC has been giving award for best paper presentation during CHEMCON. The same was continued in 2022 by awarding Rs. 8,000/- for the best paper presentation during CHEMCON-2022.

13.2 Financial Support for S-CHEMCON-2022

IChE-NRC has been giving financial support of Rs. 25,000/- to the S-CHEMCON every year. The same was continued in 2022 and Rs. 25,000/- was given to NIT Warangal.

Forthcoming Events:

S. No.	Event	Date
1	Annual General Meeting of Northern Regional Centre	July, 2023
2	Workshop/Seminar on ‘Process Design/Control and Instrumentation’ at Shiv Nadar University	Aug, 2023

The election process for the Executive Committee (EC) for the term 2023-25 was discussed by the EC during its meeting held on 13th May 2023. The Committee observed that for the last two years NRC undertook various commendable activities and felt the need for continuity of the existing EC further in line

with past practices in NRC in this regard. It was unanimously resolved to extend the tenure of the present EC for one more year. Placed before the AGM for approval.

I thank the Executive Committee Members, Participating Members and Staff of NRC for their efforts / support in conducting the activities during the year 2022-23. I also take this opportunity to express our gratitude and thanks to the Chairman, IChE-NRC for his guidance in the NRC activities.

Thank you all for your continuing support and guidance and solicit the same for future.



(C.P. Srivastava)
Honorary Secretary