Department of Chemical Engineering

ChemELetter

2024-2025
Platinum Jubilee Year Celebration

SP2025 VOL. 002

From the Desk of Head

ChemELetter showcases our commitment to fostering communication, celebrating achievements and inculcating a sense of community within our department. I extend my regards to the editorial team for their contributions in bringing this publication to life. ChemELetter reflects our shared efforts, providing a summary of the department's academic achievements, co-curricular activities, and key accomplishments upto January 2025. This issue will reinforce the department's stated objectives. We aim to enhance our commitment towards research, provide a platform for the students to learn and grow and contribute to the broader scientific community while firmly being committed to sustainability. I hope you find this issue of ChemELetter captivating and insightful. We look forward to your suggestions and feedback.

Dr. G.T. Mohanraj
Head of the Department

Message from the Editors

This edition of ChemELetter encapsulates the notable strides and events of the Department of Chemical Engineering and the Centre for Food Engineering and Technology over the past year. Here, you'll find snippets of activitites pursued to shape the next generation of engineers, and vibrant student life that fuels our department. Our aim is not only to inform but to inspire innovation. In these pages, we hope to create a space that reflects this essence of our pursuit.

As editors, we are deeply grateful for the contributions of our student editors, faculty colleagues and students (past and prsent) who have brought this edition to life. We hope you enjoy reading this edition of ChemELetter that bears the true testament of our accomplishments.

Dr. Anand Bharti
Sangram Roy

PATENTS (Applied/Granted)

1) Anupam Roy, Vijendra Sahoo, Ankanksha Kumari and Shubhajit Sarkhel

An integrated apparatus for blanching, sterilization, drying, and recovery of volatile components
Patent Application number: 202331085872
Published : 2023

2) Anupam Roy, Bijendra Sahoo, and Shubhajit Sarkhel

A multipurpose integrated apparatus for treatment of powder, flaked and granular material
Application No.: 202331085872
Published : 2023

3.) Shubhajit Sarkhel and Anupam Roy

A multipurpose integrated apparatus for treatment of food matrices and ingredients thereof
Application No. 202331056554
Published : 2023

New Facilities

Shell and Tube Heat Exchanger

Flow rate measuring instrument

Publications

1 Kumari, P., Raj, A., Ghosh, D. Selection of phase change material for latent heat thermal energy storage using a hairpin heat exchanger: Numerical study. J. Thermal Sci. Eng. Appl., 2024, 16(9), 091005.

2 Kumari, P., Ghosh, D. A comparative numerical analysis of concentric and hairpin heat exchanger for efficient energy storage using phase-change material. J Therm Anal Calorim, 2023, 148, 12211.

3 Jana, SK., Pattanayak S., Bhausaheb, MS., Ruidas, BC. Pal DB. Pyrolysis of waste plastic to fuel conversion for utilization in internal combustion engine. Chem. Chem. Technol., 2023, 17, 438.

4 Satpathy, A.; Fatima, F.; Sen, AK.; Mukherjee, K.; Nigam, VK. Solid-state fermentation of pectinase and amylase from bread waste using bacillus strain (BIOSMNF02). Taiwanese Journal of Agricultural Chemistry and Food Science, 2024, 62(1), 12.

5 Kumari, A.; Roy, A. Impact of the degree of starch gelatinization on the texture, soaking, and cooking characteristics of high amylose rice: An experimental and numerical study. J. Food Meas. Charact. 2023.

6 Sarkhel, S.; Mondal, M.; Datta, D.; Sahoo, B.; Kumari, A.; Saha, S.; Bera, S.; Jana, M.; Tiwari, A.; Roy, A. Ultrasonic high-yield extraction of non-toxic fucose-containing polysaccharide bearing emulsifying properties. J. Sci. Food Agric.

7 Huang, Y.; Phillips, D.; Kong, F.; Suh, J.; Roy, A.; Mohan, A. Detection and quantification of 4-Oxo-2-Nonenal in plant-based meat and beef. J. Food Compos. Anal. 2024, 132, 106292.

8 Sarkhel, S.; Roy, A. Vacuum impregnation assisted simultaneous micronutrients fortification and phytic acid reduction in lentils. J. Food Eng. 2024, 365, 111823.

9 Sahoo, B.; Kumari, A.; Sarkhel, S.; Jha, S.; Mukherjee, A.; Jain, M.; Mohan, A.; Roy, A. Rice starch phase transition and detection during resistant starch formation. Food Rev. Int. 2023, 40(1), 158.

10 Jha, S.; Sarkhel, S.; Saha, S.; Sahoo, B.; Kumari, A.; Chatterjee, K.; Mazumder, P. M.; Sarkhel, G.; Mohan, A.; Roy, A. Expanded porous-starch matrix as an alternative to porous starch granule: present status, challenges, and future prospects. Food Res. Int. 2024, 175, 113771.

11 Das, J., Mondal, A., Nag, S. Competitive sequestration behavior and mechanism of Cd2+, Pb2+and Ni2+ ions from single, binary and ternary metal laden solution by Hevea brasiliensis wood sawdust (HBS). Journal of Dispersion Science and Technology, 2024, 1

12 Shekhar, N., Mondal, A. Synthesis, properties, environmental degradation, processing, and applications of Polylactic Acid (PLA): An overview. Polym. Bull., 2024, 81, 11421.

13 Paul, T., Mondal, A., Bandyopadhyay, T.K. et al. Prodigiosin production and recovery from Serratia marcescens: process development and cost–benefit analysis. Biomass Conv. Bioref., 2024, 14, 4091.

14 Majumdar, R., Mishra, U., Mahata, N., Shah, MP., Mondal, A., Bhunia, B. Preparation, characterization, and performance evaluation of composite films of polyvinyl alcohol/ cellulose nanofiber extracted from Imperata cylindrica, Chemosphere, 2023, 337, 139370.

15 Balihar, A. J., Karmakar, A., Kumar, A., Minj, S., Sangso, P. Analysis of thermal performance in a two-phase thermosyphon loop based on flow visualization and an image processing technique. Heat Transfer Res., 2024, 55(12), 71.

16 Karmakar, A., Patra, AK., Saha, S., Jana, SK. Design and simulation of a low-temperature thermal desalination system. Chem. Eng. Technol., 2023, 47(1), 160.

17 Akshat, R., Bharti, A., Padmanabhan, P. Atomistic molecular dynamics simulation and COSMO-SAC approach for enhanced 1,3-propanediol extraction with imidazolium-based ionic liquids. J Mol Model, 2024, 30, 164.

18 Kumar, G., Kumar, K., Bharti, A. Energy and environmental metrics-based comparison of ionic liquids/deep eutectic solvents assisted chemical recycling of waste poly (ethylene terephthalate). Industrial and Engineering Chemistry Research, 2024, 63, 6024.

19 Kumar, G., Kumar, K. Bharti, A. Quantum chemistry-based approach for density prediction of non-ionic hydrophobic eutectic solvents. J Solution Chem, 2024, 53, 1195.

20 Dey, B., Ahmad, MW., Syed, A., Bahkali, AH., Verma, M., Choudhury, A., Iron metal organic framework decorated carbon nanofiber-based electrode for electrochemical sensing platform of chlorpyrifos in fruits and vegetables, Mate. Sci. Semicond. Proce. 2024, 181, 108669.

21 Ahmad, MW., Singh, J., Syed, A., Bahkali, AH., Subramaniam, M., Yang, D.-J., Choudhury, A. Bimetallic manganese–nickel metal–organic framework anchored hexyl-aminated carbon nanotube hybrid as an anodic material for solid-state asymmetric supercapacitors. Energy Fuels, 2024, 38. 14672.

22 Dey, B., Ahmad, MW., Al-Shannaq, R., Al-Humaidi, JY., Hossain, SK., Patra, CN., Althomali, RH., Rahman, MM., Choudhury, A. Non-enzymatic electrochemical sensing of bisphenol a in drinking water and milk using bimetallic nickel-copper metal–organic framework, J. Anal. Testing, 2024, 1.

23 Singh, J., Anand, S., Ahmad, MW., Syed, A., Elgorban, AM., Verma, M., Yoon, KB., Choudhury A. Solvothermal growth of silver-doped vanadium pentoxide microurchins as a cathode material for all-solid-state asymmetric supercapacitors, Colloids and Surfaces A: Phys.Eng. Aspects, 2024, 689, 133602

24 Alwi, MMA. Singh, J., Choudhury, A., Hossain, SKS., Butt, AN. Improvement in electrochemical performance of waste sugarcane bagasse derived carbon via hybridization with SiO2 nanospheres. Molecules, 2024, 29, 1569.
25 Anand, S., Ahmad, MW., Syed, A., Bahkali, AH., Verma, M., Kim, BH., Choudhury, A. Walnut shell derived N, S co-doped activated carbon for solid state symmetry supercapacitor device. J. Ind. Eng. Chem. 2024, 129.309.
26 Ahmad, MW., Anand, S., Syed, A., Bahkali, AH., Wong, LS., Shrivastava, A., Choudhury, A., Yang, DJ. Synthesis of graphene nanocomposites integrated with 3D bimetallic magnesium/cobalt metal-organic framework as anodic material for solid-state asymmetric supercapacitors. Surfaces and Interfaces, 2024, 44, 103834.
27 Choudhury A., Anand, S., Syed, A., Bahkali, AH., Wong, L. S., Yoon, KB., Yang, DJ., Ahmad, MW. Synthesis of 2D bi-metallic Zn/Cu metal-organic framework integrated graphene nanocomposites for all-solid-state asymmetric supercapacitors. Diamond and Related Materials, 2024, 141, 110613.
28 Anand, S., Ahmad, MW., Hossain, SKS., Choudhury, A. A review on metalorganic framework hybrid-based flexible electrodes for solid-state supercapacitors. Ionics, 2024, 29, 4437.
29 Ahmad, MW., Dey, B., Kim, BH., Sarkhel, G., Yang, DJ., Hossain, SKS., Kamal, T., Choudhury, A. Bimetallic copper-cobalt MOFs anchored carbon nanofibers hybrid mat based electrode for simultaneous determination of dopamine and tyramine. Microchemical Journal, 2023, 193, 109074.
30 Ahmad, MW., Dey, B., Syed, A., Bahkali, AH., Verma, M., Yang, DJ., Choudhury, A. MOFs-derived niobium oxide nanoparticles/carbon nanofiber hybrid paper as flexible binder-free electrode for solid-state asymmetric supercapacitors. J. Alloys Comp., 2023, 957, 170269.
31 Dey, B., Ahmad, MW., Kim, BH., Kamal, T., Yang, DJ. Patra, CN. Hossain, SK S. Choudhury, A. Manganese cobalt-MOF@ carbon nanofiber-based non-enzymatic histamine sensor for the determination of food freshness. Anal Bioanal Chem, 2023, 415, 3487.
32 Deb, Aniruddha, Pattader SG Partho, Rapid and Sensitive Detection of Klebsiella Pneumoniae for UTI Diagnosis with Plasmonic Gold Nanoparticle Conjugated Aptasensor.
DOI: https://aiche.confex.com/aiche/2024/meetingapp.cgi/Paper/685508
33 Tiwari AK., Prasad N., Kapoor A., Arya AK., Pal DB. Sustainable valorization of cascabela thevetia fruit peel and seed waste biomass: characterization and thermo-kinetic analysis. Biomass conv. Bioref., 2023.
34 Nadda, M., Singh, K., Roy, S., Yadav, A. A comparative assessment of CFD-based LSTM and GRU for hydrodynamic predictions of gas-solid fluidized bed. Powder Technol., 2024, 441, 119836.

MoUs / Collaborations :

S.No.	Organization / University	Particulars	Year / Duration
1	University of Georgia Athens, USA	Student and Faculty Exchange	2024-2029
2	Indobell Insulations Ltd. Kolkata	Development of Fiber reinforced silica aerogel blanket	2024/ 6 months

Sponsored Projects (1st JULY 2023 to 30th JUNE 2024)

S. No.	Project Title	PI / Co-PI	Funding Agency	Amount in INR Lakhs	Duration
1.	Design and Development of short-time Microwave Assisted Vacuum-Steam-Vacuum (MAVSV) process technology for simultaneous reduction of rancidity-causing enzymes and antinutrients in Millet: Enhancing shelf life and micronutrient bioavailability	Dr. Anupam Roy (PI) Dr. B. C. Ruidas (Co-PI)	DBT	30.00	2024 -2026
2.	Waste Nutshell-derived Porous Carbon Nanofibers and Their Hybrid Mats as Supercapacitor Electrode	Dr. Arup Choudhury (PI)	BRNS	31.69	2024 -2027
3.	Fibre Reinforced Silica Aerogel Blankets Preparation	Dr G T Mohanraj (PI) Dr Bidhan Chandra Ruidas (Co-PI) Dr. Aniruddha Deb (Co-PI)	Indobell Insulations Ltd, Kolkata	1.9	06/2024 to 12/2024

Conferences / Seminars/ Workshops/ Staff Development Programmes/ FDP attended by Faculty Members

Sr. No.	Name of the Faculty	Title	Funding Agency	Organizers	Date
1	Dr. B.C. Ruidas	AICTE certificate course of National Initiative for Technical Teachers Training	NA	AICTE	09/2023
2	Dr. Anand Bharti	Quantum Chemical Calculations and Molecular Dynamics Simulations	SERB, DST	IIT Guwahati	04-01-2024 to 10-01-2024
3	Dr. Aniruddha Deb	5-day Online UHV FDP	NA	AICTE	17-06-2024 to 21-06-2024
4	Dr. Aniruddha Deb	Rapid and Sensitive detection of Klebsiella pneumoniae for UTI Diagnosis with a Plasmonic gold nanoparticle conjugated aptasensor.	Institute	Mahatma Gandhi University, Kottayam, Kerala, India	10-05-2024 to 12-05-2024

CHEMLANE

CHEMENGER

COALESCENCE'24

MIND LUSTER

RESEARCH SHOWDOWN

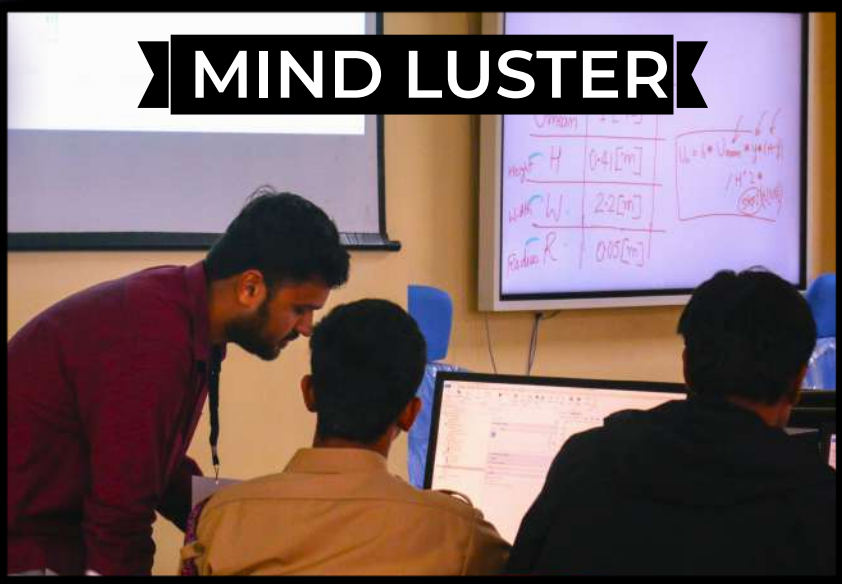
29th February to 3rd March 2024.

The student chapter of Indian Institute of Chemical Engineers (IIChE) at BIT Mesra organized its annual technical program **Coalescence'24** from **29th February to 3rd March 2024**

Dr. Avijit Ghosh, Director IIChE-Training Institute, Jadavpur University delivered an insightful talk on "Green Hydrogen"during Coalescence '24

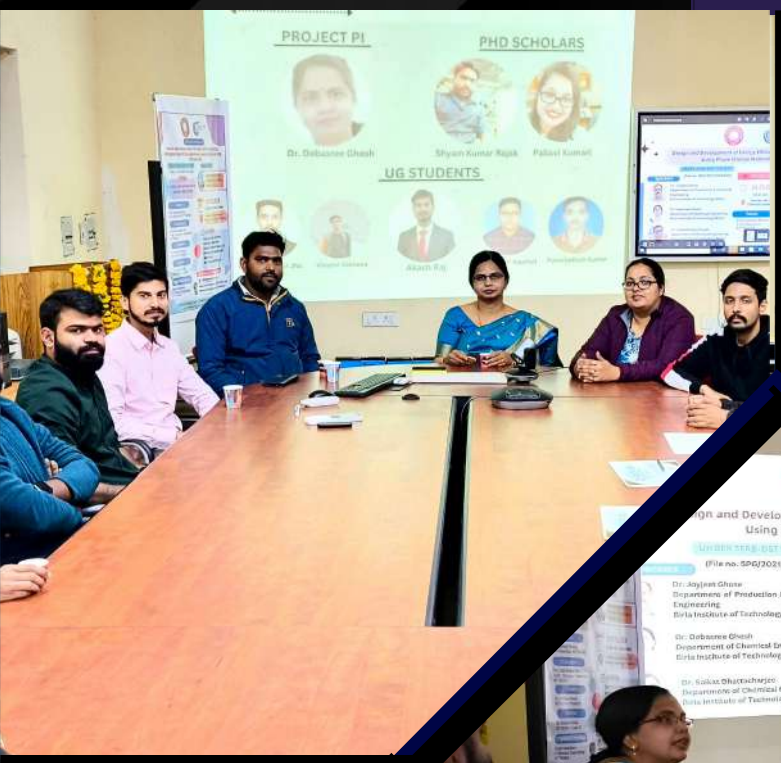
The department also hosted Mr. Sabyasachi Mondal, Sr. Scientist at Aditya Birla Science and Technology Company Private Limited who delivered a session on "Course Work to Commercialization: Role of Chemical Engineering in Industry"

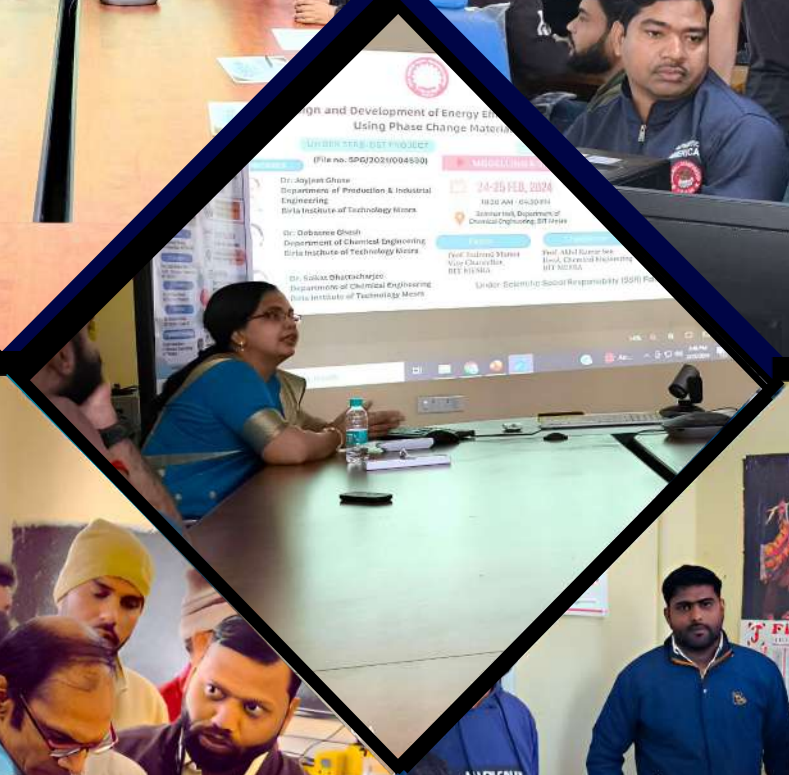
MIND LUSTER



WorkShop

2024

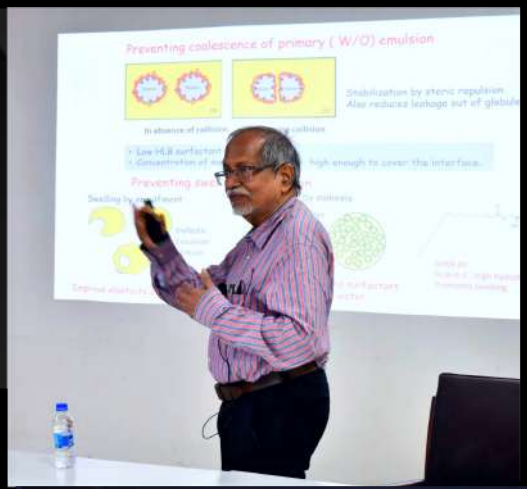




The department hosted a Two day workshop on Design and development of modified refrigeration system using phase change material and its CFD analysis. This was organized by Dr. Debasree Ghosh and was supported by grants from DST.

ETCEAM'24

13th to 15th December 2024



Our department hosted an International Conference on Emerging Trends in Chemical Engineering & Advanced Materials (ETCEAM-2024) from 13th to 15th December, 2024. The conference offered knowledge exchange and collaborative exploration of cutting-edge research and promotion of sustainable solutions. It led to networking and professional development, inspiration and innovation by bringing together leading experts, researchers, practitioners, and stakeholders on a unified platform.

STUDENT CORNER

Conquering "The TECH"

Naman Utsav
Batch (2019-2023)
AIR 38 (GATE 2024)
M. Tech in Chemical Engineering at IIT Bombay

Linked In:
www.linkedin.com/in/naman-utsav-b078a81a8

Shashank
Batch (2019-2023)
AIR 78 (GATE 2024)
Management Trainee at Rashtriya Chemicals & Fertilizers Limited

Linked In:
www.linkedin.com/in/shashank-shashank-8271a7223

Higher Studies

Akish Emmanuel Kujur
Batch (2020-2024)
AIR 2822 (GATE 2024)

M. Tech in Chemical Engineering at IIT Kharagpur

Linked In:
www.linkedin.com/in/akish-emmanuel-kujur-2242851ba/

Koustav Mondal
Batch (2019-2023)
MS Chemical Engineering Texas A&M University (2024-2026)

Graduate Engineer Trainee at GRASIM INDUSTRIES LTD (ADITYA BIRLA GROUP)

Linked In: https://shorturl.at/HDUx1

Conquering "THE MBA"

Shikha Kumari
(2016-2020) IIM
Banglore EGMP'25

Udit Jarwal
(2020-2024) IIM
Tirchy MBA'26

Priyanshi Srivastava
(2019-2023) IIM
Mumbai PGP'26

Monisha J Nayaka
(2018-2022) ISM
Dhanbad PGP'26

Conquering "THE REASEARCH"

SUMMER INTERN OF K21

Prashansa Agarwal Secured a fully funded internship at University of Guelph

Soumya Parihar
Carnegie Mellon University Pittsburgh

Umang Raj
Carnegie Mellon University Pittsburgh

NEW FACULTY MEMBERS

Dr. Aniruddha Deb

PhD (Chemical Engineering) IIT Guwahati, M.Tech (Chemical Engineering) IIT Guwahati, B.Tech. (Heritage Institute of Technology) Kolkata

Area of Interest ˜Biosensors & Healthcare Portable Noise induced Gel electrophoretic platform Functionalized Micro/Nano patterning (Soft Lithography)

Dr. Iman Sengupta

Post Doc (IIT Bombay), Ph.D(Chemical Engineering) IIT Kharagpur, M.Tech.(Chemical Engineering) IIT Kharagpur, B.Tech (Chemical Engineering) Heritage Institute of Technology

Area of Interest ˜Carbon Nanomaterials, Nanomaterials Synthesis, 2D materials

CONFERENCE

Dr. Aniruddha Deb

Received International Travel grant from ANRF , Government of India to attend the 18th International Conference on Biomedical Engineering, NUS Singapore (9th-12th December 2024)

Pallavi Kumari

Received International Travel grant from ITS DST-SERB for ACS Spring (17th - 21st March 2024)

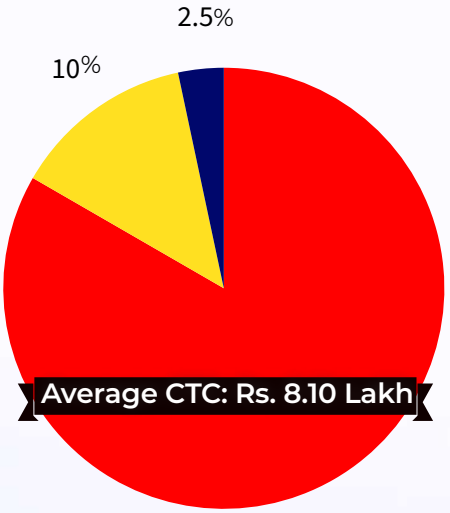
ALUMNI TALKS

Sushil Lohia

B.E. (Polymer Engineering), 1997-2001
Designation: Director (Supply Chain & Procurement), KPMG India

"My time at BIT, Ranchi, was transformative, building a strong foundation in technical and analytical skills, adaptability, and soft skills like leadership and teamwork. I prepared for placements through workshops, internships, peer study groups, and mock interviews. Currently, as Director of Procurement & Supply Chain at KPMG India, I lead strategic initiatives, deliver 6-15% annual cost savings, drive 25-30% revenue growth, and mentor teams while collaborating with CXOs, reflecting the foundation and continuous learning nurtured at BIT."

PLACEMENTS (K20)



Key Moments

Manpreet Singh(K20)

Gold Medalist- Chemical Engineering

Sneha Jha(K20)

Gold Medalist- Chemical Engineering (Plastic and Polymer)

RECENT GRADUATES

RECENT GRADUATES

EDITORIAL TEAM

STUDENT EDITORS (K22)

Sakshi Sinha

Vivek Raj Sinha

Siddharth Kaushal

Sanjay Thakur

Tanishka Jaiswal

STUDENT SUB-EDITORS (K23)

Adarsh Pathak

Yash Raj

Swati Singh

Tavishi Prasad

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