



DEPARTMENT OF CHEMICAL ENGINEERING INDIAN INSTITUTE OF TECHNOLOGY KANPUR



PROF. NAVEEN TIWARI
RECEIVING EXCELENCE IN
TEACHING AWARD FROM
DR. BIBEK DEBROY



CLASS OF 2019



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CHEMIELETTER,
OCTOBER - 2019

WHAT'S IN THIS ISSUE :

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DR. ANIMANGSU GHATAK



DEAR READER,

I AM HAPPY TO PRESENT TO YOU THE 3RD ISSUE OF THE NEWSLETTER OF THE DEPARTMENT OF CHEMICAL ENGINEERING AT IIT KANPUR. THE HIGHLIGHTS OF THIS ISSUE ARE THE RESEARCH FOCUS OF OUR FACULTY COLLEAGUE, DR. NISHITH VERMA, A WRITE-UP CONTRIBUTED BY OUR 2019 UG BATCH TOPPER MS. ARCHANA KUMARI ON HER EXPERIENCES IN THE CAMPUS AND A COLUMN ON UNIT OPERATIONS LABORATORY COURSE WRITTEN BY DR. ANURAG TRIPATHY.

IN THE LAST ADMISSION SESSION, 90 UG, 36 M.TECH. AND 16 PHD STUDENTS JOINED OUR DEPARTMENT. SIX OF OUR PHD STUDENTS DEFENDED THEIR THESIS IN LAST SIX MONTHS, DURING THIS TIME WE WELCOMED TWO POST DOCTORAL FELLOWS. IT IS HEARTENING TO INFORM YOU ALSO THAT TWO FACULTY COLLEAGUES DR. HARSHAWARDHAN KATKAR AND DR. DIPIN PILLAI JOINED OUR DEPARTMENT AS ASSISTANT PROFESSOR IN THE MONTHS OF JUNE AND OCTOBER RESPECTIVELY. OUR COLLEAGUES, ALUMNI AND STUDENTS CONTINUED TO MAKE US PROUD. DR. NAVEEN TEWARI JOINED THE SELECT GROUP OF HIGHLY ACCOMPLISHED TEACHERS IN THE INSTITUTE WHEN HE WAS HONORED WITH EXCELLENCE IN TEACHING AWARD ON TEACHER'S DAY. DR. YOGESH JOSHI, DR. RAJU K. GUPTA, DR. JAYANT K. SINGH AND RAHUL MANGAL RECEIVED INVITATION TO JOIN EDITORIAL ADVISORY BOARD OF HOST OF JOURNALS. WE CONGRATULATE THESE FACULTY COLLEAGUES FOR THE ACCOLADES THEY BROUGHT ONTO THEMSELVES AND TO THE INSTITUTE. IT IS HEARTENING TO INFORM YOU ALSO THAT FOUR OF OUR STUDENTS RECEIVED SIX HIGHLY PRESTIGIOUS AWARDS IN THIS YEAR'S CONVOCATION OF THE INSTITUTE. OUR STUDENTS CARRIED OUT SUMMER INTERNSHIPS IN DIFFERENT INDUSTRIAL AND RESEARCH LABORATORIES AND THEY PARTICIPATED IN SEVERAL EXTRA-CURRICULAR ACTIVITIES, A GLIMPSE OF WHICH HAS BEEN PRESENTED IN THIS NEWSLETTER.

THE NEWSLETTER HAS SERVED AS AN EXCELLENT BRIDGE TO CONNECT WITH OUR ALUMNI AND WELL-WISHERS LIVING AT DIFFERENT PARTS OF THE WORLD AND I TAKE THIS OPPORTUNITY TO THANK ALL OF THEM WHO HAVE SHARED THEIR KIND WORDS OF APPRECIATION IN THEIR LETTERS WRITTEN TO ME. THESE LETTERS HAVE BEEN PRESENTED IN THE "LETTER TO EDITOR" SECTION OF THIS ISSUE. I HOPE, LIKE PREVIOUS ISSUES, THIS THIRD ISSUE TOO WILL GIVE A GLIMPSE OF CURRENT HAPPENINGS IN THE DEPARTMENT. IN ANY CASE, PLEASE DO WRITE TO ME YOUR FEELINGS, COMMENTS AND SUGGESTIONS; LET US REMAIN CONNECTED THROUGH THIS NEWSLETTER.

HONORS AND RECOGNITION OF OUR FACULTY

- Dr. Naveen Tiwari has been awarded the Excellence in Teaching Award by our institute this year.
- Dr. Yogesh Joshi has been invited to join the Editorial Advisory Board of AIP Journal, Physics of Fluids.
- Dr. Raju Gupta of our department has been invited to join as an Editorial Board member of Scientific Reports, a Nature Research journal and has been also invited to serve on the Editorial Advisory Board of RSC journal "Reaction Chemistry & Engineering".
- Dr. Jayant K. Singh has been invited to serve on the Editorial Advisory Board of the "Journal of Chemical & Engineering Data".
- Dr. Rahul Mangal has been invited to serve on the editorial advisory board of "ACS Applied Polymer Materials".
- Research Matters published an article on work of Prof. Nishith Verma and his students:
<https://researchmatters.in/news/iit-kanpur-researchers-develop-cost-effective-natural-bio-fertiliser>
- Research Matters published an article on work of Prof. Animangsu Ghatak and his students:
<https://researchmatters.in/news/vibrations-painless-injections>
- Dr. Jayant K. Singh has been appointed as the new Dean of Resources and Alumni of IITK From July 2019.
- Dr. Yogesh Joshi has been appointed as the new Dean of International Relations.

HONORS AND RECOGNITION OF OUR STUDENTS

- **MR. DHYANAND YADAV (PH.D. STUDENT) AND MS. SHALINI ARORA (PH.D STUDENT)** WON 3RD PRIZE IN **NEW GENERATION IDEATION CONTEST 2019** WHICH WAS CONDUCTED BY **HINDUSTAN PETROLEUM CORPORATION LIMITED R&D CENTER** SITUATED AT **BENGALURU**. THEY ARE CURRENTLY BEING SUPERVISED BY **DR. SRI SIVAKUMAR**.
- **MS. ARCHANA KUMARI**, AN OUTGOING 4TH YEAR **UG** STUDENT, HAS BEEN AWARDED THE **SHRI. GHISA LAL KAMDAR MEMORIAL MEDAL, IITK EXCELLENCE IN COMMUNITY SERVICES AND GENERAL PROFICIENCY MEDAL** FOR HER OUTSTANDING PERFORMANCE IN **ACADEMICS**, HIGHLY DEDICATED COMMUNITY SERVICE ON OUR CAMPUS.
- **MS. MAHIMA SRIVASTAVA**, AN OUTGOING 4TH YEAR **UG** STUDENT, HAS BEEN AWARDED THE **VIBHA GOLD MEDAL**, FOR HER EXCEPTIONAL PERFORMANCE IN HER UNDERGRADUATE PROJECT AS A FEMALE STUDENT.
- **MR. ABHIMANYU GUPTA AND MR. SHASHWAT NARHATIYAR**, BOTH BEING OUTGOING 4TH YEAR **UG** STUDENTS, HAVE BEEN AWARDED **IITK EXCELLENCE IN ART & CULTURAL ACTIVITIES** FOR THEIR OUTSTANDING CONTRIBUTIONS TO THE CULTURAL ACTIVITIES OF OUR INSTITUTE AS **COORDINATORS OF DRAMATICS CLUB**.

HONORS AND RECOGNITION OF OUR ALUMNI

THE CURRENT CHIEF ELECTORAL OFFICER OF HIMACHAL PRADESH, **MR. DEVESH KUMAR** IS AN ALUMNUS OF OUR DEPARTMENT. HE BELONGS TO **B.TECH, 1991-1995** BATCH AND **M. TECH. 1995-1997** BATCH. **MR. KUMAR WAS 1997 BATCH IAS TOPPER**.

OUR ALUMNUS **DR. SRINIVAS METTU** RECEIVED **GRAND CHALLENGES EXPLORATIONS GRANT** FOR GROUND BREAKING RESEARCH IN **GLOBAL HEALTH AND DEVELOPMENT** FROM THE **GATES FOUNDATION**. IN COLLABORATION WITH **CITY U OF HONG KONG**, **SRINIVAS** WILL BE WORKING ON DEVELOPING **HYDROGEL BIO-REACTORS** FOR GROWING MULTIPLE STRAINS OF HUMAN GUT MICROBES IN A SINGLE REACTOR. HERE IS THE ANNOUNCEMENT OF AWARDED GRANTS ON **GATES FOUNDATION WEBSITE**.

<https://gcgh.grandchallenges.org/grant/novel-radial-gradient-fibrous-bed-bioreactors-cellulose-hydrogel>

NEW COURSES INTRODUCED

- **INTEGRATED CATALYSIS, REACTION, AND REACTOR ENGINEERING**

OFFERED BY – DR. RAJ GANESH S. PALA

This course deals with the engineering of chemical reactions with the main focus on the working and design of chemical reactors. Also, some parts of Computational Fluid Dynamics (CFD) will be covered in this course. Some practical sessions are also planned for some topics of this course.

- **QUANTUM MECHANICAL DESIGN OF MATERIALS AND CATALYSIS**

OFFERED BY – DR. RAJ GANESH S. PALA

This course gives a Quantum Mechanical view to the materials we see around us and the major materials relevant to chemical engineering like catalysts. It will start from the basics of Quantum Mechanics and building upon that will touch upon topics of electronic modelling like DFT, topics of material properties and some basics of heterogeneous catalysis and its design.

Short Term Courses

- A short-term course on “Introduction to Programming: A Pedagogical Approach” was co-coordinated by Dr. Jayant K. Singh and other faculties from different departments.
- An introductory course on “High Performance Computing in Engineering” was co-coordinated by Dr. Jayant K. Singh and other faculties from different departments (28th Sep- 2nd Oct)

NEW FACULTY JOINED



Dr. Harshwardhan H. Katkar joined our department in June 2019 as an Assistant Professor. He is a B.Tech. in Polymer Engineering from Institute of Chemical Technology, Mumbai, M.Tech in Chemical Engineering from IIT Bombay and had received his Ph.D. from the University of Massachusetts, Amherst. Before joining IIT Kanpur, Dr. Katkar worked as a postdoctoral scholar in the Department of Chemistry at The University of Chicago. His research interests lie in the areas of fluid and solid mechanics, and multiscale modeling and simulations of biological and soft matter.

Dr. Dipin S. Pillai joined our department in October, 2019 as an Assistant Professor. Dipin is a B.E. (Hons.) in Chemical Engineering from BITS Pilani Goa Campus and PhD in Chemical Engineering from IIT Madras. Before joining IIT Kanpur, Dipin carried out Post-doctoral research at the Chemical Engineering Department, University of Florida. His current research focuses on leveraging interfacial instabilities to enhance transport in microfluidic and microgravity settings. A prominent aspect of his research involves developing reduced-order models for physico-chemical transport phenomena.



NOTABLE RESEARCH WORK

Mahima Srivastava, a B.Tech student worked with Professor Anurag Tripathi and Professor Naveen Tewari of our department and studied rheology of granular materials. She used Finite Element Method of COMSOL to simulate the steady, fully developed, gravity-driven flow of identical particles, on an inclined plane. In her approach, the granular material was considered to be in a fluid-like state, the rheology of which has earlier been described in terms of a viscoplastic fluid model in which the apparent viscosity of the fluid depends not only on the local shear rate but also on the local pressure. Boundary condition at the top surface involved no viscous stress and that on the bottom surface was no slip condition at the plane. Periodic boundaries were chosen in the direction of the flow, so as to achieve simulations of infinitely long flow without end effects. The range of angles of the inclined plane were selected in such a way that the flow is in the dense regime. Further, the lift and drag force acting on a single, larger-sized particle placed in the flow was studied using COMSOL and compared with results obtained from simulations based on Discrete Element Method.

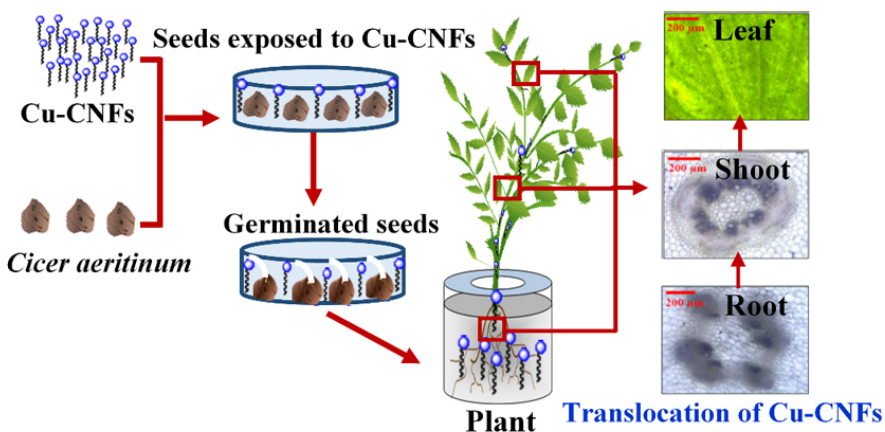


PROF. NISHITH VERMA

Nishith Verma is a professor of chemical engineering at IIT Kanpur. He joined our Department in 1998. Prof. Verma has served as the Coordinator of Center for Environmental Science and Engineering and Head of Chemical Engineering Department at IIT Kanpur. He is the recipient of AICTE career award for the young teacher, Alexander Humboldt Fellowship and Nehru-Fulbright USIEF Fellowship. The current focus of his research group is on the synthesis of novel carbon substrate-based nanocomposite materials for environment, energy and health applications, in particular remediation of air and water effluents, electrodes of microbial fuel cells, hydrogen storage materials, biosensors, and plant micronutrients. He has over hundred research publications in reputed international journals, and has twelve patents granted or filed.

Among the different types of activities based on the novel carbon-based materials developed by Prof. Verma's research group, a notable progress has been made in the treatment of petroleum aqueous effluent on a pilot-plant scale. The project, sponsored by Shell India Pvt Ltd, Bangalore, has shown complete reduction of COD (~115,000 mg/L) of the wastewater effluent sample under continuous flow conditions. Such high degree of remediation was made possible through the catalytic wet air oxidation (CWAO) technique using Cu or Fe metal nanoparticles (NPs)-doped carbon microbeads ($\varnothing 0.5$ mm) packed in a high pressure reactor. In pursuit of developing a promising green technology for the production of H₂ as green renewable energy and alternative to the presently fast depleting fossil fuel, from the waste aqueous organic biomass, the focus of one of the research groups is on the preparation of the inexpensive transition metal and reduced graphene oxide-based electrodes to be a viable alternative to the expensive noble metal-based electrodes used in microbial electrolytic cells (MECs).

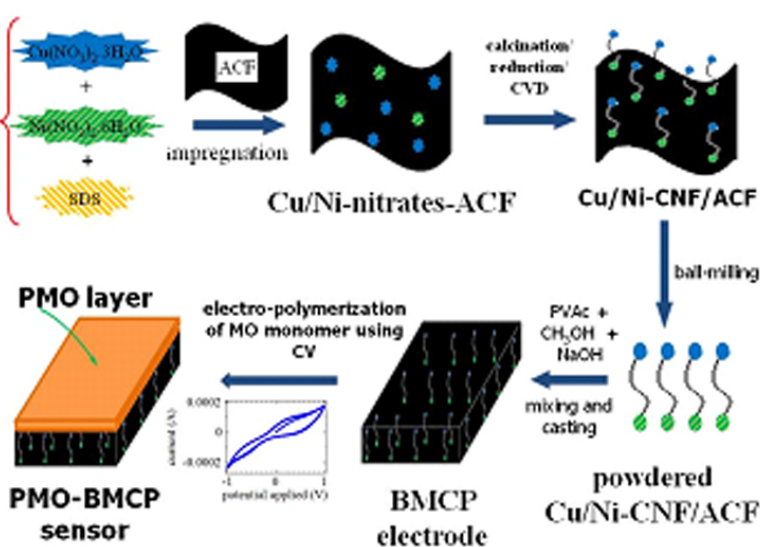
The technology assumes high importance because it can produce a clean energy and simultaneously remediate wastewater. In a recent study, Prof. Verma's laboratory has developed a stable eco-friendly substrate, using Fe or Cu-carbon nanofibres, to help deliver the metal nanoparticle micro-nutrients and the N-acetyl homoserine lactone



biomolecules to chickpea plants through easy translocation from roots to shoot of the plant cells, increasing plant growth as well as developing resistance towards *Fusarium oxysporum ciceri* infection. These studies were published in the journal *Environmental Science: Nano* and was funded by the Council for Scientific and Industrial Research (CSIR).

Another study shows a facile technique to reduce the uptake of Cr(VI) by chickpea plant in the metal-contaminated soil using microporous activated carbon microfiber. Simultaneously, nano-sized carbon nanofibers are used as an efficient carrier of the Cu micronutrient from soil to root, shoot and leaf of the plants. The laboratory tests showed that a simple physical mixture of carbon micro- and nanofibers can be successfully used for the simultaneous scavenging of Cr(VI) from soil and increased uptake of Cu by plants.

Through the DBT funded project, the research laboratory of Prof. Verma has developed the non-enzymatic electrochemical biosensors for various analytes in human blood, such



as glucose, cholesterol and creatinine. Such biosensors can potentially overcome the common drawbacks of enzymatic biosensors, including non-repeatability and potential denaturation of enzyme. The novelty of the project was to be able to successfully fabricate an efficient electrode via electrochemical polymerization of the recognition elements for different biomarkers, on the inexpensive transition metal-graphitic carbon-polymer nanocomposite film. Tested using various electrochemical techniques in a clinical

setup, the prepared biosensor showed a high sensitivity and low detection limit over a wide concentration range, with a remarkable linearity, which were either higher or comparable to most of the biosensors discussed in the literature.

The schematics on the left describes, as an example, the proposed route to the synthesis of a cholesterol biosensor: preparation of bimetal-dispersed carbon nanofiber (CNF)/activated carbon microfiber (ACF), bimetal-carbon-polymer (BMCP) electrode, and electro-polymerization of the PMO recognition element.

EXPERIENCE OF THE GRADUATING BATCH



Hello everyone, I am Archana Kumari. I graduated this year with a major in Chemical Engineering and a minor in English Literature. Currently, I am working as a Risk Management Analyst at American Express. I am supposed to talk about my journey here at IITK.s Given that I was a grade freak, academics usually topped the priority list. Interestingly, the commitment to not miss the lectures left me with all the time to explore anything that interested me. In my first year, I was made a part of the Inter IIT team for volleyball. The observer in me figured out that each game against a strong opponent was a beautiful metaphor for life but the inner self always repelled this nature of competition, so I decided to quit it after first year. Post that, I began to spend more and more time at Prayas. My acquaintance with all the stakeholders of Prayas transformed me in ways more than I can count and brought me several steps closer to the realities of society we make. At some point in the journey, I took over as the Overall Coordinator of Community Welfare Cell. This role taught me how a leader should behave and what kind of team works out. I spent a considerable amount of time in my fourth year working with Vox Populi, doing the Vox Walks series and writing articles. In my final semester, I accidentally landed up in the Grievance Redressal Committee, GRC, for the General Elections 2019 as one of the three student nominees. I carry a sole regret though, of not utilizing the excellent research facilities of the place. I hope the younger utilize these facilities and make significant contributions to the task of nation building.

I cannot conclude without expressing my gratitude for the professors in the department. I will always fondly remember the freedom that we had in Professor Mangal's classroom to discuss our doubts, the unmatched perfection in Professor V. Shankar's teaching, convenience with which Professor Naveen Tiwari could see through us, leaving with no choice but to finish the tasks sincerely and the mails from Professor Pala after the classroom which sometimes expressed how glad or disappointed he was after the class. We are limited by how much we can recollect at any particular moment but I am truly grateful to all that I have had here.

The Unit operations lab for last two semesters was conducted somewhat differently with the aim of generating deeper understanding of the concepts through learning-by-doing style. Conventionally students follow the laboratory manual with well-defined objectives, definite experimental procedure and a known method of analyzing data. This time, the manual was used only as a reference and students were asked to explore new ideas regarding both experimental measurement and analysis of data. Teaching Assistants (TAs) and Lab staffs were also involved in this process. Here are some notable outcomes of this experiment.

- Usually, estimation of thermal conductivity of an insulating slab involves only steady state temperature data. For a change, students performed unsteady state analysis of data obtained at the initial part of the experiment, leading to an excellent estimate of the thermal conductivity.
- The experiment on centrifugal pump characteristic was performed differently by adding small quantity of surfactant to the water. In addition to estimation of pressure head, the flow rate and efficiencies of pumps in series and parallel connection, students explored also the effect of addition of surfactant on the noise level of the pump. In some case, the noise level reduced because of addition of surfactant. Students recorded the audio signal of the noise from the pump using their mobile phones and then carried out Fourier Analysis of this signal to understand which frequencies got altered because of surfactant addition and how it may be helping in noise reduction.
- The experiment for measurement of vapor in air diffusion too was revised. The method of collection and analysis of data, both were revised which resulted in very good agreement with that reported in literature. Some groups were able also to measure the coefficient of thermal expansion using the same setup!
- Contrary to their knowledge from Heat transfer textbooks, students found in natural convection experiment that the Nusselt number (Nu) decreased with the Rayleigh number (Ra) for a particular case! This puzzled a group so much that they (along with our highly cooperative lab staff) ended up dismantling the entire setup and revising their calculations. Despite this, the trend for Nu and Ra did not agree with what is written in textbooks. The students had a sigh of relief only after finding a research paper from 2011, which too showed this puzzling trend for a similar situation.
- Earlier, in experiment on settling velocity measurement, the error in measurement of time of falling of a sphere used to be comparable to the total falling time (~0.5s) because of use of stopwatch. This practice was replaced by video recording the phenomenon by using the camera of a mobile phone, which resulted in an order of magnitude reduction in error. Few groups used Image analysis to obtain the variation in position and velocity of particle with time. Styrofoam balls falling through a column of air were also analyzed using this approach. This method allowed students to differentiate between initial phase of acceleration and the phase of steady fall with a constant terminal velocity.

Students were enthusiastic to carry out these experiments. Many groups worked even after the lab hours, quite a few of them worked even on the non-lab days of the week and some worked even over the weekends. No wonder, some of them complained in their course feedback that this lab made them work as hard as a PhD student!

- DR. ANURAG TRIPATHI

INTERNSHIP EXPERIENCE

Narayan Amit, a senior year student, spent his summer as a Global Markets Intern in Nomura (A Japanese Investment Bank) at Mumbai. He worked in the 'Index Structuring Team', developing Multi-Asset Indices. His work involved developing rules for optimal asset weight allocation, volatility control and rebalancing of the index. His work also included simulating indices of peer banks and understanding their rules and contrasting them with Nomura's Indices.



Sirjan Jain, a final year student, spent the summer of 2019 in Reliance Industries Limited, Jamnagar interning in the R&D profile. He worked on the Optimization of Air Separation Unit to maximize the Nitrogen production. He developed the model using partial least squares regression and then tested the final results obtained after simulation in the Aspen Plus model developed for the complete flowsheet of the unit. His other work was to plot several meaningful graphs that can be made using the Aspen ProMV model. His aim was to give an alternative to the ProMV software.

Shivali Agrawal, a final year undergraduate student, spent her summers at Texas A&M University, USA. She worked with Computational Materials Group in the Chemical Engineering department under the supervision of Dr. Perla Balbuena. Her project aimed at understanding nucleation of Solid-Electrolyte Interphase (SEI) components (Li_2S) from liquid solutions in contact with Li metal anode surface in Li-S batteries. Shivali performed classical reactive molecular dynamics simulations to understand the nucleation of blocks that compose the SEI layer and study what morphologies the products may adopt and most importantly how their properties vary as a function of such morphology.



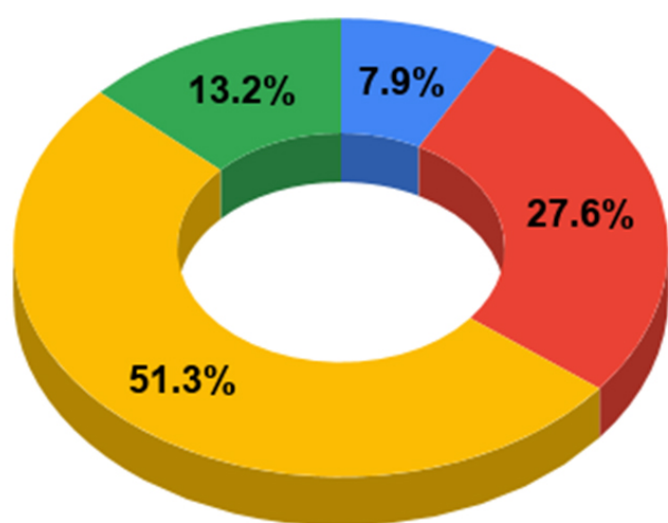
CLUB INVOLVEMENTS

Ayushi Kushwaha a final year undergraduate in Chemical Engineering. Along with academic interest, she always have an inclination towards sports. She had represented IIT Kanpur's Basketball women team in many tournaments which includes winning a Bronze medal in Inter IIT Sports Meet'17 and Silver Medal in Udghosh'17. She had conducted various sports workshop during her tenure as a core member of GnS Council. She is the Head of Events and Hospitality Cell for Udghosh'19.



Sakshi Singh was given the opportunity of being the Coordinator of Fine Arts and Design Club (FADC) in her penultimate year. Her tenure started with organizing introductory summer workshops and projects. She, along with other club secretaries organized a four-day art exhibition and presented two separate speed art performances. During Antaragni, they set up an exhibition for the campus community. The club also participated in Rendezvous '18 and Inter IIT cult meet '18.

PLACEMENT STATISTICS



● Consultancy ● Core ● Analytics ● Software





Dr. Debjani Banerjee is associated with PGRL in the Department of Chemical Engineering since June 2017 as Research Establishment Officer. She completed her doctoral thesis from Department of Physics, IIT Bombay (2007) and subsequently did postdoctoral research (2007-2010) at FZ-Juelich in Germany & University of Maryland at College Park, USA. She has worked as Assistant Professor in the Department of Physics at PSIT, Kanpur (2011-2012) & then at Shivaji College, University of Delhi (2013-2017). In the last 2.5 years, she has

assisted in the entire purchasing and subsequent installation process of several high valued equipment like Real Time PCR, EDS & STEM detectors & sample preparation tools like Ultramicrotome & Sputter Coater for the Electron Microscopy unit, Differential Scanning Calorimeter, Polarization Microscope with Fluorescence & Heating Stage, Electrospinning Set up for nanofibers etc. Her broad responsibilities in the department include overseeing and running of all central equipment in PGRL, generating revenue for maintenance & operation in a self-sustenance mode and also assisting and facilitating the department students in their research by providing them instrument based training through talks, lab demonstrations. Since PGRL is a pay and use facility, her responsibilities are not only confined to the scientific community in the IIT Kanpur campus but also involves engaging with several research groups in other academic institutions like IITs, MNITs, NITs, CSIR Laboratories like CDRI Lucknow & NPL, Delhi, Universities like HBTU, CSJM Kanpur, BBAU Lucknow, Aligarh Muslim University & BHU & Industries like Tata Consultancy Services R & D Centre in Pune etc.

Mr. Ram Ashish Mishra is currently working as Senior Technical Superintendent at the Department of Chemical Engineering at IIT Kanpur since October 2001. He completed his M.Tech. (Hons.) in Chemical Engineering from HBTI Kanpur. He has more than 25 years' experience of working in both industries and in academic Institutions. Before joining IITK, Mr. Mishra has worked with India poly fiber Ltd., Lupin Laboratories Ltd. and SLIET Longowal. Mr. Mishra has hands-on experience of working with Rheometers, Field Emission Scanning Electron Microscope (FESEM), GC/HPLC, TGA/DSC System, Mass Flow Controllers, Pressure Transducer, Limited Oxygen Index Unit, Melt Flow Index Unit, High-Temperature Furnace, Tensile Tester, Hydraulic Press, Blow film extruder, Interactive smart board with a UF-55 projector system and so on. At present, Mr. Mishra is in charge of the Rheology Lab where he looks after the installation of sophisticated equipment like Rheometers: Discovery HR-3, AR-1000 (TA Instruments), CVO-100 (Bohlin Instruments), RS-1 (Haake Instruments), Micro-PIV, their operation and maintenance. Beside the laboratory work, Mr. Mishra coordinates the summer-in-plant training for under-graduate students.



PH.D. THESES SUBMITTED FROM CHE (2019)

Sl.No.	Name of Student	Name of Thesis Supervisor	Title of the Thesis
1	Vivek Kumar	Dr. Nitin Kaistha	Economic Plantwide control technology applied to a reactor-separator recycled process
2	Ramkarn Patne	Dr. V. Shankar	Role of Constitutive models of fluid and solid on the prediction of elastohydrodynamic & hydrodynamic instabilities
3	Sanjay Gupta	Dr. V. Shankar and Dr. R.P Chhabra	Heat transfer from single and 2 cylinders in uniform and pulsating flow of power law and Bingham plastic fluid
4	Pooja Thakur	Dr. Naveen Tiwari and Dr. R.P Chhabra	Non-Newtonian fluid flow past a rotating cylinder, momentum and heat transfer characteristics.
5	Anurag Pramanik	Dr. Sanjeev Garg	Reverse engineering the controlled release of Paclitaxel
6	Krishna Kant Kundan	Dr. Animangsu Ghatak	Fracture of brittle soft solid with a sharp object

EXTERNAL SEMINAR SPEAKERS (2019)

Sl. No	Speaker	Affiliation	Title of the Talk
1	Dr. Dipin S. Pillai	Postdoctoral Fellow, University of Florida	Interfacial pattern formation: Enhancing transport in microfluidics and microgravity
2	Dr. Suresh Bhatia	Professor, Department of Chemical Engineering, University of Queensland	Simulation of Disordered Carbon Structure and its Influence on Adsorption and Transport
3	Dr. Pramod P. Wangikar	Professor, Department of Chemical Engineering, IIT Bombay.	Metabolic engineering and ¹³ C Metabolic Flux Analysis of Cyanobacteria.

EXTERNAL SEMINAR

SPEAKERS (2019)

4	Prof. Mohit K. Jolly	Assistant Professor in Centre for Biosystems Science and Engineering, IISc Bangalore	Metastasis – The spread of cancer cells from one organ to another
5.	Dr. Phillip E. Savage	Walter L. Robb Family Endowed Chair, Department of Chemical Engineering at Penn State University	Biomass Valorization and Catalysis in Hot Compressed Water
7.	Dr. Christopher W. Jones	Associate Vice President for Research, Professor and William R. McLain Chair of Chemical & Biomolecular Engineering and Adjunct Professor of Chemistry and Biochemistry, Georgia Institute of Technology	Aminosilica Materials as a Platform for Separations and Catalysis
8.	Dr. Karthik Subramaniam Pushpavanam	Ph.D., Arizona State University	Development of a Colorimetric Plasmonic Nanosensor for the levels of Ionizing Radiation
9.	Dr. Chhavi Gupta	Engineer 'C' (permanent), Sree Chitra Thirunal Institute of Medical Sciences and Technology (SCTIMST)	Polymeric biomaterials for ophthalmic and orthopaedic applications
10.	Dr. Madhumita Patel	Postdoctoral fellow in Sustainable Energy Research Laboratory, Department of Mechanical Engineering, University of Alberta.	Production of Renewable Diesel from Canadian Lignocellulosic Biomass through Fast pyrolysis and Hydroprocessing Technology
11.	Dr. Lalit Mohan Pandey	Associate Professor, Department of Biosciences and Bioengineering, IIT Guwahati	Self-assembled monolayers: Kinetics and Applications in Biomaterials
12.	Dr. Omkar S. Deshmukh	Postdoctoral researcher, University of Queensland, Brisbane, Australia	Understanding the behaviour of colloids across different domains: From Pickering emulsions to Food Physics

CHEMINEERS SOCIETY

Chemineers Society is a student body aiming to promote intellectual and cultural activities of all chemical engineering students, here at IIT Kanpur. It focuses on improving the overall institute experience of the students as well as helping them to develop professionally, socially and academically. It helps students to identify campus resources, and fosters harmonious relationship among students, faculty, staff and administrators.

Chemineers Society organises a lot of events and workshops for the department. It organises the departmental freshers' party and farewell party for the incoming and the outgoing batches respectively. It organises various workshops for MATLAB and ASPEN to help the students get acquainted with these softwares. It has also organised Intern-Gyan sessions and other similar career-building events where seniors share their experiences as well as make the juniors aware of the various opportunities open to them for the future.

FACULTY-IN-CHARGE - DR. HIMANSHU SHARMA

PRESIDENT - ASHAR AHMAD



FRESHERS' PARTY OF 2018



DR. REDDY'S SESSION

SPONSERED RESEARCH GRANT

Predicting The Release Of Drugs From Multi-Component Supramolecular Membranes.

(Jayant K. Singh): ABPL

One Dimensional Model For The Study Of Oxidation Modeling Of Pcs Fibre On Stationary Cylinder Roll (Jayant K. Singh, Naveen Tiwari): Defence Materials and Stores Research and Development Establishment, Government of India

Active Colloids In Complex Environments (Rahul Mangal): Science and Engineering Research Board, Government of India

GIVING TO CHEMIE, IITK

As we gear up to implement 25% increase in student strength over next two years, we welcome our well wishers to generously contribute to our department fund. Needless to say, your contributions can help us in creating new infrastructure for both teaching and research, particularly expanding the UG and PG laboratories of the department. It can help us in engaging and supporting more students in research, in keeping our common research facilities in working condition and in attracting also top class faculty members for further enriching our department academically. For any question, comment and suggestion please write to head_che@iitk.ac.in, aghatak@iitk.ac.in.

LETTERS TO EDITOR

THANK YOU FOR SENDING OUT THE NEWSLETTER. IT'S GREAT TO SEE GREAT ACHIEVEMENTS OF CHE IITK.

- VIVEK GERA, BT-MT Y7

I READ THE NEWSLETTER FROM COVER TO COVER, AND AM DELIGHTED TO SEE THAT ALL ASPECTS OF THE DEPARTMENT ARE THRIVING. I FEEL PROUD TO BE AN ALUM OF THE IITK CHE DEPARTMENT. MY VERY BEST WISHES FOR CONTINUED SUCCESS.

- ARIJIT BOSE, BT/1976

IT FEELS REALLY GREAT TO HAVE THIS NEWSLETTER WITH SO MANY ACHIEVEMENTS BY PROFESSORS AND STUDENTS. THIS NEWSLETTER REMINDS ME OF MY DAYS IN CAMPUS. CONGRATS FOR ALL THE ACHIEVEMENTS AND THE GREAT WORK GOING ON.

- VINKISH GARG, BT/2005

THE NEWSLETTER HAS BEEN WELL PRESENTED AND IT BROUGHT BACK MY OLD MEMORIES OF TIME SPEND IN THE DEPARTMENT. I AM VERY PLEASED TO SEE THAT THERE HAS BEEN DRIVING FORCE, PASSION AND DESIRE AMONG ALL FACULTY MEMBERS TO CONTRIBUTE IN TERMS OF PUBLICATIONS, BOOK WRITING, SEMINARS AND RESEARCH GRANTS FROM DIFFERENT RESOURCES TO KEEP THE FLAG FLYING HIGH. I WISH YOU ALL BRIGHT CAREER WHILE CONTRIBUTING IN INNOVATIVE RESEARCH IN EMERGING AREAS OF CHEMICAL ENGINEERING.

- SUBHASH BHATIA, MT/1971, PhD/1976

FELT SO GLAD TO RECEIVE AN EMAIL FROM A LOVELY PLACE I GRADUATED FROM. IT'S IMPORTANT FOR ALL ALUMNI FROM OUR DEPARTMENT TO STAY CONNECTED AND KEEP THE ASSOCIATION ALIVE. MOST OF US CAN MANAGE TO ATTEND A MEET IF ORGANIZED OCCASIONALLY. WILL SURELY GO THROUGH THE ATTACHED LINK. THANKS AND KIND REGARDS

- ANKIT SHUKLA, BT/1998

THANK YOU VERY MUCH FOR SHARING THE LATEST NEWSLETTER OF THE DEPARTMENT OF CHEMICAL ENGINEERING. THOUGH I AM IN BUSINESS NOW, I AM ALWAYS EXCITED TO BE CONNECTED TO THE ACADEMIA IN ANY MANNER WHAT SO EVER.

- RAHUL GAUTAM, BT/1975

I FEEL REALLY HONORED TO HAVE RECEIVED THIS LETTER AS AN ALUMNUS OF IIT KANPUR. HAVING BEEN A PART OF THE DEPT. OF CHEMICAL ENGINEERING, IIT KANPUR, THIS NEWSLETTER NOT ONLY GETS ME NOSTALGIC BUT ALSO MAKES ME FEEL PROUD OF THE PLACE WHICH I CAN CALL AS MY ALMA MATER.

- VISHAL HELI WAL, BT-MT/2016

THIS IS A VERY WELCOME INITIATIVE OF OUR DEPARTMENT. I AM SURE THIS WILL HELP IN ATTRACTING GOOD FACULTY AND GOOD STUDENTS. MY HEARTIEST CONGRATULATIONS AND ALL THE BEST.

- PROF. DEEPAK KUNZRU, BT/1968

THANKS FOR THE NEWSLETTER. IT REALLY A VERY NICE SUMMARY OF THE CHEMICAL ENGINEERING DEPARTMENT'S ACHIEVEMENTS!

- DEVESH AGARWAL, BT/2007

IT'S A GREAT PRIVILEGE RECEIVING THE 2ND EDITION OF THE NEWSLETTER FROM CHEMICAL ENGINEERING DEPARTMENT OF IIT-KANPUR. PLEASE ACCEPT MY CONGRATULATIONS ON BRINGING OUT THIS EXCELLENT NEWS - MAGAZINE.

- V. V. PANDE, BT/1978

THANK YOU FOR SHARING THIS NEWSLETTER. GREAT TO GET THE UPDATE. BEST REGARDS.

- JAGJEET BINDRA, BT/1969

LIST OF CHE, IITK FACULTY

- ANIMANGSU GHATAK (HOD)
- ANURAG TRIPATHI
- ASHUTOSH SHARMA
- DIPIN S. PILLAI
- GOUTAM DEO
- HARSHWARDHAN H. KATKAR
- HIMANSHU SHARMA
- INDRANIL S. DALAL
- JAYANT SINGH
- NAVEEN TIWARI
- NISHITH VERMA
- NITIN KAISTHA
- PANKAJ APTE
- RAGHAVENDRA SINGH
- RAHUL MANGAL
- RAJ GANESH PALA
- RAJU GUPTA
- SANJEEV GARG
- SIDDHARTHA PANDA
- SRI SIVAKUMAR
- V. SHANKAR
- VISHAL AGARWAL
- YOGESH M. JOSHI

LIST OF POST-DOCTORAL FELLOWS

- SHRUTI MISHRA
- B. BHUVANESHWARI
- PRASENJIT KAR
- GEETANJALI CHATTOPADHYAY
- SAURABH SINGH
- SAJAL KANTI DUTTA

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DEPARTMENT OF
CHEMICAL ENGINEERING



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