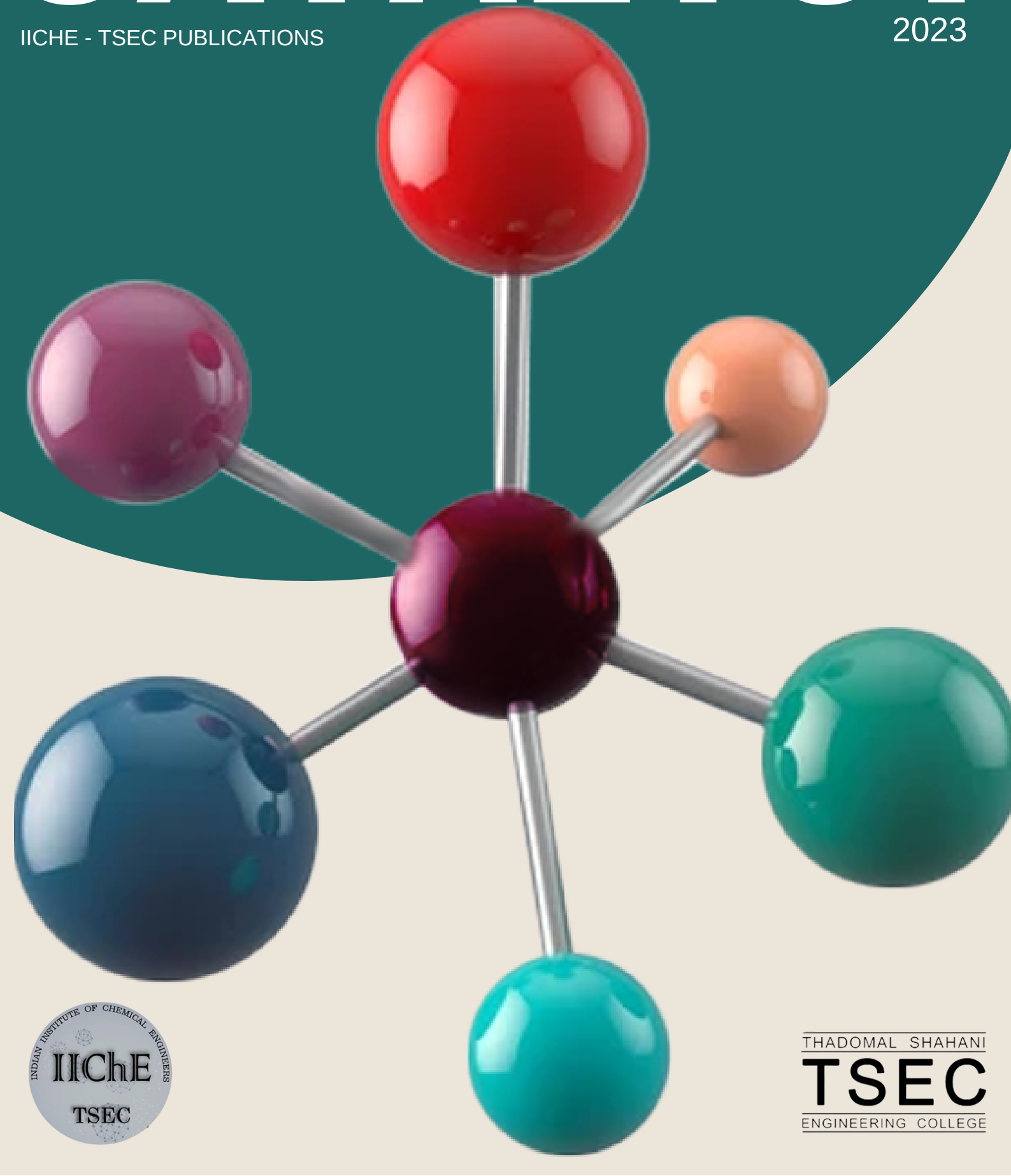
CATALYST

IICHE - TSEC PUBLICATIONS

2023



INDIAN INSTITUTE OF CHEMICAL ENGINEERS
IIChE
TSEC

THADOMAL SHAHANI
TSEC
ENGINEERING COLLEGE

FROM THE PRINCIPAL'S DESK

DR. G.T. THAMPI

Chemical engineering is in the cusp of building efficiencies leveraging AI techniques and digitization of business processes. These efficiencies ought to be revolving around evolving consciences of sustainability issues, climate change and carbon neutral.

A few recent developments and investments in the Indian chemical sector are as follows: From April 2021-March 2022, exports of organic & inorganic chemicals increased 38.67% YoY to reach US$ 24,313.88 million. Chemical production reached 907,639 MT in August 2022, while the petrochemical production reached 1,727,019 MT.

Chemical engineering sector is expected to invest massively on taping space based solar energy and also in energy sector in general leveraging nascent research finding from chemical engineering laboratories. Indian state is a signatory in Paris climate change accord and committed evolve as a carbon neutral entity by 2050. It is opportune time to seize the opportunity to capture market for energy efficient process and product which are also helps in developing ecological footprints.

I congratulate Professors and students contributing to the cause of this Departmental magazine, wishing all graduating students (Class of 23) a wonderful and productive career ahead.

Dr. G.T Thampi
Professor and Principal
Thadomal Shahani Engineering College

FROM THE HEAD OF DEPARTMENT

DR. ELIZABETH JOSEPH

The department of Chemical Engineering understands the necessity and virtue of sustainable development model for industrial activity. As a nation we march towards sustainable energy future. The march gains momentum when at COP26 the pledge towards net-zero India by 2070 was made. As the chemical engineering fraternity internalizes the gravity of the fulfilment of the pledge towards net-zero, we develop, frame processes, operations needed to deliver these promises.

India's per capita carbon dioxide (CO_2) emissions are about 1.9TPA, which accounts for less than 40% of the global average. Industry contributes to 70 % of the emissions, out of which the power plants share 30%. Carbon capture utilization and storage (CCUS) would play a crucial role in achieving net-zero by 2070. Chemical engineering is on the steering wheel whether it is to do with various methods of capture, utilization of the CO_2 or its storage.

Students of our department are encouraged to study various technology for capture and utilization. We do have experimental setups to do research on the same. Their study results in publication on the various capture and utilization technology. Storage is an area the department is yet to explore.

Additionally, students are encouraged to explore on importance of life cycle assessment of products and processes. They understand these through various elective courses and projects undertaken.

As India gears up to products and processes to have sustainable ecosystem the department of Chemical engineering grows in providing sustainable solutions.

Dr. Elizabeth Joseph
Head of Department
Department of Chemical Engineering

FROM THE TEACHER COORDINATOR

PRASEEDA NAMBISAN

CHEMERGENCE, a tradition that has started since 2006, has grown to be become one of the biggest student organized national tech fest. What made it special this year was the experience and exposure it gave the students as an offline campus activity post pandemic. The energy and enthusiasm of the students in planning and organizing CHEMERGENCE'22 brought back the adrenaline rush in all of us.

In addition to the signature Chemergence events like Chem-Quiz & The Bait that stimulated the young minds to gain deeper insights into the various areas of Chemical Engineering, this year the team had come up with some more new and exciting events like Chemical Feud & Prof. Frank's Diagram in which maximum students participated with great enthusiasm & had a great time of fun and joy.

It also provided a platform for the aspiring chemical engineers to interact with renowned experts from various chemical industries and develop greater understanding in the areas like use of energy efficient methods for a sustainable tomorrow & IPR. It gave me immense pleasure to be a part and work with the highly energetic students' team of Chemergence-22 in making this Annual Symposium a great success.

I wish all the best to the organizing committee of Chemergence'23 to accomplish the purpose of encouraging innovative ideas in young budding chemical engineers and continue the legacy.

Ms. Praseeda Nambisan
Teacher Coordinator
Department of Chemical Engineering

FROM THE CHAIR PERSON

URJA MALADKAR

Having attended college only in the first semester, the Batch of 2023 was the batch that lived through the pandemic. Leading a committee of 24 members for the first time in an offline setting was a challenge like no other. ChEMERGENCE'22, the flagship event of IIChE, saw the enthusiasm and zest of Chemical Engineers from colleges all over, especially post-pandemic. Chemical engineering being a vast field, the theme for ChEMERGENCE'22 revolved around a culmination of different areas of chemical engineering, from traditional fields like oil and gas, pharmaceuticals, and renewable energy to cosmetics, food technology, and nanotechnology. The team introduced two new events this year, Prof. Frank's Diagram and Chemical Feud which saw the maximum number of participants among all events. Our Panel constituted of distinguished professionals from the industry including Dow, Reliance, BARC, and Tata Consulting Engineers. Our tagline for the tenure, Radiating Resilience, proved apt in showcasing the team's resilience in organizing an event of this grandeur. ChEMERGENCE'22 would not have been possible without the continued and evergreen support and encouragement of the Chemical Engineering Department in TSEC. I would like to extend my gratitude to our HoD, Dr. Elizabeth Joseph who played a vital role in the success of this tenure. I would like to thank our teacher coordinator, Ms. Praseeda Nambisan, who was our constant pillar of support and inspiration throughout this tenure. I would also like to thank my seniors, Ms. Arpita Ghosh, Mr. Judewin Noronha, Ms. Esha Sharma, Ms. Apurva Chaubal, and Mr. Mohit Surana for their continued support and dedication to the IIChE team till date. I wouldn't be where I am without them. I would like to thank IIChE-MRC and Mr. Pratik Bhagat, without their support this event wouldn't have been possible. Lastly, ChEMERGENCE'22 would not have been possible without my wonderful team, whose hard work and dedication truly shone through. I couldn't possibly end without thanking my Vice-Chairperson, Ms. Vaishnavi Nambiar, and my Secretary, Mr. Saket Mundra; I couldn't sum up my appreciation and gratitude for them enough. While being the Chairperson was challenging and hard, I wouldn't trade this experience for anything else. My journey with IIChE was one of growth and valuable lessons, which will only help me hone my skillset as I step into the next phase of my career. As I write this, I realize that saying goodbye to the committee is going to be a bittersweet moment and while I will cherish this experience for years to come, I rest assured that the committee will reach great heights as I pass the baton on to the next tenure.

VAISHNAVI NAMBIAR

VICE CHAIRPERSON

Radiating-resilience, our team's motto, exuded brilliance and surpassed expectations during ChEMERGENCE'22, our flagship event for the tenure of IIChE. Navigating our team members and the ever-enthusiastic participants, we conducted a mesmerizing symposium that received an overwhelming response. Our theme highlighted the significance of chemical engineering in various domains, ranging from renewable energy to oil and gas.

ChEMERGENCE'22 aimed to ignite the passion for growth and discovery among budding chemical engineering students. Transitioning from an online to an in-person forum was a challenging task, and we extend our gratitude to our Head of Department, Prof. Elizabeth Joseph, and our teacher Coordinator, Mrs. Praseeda Nambisan, for their unwavering support and motivation. We are also grateful to the entire committee of IIChE, our dedicated volunteers, and faculty who served as a strong pillar throughout our tenure. This particular tenure holds a special place in our hearts as it marked the return of our annual technical symposium with great cheeriness. The memories of ChEMERGENCE'22 will be cherished for years to come.

SECRETARY

Chemical Engineering is one of the core fields of engineering, and I believe that the research and career potential in chemical engineering is enormous but untapped. ChEMERGENCE provides the platform to showcase ideas, present research and demonstrate the skills for budding chemical engineers.

ChEMERGENCE'22- the first offline ChEMERGENCE after the COVID-19 pandemic aimed to restart the legacy of the annual festival of the Chemical Engineering department of TSEC. Some rapid growing industries- Oil and Gas, Renewable energy, Pharmaceuticals, Food Technology, Nanotechnology as well as Cosmetics were the domains that IIChE-TSEC aimed to encompass in this year's event.

I'm grateful to my fellow committee members, our volunteers, teacher co-ordinator- Prof. Praseeda Nambisan as well as Head of Department- Dr. Elizabeth Joseph for making ChEMERGENCE'22 a success.

The journey from being a participant in ChEMERGENCE in my first year to working as the Logistics Head and Secretary of IIChE-TSEC has been an immense learning experience as well as given me moments which I'll forever cherish in my career.

SAKET MUNDRA

TABLE OF CONTENTS

TABLE OF CONTENTS

WHY CHEMICAL ENGINEERING?

- Vridhi Varliani

Chemical Engineering is one of those branches of engineering that involves the designing and processing of industrial manufacturing. The employment of chemical engineers in the field of chemical engineering is in demand and so is the scope of the course which keeps increasing with more and more candidates wishing to pursue this course as it enables the students to experiment with new materials. It is one of the established branches in India and offers career opportunities in this course. Despite this, many colleges in India have been shutting down their chemical engineering department sector.

Chemical engineering is one of the most expensive branches in India. Since in India there is an engineering college on almost every corner, the thing is, not every engineering college can afford a branch like chemical engineering. Most of the small government colleges and some private colleges as well are having chemical engineering but the truth is their practical facilities fail to fulfill what this branch has to offer. Chemical engineering is one of the underrated branches of engineering. Students usually are unaware of this branch unless they know someone from that background. The main concern is often that it is related to only chemistry but it has a vast curriculum and chemistry is just a part of it. Chemical engineering is much diverse and vast than what's in it's name.

People are getting concerned about future prospects for chemical engineering careers, usually because of some downturn in the oil and gas markets. But it is much more than oil, gas, and petrochemicals! There is also food, pharmaceuticals, alternative energy, environment, safety, consumer products, plastics, minerals, metals, paper & fibers, etc.

Actually, the next 30 years is probably going to be a very exciting time to be a chemical engineer. The world needs people with the innovation skills to handle new materials and energy processes more than ever.

FUTURE AREAS OF RE-SEARCH

1

Fossil fuels: People are trying to transition away from fossil fuels, but that in itself is a huge challenge and it's not going to happen overnight. Even ignoring the transportation and heating uses, we still rely on them for feedstocks in plastics, chemicals, pharmaceuticals and other manufacturing. Chemical engineers have a huge task ahead in re-engineering the existing refineries and plants to accommodate the shifts in demand.

2

Alternative fuels and feedstocks: The shift from a fossil carbon-based world to a renewable and bio-based economy requires a huge chemical engineering effort to develop new processes, design new plants, and tackle all the environmental sustainability and safety issues while doing so.

3

Green Energy: Alternative fuels like ethanol, biodiesel, and biogas are already well-established but need expansion and improvement. There is also much more that can be done to create other bio-based transportation fuels, also requiring a lot of chemical engineering. Transitions to electric vehicles will drive demand for battery materials, like lithium, for many years. Also, recycling of battery materials and electric motor components (rare earth elements) will become much more important as demand rises. Extracting, recovering, recycling, and purifying materials is a chemical engineering specialty.

4

Green Plastics & Materials: It's not so easy to simply give up on fossil-based plastics and other materials. They are relatively easy to produce and have nice properties. But, there has been lots of ongoing work on bio-based plastics, fibers, etc. that can be eventually used as substitutes. The development and then production of these materials is a big chemical engineering challenge.

5

Food Supply: This is an on-going concern, where chemical engineering can play a role in helping to make products that have better shelf-life (limiting waste), as well as recovering valuable chemicals and materials from food waste and by-products.

IIChE MRC

Indian Institute of Chemical Engineers Mumbai Regional Center

Indian Institute of Chemical Engineers is a confluence of streams of professionals from academia, research institute and industry. It provides them the appropriate forum for joint endeavour's, hand-in-hand, to work for human being through application of chemical engineering and allied sciences. If you are interested about, attached to or involved in chemical engineering related activities – whether as a student as a seasoned professional - you shall find the program of IIChE immensely beneficial, opening up doors of new possibilities and existing possibilities. The Institute has created a unique identity for itself over time. The IIChE's core goals have generally remained constant since its founding, despite the organisation constantly adapting and taking initiative to meet society's and the economy's shifting requirements. One may shortlist them as:

- To promote advancement of Chemical Engineering Science and draw up a code of ethics in the profession.
- To maintain and widen contacts with chemical engineering professionals in India and abroad ensure regular exchange of ideas with other national and international professional institutes in this field.
- To act as an authoritative body on matters pertaining to the teaching and the profession of chemical engineering.
- To conduct examinations and assist persons engaged in the industry to qualify as chemical engineer.
- To confer awards, diplomas and certificates to such persons as may be deemed fit.
- To undertake publication work, i.e., journal, monographs, proceedings of seminars/symposia/ workshops
- To conduct meetings and transact business on administrative, academic, and technical matters relating to the profession.

Executive Council - IIChE - Mumbai Regional Centre

Prof. Aniruddha B. Pandit	Hon. Chairman
Shri Lalit Vashishta	Hon. Vice Chairman
Shri Dhawal Saxena	Hon. Secretary
Shri Mahendra Patel	Hon. Treasurer
Shri Jagdish Nageshri	Editor E-Newsletter
Shri Pratik Bhagat	Hon. Joint Secretary
Shri Rajesh Jain	Hon. Joint Treasurer
Dr. M.P. Jain	Member
Dr. Alpana Mahapatra	Member
Dr. T.L. Prasad	Member
Dr. Aparna N. Tamaskar	Member
Shri Shreedhar M. Chitanvis	Member
Shri Akash Shinde	Co-opted Member
Shri Praveen Kumar Saxena	Co-opted Member
Prof. Sanjay Mahajani	Co-opted Member
Shri Vijay Sane	

IIChE TSEC

IIChE Student Chapter TSEC

One of IIChE's largest student chapters, IIChE-TSEC, is located at one of its largest regional centres, IIChE-MRC, or Mumbai Regional Centre. Its uniqueness as the only student body in TSEC dedicated solely to chemical engineers stands out among its many other advantages. The chapter for students focuses on instilling the philosophy of giving pupils real-world industry exposure in accordance with the academic ideas they are taught. We encourage excellence, personal development, and the sharing of pertinent information. The association's mission is to promote industry-student, university-student, and professional society collaboration. In order to keep up with the times, IIChE-TSEC, along with the Department of Chemical Engineering-TSEC, has adopted a ground-breaking strategy to support the demands of its students. Reputable speakers from the chemical engineering fraternity have recently given seminars that provide students the chance to explore new areas. IIChE-TSEC has been a pioneer in recognising and identifying young talent, as seen by the activities it has put on and by the young people who have participated in it. An opportunity to compete with emerging talent is provided by the yearly technical symposium ChEMERGENCE. The activities offer a great way to connect academic understanding to its real-world applications in chemical engineering and related fields. We are committed to promoting public knowledge of technical challenges through ChEMERGENCE.

Executive Council - IIChE - Student Chapter TSEC (2022-2023)

Ms. Urja Maladkar	Chairperson
Ms. Vaishnavi Nambiar	Vice Chairperson
Mr. Saket Mundra	Secretary
Ms. Ishneet Kaur Alag	Treasurer
Ms. Srishti Bhardwaj	Joint Treasurer
Mr. Sidharth Kanjoor & Mr. Jeet Thakur	CTOs
Mr. Eshaan Phatak	Chief Operations Officer
Ms. Rasika Mungekar & Mr. Aditya Karande	Event Heads
Ms. Shruti Nayak	Head of Content
Mr. Vignesh Sawant	Marketing Head
Mr. Rishi Hariharan	Public Relation Officer
Mr. Yogesh Jadhav	Editor
Mr. Ankit Myana, Ms. Yukta Vyas & Mr. Subodh Sinha	ATOs
Mr. Abhinav Tyagi	Creative Head
Mr. Sharang Rajan	Publicity Head
Mr. Piyush Firke & Mr. Vineet Mahajan	Logistics Heads
Ms. Pallavi Dhonde	Graphic Designer

Committee Members

IIChE Student Chapter TSEC

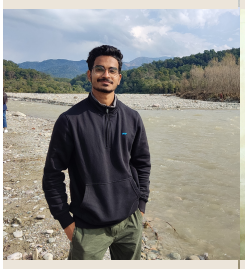
URJA MALADKAR

VAISHNAVI NAMBIAR

SAKET MUNDRA

ISHNEET KAUR ALAG

SRISHTI BHARDWAJ



SIDHARTH KANJOOR

JEET THAKUR

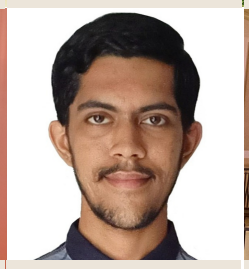
ESHAAN PHATAK

RASIKA MUNGEKAR

ADITYA KARANDE

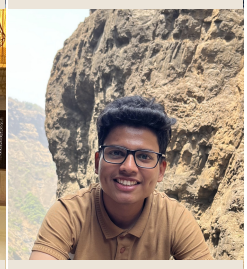
SHRUTI NAYAK

VIGNESH SAWANT



RISHI HARIHARAN

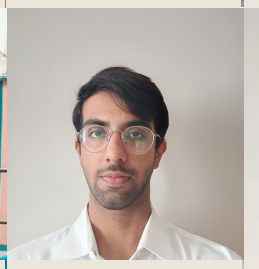
YOGESH JADHAV



ANKIT MYANA

YUKTA VYAS

SUBODH SINHA



ABHINAV TYAGI

SHARANG RAJAN

PIYUSH FIRKE

VINEET MAHAJAN

PALLAVI DHONDE

Department of Chemical Engineering, TSEC

Department of Chemical Engineering, TSEC was established in 1983. It has a long and distinguished history of successfully educating leaders for a wide variety of industries. Ever since its inception in 1983, the institute has established itself as a premier institution engaged in imparting quality technological education.

The Department of Chemical Engineering will conduct its key programs and activities in a manner that promotes excellence and leadership in education and research and service to society and fosters an environment that is safe, highly productive, co-operative, and collegial, and dedicated to continuous improvement.

Continuous industry-institute interactions is going on by:-

- Conducting guest lectures/ Alumni lectures in the department by industrial experts, especially in energy fields like energy, environment, safety, biochemical engineering, and computerized process control.
- Organizing national level conference on various recent developments.
- Industrial visits by staff and students of the department.
- Promoting industrial training (internship) programmes for the students of the department.

Our chemical engineering graduates have been working in reputed organizations, to name a few- Tata Chemical, Reliance Industries, Toyo, VVF, Tecnimont, ThyssenKrupp, Aker Solutions, UPL, Jacobs etc. holding responsible positions.

Department of Chemical Engineering

Dr. Elizabeth Biju Joseph	Professor & HOD
Dr. Rajkumar Pathak	Professor
Dr. Anita Kumari	Professor
Mrs. Nita Mehta	Associate Professor
Dr. Ramesh Sakharam Bhande	Associate Professor
Mr. Prasad Jayavant Parulekar	Assistant Professor
Mr. Ravindra R. Joshi	Assistant Professor
Mrs. Sangita Sachin Gaikwad	Assistant Professor
Dr. Trupti Dharmarao	Assistant Professor
Mrs. Mannat Khanwani	Assistant Professor
Dr. Nitin Pereira	Assistant Professor
Ms. Praseeda Nambisan	Assistant Professor
Mrs. Bharti Deshmukh	Assistant Professor

Department of Chemistry

Dr. Anupama Sawant	Associate Professor
Ms. Anjali Kirkire	Associate Professor
Ms. Vandana Sawant	Associate Professor

IDEAS AND LESSONS

‘A teacher presents the past, reveals the present and creates the future’ – a quote by John Dewey perfectly sums up the the importance teachers hold on our future. The TSEC Chemical Engineering Faculty has given us distinguishing results in helping our students secure the best of the careers. Here are some of the opinions regarding the future of Chemical Engineering put forth by our faculty.

Prof. Nita Mehta

Q. How do you see the Pharmaceutical industry growing in the next few years?

With thousands of compounds in the final stages of clinical development and hundreds of new products expected to be approved in 2023 and beyond, the industry is expected to grow multifold. Advanced biologics, cell therapies, and gene therapies have the potential to change people's lives. Encouraging pharmaceutical R&D, including intellectual property and technology commercialization, government procurement, scientific research, education, skill development, ease of doing business, regulatory legislation, tax, and financial incentives. Chemical engineers will be required in various capacities. Scaling up production, developing upstream and downstream processes, designing chemical routes and improving the efficiency of existing processes are a few of the booming opportunities laid in front of the youth engineers.

Prof. (Dr.) Ramesh Bhande

Q.What potential does chemical engineering hold to change the course of food industry?

The exclusive knowledge from Chemical Engineering is used to conceive, design, test, improve food flavors and textures, add nutritional value, perfect the appearance of foods and scale up revolutionary food-processing techniques in the Food Industry. Due to which, various products are always available on our local grocery shelves like exotic fruits, vegetables, fresh meats, seafood, and dairy products. New agricultural and food manufacturing innovations can help alleviate food shortages as well as food additives manufactured can be used in processed food to create better flavors that make foods more attractive to consumers. Some of the most prominent breakthroughs have been in the areas of natural and artificial sweeteners and flavors. Today synthetic and organic fertilizers significantly increase crop yields, while herbicides and pesticides help protect crops from damage.

Prof. Prasad Parulekar

Q. We always hear that renewable energy will replace fossil fuels, when do you see that happening and also can you elaborate how it will happen?

For renewable energy to entirely replace fossil fuels certain factors are needed to be considered. These include the current status of fossil fuels which comprises their global storage and their consumption rates, availability of current renewable energy resources, global potential of their renewable resources to overtake the energy production of fossil fuels, availability of technology to harness this technology and the cost of production of 1 unit of electricity/energy for each renewable source and the time needed for complete installation of these respective energy sources. These major factors will determine when and how renewable energy can overtake fossil fuel source.

Prof. Ravindra Joshi

Q. A freshman student is unaware that food technology is a subset of chemical engineering. How will you educate the student about the same?

Food technology involves mass production of food products on an industrial scale. The field heavily borrows from biochemistry, microbiology, chemical and mechanical engineering. Food processing involves unit operations. A well trained chemical engineer is perfectly capable of working in design and operation of food processing plants. As chemical engineers study heat-mass-momentum transfer, transport phenomena, plant and equipment design; they are grounded in basics of food plants operation and design. Chemical engineers can get further education in food technology or allied fields and work as specialists. They have the opportunity to work as sales and marketing, scientists, designers, simulation experts, alcohol technologists. We can educate our students about opportunities for growth in food industries by incorporating knowledge of food processing in the curriculum.

Prof. Sangeeta Gaikwad

Q. What are the problems faced while working on renewable energy projects?

Some of the common problems faced while working with renewable energy include consistent high-power quality to ensure stability and high efficiency of the network. The quality of the power supply allows the system to work well with high reliability and lower costs. Secondly, most renewable energy plants that share their energy with the grid require large areas of space. In most cases, renewable energy sources are dictated by location which can be off-putting to users. Last but not the least, one of the biggest concerns in the field of renewable energy is power generation depending on natural resources that are uncontrollable by humans. The uncertainty in energy production in renewable energy technologies is making integration more complex.

Prof. Bharti Deshmukh

Q. Nanotech is a growing entity nowadays, it is used in films and all, what do you think about the prospect of nanotech used in daily life, its future and limitations currently?

Nowadays many people are using the word nanotechnology, yet many of them are not even aware of the great impact of nanotechnology on our daily lives. Nanotechnology has the huge potential to transform people's lives for the better. As the world readily adapts the new technology, efforts should be directed to understand the possible side effects and proper regulations should be made for such research. Some key fields where nanotechnology impacts our lives are in the production of faster, powerful and efficient computers, accurate medical equipments, water filters and vehicle parts made of lighter, stronger and chemical resistant nanomaterials.

Prof. (Dr.) Trupti Dharmarao

Q. We live in an era of alternative energy so suppose tomorrow there is no drop of crude left on earth, what do you think is the best alternative for crude oil?

If crude oil depletes and a situation comes when we do not have a drop of it , then the alternate sources of energy that we can rely on are solar energy, wind energy, hydro energy, hydrogen, biofuels and nuclear power. If we think globally, in my opinion no country can rely on only one source of energy. If we talk about solar energy, not every part of the world can get sufficient sunlight throughout the year. Same with wind and hydro energy. Nuclear power is also a good alternative but it relies on uranium and even uranium is also not a renewable source.

Prof. Praseeda Nambisan

Q. What is the role of a chemical engineer in the pharmaceutical industry according to you?

The multidisciplinary endeavor of developing a pharmaceutical product in a chemical industry has expanded into a process requiring years to complete. The role of a chemical engineer is vital in most of the important aspects of this industry. These include designing equipment for production, devising chemical methods of synthesis and purification of pharmaceutical products, Scaling up of production, development of novel and alternate methods of improving processes of existing products. The knowledge and skills of chemical engineers imparts to them the ability to understand the equipment designs and optimize production by mathematical models. a chemical engineer accomplishes the various stages of pharmaceutical product development from its inception to completion.

Prof. Vandana Kadam

Q. Where is analytical chemistry used in the Cosmetic industry?

Cosmetics have been used for millennia to cleanse, protect or enhance personal appearance. Ingredients from which the cosmetics are made to be assessed and approved to ensure safety, quality and efficacy. Analytical technique and modern instrumental method are used for this purpose. They characterize and quantify the component of cosmetic industry. Analytical chemistry is not only limited to analysis of product but also used in basis research on skin and hair to which the product is applied.

Prof. Anjali Kirkire

Q. How is the cosmetic industry becoming the face of chemical engineering?

Cosmetic chemicals that are generally found in cosmetic products include colorants, surfactants, rheology control agents, emulsifier, emollients, and preservatives. Some of the widely used Polymer ingredients like emollients include coconut oil beeswax, olive oil, lanolin, glycerin, petroleum jelly, zinc oxide, mineral oil, butyl stearate, and diglycol laurate. The coronavirus pandemic situation has increased sales of personal hygiene and cleansing products such as soaps and skin care products mascara is anything but commonplace —it's carbon black and iron oxide, with a polymer to form a film that coats the lashes, combined with preservatives and thickening waxes such as lanolin, mineral oil, paraffin, petrolatum, castor oil, carnauba or candelilla wax. Chemical engineers along with chemists are innovating the chemical formulations that make lipsticks last, mascaras waterproof, and lotions hydrating.

Prof. (Dr.) Anupama Sawant

Q. What are the certain roles of a chemist in a chemical industry?

Chemical Engineers process raw materials to make them useful. It covers different areas like agriculture (development and use of fertilizers and pesticides), pharmaceutical industry (development and manufacture of drugs), food industry (preservatives), cosmetics (development of UV protecting, anti-aging products) and so many. In developing and manufacturing new products the aim is to incorporate principles of green chemistry. Role of a chemist and chemical engineer is very important in order to achieve the goals of a sustainable world. The world is standing at the crossroads and with large-scale challenges and difficulties facing us all the role of chemists in upcoming developments will continue to be a crucial one. A chemist and a chemical engineer can put hands together and can achieve goals of green chemistry & sustainable world.

CHEM E SNAP

Click & Describe!

Theme: Sustainability

An event where participants applied theoretical knowledge of sustainability with everyday life examples and presented it with the help of a photograph clicked by themselves.

In this event participants came up with really good changes that can be made in everyday life to reduce the wastage of resources and make things more sustainable. The participant that perfectly aligned their thoughts with the given theme became the winner.

Winners: 1st place: Ms. Jyoti Banduni

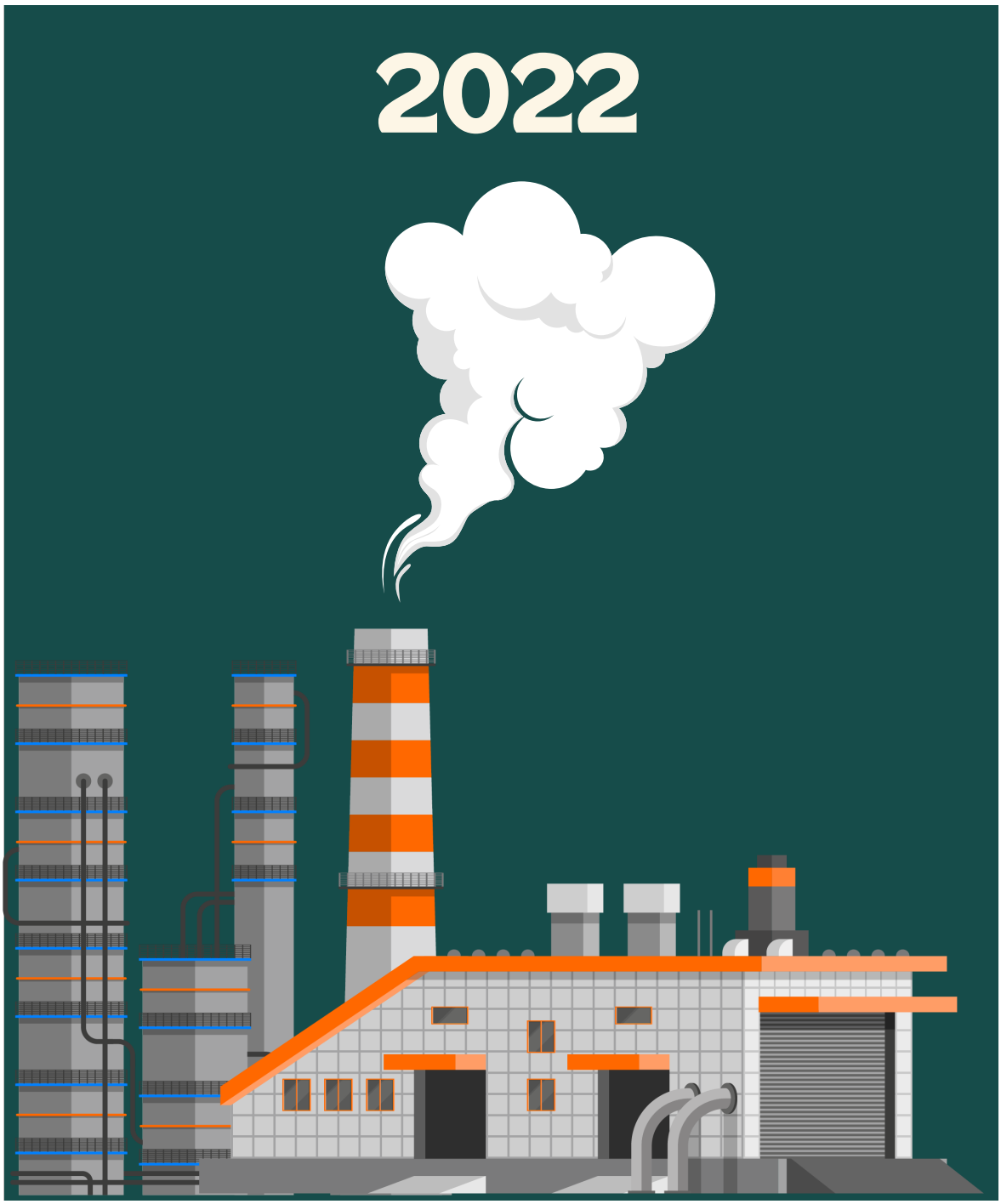
Idea:"Ornaments made from sea stones."

2nd place: Mr. Aditya Karande

Idea: "Everybody knows about the ever-growing problem of synthetic waste."

ChEMERGENCE

Radiating Resilience



September 30th – October 01st

THADOMAL SHAHANI
TSEC
ENGINEERING COLLEGE

CELEBRATION OF CHEMICAL ENGINEERING

The Triumphs of Engineering Rest on a Chemical Foundation!

Chemical engineering firms drive innovation in a wide range of industries, affecting nearly every aspect of daily life, from energy generation, food and beverage production, biotechnology, construction to finance, law and medical treatments.
Although, the vastness of chemical engineering is evident with all the avenues it taps into, few people understand the importance of chemistry in engineering. These two fields complement one another and allow for the creation of something new, innovative, and unique!

The Role of Chemical Engineers?

Chemical Engineering Touches Everything

For more than a century, chemical engineers have been improving our lives. Chemical engineers have helped create processes and products that touch every aspect of our lives, from the development of smaller, faster computer chips to innovations in recycling, disease treatment, water cleaning, and energy generation.

This year, IIChE-TSEC is delving into some of the rapidly growing and ever-important avenues.

Oil and Gas

Renewable Energy

Pharmaceutics

Nanotechnology

Cosmetics

Food Technology

DOMAINS

01

RENEWABLE ENERGY

Zero carbon footprint and low emissions? Chemical Engineering has Answers!

Many of our major energy sources are not renewable and will run out eventually. Chemical engineers are well-suited to meet the challenges of energy production, and they are actively working on novel ways to generate the energy we require.

PHARMACEUTICS

Careful Curation of Medicine

02

The pharmaceutical industry demands a high level of precision in the mass production of medicine. Chemical engineers are the brain of these machines that have to be properly calibrated and tested for efficiency and accuracy.

03

OIL AND GAS

A Necessity for Decades to Come!

Over the last century, countless chemical engineers have made significant contributions to the advancement and modernization of petroleum refining, focusing on how to compete as the world transitions to a low-carbon future.

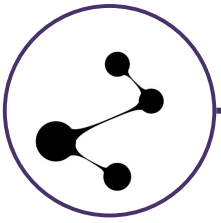
COSMETICS

The Art of Engineering Beauty!

04

A product as common as mascara, is not so ordinary for a chemical engineer – it's an amalgamation of carbon black and iron oxide mixed with a polymer to form a film that coats the lashes.

05



NANOTECHNOLOGY

This is where the Future is!

Microstructure and composition control at the micro and nanoscales are critical for future breakthroughs. Their preparation, however, remains difficult - a problem that chemical engineering can help to solve.

FOOD TECHNOLOGY

The Engineering behind a Morsel of Food!

06

We no longer have to be satisfied with locally grown foods that are purchased and cooked in a short period of time. Chemical engineers have made significant advances in the growing, packaging, convenience, taste, and appeal of our food products.

About Chemergence

An annual symposium of chemical engineering intents to bridge the gap between the profusion industries and rejuvenate the chemical engineers to seek the rapid growth of knowledge within the students.

This chemicalize version of MUN strives towards the best toehold and exquisite ideas with undefined excellence and a juncture providing extraordinary and comprehensive grasp along with diversified collaboration among the chemical society; upbringing the potential that lies within the students from various institutes.

A completely euphoric and loaded divergent episodes of events where a plethora of engineering colleges shall battle for the ultimate glory to emerge as the best in varied events within this technical event, enhancing not only their research skills but also boosting their confidence.

In addition, a revolution of refined and exceeded ideas which might, in fact ignite the need for innovations.

1

CHEMIC-CON

Where Education meets Knowledge!

A dais of productive and engrossing discussion among the group of industrial experts where the feedbacks with conceptualized solutions are discussed regarding the sustainable tomorrow. "Energy Efficiency & Sustainable Development in building a circular economy in the chemical industry", is the topic where all the panelists went deep into. The prime idea of this event is to bring an immense transformation in chemical industry with a motto of being environmentally and economically responsible and to be more sustainable.

The following were our set of panelists:

- Mr.Atul Choudhari

He is currently working as the CTO at TCE with impeccable knowledge of distillation and simulation which is truly noteworthy.

- Dr. Nimisha Pathare

She is a passionate and curious researcher working on ESG. She is currently working as Intellectual Capital Manager for the Food and Specialty Packaging at DOW Chemical's India.

- Mr. Jagdish Nageshri

With 35+ years of experience in strategy, planning, execution and change management with respect to Operations, Maintenance and Safety of HWPs, he is currently working as Senior General Manager at the Department of Atomic Energy – BARC.

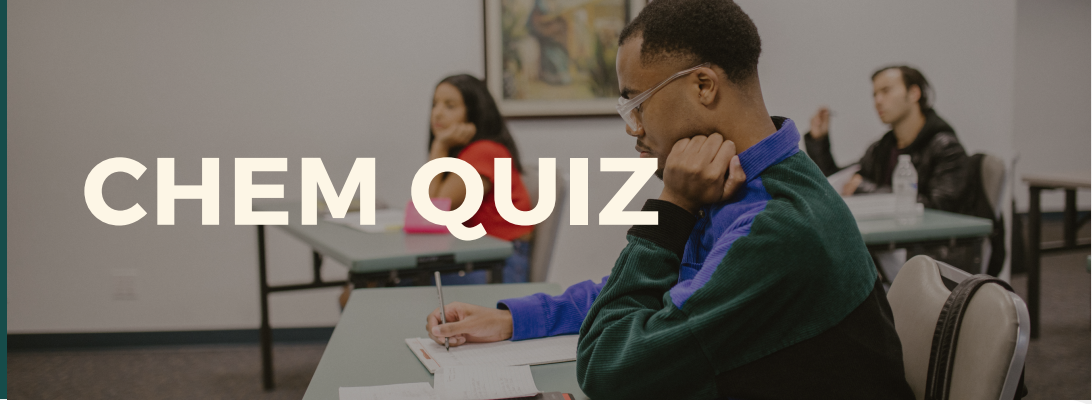
- Mr. Vishwanath Dalvi

With an interest in process development and scale up, he has been teaching at the Institution of Chemical Technology as R.A Mashelkar Assistant Professor.

- Mr. Sushil Kumar

With an experience of 21+ years in Reliance, along with helming the position of President of Reliance Industries, he is now working as a consultant.

2



CHEM QUIZ

Where a smart answer won't get you fired!

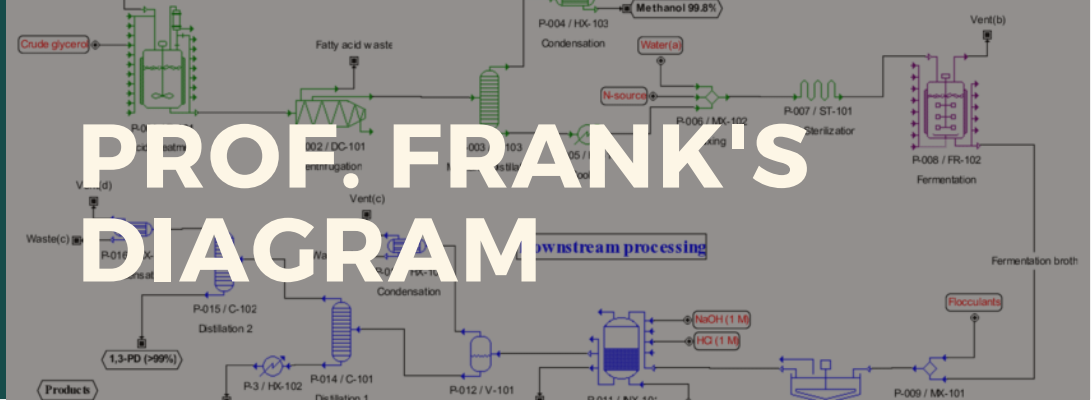
An interesting array of questions ranging from basic chemistry to intricate details of mass transfer blended with practical and industrial aspects, this event tests the knowledge of teams unto their last grey cell.

A competitive team event, indulging them in a battle of Q&A showcasing their knowledge in the field.

In all there were 4 Stages in this event. First stage was an elimination round where teams solved a question paper (MCQ). In 2nd round teams gave answers to the questions orally followed by 3rd round which was a buzzer round(this round included negative marking).Then the qualified teams entered the final stage which was a rapid fire round.

Winners:
1st place: Mohammed Saud Shaikh, Gayatri Nalawade, Amandeep Kaur Chawla (TSEC)
2nd place: Anmol Gupta, Rishabh Bhingarde (TSEC)

3



PROF. FRANK'S DIAGRAM

Tighten your belts, as you meander through the process!

In honour of industrial engineers Frank and Lillian Gilbreth, the creators of process flow diagrams (PFDs), a new competitive event was held where the participant teams had to come up with some modifications in the PFD of a specific process by replacing certain equipment for which a bidding took place where the teams bid on the required equipment. The team which made displayed their skill and the most efficient and cost friendly/economically profitable process flow diagram got the crown of PFD.

Winners:
1st place: Mohammed Saud Shaikh, Gayatri Nalawade, Amandeep Kaur Chawla, Harmit Kadu (TSEC)
2nd place: Divyansu Bhalotia, Mohammed Adil Babar (TSEC)
3rd place: Harinaryan Jha, Naeef Dalvi, Himanshu Patil, Yash Gaikwad (MGM)

4

THE BAIT

A battle of wits and words!

A classic knockout debate, exploring the domain of Chemical Engineering and current chemical and environmental affairs, The Bait provided a platform for speakers to speak, establish, and defend their opinions. This structured contest of ideas, where expressing your views and fighting for their point of view was a process that drove one through an enlightening path of wisdom. The topics chosen were related to the current problems and challenges in the world of science and technology.

Event Format: Qualification round → Quarterfinals → Semifinals → Finals

There were 3 Qualifying rounds and then a final.
Winners:
1st place: Anvita Bhate, Amandeep Kaur Chawla (TSEC), Om Mihani (IIT-B)
Best Argument: Tejas Khadke (TSEC)
Best Speaker: Ananjai Tamboli (TSEC)

5 CHEMX

The Chemical Engineering TEDx!

A platform where our industry expert will share her wisdom and knowledge of her expertise. This year, IIChE-TSEC brings to you a crucial topic of Intellectual Property Rights! Intellectual property rights (IPR) are the legal rights granted to the inventor or creator to protect his or her invention or creation for a set period of time.

About the Expert

Ms. Laxmi Rao

Ms. Laxmi Rao, is an IP Attorney with over 14 years of experience in IP, particularly Patents. She is currently working with InnovarIP Consulting group (A part of SML Group of Companies), She has a unique experience of working in Research Institutes, top tier IP/ Law firms and Corporate sectors. She has advised clients on product launch strategy, patent strategy, patent search and analytics patent prosecution, clearance, patent oppositions, patent due-diligence, etc.

She has worked with MaxVal IP Services Pvt. Ltd, D.P. Ahuja & Co., Megafine Pharma, JindalPoly Films Ltd, Legasis Services and CSIR - URDIP. She is registered to practice at the Indian Patent Office.

Our expert believes, " IPR is the key for converting Research to Revenue"

She has conducted in-depth analyses of patents with a solid technical knowledge and understanding of the fundamentals of IPR, while advising/suggesting the scientists to generate data for strengthening and enhancing the patentability and allowance/grant of the Patent.

6 CHEMICAL FEUD

Let's play the Feud!

A new marvellous event was added to the list of CHEMERGENCE'22 which was an exhilarating recreation of the famous game show, 'Family Feud' where the participants are presented with questions correlating principles and processes in the field of chemistry and chemical engineering with daily life. The teams, consisting of 4 participants, went through an elimination round which had Q&A.

The event was an attraction for many and it is proud to say that it had the maximum number of participations in the symposium and was appreciated by everyone.

Winners:
1st place: Mohit Tupkar, Amogh Deshpande, Vinit Khopkar, Pratik Kalambe (TSEC)
2nd place: Aryan Mehta, Aryan Tiberwala, Huzaifah Bhati, Nitish Singh (ICT)
3rd place: Craig Desouza, Arya Shah, Aditi Tendulkar, Pravin Kumar Sahu (ICT)

7

POSTER AND PAPER PRESENTATION

Creativity is intelligence having fun!

An exciting event where participants showcased their intellect with a creative twist, by presenting their innovative and invigorating project ideas through a poster. The participants had to explain their ideas within a given time and after that a Q&A round was taken by the judges.

Winners:
1st place: Riddhi Patil, Komal Kaur Sambhi, Kajal Yadav (TSEC)

Imagination is Inspiration for Innovation!

An event which provides a platform to convey the participants' knowledge and understanding in the field of chemical engineering and a chance to present your ideas and research to the expert panelists.

Winners:
1st place: Drashti Sodha, Ved Karawale (ICT)
2nd place: Riddhi Patil, Komal Kaur Sambhi, Kajal Yadav (TSEC)

INTERVIEW

JAYESH R. TEKCHANDANEY

CEO at UNIMIX EQUIPMENTS PVT LTD
Technical Director at UNIQUE MIXERS AND FURNACES PVT LTD

As a Life coach, how would you encourage a student to maintain a steady success rate while also prioritizing self-care?

I prefer to be a student of life, and not a life coach. For steady success, there is no substitute to hard work. Enjoy your journey as a student. In the long run, the journey matters more than the result. Never lose hope – life presents many opportunities.

What are the certain lessons you wished you would have known much sooner in life?

i. Readers are leaders, and leaders are readers. I wish I had started reading during my student days.
ii. Set goals in all areas of life. Goals give a sense of meaning and purpose to life.
iii. You will fail, accept it. But never, never, never, never give up.

There would have been times where you might have felt like giving up, how did you convince yourself it was important to keep going?

As long as I can remember, I have never given up. Giving up is not an option.. The results may be beyond our control, but the effort we choose to put in is what defines our character and attitude. Never, Never, Never...Never Give Up.

With the industry changing dynamically everyday, what opportunities and challenges will the future generation possibly encounter?

The world will continue to change at such rapid pace, that opportunities would come and go in the blink of an eye. It is not just a challenge for the future generation, but the present generation as well. Each one of us must keep learning and adapting to technology and tools that would be available to the world at the click of a button. There will be many distractions. Maintaining a clear and unwavering focus will hold the key to success and will differentiate between the best from the rest.

How do you approach troubleshooting and problem solving when issues arise in a mixing system, and what tools or resources do you rely on to address those issues?

Troubleshooting starts only after you have fully understood the problem. Observe the mixing system, gather information on the process and the process parameters. Identify the nature of problem – whether it is related to choose of equipment, process performance or mechanical performance of the equipment. Ask questions to those who are operating the system and identify the root causes of the problem. With a clear and well-defined problem statement, getting to the solution requires correct application of the fundamental principles of chemical engineering. Only then can you make effective and efficient use engineering tools and software for speeding up calculations.

How do you see the field of mixing technology evolving in the next 5-10 years, and what new technologies or approaches do you see emerging?

Liquid mixing technologies are the most mature. Advances in liquid mixing will be related to development of power efficient impellers. Programs on Computational Fluid Dynamics will become more and more user friendly and will be available at lower costs.
The ever-increasing demand for new products, and the increasing production volumes, and process requirements, will result in new mixing equipment designs. Solid blending systems will have to be integrated with charging and discharging systems that help improve productivity.
Mixing of high viscosity materials has always been a challenge. The design and development of mixers for high viscosity materials with complex rheology presents an opportunity for academic research. Developments in this area will be steady and incremental.
Automation of mixing processes and equipment will ensure consistent product homogeneity and higher productivity. Advances in continuous mixing technology and equipment will result in larger production volumes with a smaller equipment footprint.
Developments in design and construction of mechanical components used in mixing equipment will result in compact designs which are power efficient.

How should one make sure that failure and negativity don't become barricades in their journey to success?

As human beings, we tend perceive failure as an identity. That's because, "I failed to..." is perceived as "I am a failure". As a result, most of us fear failure. Failure is not an identity it is only a judgment about an event.
Failure comes to all. What's important is how we choose to deal with it. Blaming others for our failure, or finding excuses indicates a negative mindset. However, by accepting failure, we give ourselves an opportunity to learn from our mistakes. It's important to be able to forget the pain of failure while retaining the lessons from it.

In your book, Process Plant Equipment Operation, Reliability and Control, you have published a chapter on Mixers. How difficult it was to write for such a esteemed publication and how did you manage to get this opportunity?

I used to regularly write articles on mixing for an online publication. It was because of these articles, that I was approached to author a chapter on the subject of mixing for the book 'Process Plant Equipment Operation, Reliability and Control'. Authoring a chapter for John Wiley & Sons publication, was a one in a lifetime kind of opportunity.
At first, it was important to identify the topics to be included in the chapter. The sequence and the flow had to established. The content in any technical publication has to be well researched, and supported with appropriate illustrations, in the form of drawings, photographs. Relevant data and tables need to be provided. Sources of information, and references have to be included. I am glad that in the end everything worked out well. Writing the chapter was an enjoyable learning experience.

A message for the youth today.

Be yourself, be honest, read books, write your goals, work hard, strive for excellence, lead a simple life, take care of the family, be a responsible citizen, and always follow your dreams.

I wish share one of my favourite quotes, by Paul Meyer.

"Whatever you vividly imagine, ardently desire, sincerely believe, and enthusiastically act upon, must, inevitably come to pass."

The 2023 Distinguished Alumni

As John F. Kennedy has said ‘ The future of our world depends on the education of our alumni ‘, tells the modern society the significance of being graduate of a institution. The TSEC alumni have always exceeded expectations and showed the best of the outcomes. Here are some of the thoughts of our most finest alumni whose dedication and motivation towards their respective field is still unmatched.

Apurva Chaubal

BE'20 Chemical Engineering
Associate Voyage Manager at Maersk Tankers

Tell us a bit about your experience at TSEC and also being the chairperson at IIChE-TSEC.
TSEC offers superior quality of education as well as training to their students. It is a place full of opportunities for students to be involved in endless co-curricular and extracurricular activities to explore their interests outside the classroom. The chemical engineering department has always encouraged extracurricular learning and leading the team of IIChE was a critical point in my personal and professional development.

What inspired you to pursue a career in the maritime industry?
The maritime industry has provided a platform for me to utilise my background in chemical engineering and further develop my skills in supply chain management. This industry is going through a massive digitalization journey and there is a need of talented engineers who will provide innovative solutions to age-old problems. The scope of innovation and the global nature of this industry inspired me to be a part of this industry.

Can you tell us what it is like working at Maersk Tankers?
Maersk Tankers has a rich legacy of close to 100 years and the Maersk Values have been passed down for many generations. One can feel a strong sense of pride when working for an organisation which has adapted to changes and evolved into a multinational company over the last two centuries. My role as an Associate Voyage Manager is highly dynamic and provides a scope of constantly learning something new.

In the past, there have been many accidents due to oil leaks during transportation (such as oil spills) so the question is how can we mitigate this?
Usually, oil tankers have double hull to avoid any direct leakage of oil into the sea. There is an International Convention for Prevention of Pollution from Ships (MARPOL) adopted by the IMO to minimize the pollution caused by ships. According to MARPOL Annex I, oil tankers must carry an approved Shipboard Oil Pollution Emergency Plan (SOPEP) to provide guidance to the crew on steps to be taken when an oil pollution incident is likely to occur. Additionally, there are SOPEP equipment present on a ship. Apart from this, prevention is always better than cure. Hence, the most important step to mitigate oil leaks is to train the crew and shore personnel on safe handling of all hazardous cargo.

Have you ever experienced an oil leak during transportation? If so, how did you handle the situation?
Fortunately, I have not experienced an oil leak during my time as an Associate Voyage Manager thanks to our crew on-board the vessels who ensure that the cargo is always carried safely.

We live in an era of alternative energy so what do you think is the future of oil?
Presently there are not enough options available in the market to replace petrochemicals in the next few decades. By working towards achieving aggressive targets of clean energy and recycling, we can expect a significant reduction in demand for oil and petroleum by 2050. The
shipping industry is witnessing a big shift towards renewable and more carbon neutral sources of energy. We already have LNG powered ships entering the market and Maersk Tankers has been involved in developing wind propulsion technology on product tanker vessels.

How do you ensure that all necessary permits and licenses are obtained before transporting hazardous material such as oil?
Each ship carrying dangerous cargo is built and equipped with materials which are in compliance with the IMO IBC Code. The charterers (party shipping the cargo) are responsible to verify that all the statutory and mandatory certificates such as a Certificate of Fitness (COF) and International Oil Pollution Prevention (IOPP) Certificate of the ship are valid. Prior carriage of oil, a Certificate of Quality and MSDS is provided to the vessel to ensure readiness for loading and transporting the cargo.

What steps can be taken to train and educate employees about the safe and responsible transportation of oil, including emergency response procedures?
A Material Safety Data Sheet (MSDS) is provided to the vessel's crew prior to the loading operation which lists the potential hazards and safe handling of the cargo. It contains the emergency procedures to be followed in case of exposure to the cargo. Safety briefings and emergency drills are carried out every week as per the ISM procedure of the company to brief the crew on the emergency response for the safe carriage of oil.

Shulmit Bapat

BE'08 Chemical Engineering
Head of International sales & Business development
at Tata NQ (a new-age venture of Tata Chemicals)

Can you describe your experience managing a global sales team, and how do you ensure effective communication and collaboration across different regions?

Managing a sales function has to do a lot with the mindset of the team. Every individual has a different approach to making a sale. While managing a global team, it is important to be aware of cultural sensitivities which can be obtained either through training or experience. Crisp and articulate communication with regular verbal and written interaction is extremely important to minimize loss of information.

Can you describe your experience with sales forecasting and budgeting, and how do you ensure that the company's sales targets are met or exceeded?

The annual business plan for a company is a critical requirement to set the tone and targets for the year. Broader objectives and goals planned by the board and senior management for three to five years lay the foundation to determine sales outcomes for the year. Forecasting and budgeting inform revenue predictions and help plan for growth. To meet sales targets one has to be close to customers to gauge purchase budgets, tentative demand metrics over the following six months to a year, and price trends of services and products on offer. Rigorous planning and understanding customer needs will help achieve the goals of the organisation and exceed them on a good day.

How do you ensure that the company's sales strategy aligns with broader business goals and objectives, and what steps do you take to ensure that the sales team is contributing to the company's overall success?

Close coordination in the sales team and alignment with the expectations of senior management. Sales as a function is well integrated with the business by default as it is a revenue-generating function and is a key pillar to achieving organisational goals.

What skills or experiences that you gained during your time in college have proven to be most valuable in your current role and how have you continued to develop them over time?

My passion for chemistry led me to select chemical engineering. From the 1st year, I had planned to stay in the chemical industry. While learning different subjects was giving us exposure to various aspects of chemical engineering, attending various seminars and competing in various college events in Mumbai gave us the exposure to interact with students from the same field in different colleges. Being a founding member of Chemergence gave us the experience in managing people, events, sponsors, and administrative nuances that come with it.

After graduation, I worked for SNC-Lavalin - an engineering company in Mumbai - for six years following which I moved to the USA to pursue my MBA from the University of Tampa. The MBA along with my chemical engineering degree helped me secure a sales position with a large fertilizer and chemical company based out of Latvia in Eastern Europe. My intent to stay in the chemical industry continues today as I work with Tata Chemicals in its Nutritional science business leading their global sales.

Sunil Vaswani

BE'07 Chemical Engineering
Commercial Operations Lead at Shell Trading Rotterdam B.V.

Can you tell us about your experience being the chairperson of IIChE TSEC?

My time leading the IIChE – TSEC 2006-07 was the most enriching experience of my student life, the exhilaration of it lasted for some years even post college and provided me with countless memorable moments, worthy of a book. By the third year I progressed to become its treasurer and it helped my cv to stand out. With the support of 5-6 likeminded juniors, we challenged the status quo to ring the changes. We started organizing small local industrial visits to generate funds and increase membership base and scaled it to a full-fledged 2-day visit to Daman – Silvassa.

By the time I took over the de-facto leadership of IIChE- TSEC in my final year, we had already started working on plans to organize the department's first ever state level technical symposium and magazine – which we named Chemergence and Catalyst. I gained first-hand experience of some of fundamental corporate skills such as: Leadership skills, Team building skills, Communication skills, Decision-making skills, etc. Today, when I lead my team at Shell Trading, I still bank on learnings from my time as the chairperson of IIChE TSEC. It fills all our hearts with joy and pride to see that the subsequent batches have carry forwarded and improved what we started in 2006.

Can you share about your journey from TSEC to Rotterdam and about working there?

I always had ambitions to pursue an international business masters after a few years of post TSEC work experience and my sector of choice was oil and gas

Through campus, I was recruited by Aker Solutions, a company with Norwegian roots, as a project and planning engineer and worked with them from 2007 to 2010.

Since in 2010, USA was still reeling from the recession of 2008, I decided to study in Norway ,which has a thriving oil and gas industry due to the North Sea reserves.

In Norway, I won the double degree Erasmus scholarship in my second year and moved to the partner university in Netherlands to pursue a second masters in 2011 Netherlands, is known for its gas reserves and is home to major downstream assets , including Europe's largest refinery – Shell Rotterdam, so it all fitted with my preferences.

After graduating in Netherlands, I worked in energy consulting with Accenture and then Shell between 2012-2015.

I switched to Oil products Trading Operations within Shell in 2016. I have experience with middle distillates and JET as products and currently lead the Low carbon – Feedstocks team as Shell looks to invest more and grow within the Low carbon fuel business.

What are challenges and opportunities for sustainability in middle distillates industry and how do you see it evolving?

Transport makes up nearly 30% of the world's energy use and around a quarter of global CO2 emissions. So, it's no surprise that more and more people are switching to cleaner modes of transport to get around. Middle distillate products like diesel, gasoline, marine fuel, JET are in direct line of fire for relevance. The challenges it faces are also it's opportunities.

Hydrogen is poised to be a game-changer in the future energy landscape, playing a central role in helping the world reach a net-zero emissions energy system. Because hydrogen has a high energy density, it is especially suitable for hard to electrify sectors like heavy duty transport, heavy industry, shipping and aviation. Biofuels like renewable diesel and sustainable aviation fuel from industrial and agricultural residual products are also on the mix. Shell is investing in a facility that could produce enough renewable diesel to avoid 2.8 million tonnes of carbon dioxide emissions a year, the equivalent of taking more than 1 million European cars off the roads. Natural gas, the cleanest-burning hydrocarbon, could also play an important role in cleaner mobility. Liquefied natural gas (LNG) in particular is emerging as fuel for ships and trucks. It is cleaner than diesel and heavy fuel oil because it produces less sulphur, particulates and nitrogen oxides, and can help reduce greenhouse gas emissions from production to use.

GTL process: turns natural gas into high-quality liquid products for use in fuels and lubricants. It burns with lower sulphur dioxide and fewer nitrogen oxides and particulate emissions than conventional oil-based diesel. It can be used to power trucks, buses and taxis. Trials are on for the creation of gas-to-liquids GTL Jet Fuel, which reduces particulate emissions.

Do you have a message for students who want to pursue a career in energy industry?

To begin with, I would say , great choice !

Energy sector is the corner stone of civilisation in my opinion and will always remain relevant.

Yes, the industry is in transition and rightly so.

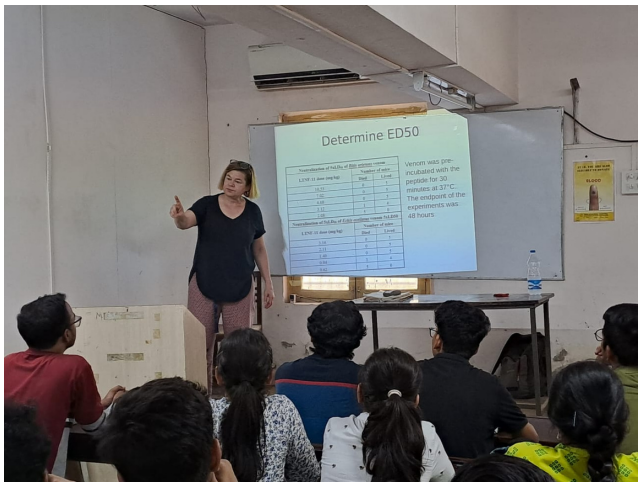
But, the energy and cost of living crises have highlighted the need for a balanced energy transition - one in which the world achieves net-zero emissions, while still providing a secure and affordable supply of energy.

A lot of investments are being made by corporations in projects with lower carbon footprint with aims to become a net-zero emissions. So I see a lot of opportunities in wind, solar, biofuels, hydrogen, electric vehicle charging, carbon capture and storage and nature-based solutions. These opportunities will cover range of functions like R&D, project management, commercial, retail and marketing etc.

So roll your sleeves and enter the industry but most importantly be open to changes!

GUEST LECTURES

● TSEC Alumni Webinar Series Session - 1 on the topic “What path to follow after graduation” by Mr. Akhil Subramanian.
● TSEC Alumni Webinar Series Session - 2 on the topic “An overview on absorption” by Ms. Divya Mandalia.
● TSEC Alumni Webinar Series Session - 3 on the topic “An overview on P&ID” by Mr. Sunil Harchandani.
● TSEC Alumni Webinar Series Session - 4 on the topic “Introduction to HAZOP” by Ms. Gloria Nalli
● Expert's Session on Role of Membrane-based Technology for Industrial water treatment was conducted by Mrs. Rajshri Kankate.



EXPLORING OPPORTUNITIES

The Chemical Engineering Department of Thadomal Shahani Engineering College is considered to be the finest in the city and reputed among the ones affiliated by the University of Mumbai. Since its inception in 1983, the department has been adaptable to furnish escalating needs with its quality and the same is reflected in the alumnus nexus that has flourished over the years.

PLACEMENTS

With another accomplishment for our graduating seniors, they not only get a bachelor's degree at the end of the academic year but they also get lucrative job opportunities. Our placement cell is highly equipped and aims primarily at providing them with employment opportunities. The placement cell of TSEC is managed by Prof. Nita Mehta and Ms. Monica Tolani. Many activities were been arranged for the graduating students ranging from industrial visits to internships, from alumni meets to industrial experts' guest lectures and many more. Over the years, it's a trend that has been noticed that students not only choose technical sectors but also, they were involved in non-technical sectors of the field like financing/banking, research, FMCG sector, education and etc. Reputed companies like Cognizant, Quantiphi, Deloitte USI, Accenture and Worley India are some of the places where our graduating students were placed. For the batch of 2021-22, a total of 81.4% chemical engineering students were employed in companies through TSEC. Many of our past recruiters held their faith in the abilities of our students and came to recruit in large numbers. This year, several new organizations visited the institute for the first time, and the institute looks forward to fostering long-term relationship with all these organizations in near future.

INTERNSHIPS

Department of Chemical Engineering of TSEC has always made sure that its students are well-versed with academics as well as with industrial knowledge. To open the gates of the industry, TSEC arranges internships programs for students to enrol which ranges from a month to nearly half a year. Not only it helps students learn the deeper aspects of the industry and the competitive market but they are also paid with sufficient stipend along with a Letter of Recommendation and a certificate at the end of internship. Internships like these are of major importance because this provides them with working experience as well as connects them with people of countless diversities in their fields which can ultimately help them track their career with proper mentored guidance. Students also contribute by being part of the technical papers

published by the faculty members every year which boosts their resume. Year after year the demand for interns is rising in our most trusted organizations and our students to use these golden opportunities to the fullest. Organizations like BARC, ONGC, Tata, internships platforms like Internshala and Linkedin are the front runners for our aspiring chemical engineers of TSEC. The department also helps students get in touch with the alumni who have established their business which ultimately become another chance for students to explore a new field of entrepreneurship while working as an intern.

HIGHER STUDIES

Chemical engineering is a diverse field which transcends boundaries by incorporating elements from many disciplines. After completing a bachelor's degree in chemical engineering there are various options for pursuing higher studies.

Students can pursue master's degree in chemical engineering or in related field which will prepare them for specialised roles in industry, Ph.D. in chemical industry which will prepare them for academic and research positions, MBA in chemical engineering which will help them manage business aspects of chemical engineering like managing production, medicine and health care related fields.

Students who wish to continue their studies in India can prepare for Graduate Aptitude Test in Engineering (GATE), BARC, Indian Forest Service (IFoS), Joint Admission Test for Masters (JAM), NPCIL, NRL and many more. Students who wish to continue their studies abroad can prepare for Graduate Record Examination (GRE), Graduate Management Admission Test (GMAT), TOEFL or IELTS and other examinations depending upon the university.

IIT's, NIT's, RVCE Bangalore, Alagappa College of Technology in India and Massachusetts Institute of Technology (MIT), Stanford University, National University of Singapore, University of California (UCB), University of Cambridge in abroad are the most chosen universities for higher studies in chemical engineering by the students of Thadomal Shahani Engineering College.

DEPARTMENTAL PUBLICATIONS

- Dr. Elizabeth Joseph, Rima Sawant, Dipesh Thakur, Dharatiben Antiya, Anas Siddiqui, Re-Refining of Used Lube Oils and Sustainability, International Journal for Research in Applied Science & Engineering Technology, Volume 9 Issue VI June 2021.
- Dr. Elizabeth Joseph and Rima Sawant, Recent Trends in the Use of Amine Solvents for Carbon Dioxide Scrubbing Process, IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT), Volume 15, Issue 7 Ser. III (July 2021).
- Dr. Elizabeth Joseph, Shweta Shinde, Alfia Shaikh, and Muntaha Shaikh, Plastics and Circular economy, IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT), Volume 15, Issue 9 Ser. I (September 2021)
- Dr. Elizabeth Joseph, Piyush Patil, Pranav Dharmadhikari, Prosido Mitra, Vighnesh Pai, Methods of Preparation of Grey, Blue, Green, and Yellow Hydrogen, IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT), Volume 15, Issue 9 Ser. II.
- Dr. Sadhana Purohit, Gaurav Khandelwal, Sanyukta Shinde, Bhargavi Lokapur, Biomedical Waste Management, International Journal for Research in Applied Science & Engineering Technology (IJRASET) Volume 9 Issue VII July 2021.
- Dr. S.J. Purohit, Aatish Dhiraj Agrawal, Owais Merchant, Janakartik Ganeshkumar, Carbon Capture, and Storage, International Journal for Research in Applied Science & Engineering Technology (IJRASET)Volume 9 Issue IX.
- Dr. S.J. Purohit, Piyush Patil, Use of Cobalt Nitroprusside Nanoparticles in the detection of Sulphites in Sugar, International Journal of Environmental & Agriculture Research (IJOEAR), Vol-7, Issue-4, April-2021.
- Dr. S.J. Purohit, Vanshika Poray, Sharvari Raut, Sudiksha Hegde, Production of Activated Carbon from Coconut Shells, International Advanced Research Journal in Science, Engineering and Technology, ISSN.
- Nita Mehta, Shivani Mirchandani, Sakshi Vichare, Bhargavi Lokapur, Nuclear Power as a Source of Sustainable Energy, International Journal of All Research Education and Scientific Methods (IJARESM), Volume 9, Issue 11, November-2021.
- Nita Mehta, Vedant Lal, Extraction Of Essential Oils From Cashew Nuts, International Journal of Research and Analytical Reviews (IJRAR) ©2021 IJRAR September 2021, Volume 8, Issue 3.
- Nita Mehta, Vedant Lal, Swapnil Bansi, Rugved Deshpande, Custard Apple Seed Oil as a Pesticide, International Journal of Environmental & Agriculture Research (IJOEAR), Vol-7, Issue-8, August-2021

- Dr.Ramesh Bhande, Vighnesh Pai, Pranav Dharmadhikari & Vanshika Poray, Treating SARS-CoV-2 Virusby RepurposingAnti-Cancer Drugs, IOSR Journal Of Pharmacy And Biological Sciences (IOSR-JPBS), Volume 16, Issue 5 Ser. I (Sep. -Oct. 2021).
- Dr. Ramesh Bhande, Sharvari Raut, Sudiksha Hegde & Salil Modak, Advancements In Space Food Processing Technologies, International Journal of Recent Scientific Research Vol 12, Issue, 06
- Prasad J. Parulekar, Pratik G. Bhagat, Tanushi Mehta, Raveena Nichani, Ashwin Nair, Chemical Plant Utility - Nitrogen System Design, International Journal for Research in Applied Science & Engineering Technology (IJRASET), Volume 9 Issue XI Nov 2021.
- Mr. Ravindra Joshi, Ashish Jaiswal, Arpita Ghosh, Radha Sawant, Dr. Anupama Sawant, Methods For Determining Fluorine Concentration: A Review, International Journal of Scientific Research in Engineering and Management (IJSREM) Volume: 05 Issue: 06, June-2021.
- Dr. Trupti Dharmarao and Khushank Parmar, Environmental Impact Of Emerging Electric Vehicle Technology, International Journal of Science, Environment and Technology, Vol. 10, No 5, 2021.
- Dr. Trupti Dharamrao, Shivani Mirchandani and Aryan Musale, Influence of DNA Origami Method in DNA Nanotechnology, International Journal of All Research Education and Scientific Methods (IJARESM), Volume 9, Issue 11, November-2021.
- A paper on “Revisiting Thermal Cracking Reactions” was was presented by Nita Mehta at CHEMCON

STUDENT ACHIEVEMENTS

- Heet C Vora, Rahul R. Singh, Siddhesh Chalke from BE secured the First position, and Komal Kaur Sambhi, Kajal Yadav, and Riddhi Patil from TE secured the Second Position at Tsec-Expo, conducted by E-Cell Tsec in April 2022.
- The Dance Team of the Chemical Department secured the first position in Groove'22, conducted by the Students' Council, Tsec in April 2022.
- Salil Modak from BE secured the first position in Hit the Note, a musical instrument competition conducted by the Students' Council in April 2022.
- The Girl's Football Team of the Chemical Department secured the second position in the Football Tournament conducted by the Students' Council, Tsec in April 2022.
- Judewin Lucio Noronha was awarded a Special Mention and Kashish Dungar (BE) was awarded Best Speaker, at a Model United Nations (MUN), organized by the Rotaract Club of ISME (RCISME) in April 2022.
- Komal Kaur Sambhi, Kajal Yadav, and Riddhi Patil secured the second position in Shodh, Technical Paper Presentation by Gharda Institute in March 2022.
- Amandeep Kaur Chawla, Mohammed Saud, and Harmit Kadu from TE secured the third position in Plant Disaster, AIChemE, conducted by DJ Sanghvi College of Engineering in March 2022.
- Amandeep Kaur Chawla (TE) and Anvita Bhate (SE) secured the first position in the Debate on Sustainability, conducted by DJ Sanghvi College of Engineering. Vaishnavi Nambiar (TE) bagged the best argument award in March 2022.
- Gayatri Nalawade(TE), Mohammad Saud (TE), and Ashish Jaiswal (BE) secured the first position, and Vaishnavi Nambiar, Komal Kaur Sambhi, and Kajal Yadav (TE) secured the third position at Arise, a quiz competition conducted by Bhartiya Vidyapeeth College of Engineering in March 2022.
- Gayatri Nalawade (TE), Mohammad Saud (TE), and Ashish Jaiswal (BE) secured the first position at the NR Kamath Quiz Competition, conducted by the Indian Institute of Chemical Technology (ICT) in March 2022.
- Gayatri Nalawade (TE) secured the 11th position at Azeotrope, conducted by IIT Bombay in January 2022.
- Amandeep Kaur Chawla (TE) secured the 32nd position amongst 15000+ students in National Engineering Olympiad (NEO), conducted at PAN India Level in January 2022.
- Judewin Lucio Noronha (BE) secured the first position in an Essay Writing Competition on "Substance Abuse, as a part of National Youth - 2022" in January 2022.

- Judewin Lucio Noronha (BE) secured the first position and Kashish Dungar (BE) secured the second position in Essay Writing Competition conducted by Vigilance Awareness Week by NSS in November 2021.
- Amandeep Kaur Chawla (TE) and Anvita Bhate (SE) secured the first position in the debate competition conducted by IIChE - TSEC in September 2021.
- Shruti Nayak, Urja Maladkar, and Vaishnavi Nambiar secured the first position at the paper presentation competition PRAKALP'21 organized by MITAoE in September 2021.
- Bhargavi Lokapur, Shivani Mirchandani, and Sakshi Vichare (BE) secured the third position in Technovision, conducted by D.Y. Patil Engg College in August 2021.
- Rushikesh Bhosale (BE) secured the first position in an online quiz competition conducted by DY Patil Institue of Engineering, Research and Management in August 2021.
- Judewin Lucio Noronha and Kashish Dungar (BE) secured the first position, in a National level presentation competition, Plant Plastic and Sustainability, organized by IIChE-UPES in June 2021.
- Judewin Lucio Noronha and Kashish Dungar (BE) secured the first position for a National level Poster presentation competition, Genesis, on ‘Recovery Methods of Metals from Printed Circuit Boards’, organized by IIChE-UPES
- Judewin Lucio Noronha and Kashish Dungar (BE) were awarded the first position in a national level Case Study Competition, organized by IIChE-UPES in June 2021.

THANKING THE TEAM

TEAM ChEMERGENCE'22

IIChE TSEC

Volunteers

TEAM CATALYST

Prachi Rode
Surin Gupte
Ira Sahasrabudhe
Sharvari Indalkar
Vridhi Varliani
Sahas Kasar
Karan Shah
Om Pawar
Sia Shetty
Aaditya Premraj
Arya patil

Asad Ansari
Jatin Gola
Kashish Agarwal
Rhea Dhanuka
Ronit Tejani
Viraj Dalvi
Shivam Jadhav
Mrunmayee Hegiste
Atharva Jindal
Ajinkya Joshi
Anurag Sharma

THE NON-TEACHING STAFF

LAB ASSISTANT

Mr. H. Jethani

Mr. Shobha Singh

Mrs. Deepti Pol

Mr. Rahul Singh

Ms. Vaishali Sangle

LAB ATTENDANT

Mr. R. Dubey

Mr. A. Shukla

Mr. C. Tiwari

Mr. C. Chaubey

APPLIED CHEMISTRY DEPARTMENT

Mr. Pritam Raut
LAB ASSISTANT

Mr. Uday Yadav
LAB ATTENDANT

In
Our memories forever

JEET THAKUR

From,
One of your many friends

To,
Jeet Thakur

I know In my heart and memories Dear Jeet, This is for you and me. You know, I've known you for too little of time. I wish I had known you some more. I wish there was a way to relive those moments. Life happened to us differently, I wish I had known yours some more. Too many times I have thought about you and too many times I've felt its insufficient. Cause you personally were a being I admired in entirety. You lived life the hardest, you lived like it was your calling. Too many times I thought you lived life too soon. I wish you had slowed down and lived some more. You were the Happiest when you laughed alongside us, the Liveliest when you wore that suit you bought with us. The Coolest when you argued about Equal rights and Change in India, And the Largest when you talked about your dreams looking down on passing trains. You were more than what you thought about yourself. More than what we thought about you. You are now more than anyone could have ever imagined. You are one gem of a friend. I wonder if you know that.

Yours lovingly,
You know who

Jeet was and always will be known for being distinctive, cheerful and a very friendly person and a senior. Although we met when our tenure of IIChE committee started which was short, he was always approachable and soft spoken. He was very grounded, and always had clarity of his thoughts. He was an important part of the committee and within this short time he made quite an impression. He will always be missed.

Jeet was one of the smartest minds I had ever met, and I was lucky enough to work along with him for two years in this committee. I remember being impressed by his achievements when I talked to him for the first time in TSEC. Jeet was really the kindest and the most calm person to work with. Saying goodbye isn't for us. Instead, I will say that I look forward to seeing him again, each time I am reminded of him through a phrase, a joke or by the work I do. Forever grateful that I got to meet such a beautiful soul in this lifetime.

I knew Jeet for a very short period, but he left a lasting impression on all of us. I know him as a hardworking & calm individual, one of the smartest people in the room and someone you could depend on. He also knew how to lighten up the atmosphere when needed. I remember him as being a good friend to all his peers, kind-hearted and someone who'd help others before helping himself. I always knew in my heart that he'd go places. Jeet and I have few memories together, but they are enough to always remind me of the good-hearted human that he was and of the time we spent together. He will be missed.

I remember first interacting with Jeet during the COVID-19 Lockdown in my SE. I became friends with him being a part of ChEMERGENCE'21 team, where we interacted a lot and eventually in the ChEMERGENCE'22 team as well. Being an important part of the Technical team for both years, I always saw him working very diligently and efficiently for the committee. As a person, Jeet had that calmness about him which I really admired. I still can't digest that he is not with us. We'll always remember Jeet as a good person and a friend and I'll forever cherish the memories that I have with him.

My first proper interaction with Jeet was during the initial oflfine meets for ChEMERGENCE. Jeet will always be remembered as the person who isn't shy to talk or to strike up a conversation. Even as a DSE student, he blended so well with the entire class and our committee. The vibrance with which he worked for the tenure of the committee will always be remembered by all of us and every interaction that we have had will stay with us for the time to come. I still recall the last conversation that we had during our semester exams, never did i realise that it would be the end of the road for us. Here is to hoping that he is at a much better place now.

~ from your dear friends

OUR ASSOCIATIONS