

NEWSLETTER (3rd Issue)

School of Chemical Engineering (SCHEME)



Vision

To impart knowledge and nurture innovation in Chemical Engineering for improved quality of life

Mission

- To prepare the graduates for a rewarding career by providing quality education in Chemical Engineering in tune with evolving requirements of the society.
- To impart knowledge and develop technology through quality research in frontier areas of chemical and inter-disciplinary fields.
- To produce practicing engineers with professional ethics to cater the contemporary needs of the society and environment



VIT[®]
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

Govt. of India recognizes VIT as Institute of Eminence (IoE)



Dean's message: Dear readers, Greetings from School of Chemical Engineering (SCHEME). This is the 3rd issue of the school newsletter.

SCHEME houses B. Tech and PhD programmes in Chemical Engineering. Presently it has 20 faculty members. There are 67 students in the final year, 124 students in the third year, 139 students in the second year and 110 students in the first year of B. Tech (Chemical Engineering). In addition, we have 15 PhD students in our school.

This issue provides information about publications and research work of our faculty members and students. It also provides details of conferences, workshop participation, industrial visits, online course, training undertaken by faculty and other outreach activities.

I hope you will find this newsletter interesting and engaging. While the newsletter provides a bird's eye view of the accomplishments of the school, you are welcome to contact the office of SCHEME to know further details about us.

Regards,
Dr. Shishir Kumar Behera

SCHEME at a Glance

School of Chemical Engineering

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FACULTY DEVELOPMENT PROGRAM



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Student Achievements

The AIChE Student Chapter has secured 1st position in the “**K-12 STEM Showcase Competition**” by the team “Code Red” comprising of Adamyia Patel (18BCM0022), Abhimanyu Milan (18BCM0006), Vaikunt Ramaswamy (18BCM0004) and Smriteek Dash (18BCM0100) during 9-11th November at SRC 2020 organized by NIT Rourkela.

Abhishek S Chaudhary (18BCM0077) has secured 2nd position in “**ChemFluence**” held on 7th November 2020 organized during PDPU SPE FEST 2020.

Saktipriya S (19BCM0130) has secured 3rd position in “**Chem-e-Housie**” organized by AIChE, VIT during Gravitas’20.

Team EDITH comprising of Jaydev C Javeri (19BCM0087), Niranjana S (19BCM0098) and Alavya Tiwari (19BCM0036) has secured 2nd position in “**Chem-E-Case**” organized by BITS Pilani on 25th October 2020.

Mr. Jaydev Chetan Javeri (19BCM0087) has been awarded with “**BEST PAPER AWARD**” in the **CHEMCON2020** held on December 27-29th, 2020 organized by Indian Institute of Chemical Engineers (IIChE). Co-authors of this paper are “Dr. S R Dhanushkhodi (Associate Professor, SCHEME), Mr. Nallanthigal Harsh Vaibhav (19BCM0032), Mr. Hridya Ashokan (19BCM0009)”

Ms. Shaily Gupta (19BCM0132) has been awarded with “**Freshman Recognition Award**” by The American Institute of Chemical Engineers for the year 2019-2020.

Eleena Banerjee (18BCM0057) has been awarded with “**Donald F. Othmer Sophomore Academic Excellence Award**” for the year 2019-20 by The American Institute of Chemical Engineers.

Student Achievements

Muskaan Kothari (18BCM0090) has secured 1st position in **“Rhapsody”** held on 7th November 2020 organized during PDPU SPE FEST 2020.

Smriteek Dash (18BCM0100) has been awarded with **“2020 International Student Chapter Leadership Development Award** by The American Institute of Chemical Engineers.

Rajdip Soni (18BCM0077) has secured 2nd position in **“Catechize”** held on 7th November 2020 organized during PDPU SPE FEST 2020.

Sparsh Modi (18BCM0001) has secured 3rd position in **“ChemFluence”** held on 7th November 2020 organized during PDPU SPE FEST 2020.

Sparsh Modi (18BCM0001) has secured the 3rd position in the **“Chem-E-Jeopardy”** during 9-11th November at SRC 2020 organized by NIT Rourkela.

Sparsh Modi (18BCM0001) has secured the 2nd position in the **“Speech Contest”** on 30th August organized by Toastmaster International VIT.

Muskaan Kothari (18BCM0090) has secured 1st position in **“Catechize”** held on 7th November 2020 organized during PDPU SPE FEST 2020.

Muskaan Kothari (18BCM0090) has secured 3rd position in **“ChemFluence”** held on 7th November 2020 organized during PDPU SPE FEST 2020.

Muskaan Kothari (18BCM0090) has secured 1st position in **“Sanyukt”** held on 15th July 2020 organized by Avaahan - Showcasing literary skills depicting ardour for patriotism and support towards Indian Army

Events Organized by Student Chapters



American Institute of Chemical Engineers, Vellore Institute of Technology, Student Chapter has organized **14** events.

Indian Institute of Chemical Engineers, Vellore Institute of Technology, Student Chapter has organized **82** events.



Society of Petroleum Engineers, Vellore Institute of Technology, Student Chapter has organized **26** events.

Events Organized by School

Dr. S. K. Behera, Dr. K. Sivagami and Dr. S. Karthika organised the FDP on "**Machine Learning Applications in Engineered Systems**" during 7-11th December 2020 in association with Academic Staff College, VIT Vellore.

1st International Virtual Conference on "**Advances in Colloidal and Polymeric Systems (ACAPS2020)**" was organized on 22nd August, 2020 by Colloids and Polymers Research Group, School of Chemical Engineering, VIT Vellore (Dr. Mohammed R Chandan, Dr. Aabid H Shaik, Dr. Dharmendra K Bal and Dr. Samarshi Chakraborty).

– Details next page

Events Organized by School

1st International Virtual Conference on “Advances in Colloidal and Polymeric Systems (ACAPS2020)” was organized on 22nd August, 2020.

Chief Guest:

Prof. John Philip, Indira Gandhi Centre for Atomic Research, India

Invited speakers:

Prof. Yury Gogotsi, Drexel University, USA

Prof. Shlomo Magdassi, The Hebrew University of Jerusalem, Israel

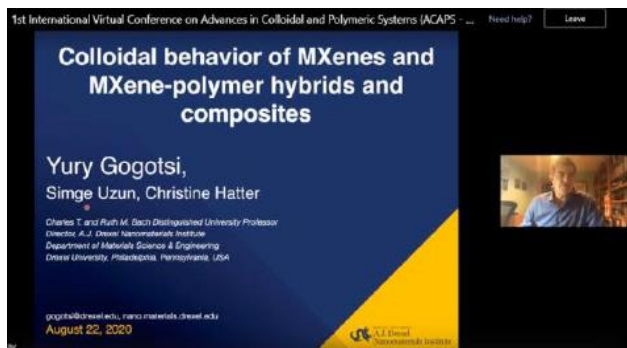
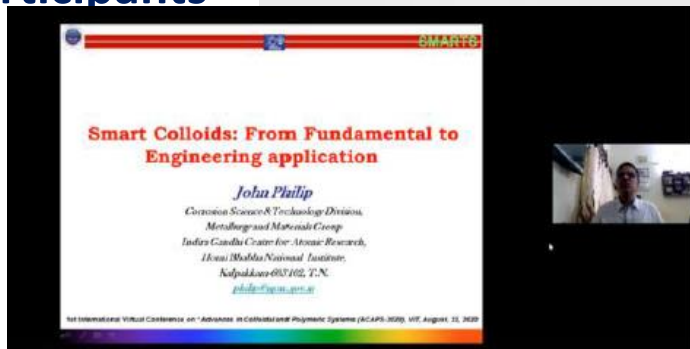
Prof. Basavraja M. G., Indian Institute of Technology Madras, India

Prof. Anju R. Gupta, University of Toledo, USA

Prof. Abdul Khaliq Rasheed, Xiamen University, Malaysia

Prof. Nariman Yousefi, Ryerson University, Canada

Prof. Zafar Said, University of Sharjah, UAE



Journal Publications

1. Parhi, S. S., Pramanik, A., Rangaiah, G. P., & Jana, A. K. (2020). Evolutionary Algorithm Based Multiobjective Optimization of Vapor Recompressed Batch Extractive Distillation: Assessing Economic Potential and Environmental Impact. *Industrial & Engineering Chemistry Research*, 59(11), 5032-5046.

2. Sompalle, R., Roopan, S. M., Priya, D. D., Suthindhiran, K., Sarkar, G., Ranjith, M., & Arunachalapandi, M. (2020). Microwave-Assisted Synthesis of Positional Isomeric Dihydro-triazolo-pyrimido-acridines and Biological studies. *ChemistrySelect*, 5(10), 3085-3090.

3. Drewnowski, J., Szeląg, B., Xie, L., Lu, X., Ganesapillai, M., Deb, C. K., & Łagód, G. (2020). The Influence of COD Fraction Forms and Molecules Size on Hydrolysis Process Developed by Comparative OUR Studies in Activated Sludge Modelling. *Molecules*, 25(4), 929.

4. Chandan, M. R., Shaik, A. H., Kumar, H., Rahaman, A., Bal, D. K., Ponnusami, B. A., & Imran, M. (2020). Influence of polymer washing on thermal conductivity enhancement of Cu nanofluids. *Asia-Pacific Journal of Chemical Engineering*, e2501.

5. Thawani, B., Mahanty, B., Behera, S. K. (2020) Characterization of refuse derived fuel samples prepared from municipal solid waste in Vellore, India, *Environmental Technology* (Accepted manuscript).

Journal Publications

6. Parhi, S. S., Rangaiah, G. P., & Jana, A. K. (2020). Mixed-Integer dynamic optimization of conventional and vapor recompressed batch distillation for economic and environmental objectives. ***Chemical Engineering Research and Design***, 154, 70-85.

7. Sheth, D., Maiti, S., Patel, S., Kandasamy, J., Chandan, M. R., & Rahaman, A. (2020). Enhancement of mechanical properties of carbon fiber reinforced epoxy matrix laminated composites with multiwalled carbon nanotubes. ***Fullerenes, Nanotubes and Carbon Nanostructures***, 1-7. (Accepted manuscript)

8. Rambabu, K., Bharath, G., Hai, A., Luo, S., Liao, K., Haija, M. A., & Naushad, M. (2020). Development of watermelon rind derived activated carbon/manganese ferrite nanocomposite for cleaner desalination by capacitive deionization. ***Journal of Cleaner Production***, 272, 122626.

9. Rambabu, K., Show, P. L., Bharath, G., Banat, F., Naushad, M., & Chang, J. S. (2020). Enhanced biohydrogen production from date seeds by *Clostridium thermocellum* ATCC 27405. ***International Journal of Hydrogen Energy***, 45(42), 22271-22280.

10. Swathy, R., Rambabu, K., Banat, F., Ho, S. H., Chu, D. T., & Show, P. L. (2020). Production and optimization of high grade cellulase from waste date seeds by *Cellulomonasuda* NCIM 2353 for biohydrogen production. ***International Journal of Hydrogen Energy***, 45(42), 22260-22270.

Journal Publications

11. Kiran, M. G. Das, R., Behera, S.K., Pakshirajan, K., Das, G. (2020) Modeling a rotating biological contactor treating heavy metal contaminated wastewater using artificial neural network, **Water Supply** (Accepted manuscript)

12. Li, Q., Feng, Z., Rangaiah, G. P., & Dong, L. (2020). Process Optimization of Heat-Integrated Extractive Dividing-Wall Columns for Energy-Saving Separation of CO₂ and Hydrocarbons. **Industrial & Engineering Chemistry Research**, 59(23), 11000-11011.

13. Shrikhande, S., Babu, G. U. B., Ahmad, Z., & Patle, D. S. (2020). Intensification and analysis of ethyl levulinate production process having a reactive distillation through vapor recompression and bottom flash techniques. **Chemical Engineering and Processing-Process Intensification**, 156, 108081.

14. Pachiyappan J., Gnanasundaram N. (2020). Using graphene oxide-silica [Go-Si] nano composite adsorbent, removal of heavy metal ions (Lead and mercury) from industrial wastewater and analysing its performance. **Rasayan Journal of Chemistry**, 13(3), 2027-2035.

15. Priya, D. D., Nandhakumar, M., Shanavas, S., Arasu, M. V., Al-Dhabi, N. A., & Madhumitha, G. (2020). Aerva lanata-mediated bio-treated production of copper oxide nanoparticles, optimization by BBD-RSM method and its behaviour against water related mosquito. **Applied Nanoscience**, 1-10. (Accepted manuscript)

Journal Publications

16. Wang, Z., Parhi, S. S., Rangaiah, G. P., & Jana, A. K. (2020). Analysis of Weighting and Selection Methods for Pareto-Optimal Solutions of Multiobjective Optimization in Chemical Engineering Applications. *Industrial & Engineering Chemistry Research*, 59(33), 14850-14867.

17. Chandan, M. R., Radhakrishnan, K., Bal, D. K., Rizwan, M., & Shaik, A. H. (2020). Flexible Polyurethane Foam-ZnO Nanocomposite for Photocatalytic Degradation of Textile Dye. *Fibers and Polymers*, 21(10), 2314-2320.

18. Sureshkumar, N., Bhat, S., Srinivasan, S., Gnanasundaram, N., Thanapalan, M., Krishnamoorthy, R., & Show, P. L. (2020). Continuous Phenol Removal Using a Liquid–Solid Circulating Fluidized Bed. *Energies*, 13(15), 3839.

19. Rambabu, K., Nirmala, G. S., Hasan, S. W., Yousef, A. F., Show, P. L., & Banat, F. (2020). Date-fruit syrup waste extract as a natural additive for soap production with enhanced antioxidant and antibacterial activity. *Environmental Technology & Innovation*, 20, 101153.

20. Devi Priya, D., Nandhakumar, M., & Mohana Roopan, S. (2020). Pyrazolo [1, 5-a] pyridine: Recent synthetic view on crucial heterocycles. *Synthetic Communications*, 50(23), 3535-3562.

21. Bhuvanagayathri, R., Daniel, D. K., & Nirmala, G. Kinetic Evaluation of the Inhibition of Acetylcholinesterase for use as a biosensor. *ASEAN Journal of Chemical Engineering*, 20(1), 99-108.

Journal Publications

22. Rambabu, K., Bharath, G., Arangadi, A. F., Velu, S., Banat, F., & Show, P. L. (2020). ZrO₂ incorporated polysulfone anion exchange membranes for fuel cell applications. *International Journal of Hydrogen Energy*, 45(54), 29668-29680.

23. Sinha Ray, S., Singh Bakshi, H., Dangayach, R., Singh, R., Deb, C. K., Ganesapillai, M., & Purkait, M. K. (2020). Recent developments in nanomaterials-modified membranes for improved membrane distillation performance. *Membranes*, 10(7), 140.

24. Yadav, A. L., Sairam, V., Srinivasan, K., & Muruganandam, L. (2020). Synthesis and characterization of geopolymer from metakaolin and sugarcane bagasse ash. *Construction and Building Materials*, 258, 119231.

25. Jeyapaul, A. S., & Ganesapillai, M. (2020). Dual packed bed adsorption of sulphur dioxide from surface modified haematite/III-ferric oxide: characterization of the mass transfer zone. *South African Journal of Chemical Engineering*, 33, 95-102.

26. Gupta, A., Bhasarkar, J., Chandan, M. R., Shaik, A. H., Kiran, B., & Bal, D. K. (2020). Diffusion Kinetics of Vitamin B12 from Alginate and Poly (vinyl acetate) Based Gel Scaffolds for Targeted Drug Delivery. *Journal of Macromolecular Science, Part B*, 59(11), 713-730.

Journal Publications

27. Rangaiah, G. P., Feng, Z., & Hoadley, A. F. (2020). Multi-Objective Optimization Applications in Chemical Process Engineering: Tutorial and Review. *Processes*, 8(5), 508.

28. Selvaraj, T., Yadav, A., Bahuguna, H., Drewnowski, J., & Ganesapillai, M. (2020). Ancient settlements-atavistic solutions for present water supply and drainage problems engendered by urbanism. *Environment, Development and Sustainability*, 1-13.

29. Sivagami, K., Divyapriya, G., Selvaraj, R., Madhiyazhagan, P., Sriram, N. and Nambi, I., (2021) Catalytic pyrolysis of polyolefin and multilayer packaging based waste plastics: A pilot scale study. *Process Safety and Environmental Protection*, 149, 497-506.

30. Sivagami, K., Tamizhdurai, P., Mujahed, S. and Nambi, I., (2021) Process optimization for the recovery of oil from tank bottom sludge using microwave pyrolysis. *Process Safety and Environmental Protection*, 148, 392-399.

31. Sivagami, K., Rajasekhar, B., Mujahid, S. and Nambi, I.M., 2020. A case study on microwave (MW) remediation of hydrocarbon contaminated soil from an Indian Metropolitan city. *ASCE Journal of Hazardous, Toxic, and Radioactive Waste*, 25, 04020074.

32. Abdullah, A. and Singh, A., 2020. Impact of Corona Virus Outbreak on crude oil prices in India, *Pensee International Journal*, 50, 661-664.

Conference and Workshop Attended

Dr. G. S. Nirmala has participated in “**1st International conference on Advances in colloidal and polymeric systems (ACAPS 2020)**”, 22nd August 2020, VIT, Vellore.

Dr. G. S. Nirmala has attended “**2020 Dow Sponsored Virtual CCPS Process Safety**” Faculty Workshop on Oct 6-7th, 2020.

Dr. Bandaru Kiran has participated in “**1st International conference on Advances in colloidal and polymeric systems (ACAPS 2020)**”, 22nd August 2020, VIT, Vellore.

Dr. Bandaru Kiran participated in “**Clean Water: Emerging Frontiers**” conducted during June 29 - July 08, 2020 at IIT Madras.

Faculty Outreach

Dr. S. K. Behera was invited as a panellist in the webinar on “**Implementation of Industrial Symbiosis in India**” on 20th October 2020 by KPMG India and Shakti Sustainable Energy Foundation, Kolkata, India.

Dr. A. Babu Ponnusami was invited as a keynote speaker in AICTE ATAL FDP on “**Recent Trends in Waste Management Technologies**” held during 12-16th October 2020 at the Department of Petrochemical Technology, Anna University, Tiruchirappalli.

Faculty Outreach

Dr. A. Babu Ponnusami was invited as a keynote speaker in Faculty Development Programme on "**Waste Audit, Management for Fuel and Value Added Products**" organized by the Centre for Waste Management, Sathyabama Institute of Science and Technology during 8-12th December 2020.

Dr. Bandaru Kiran was invited as a keynote speaker in "**Sustainable Design of Chemical Process Plants by Using ASPEN PLUS and ASPEN HYSYS simulating Tools**" in AICTE Sponsored STTP-I held on 8th August, 2020 at VIT, Vellore

Dr. Sivagami K was invited as a resource person in Online Faculty Development Program titled "**Nurturing Research & Innovation in Higher Education Institutions - Catalyzing Innovation and Research**" conducted by Department of Financial Planning, Dr. M.G.R University, Chennai on 04th July 2020

Guest Lectures/Webinar Organized

Dr. S. Karthika and Dr. Dharmendra K Bal has organized a Guest lecture on "**Artificial Intelligence and Optimization for decision making**", delivered by Dr. Kirubakaran Velswamy, University of Alberta, Canada on 5th November 2020.

Dr. Shishir Kumar Behera and Dr. Aruna Singh has organized an Industrial expert lecture on "**Food Safety and Standards Authority of India**", delivered by Ms. Manogary, Chennai Reliable Pest Solutions on 2nd November 2020.

Guest Lectures/Webinar Organized

Dr. Babu Ponnusami A has organized an Industrial expert lecture on “**Recent Trends in Filtration processes**”, delivered by Mr. Anand Narayanan, Global Business Development and Engineering Consultant Atlanta, USA on 20th October 2020.

Dr. S. Karthika and Dr. Mahesh Ganesapillai has organized an Industrial Expert Lecture on “**Steam Utility in Process Plants**”, delivered by Dr. Uthirapathi Vengateson, Senior Process Engineer, Jacobs Zate & Worley Engineering, Alkhobar, Saudi Arabia on 6th November, 2020.

Dr. L. Muruganandam has organized an Industrial expert lecture on “**Overview of Chemical Process Plant – Reactor Control System**”, delivered by Mr. Chaitanya Vadlamani, Process Engineer, SABIC Petrochemicals, Saudi Arabia on 16th October 2020.

Dr. K. Sivagami and Dr. G. S. Nirmala has organized a Guest lecture on “**Application of Mass Transfer in Modelling the Transport of Pollutants in the Environment**”, delivered by Dr. R. Ravi Krishna, IIT Madras on 7th October 2020.

Dr. S. Karthika and Dr. Mahesh Ganesapillai has organized an Industrial Expert Lecture on “**Steam Utility in Process Plants**”, delivered by Dr. Uthirapathi Vengateson, Senior Process Engineer, Jacobs Zate & Worley Engineering, Alkhobar, Saudi Arabia on 6th November, 2020.

Guest Lectures/Webinar Organized

Dr. Aabid H Shaik and Dr. Mohammed R Chandan has organized Industrial expert lecture on “**Role of Mechanical Operations in Alumina Refinery Plant**”, delivered by Mr. Purna Chandra Rao, Hindalco Industries Limited on 6th November 2020.

Dr. Chitra D and Dr. Dharmendra K Bal has organized Industrial expert lecture on “**Process Piping and Water Hammer Problems in Process Industry**”, Delivered by Dr. Ganesh P, ISRO Propulsion Division on 6th November 2020.

Funded Project Granted

Dr. Aabid Hussain Shaik (PI) and Dr. Mohammed Rehaan Chandan (Co-PI) has been granted a funded project titled “***Mechanistic investigation of the effect of washing of stabilizers in Cu nanofluids for heat transfer applications using small angle neutron scattering***” by UGC-DAE Consortium for Scientific Research for a period of 3 years (2020-2023). Project worth: 3 Lakhs.

Patent filed/granted

Dr. Shishir Kumar Behera has filed a patent titled “**Coconut grater attachment for household mixer grinders**” along with Niranjana Behera (SMEC) and R. Raja Singh (SELECT) on 21st July 2020. (Application No.: 331287001)

Short Term Training Program/FDP Attended

Prof. Mahesh Ganesapillai has attended AICTE sponsored Short-term Training Program on “**Augmentation of SMART Materials and Technologies for Commercial Energy Harvestation**” organized by Kongu Engineering College, Perundurai on 26th November 2020

Dr. Bandaru Kiran participated in Recent Advances in “**Artificial Intelligence for Smart and Sustainable Energy Systems**” during Dec 7 – 11th 2020 at MIT, Manipal.

Dr. Sivagami K has attended a workshop on “**Clean Water and Emerging Frontiers**” conducted by IIT Madras from 1st July 2020 to 8th July 2020.

Dr. Sivagami K has attended one day webinar on “**Demonstrating Waste to Value Technologies**” organised by DBT on 01-10-2020

Online Course Attended

Dr. Aslam Abdullah has attended online course on “**Running Pipe in oil and gas wells**” through EdX Platform b/w 1st Sep to 30th Nov, 2020.

Dr. A. Babu Ponnusami attended “**How to make a MOOC?**” through Coursera platform between 8th June to 6th July, 2020.

School of Chemical Engineering (SCHEME)



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