

NEWSLETTER

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 an
Institute of Eminence (IoE)



Dean's Message: Dear readers,

At the outset let me wish you all a Happy and Prosperous New Year 2020. This is the inaugural issue of the newsletter of the School of Chemical Engineering.

SCHEME houses B.Tech and PhD programmes in Chemical Engineering. Presently it has 15 faculty members and all are doctorates from reputed institutions in India and abroad. There are 63 students in the final year, 67 students in the third year, 124 students in the second year and 139 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 the publications and research work of our faculty members and students. It also details the awards and honours received from various organizations. It talks about the teaching-learning and research process and the various MoUs signed and international collaborations cemented in this regard.

I hope you 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

Student Achievements



SPE-VIT Presidential Award 2019-20



AICHE Chem-E-Car Team 2019-20



AICHE VIT Outstanding Chapter Award



Chem-E-Safe, RSC MIT Pune, 2019



Chem-E-Jeopardy Team, ASC Florida, 2019



Team IICHe, PDPU SPE Fest, 2019

SPE VIT won the Presidency Excellence Outstanding Student Chapter Award for the year 2019.

AICHE VIT won the Outstanding Student Chapter Award for the session 2018-19.

Swapnil Banerjee, AICHE VIT won the the Freshman Recognition Award by AICHE Global 2019.

Anjali Rathore, AICHE VIT won the Donald F. Othmer Sophomore Academic Excellence Award by AICHE Global 2019.

Lakshmi Mohan, AICHE VIT won the International Student Chapter Leadership Travel Grant Award by AICHE Global 2019.

Sparsh Modi, Satvik Verma, Parth Agarwal and Ruby Susan Raju participated in Chem-E-Jeopardy Event conducted by AICHE ASC, Florida held during September 2019 and won 2nd prize.

Sparsh Modi, Satvik Verma, Parth Agarwal and Ruby Susan Raju participated in Chem-E-Jeopardy Event conducted by AICHE Regional Student Conference, MIT Pune held during September 2019 and won 1st prize.

Rohan Damani, Mohammed Hafiz, Saharsha Das, Lakshmi Mohan, Vaikunt Ramaswamy, Shubh Parekh, Adamyia Patel and Aditya Zavar and participated in Chem-E-Car Poster conducted by AICHE Regional Student Conference, MIT Pune held during September 2019 and won 1st prize.

Ambuj Gupta, Ayushi Gaur participated in Chem- E - Safe Competition, AICHE Regional Student Conference, MIT, Pune held during September 2019 and won 1st prize.

Hussain Mustafa Lal, Muskan Kothari, Riya Chaudhari, Rajdip Soni, (IICHe VIT) participated in APOTHEOSIS event conducted by PDPU SPE FEST, Pandit Deendayal Petroleum University, Gujarat held during October 2019.

Journal Publications

Jaykumar Bhasarkar and Dharmendra Bal (2019), "Kinetic investigation of a controlled drug delivery system based on alginate scaffold with embedded voids", *Journal of Applied Biomaterials & Functional Materials*, 17(2), 34-41.

Gnanasundaram Nirmala, Thanapalan Murugesan, K. Rambabu, K. Sathiyarayanan & Pau Loke Show (2019), "Adsorptive removal of phenol using banyan root activated carbon", *Chemical Engineering Communications*, 2, 1-12.

Hirra Anjum, Khairiraihana Johari, Nirmala Gnanasundaram, Arunagiri Appusamy, Murugesan Thanabalan (2019), "Impact of surface modification on adsorptive removal of BTX onto activated carbon", *Journal of Molecular Liquids* 280, 238–251.

Zeeshan Rashid, Cecilia Devi Wilfred, Nirmala Gnanasundaram, Appusamy Arunagiri, Thanabalan Murugesan (2019), "A comprehensive review on the recent advances on the petroleum asphaltene aggregation", *Journal of Petroleum Science and Engineering* 176, 249-268.

P. Jayakaran, G. S. Nirmala, and L. Govindarajan (2019), "Qualitative and Quantitative Analysis of Graphene-Based Adsorbents in Wastewater Treatment", *International Journal of Chemical Engineering*, 2, 1-17.

Mujeeb Oladipupo Kareem, Anjali Achazhiyath Edathil, K. Rambabu, G. Bharath, Fawzi Banat, G. S. Nirmala & K. Sathiyarayanan (2019), "Extraction, characterization and optimization of high quality bio-oil derived from waste date seeds" *Chemical Engineering Communications*, 6(2), 1-11.

Chinmoy Deb, Bonny Thawani, Sujith Menon, Varun Gore, Vijayalakshmi Chellappan, Shivendu Ranjan and Mahesh Ganesapillai, "Design and analysis for the removal of active pharmaceutical residues from synthetic wastewater stream", *Environmental Science and Pollution Research*, 26, 1-13.

Arlene Abuda Joaquin, Gnanasundaram Nirmala (2019), "Statistical modeling and process optimization of coagulation–flocculation for treatment of municipal wastewater", *Desalination and Water Treatment*, 157, 90–99.

Hirra Anjum, Khairiraihanna Johari, Nirmala Gnanasundaram, Arunagiri Appusamy, Murugesan Thanabalan (2019), "Investigation of green functionalization of multiwall carbon nanotubes and its application in adsorption of benzene, toluene & pxylene from aqueous solution", *Journal of Cleaner Production*, 221, 64-72.

Shir Reen Chia, Malcolm S. Y. Tang, Yin Hui Chow, Chien Wei Ooi, Krishnamoorthy Rambabu, Liandong Zhu, Pau Loke Show (2019), "Recent Developments of Reverse Micellar Techniques for Lysozyme, Bovine Serum Albumin, and Bromelain Extraction", *Molecular Biotechnology*, 61, 715-724.

Rizwan Safdar, Nirmala Gnanasundaram, Regupathi Iyyasami, Arunagiri Appusamy, Sofia Papadimitriou, Murugesan Thanabalan (2019), "Preparation, characterization and stability evaluation of ionic liquid blended chitosan tripolyphosphate microparticles", *Journal of Drug Delivery Science and Technology* 50, 217–225.

Journal Publications

Muhammad Sohail, Aafaq ur Rehman, Eldon R. Rene, Shishir Kumar Behera, Hung-Suck Park (2019), "Valorization of CO₂ in flue gas through alkalinity production: Parametric optimization for application in anaerobic digesters", *Environmental Technology & Innovation*, 17, 54-60.

G. S. Nirmala, L. Muruganandam (2019), "Hydrodynamics in a Liquid Solid Circulating Fluidized Bed—A Review", *Journal of Chemical Reviews*, 1, 114-129.

M. Aslam Abdullah, Nagamalleswara Rao, Aruna Singh (2019), "Novel methods of deep desulfurization: A review", *Journal of Petroleum and Coal*, 61(4), 647-659.

M. Aslam Abdullah, Abhishek Panda, Shivam Gupta, Saurabh Joshi, Aruna Singh, Nagamalleswara Rao (2019), "Multi-scale method for modeling and simulation of two phase flow in reservoir using MRST", *Journal of Petroleum and Coal*, 61(3), 546-558.

Mohammed R. Chandan, Aabid Hussain Shaik (2019), "Influence of ligand's thermal stability on size and self-assembly of Cu Nanoparticles", *Colloid and Interface Science Communications*, 33, 148-155.

Jilu Varghese, Mohammed Rehaan Chandan & S. Shanthakumar (2019), "Fixed bed column study for pesticide removal using silver nanoparticles-embedded polyurethane foam and glass beads", *Chemical Engineering Communications*, 14, 1-10.

Hirra Anjum, Khairiraihanna Johari, Arunagiri Appusamy, Nirmala Gnanasundaram, Murugesan Thanabalan (2019), "Surface modification and characterization of carbonaceous adsorbents for the efficient removal of oil pollutants", *Journal of Hazardous Materials*, 4(1), 379.

Saikat Sinha Ray, Chinmoy Kanti Deb, Hau-Ming, Chang, Shiao-Shing Chen, Mahesh Ganesapillai (2019), "Crosslinked PVDF-HFP-based hydrophobic membranes incorporated with CNF for enhanced stability and permeability in membrane distillation", *Journal of Applied Polymer Science*, 14, 136-148.

Hirra Anjum, Khairiraihanna Johari, Nirmala Gnanasundaram, Magesh Ganesapillai, Appusamy Arunagiri, Iyyaswami Regupathi, Murugesan Thanabalan (2019), "A review on adsorptive removal of oil pollutants (BTEX) from wastewater using carbon nanotubes", *Journal of Molecular Liquids*, 16, 66-74.

Ayi Vinati, Eldon R Rene, Kannan Pakshirajan & Shishir Kumar Behera (2019), "Activated red mud as a permeable reactive barrier material for fluoride removal from groundwater: parameter optimisation and physico-chemical characterisation", *Environmental Technology*, 4, 1-12.

S. Shyamala, N. Arul Manikandan, Kannan Pakshirajan, Van Tai Tang, Eldon R. Rene, Hung-Suck Park and Shishir Kumar Behera (2019), "Phytoremediation of nitrate contaminated water using ornamental plants", *Journal of Water Supply: Research and Technology-Aqua*, 68(8), 731-743.

Al Jabri F, Muruganandam L. and Aljuboury D.A.D.A. (2019), "Treatment of the oilfield-produced water and oil refinery wastewater by using inverse fluidization - a review", *Global NEST Journal*, 21, 204-210.

Journal Publications

G Bharath, K Rambabu, Fawzi Banat, N Ponpandian, Edreese Alsharaeh, Abdel Halim Harrath, Abdulkarem Alrezaki and Saleh Alwasel (2019), "Shape-controlled rapid synthesis of magnetic nanoparticles and their morphological dependent magnetic and thermal studies for cancer therapy applications", *Materials Research Express*, 6, 92-99.

K. Rambabu, Fawzi Banat, G.S. Nirmala, S. Velu, P. Monash, G. Arthanareeswaran (2019), "Activated carbon from date seeds for chromium removal in aqueous solution", *Desalination and Water Treatment*, 156, 267-277.

Rambabu Krishnamoorthy, Bharath Govindan, Fawzi Banat, Velu Sagadevan, Monash Purushothaman, and Pau Loke Show (2019), "Date pits activated carbon for divalent lead ions removal", *Journal of Bioscience and Bioengineering*, 128, 88-97.

K. Rambabu, G. Bharath, P. Monash, S. Velu, Fawzi Banat, Mu. Naushad, G. Arthanareeswaran, Pau Loke Show (2019), "Effective treatment of dye polluted wastewater using nanoporous CaCl_2 modified polyethersulfone membrane", *Process Safety and Environmental Protection*, 124, 266-278.

K. Rambabu, Pau-Loke Show, G. Bharath, Fawzi Banat, Mu Naushad, Jo-Shu Chang, "Enhanced biohydrogen production from date seeds by *Clostridium thermocellum* ATCC 27405", *International Journal of Hydrogen Energy*. 10.1016/j.ijhydene.2019.06.133.

C. Evangeline, V. Pragasam, K. Rambabu, S. Velu, P. Monash, G. Arthanareeswaran, Fawzi Banat (2019), "Iron oxide modified polyethersulfone/cellulose acetate blend membrane for enhanced defluoridation application", *Desalination and Water Treatment*, 156, 177-188.

Kit Wayne Chew, Shir Reen Chia, Rambabu Krishnamoorthy, Yang Tao, Dinh-Toi Chu, Pau Loke Show (2019), "Liquid biphasic flotation for the purification of C-phycocyanin from *Spirulina platensis* microalga", *Bioresource Technology*, 288, 121-131.

Apurav Krishna Koyande, Kit Wayne Chew, Krishnamoorthy Rambabu, Yang Tao, Dinh-Toi Chu, Pau-Loke Show (2019), "Microalgae: A potential alternative to health supplementation for humans", *Food Science and Human Wellness*, 8, 16-24.

K. Rambabu, Abdul Hai, G. Bharath, Fawzi Banat, Pau Loke Show (2019), "Molybdenum disulfide decorated palm oil waste activated carbon as an efficient catalyst for hydrogen generation by sodium borohydride hydrolysis", *International Journal of Hydrogen Energy*. 44, 341-348.

R. Swathy, K. Rambabu, Fawzi Banat, Shih-Hsin Ho, Dinh-Toi Chu, Pau Loke Show (2019), "Production and optimization of high grade cellulose from waste date seeds by *Cellulomonas uda* NCIM 2353 for biohydrogen production", *International Journal of Hydrogen Energy*, 19, 221-229.

Yoong Kit Leong, Pau-Loke Show, John Chi-Wei Lan, Rambabu Krishnamoorthy, Dinh-Toi Chu, Dillirani Nagarajan, Hong-Wei Yen, Jo-Shu Chang (2019), "Application of thermo-separating aqueous two-phase system in extractive bioconversion of polyhydroxyalkanoates by *Cupriavidus necator* H16", *Bioresource Technology*, 287. 121-134.

K. Rambabu, G. Bharath, Fawzi Banat, Pau Loke Show, Heriberto Hernández Cocoltzi (2019), "Mango leaf extract incorporated chitosan antioxidant film for active food packaging", *International Journal of Biological Macromolecules*, 126, 1234-1243.

Conference Participation & Workshop Details

Dr. Mahesh Ganesapillai invited as keynote speaker in 2019 Indo-Japan YNU Symposium, Yokohama National University, JAPAN, held between 16th December to 21st December 2019. Funded by Japan Society for the Promotion of Science (JSPS), JAPAN and Department of Science and Technology (DST), INDIA.

Dr. Mahesh Ganesapillai invited as participant in the 9th International Young Water Professionals Conference, CANADA, held between 23rd June to 27th June 2019, funded by Department of Science and Technology (DST), INDIA.

Dr. Aslam Abdullah invited as Young Water Professional by International Water Association (IWA) in IWA Water Congress & Exhibition held between 1st Dec to 5th Dec, 2019 at Colombo, Srilanka.

Dr. Aabid Hussain Shaik, presented a paper titled "Photocatalytic degradation of methylene blue dye using TiO₂ nanoparticle loaded flexible polyurethane foam" in CTSE-2019 conference held between 26-27th September 2019 at SSN College of Engineering Chennai.

Dr. G S Nirmala & Dr. K. Rambabu presented a paper titled "Phenol removal studies using a liquid solid circulating Fluidized Bed" at ICMHEEE Conference, NIT Tiruchirappalli during September 2019.

Dr. G.S. Nirmala invited as keynote speaker in ICMHCEE held between 9th September to 11th September at NIT Tiruchirappalli.

Dr. S. Velu Presented a paper titled Biodiesel production from karanja oil using Li₂CO₃ supported chicken bone catalyst in ICMHCEE held between 9th September to 11th September at NIT Tiruchirappalli.

Dr. Mahesh Ganesapillai invited as participant in 2019 Southeast Asia International Joint Research and Training Program on Environmentally Green Technology and Low Carbon Energy, National Tsing Hua University, Taiwan. It was held between 12th November to 23th November 2019, funded by Ministry of Science and Technology (MOST), Taiwan.

Dr. Aabid Hussain Shaik participated in "Rheology of Complex materials" workshop held between 11th November to 15th November 2019 at IIT Madras, Chennai

Dr. Dharmendra K Bal participated in "Rheology of Complex Materials" workshop held between 11th November to 15th November 2019 at IIT Madras, Chennai.

Faculty Outreach

Dr. G.S. Nirmala visited Department of Chemical and Biomolecular Engineering as an academic visitor from 1st July to 4th July 2019 at National University of Singapore.

Dr. Shishir K Behera invited as a Honorary Keynote Speaker for FDP on Innovation in waste management in smart cities held between 17th to 21st December 2019 at Gandhi Institute of Technology, Odisha

Guest Lectures Organized

Lecture delivered on "Multicomponent Distillation", by Dr. GM Deshmukh, LIT Nagpur, Maharashtra, India on 12th August 2019 (Organized by Dr. M. Aslam Abdullah & Dr. Bandaru Kiran)

Lecture delivered on "Crude Oil Characterization", by Dr. GM Deshmukh, LIT Nagpur, Nagpur, Maharashtra, India on 13th August 2019 (Organized by Dr. M. Aslam Abdullah & Dr. Bandaru Kiran)

Lecture delivered on "Petroleum Refining Scenario for the Future", by Mr. Mukthiyar, Senior Scientists, IOCL (R&D), Delhi, India on 9th August 2019 (Organized by Dr. S. Velu)

Lecture delivered on "Challenges in Chemical Industries", by Mr. Thirumalaisamy, Vice President (Project & Engineering) Thirumalai Chemicals Ltd., Ranipet, Tamil Nadu, India on 30th August 2019 (Organized by Dr. Muruganandam L)

Lecture delivered on "Relevance and Significance of the Course: Fuels and Combustion", by Dr. G.P. Rangaiah, Professor, Department of Chemical & Biomolecular Engineering, National University of Singapore, Singapore on 30th August 2019 (Organized by Dr. Muruganandam L)

Lecture delivered on "Soil and Groundwater Remediation", by Mr. Chetan Zaveri, Executive Director (Environment) AECOM, Haryana, India on 30th August 2019 (Organized by Dr. Shishir Kumar Behera)

Lecture delivered on "Retrofitting of an Industrial Closed-loop Cooling Water System", by Dr. G.P. Rangaiah, Professor, Department of Chemical & Biomolecular Engineering, National University of Singapore, Singapore on 30th August 2019 (Organized by Dr. G.S. Nirmala)

Lecture delivered on "Multi-objective Optimization for Engineers", by Dr. G.P. Rangaiah, Professor, Department of Chemical & Biomolecular Engineering, National University of Singapore, Singapore on 19th September 2019 (Organized by Dr. Monash P & Dr. Velu S)

Lecture delivered on "Introduction to Polymer Engineering", by Dr. S. Veeraraghavan, Head – Abrasives R&D, Saint Gobain Research India Private Limited, Chennai, India on 15th October 2019 (Organized by Dr. Mohammed Rehaan Chandan & Dr. Anand VP Gurumoorthy)

Lecture delivered on "Application of Combustion in Aerospace", by Mr. K Sathiyamoorthy, Principal Scientist, CSIR-National Aerospace Laboratories, Bengaluru, India on 6th November 2019 (Organized by Dr. Chitra D & Dr. Aslam Abdullah)

Lecture delivered on "Troubleshooting in Cooling Towers", by Mr. Ramakrishnan Natarajan, Associate Vice President-Technical, EID Parry Ltd., Chennai, Tamil Nadu, India on 6th November 2019 (Organized by Dr. G S Nirmala & Dr. Bandaru Kiran)

Lecture delivered on "Troubleshooting in Pumps and Blowers", by Mr. Ramakrishnan Natarajan, Associate Vice President-Technical, EID Parry Ltd., Chennai, Tamil Nadu, India on 6th November 2019 (Organized by Dr. Chitra D & Dr. Dharmendra K Bal)

Lecture delivered on "Role of Heat & Mass Transfer Equipments in Process Industries", by Mr. Batcha R M, Regional Manager, Alfa Laval India Pvt Ltd., Chennai, India on 6th November 2019 (Organized by Dr Bandaru Kiran & Dr. G S Nirmala)

Guest Lectures Organized

Lecture delivered on "Acid Gas Removal Techniques in Oil and Gas Industry", by Mr. Srihari Sampathkumar, Principal Engineer - Process, Saipem India Projects Pvt Ltd., Chennai, Tamil Nadu, India on 8th November 2019 (Organized by Dr. Monash P & Dr. Dharmendra K Bal)

Lecture delivered on "Computational Fluid Dynamics in Chemical Processes Industries - Innovative Applications", by Dr. Meguru Kaminoyama, Professor, School of Safety and Chemical Engineering, Yokohama National University, Yokohama, Japan on 3rd December 2019 (Organized by Dr. Mahesh Ganesapillai & Dr. Aruna Singh)

Lecture delivered on "Clathrate Hydrates, What can Engineers do with it?", by Dr. Praveen Linga, Dean's Chair Associate, Professor, Chemical and Biomolecular Engineering, National University of Singapore, Singapore on 12th December 2019 (Organized by Dr. Bandaru Kiran)

Lecture delivered on "Big Data Analytics in Process Industries", by Mr. Sankar Selvaraj, Director of APAC Petrochemical Business, Schneider Electric, Singapore on 18th December 2019 (Organized by Dr. G S Nirmala & Dr. Babu Ponnusami)



Guest Lecture on CO₂ Sequestration - Practices & Challenges



Guest Lecture on Polymer Engineering

Events Organized



Dr. Aslam Abdullah M organized "**Industry Academic Conclave**" in association with **SPE-VIT Student Chapter** on 29th-30th August 2019. Ten Industry Experts from prominent industries like Dr. Reddy's Laboratories, Piramal Industries, Telangana Pollution Control Board, GVK Biotech, Chemplast Sanmar Group, Thirumalai Chemicals and Hyflux Engineering shared their expertise.

Industrial Visits

Dr. M Aslam Abdullah, Dr. Aruna Singh, Dr. Mahesh Ganesapillai organized an Industrial Visit to AAVIN (Milk Production Unit), Vellore on 1st October 2019 for Undergraduate Students.

Dr. Aabin Hussain Shaik, Dr. Chitra D, Dr. P. Monash organized an Industrial Visit to ORCHID Pharma, Chennai on 25th September 2019 for Undergraduate Students.

Dr. Bandaru Kiran, Dr. Anand VPG, Dr. Aruna Singh organized an Industrial Visit to Manali Petrochemical Limited on 22nd September 2019 for Undergraduate Students.

Dr. Babu Ponnusami, Dr. Mohammed Rehaan Chandan, Dr. G.S. Nirmala organized an Industrial Visit to ORCHID Pharma, Chennai on 24th September 2019 for Undergraduate Students.

Editorial Committee

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