Issue 02

NEWSLETTER

Department of Chemical Engineering

2018-2019

COMSATS University Islamabad
Lahore Campus

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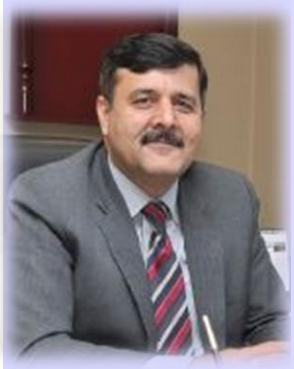
What's Inside

Message from Director



By the grace of Allah Almighty! Traversing through a journey by a passionate commitment to excellence, COMSATS University Islamabad (CUI), Lahore Campus has evolved into one of the flagship campuses of CUI. Its success story spread over a decade is matter of deep pride and honor for all those associated with this prestigious seat of higher education and quality research in emerging technologies.

Our esteemed institution caters to the pragmatic, practical and moral aspects of learners with the strong realization to make its alumni a functional part of society. By taking advantage of their newly acquired skill set and quality learning, our undergraduates and graduates as independent and critical thinkers have stood up to local and international challenges and acclaimed awards in nearly all walks of life. I believe that the need based, research oriented, solution based and innovative teaching-learning ambiance created here is a way forward for our education system that needs to bridge up the gap between the theory and the practice, address the societal demands, and reclaim its recognizable space in the comity of academia. I hope that the symbiotic relationship between the teacher and the taught, the administration and the academia will lead our institution to the new heights of fame and glory. I, as Director, look forward to the opportunity to provide you with this enriching teaching-learning experience.

I compliment Department of Chemical Engineering, CUI, Lahore Campus on publishing this newsletter and look forward to increase success of this endeavor in the coming months.

Prof. Dr. Qaisar Abbas
Director CUI, Lahore Campus

Message from Dean

Engineering at COMSATS University Islamabad (CUI) offers unique opportunities for innovative education and research. At CUI, engineering education was initiated in 1999 with single discipline and now, after more than fourteen years, engineering has grown beyond expectations. It has been consistently ranked among top engineering faculties of Pakistan.

When it comes to career development and planning, students at COMSATS University are supported by our career development centres and industrial liaison offices at different campuses. These arrangements reflect CUIs commitment, enabling all of our students to access the maximum possible range of career opportunities in engineering sectors.

Prof. Dr. Muhammad Abid
Dean of Engineering

Message from Department Head

By Chemical Engineering discipline has made important contributions to society over the years in terms of innovative and cutting edge research, processes and eco-friendly products. Here at our department we nourish our students through highly qualified faculty, modern facilities, knowledge conceiving environment, real time exposure, and systematic knowledge transfer tactics.

We are taking forward the vision of rector of CUI for making CUI number one in scientific research in various engineering and non-engineering disciplines. We have adopted the international standards of academics, research and quality policy.

Message from Department Head

Having vision of solving chemical engineering problems of industries with collaboration has always been our keen priority. Our mission is to educate and prepare undergraduate and graduate students not only for industries but for research and development (R&D) departments so that they can discover and propagate knowledge through research and be able to tackle current engineering issues. To make this dream come true, the concept of research based teaching in laboratory and conceptual learning opportunities have been adopted as primary tools of teaching. The department combines academics with useful work experience as mandatory elements of the degree requirements. We are determined to make department fruitful for researchers and industries by providing different testing services. In the department, we have various characterization equipment including XRD, NMR, Atomic absorption, GC-MS, HPLC, UV-Vis etc.

Most of our faculty is PhD doctors who are distinguished researchers and carry out cutting-edge research in all modern areas of Chemical Engineering. At present, the department is employing 25 PhDs. The department is receiving a number of research funding from the Higher Education Commission (HEC) and other funding bodies. We organize conferences and seminars in our department on various chemical engineering, energy, and environment related topics to enhance the vision of our students. Also, students are encouraged to attend the conferences, project competitions, and technical symposia. I assure you that to earn an international degree in Chemical Engineering; you would find the department of Chemical Engineering at CUI Lahore the best place to be at.

Dr. Murid Hussain
Chairman/Head of the Department

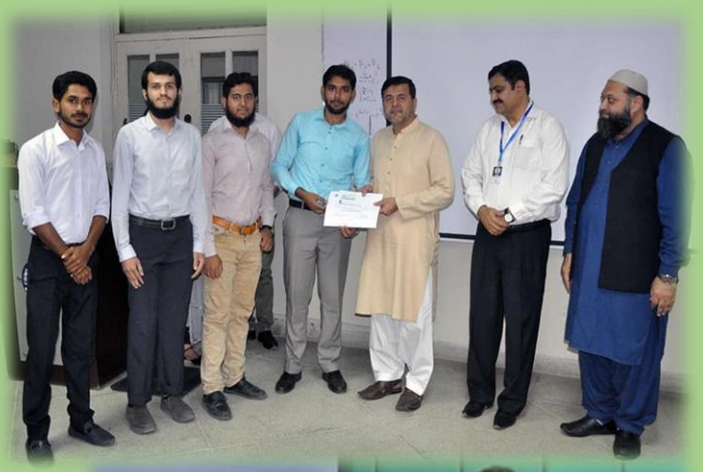
Students Achievements: Our students, our proud

❖ Our successful Graduates

The Chemical Engineering Department student, "Syed Muhammad Zaim Jaffery" has been selected in Pakistan Air Force, 123 CSC, Engineering Branch (Chemical) as a Flying Officer. It is a great privilege that he is only person selected all over Pakistan.

❖ Positions in International conference

MS students, Ms Tanzila Anjum and Ms Zabia Sajjad won the 1st and 2nd Prize respectively in Oral Presentations Competition at SPI 2018 Conference held in Peshawar.



❖ 1st Position in Business competition held at CUII

Students of Chemical Engineering secured 1st position in Student Startup Business Competition held at CUI. Teams from all over CUI participated in the competition, and we are proud to announce that our students won the 1st prize.

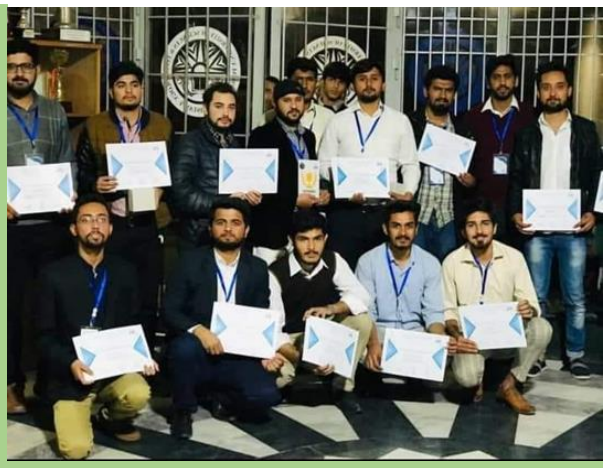
❖ 1st Position in Business idea competition FAST

Students of Fall-15, Mr. Abdul Hanan and Muzamil Nadeem, won the 1st prize in FAST Business Idea Competition 2019.

Students Achievements: Our students, our proud

❖ Top Position in ChemFest 2018

ChEmFest is organized by AICHE society, NUST Chapter every year which provides students with an entirely eloquent opportunity where chemical engineering students from different universities participate and compete in various types of modules. COMSATS was one of the universities which was able to lead the competition securing an accumulated highest rank with four of their teams.



❖ 1st Position in CHEMBUSS-2019

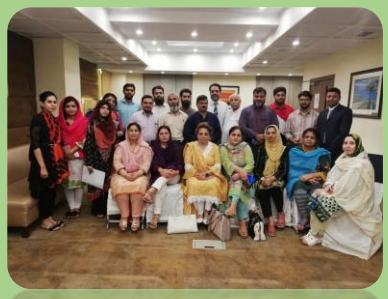
GIKI organized an international technical competition entitled as “CHEMBUSS-19”. A team from Chemical Engineering Department, under the umbrella of American Institute of Chemical Engineering (AIChE) student chapter COMSATS Lahore, has participated in this event and stood first in all technical modules.

Dr. Murid Hussain, Chairman and Head of Chemical Engineering Department appreciate team AIChE and their student advisor Dr. Qandeel Gillani for their contribution and tremendous achievement.

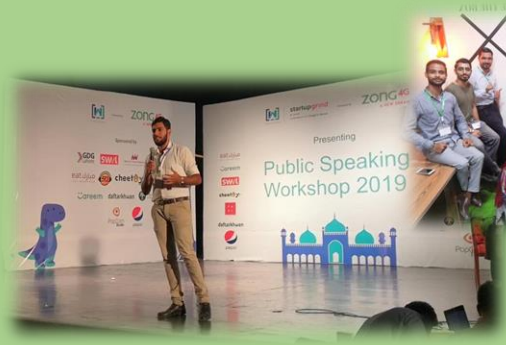
Students Achievements: Our students, our proud

❖ Significant achievements by Fall-15 student

Student of Fall-15, Mr. Abdul Hanan won 1st prize in the poster competition at the "8th Invention to Innovation Summit" held at the University of Punjab, Pakistan. He attained 3rd position for the best poster at the "Conference on Water Problems in Pakistan and Their Solutions.



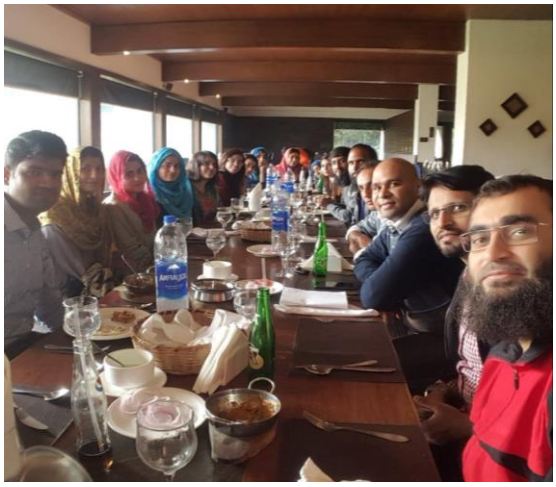
He was awarded the "best ambassador" for technical event Chembuzz'17 at the GIKI University, Pakistan. His work was featured on Lahore news and Dunya news at Dunya educational expo.



He won best education project award by USEFP on "Road to true education" a community service project at FC College. He was also shortlisted for an employment training program "21st Century Skills" by GreenBox, a youth-driven engagement lab nurturing sustainability leadership in Pakistan. Recently he was shortlisted by Uber for "UBER Pitch camp" and given three days fully-funded professional training on business plan designing, the art of pitching and storytelling.

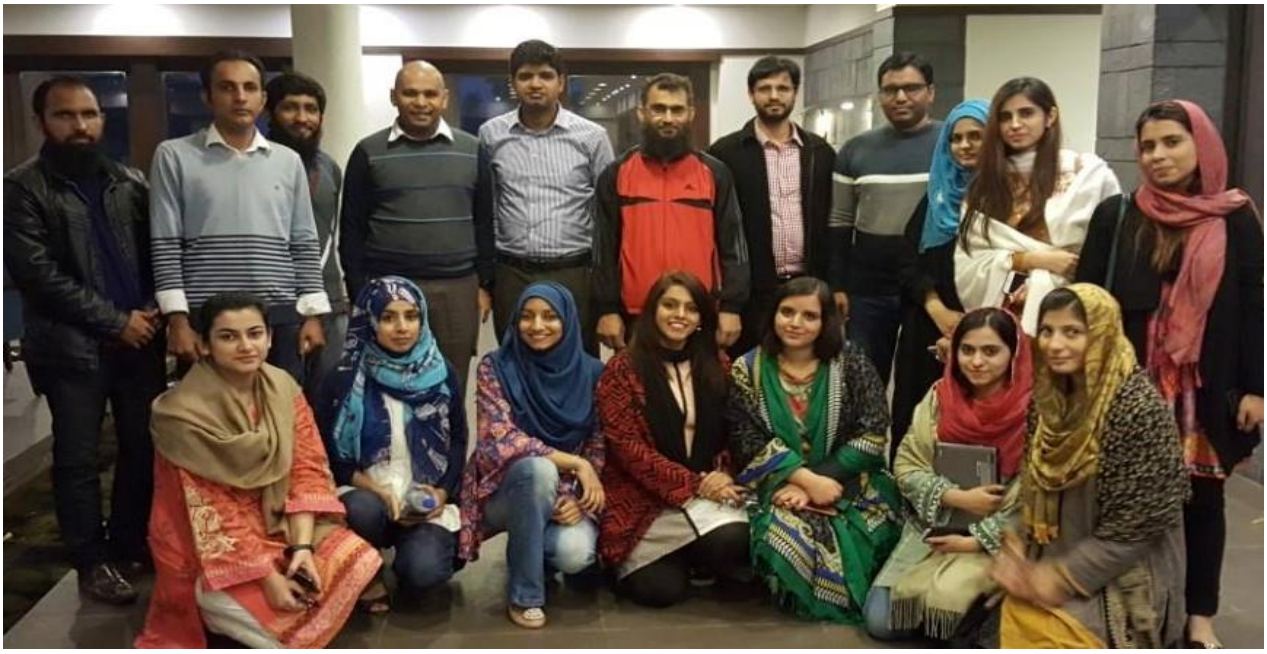
Membrane Day (Fall-2018)

'Membrane Day' was organized at Oasis Resort by 'Membrane Systems Research Group' , Dept. of Chemical Engineering, CUI Lahore. Graduate students and researchers presented their research work on different applications of membranes.



Professors & Presenters

Dr. Asim Laeeq Khan	Dr. Mazhar Gilani	Zabia Sajjad
Dr. Muhammad Aslam	Dr. Sikander Rafiq	Zain Iqbal
Zufishan Shamair	Naintara Shahzad	Nitasha Habib
Tanzila Anjum	Sudeeha ishaq	Tahreem Butt
Kiren Javid	Bazla Sarwar	Sidra Saqib



GCRF Workshop on Membrane Technology-2019

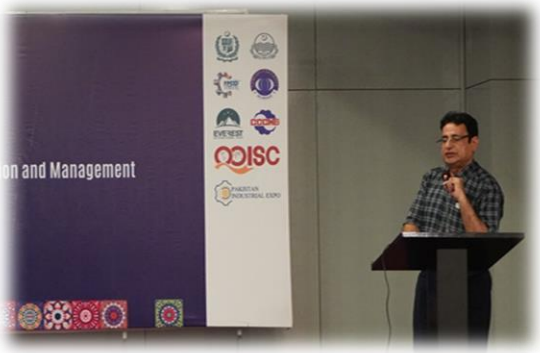
GCRF workshop was organized on April 10, 2019 at Dept. of Chemical Engineering, CUI Lahore. Graduate students presented research pitch presentations and membrane research groups from all over the Pakistan highlighted the facilities, strengths and area of collaboration.

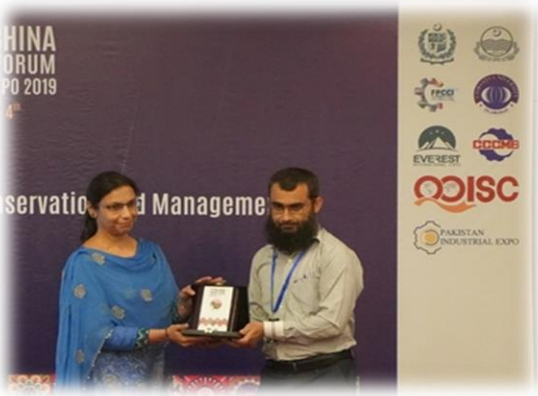
Participant Universities

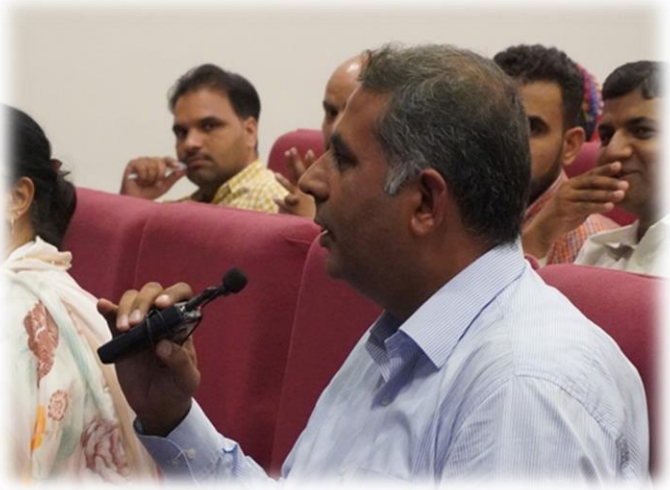
- Teeside University
- UET Lahore
- UET Peshawar
- NUST
- PU
- LSE
- CUI Lahore

Pak-China Business Forum Industrial Expo-2019

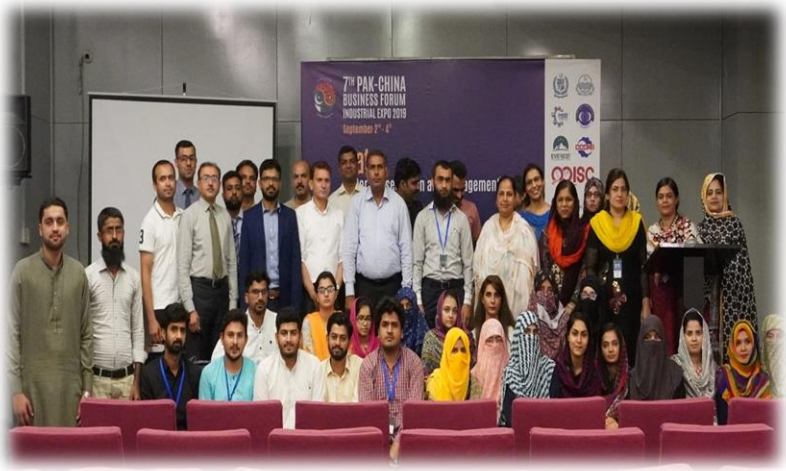
In Pak-China Business Forum 2019, thematic session on Water conservation was jointly organized by Department of Chemical Engineering and Department of Chemistry from CUI, Lahore. This session witnessed hundreds of participants and several technical speakers who thrown light on importance of water crisis and its solutions.





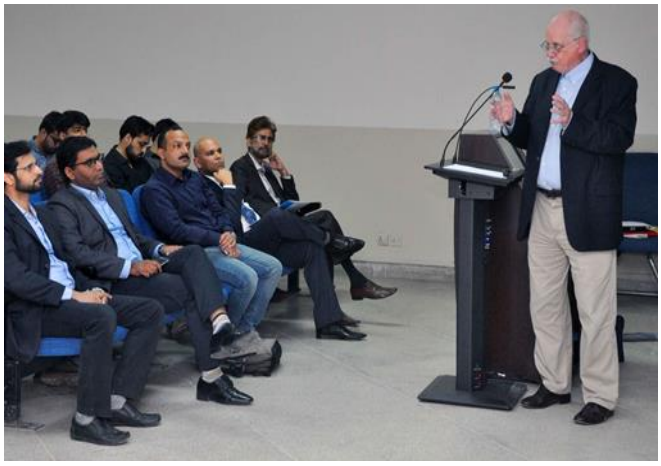


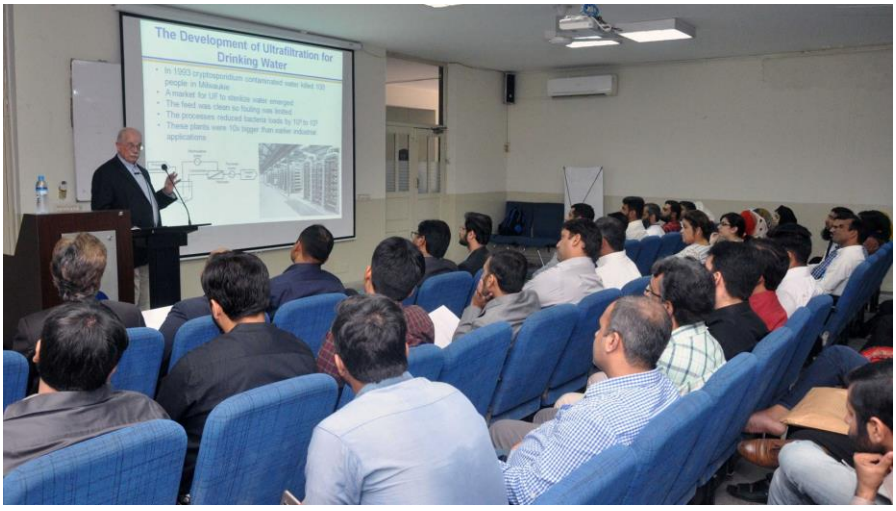
HOD Chemical Engineering Department Prof. Dr. Murid Hussain emphasized upon the rationale behind this endeavour for hosting the thematic session which included back to back lectures by experts from all over the country, in his welcome address.



Seminar on Membrane Technology by Dr. Richard Baker

Seminar on 'Membrane Technology' by Dr. Richard Baker was organized by Chemical Engineering Dept., CUI Lahore on October 9, 2018.
Dr. Baker is founder of one of the leading process industry namely, MTR, USA. He is also the author of more than 100 papers and over 100 patent.



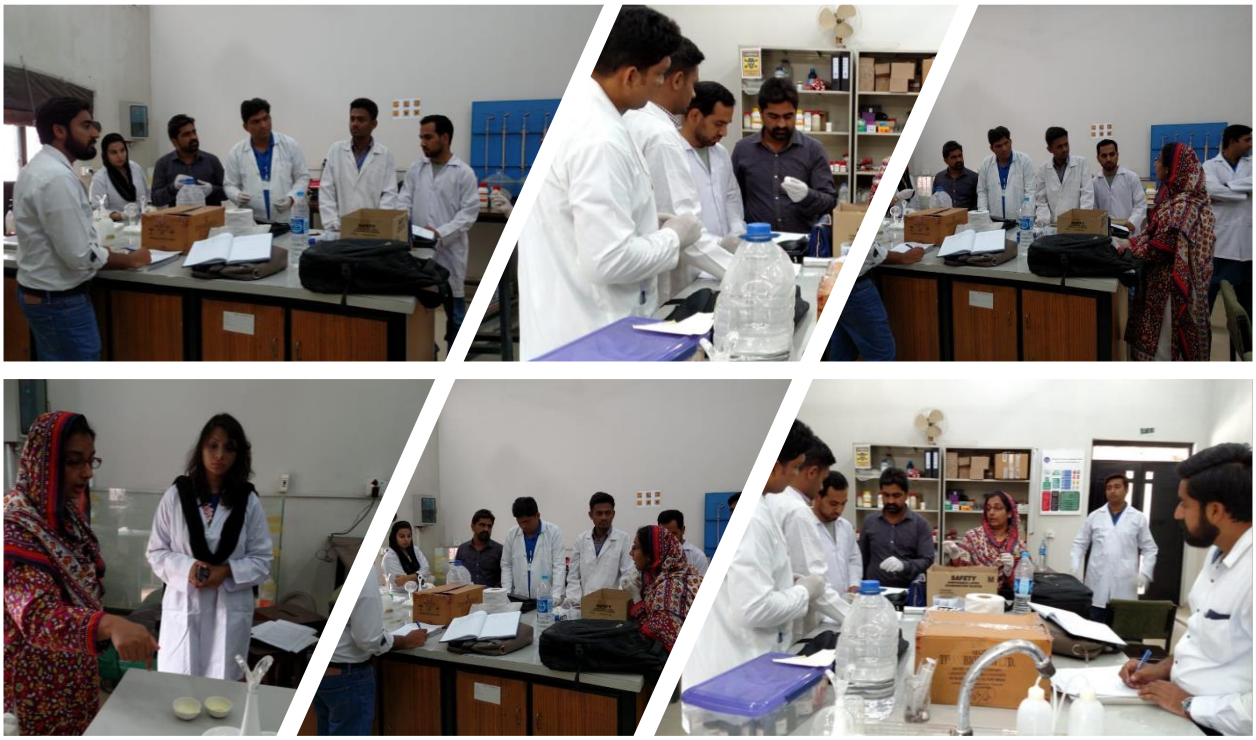


Knowledge is the key to success!

1st Chemical Engineering and Analytical Techniques Summer Camp

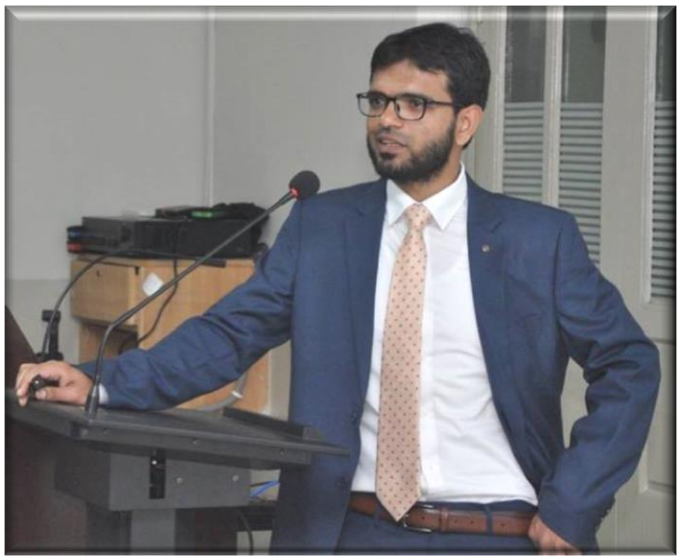
The Department of Chemical Engineering organized it's first summer camp from 29th July 2019 to 2nd August 2019. It covered the lectures on major analytical techniques. Various advance lab analytical & synthesis techniques and their applications were explored throughout the program via a series of seminars as well as several hands-on laboratory sessions. Our aim was to gather students, professionals, scientists & industry on a single platform for an interactive learning experience which can bring progress in their individual roles, as professionals.

Their training was carried out in different departmental labs including Polymer Processing Techniques Lab, Catalysis and nano-fabrication Lab, Membrane Separation Lab, and Spectroscopy Lab.



Workshop on "How to Improve Writing and Publication Skills"

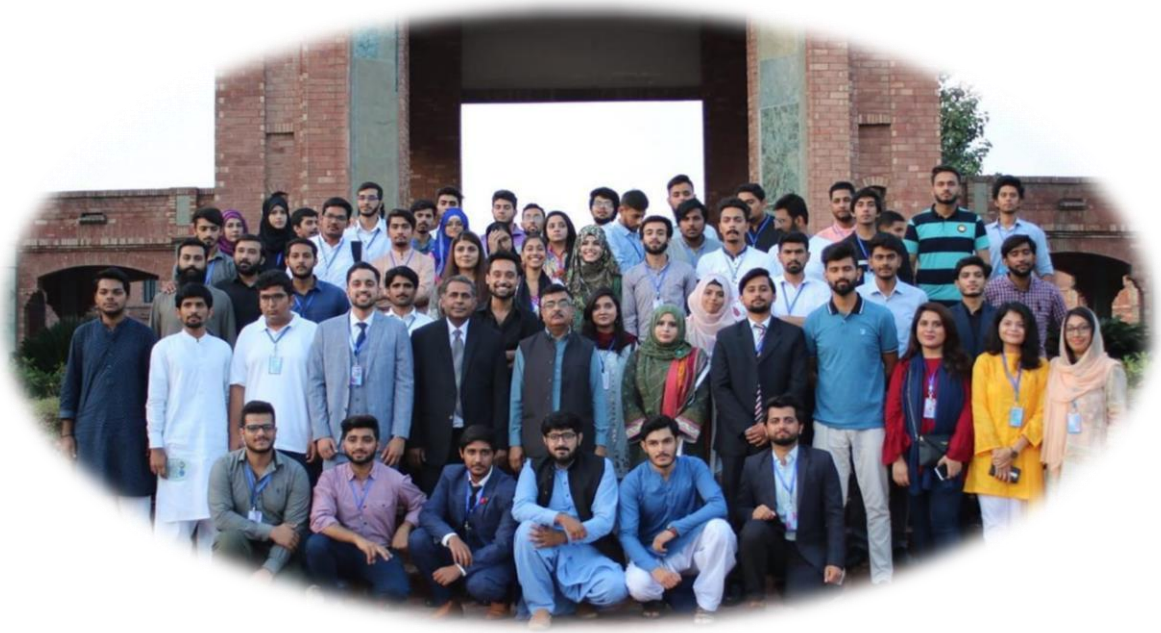
The Department of Chemical Engineering arranged a two days training workshop on "How to Improve Writing and Publication Skills". The objective of this workshop was to master the writing and publication skills of its graduate students to tailor their data and concepts into a selling document.



Dr. Naim Rashid, who received professional training in writing and publications skills from Elsevier, Springer, Global Young Academy, and other renowned research academies, served as a focal person. He sensitized the students about the importance of scientific writing. Dr. Rashid gave a comprehensive talk and provided hands-on training on different modules including how to write an article, the rules of scientific writing, the use of proper tense and grammar, the most common mistakes in scientific writing, and how to turn failure data into a publication. The graduate students actively participated and 35 students were trained in this workshop.

CHEMATHON 1.0 (2019)

The International student chapter of American Institute of Chemical Engineering **AIChE** of Department Chemical Engineering CUI Lahore Campus arranged a national level technical competition on 19th & 20th October 2019, with the title "**CHEMATHON 1.0"** in this student week. Eight teams from all over the Pakistan participated in this competition.



Faculty Achievements

Dr. Murid Hussain was honored with Best Researcher of Chemical Engineering department for the year 2017.

Dr. Muhammad Yasin was awarded with Best Teacher of Chemical Engineering department for year 2017.

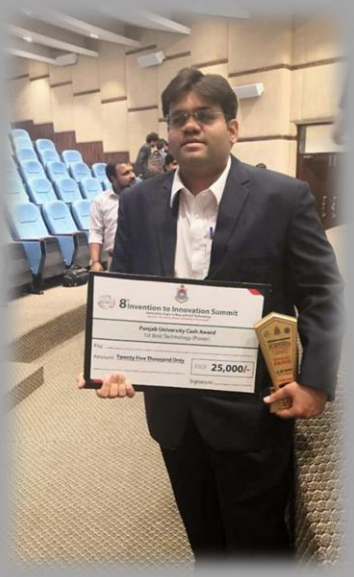
Dr. Muhammad Yasin was invited by Ministry of Commerce, P.R. China to attend a fully funded international training workshop on the Improvement and Utilization of Biomass Energies for Developing Countries organized by Biogas Institute of Ministry of Agriculture and Rural Affairs (BIOMA), P.R. China (August 20, to September 9, 2019).

Dr. Muhammad Aslam was invited give talk on "Anaerobic fluidized bed membrane bioreactor for low-strength wastewater treatment: fouling control and energy considerations" in 1st International Conference on Water Resources and Sustainability (ICWRS), Nanjin, China.

Faculty Achievements

Dr. Rizwan Ahmad has been awarded with "Dean's Choice of Best Researcher Award" by INHA university, South Korea in February, 2019 for his outstanding research contribution. He has also been awarded with "Outstanding Researcher Award" in recognition to his research productivity in March, 2019 at sustainable environmental membrane technology (SEMT) laboratory, INHA university, South Korea.

Faculty member of Chemical Engineering department, Dr. Syed Awais Ali Shah Bokhari, won Technology award and 1st prize in poster competition of worth 25,000 PKR in 8th Invention to Innovation Summit held at University of Punjab on April 3, 2019. The "Invention to Innovation Summit" is a prestigious forum and all awards are based upon open competition among the presented high-quality research projects.



Dr. Rizwan Ahmad was nominated by Higher Education Commission (HEC) and Pakistan Institute of Engineering and Applied Sciences (PIEAS) for participation in the 70th Interdisciplinary Lindau Nobel Laureate Meetings 2020 to be held in Lindau, Germany. Only 50 applicants were shortlisted and interviewed from all over the Pakistan and after the interviews, 10 applicants were nominated.

Farewell Party 2019

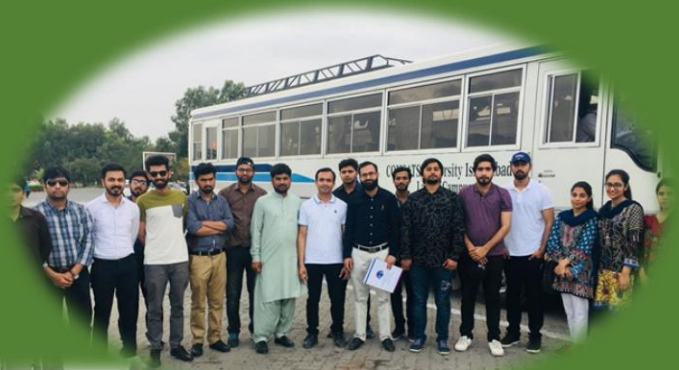
A farewell party was arranged by the department for the final year student of undergraduate. Dr. Murid Hussain, Chairman and Head of Chemical Engineering Department, wished the students best for their future and gave them a warm send off.

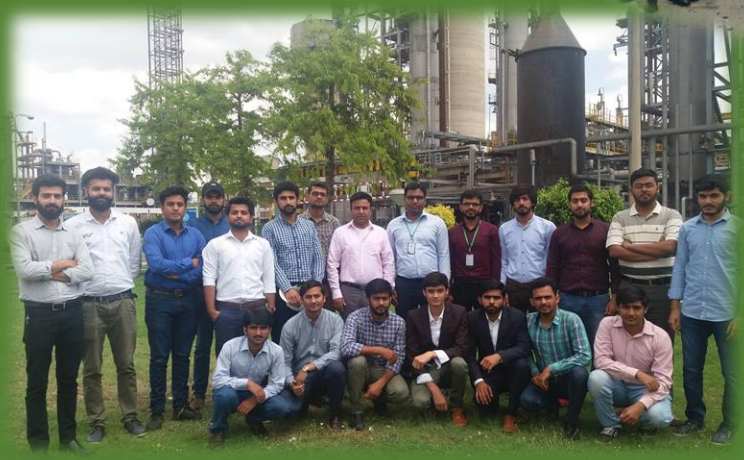
Dr. Murid Hussain also appreciated the event planning team and their student advisor Dr. Qandeel Gillani for their contribution and tremendous achievement.

Industrial Tours

Students of 6th semester visited DG Cement Factory at Chakwal under the supervision of Dr. Rizwan Ahmad and Eng. Tahir Saif. Students showed great interest in learning technical knowledge from industrial professionals.

Students of 4th semester visited Century Paper Mills under the supervision of Dr. Abdul Razaq and Engr. Waleed Siddiqi.

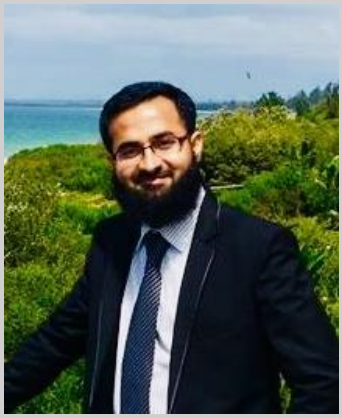




Students also visited Fauji fertilizers company under the supervision of Dr. Muhammad Aslam and Dr. Nain Rashid.

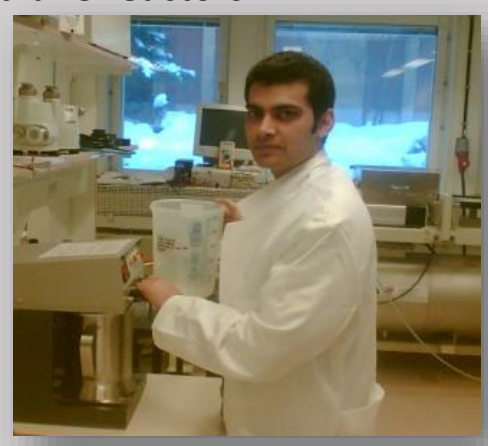
The motivation behind the arrangement of these visits is to provide students with an opportunity to physically observe different machines and processes.

New to Department



Dr. Rizwan Ahmad joined Department of Chemical Engineering after completing his MS leading to PhD studies. He received his degree from INHA University, South Korea. He has published more than 28 publications including journal publication, book chapter and conference proceedings. He was also awarded with prestigious research productivity awards during his studies at INHA University.

His research area is focused on the application self-assembled mesoporous catalytic films in photocatalytic membrane reactors with principle aim to control membrane fouling and treatment efficiency during wastewater treatment. In addition, he also works in interdisciplinary research aspects such as membrane distillation, membrane bioreactors and fluidized membrane reactors.



Dr. Arif Hussain joined Chemical Engineering Department in 2018, after completing his PhD in Chemical Engineering from Yeungnam University, South Korea. His PhD research focused on applying process intensification techniques to conventional reaction-separation processes.

During his PhD, he mastered advanced process simulators (Aspen Plus, HYSYS) and applied various process intensification techniques to improve the performance of existing chemical processes. In addition, he led and conduct several trainings of “Process Design and Simulation” to engineers from industry. He is author of 15 peer-reviewed journal publications and 10 international conference proceedings. He is also active reviewer of 4 international high impact journals.

New to Department

Dr. Engr. Syed Awais Ali Shah Bokhari completed his MSc and PhD in Chemical Engineering from Universiti Teknologi PETRONAS, Malaysia. He was recently appointed as an ***International Editorial Board Member*** *of* ***Journal of Cleaner Production***. His research activities are based on the process intensification techniques for cleaner biofuel production, engine testing and associated modelling techniques. He is author of more than **30 peer-reviewed journal publications**, 17 international conference proceedings, two Malaysian patents and one book chapter. He is currently serving as a **reviewer of 15** international high impact journals in the field of engineering and sciences.

He was awarded the AOCS (American Oil Chemist's Society) Manuchehr (Manny) Eijadi Award (Plaque and $1,000 USD Honorarium) and Honored Student Award at 2017 AOCS Annual Meeting and Industry Showcases, April 30- May 03, 2017, Rosen Shingle Creek, Orlando, Florida, USA. He won 5 Gold medals and 1 silver medal in numerous international exhibitions. The special award of RM 10,000.00 has been awarded by University of Southampton, UK for the novel intensification technology development. He got involved in several research projects for public and private institutions and collaborations with industrial partners.

Research Grants

Dr. Fahad Rehman, Assistant Professor of Chemical Engineering Department won research project

Project Title: Hydrogen Production and separation for decentralized power generation for rural areas of Pakistan

Commercially, hydrogen is produced by different technologies. However, almost 90% of hydrogen produced commercially is by the process of steam reforming and the rest of it is produced by coal gasification. Although the reforming of methane represents the major technology to produce hydrogen at the moment, however, it utilizes natural gas as feedstock which means hydrogen thus produced is neither green nor sustainable.

The project integrates cutting edge technologies to overcome the energy crisis Pakistan is suffering from. The current study is focused on clean and sustainable production of hydrogen to provide electrical power to rural areas. Hydrogen will be produced using water vapour plasmolysis. Hydrogen produced will be separated using microbubble dynamics at a significantly low principal and running cost. The hydrogen thus produced will be ready to use for power generation. The final outcome of the project will be a process and device ready to use for the production of hydrogen. The project envisages to improve the energy efficiency such that the required power can be obtained by integrating the microplasmas and microbubble generation with solar energy making hydrogen production process totally green and sustainable.

Dr. Fahad Rehman is also collaborating with other university such as CUI, Sahiwal and Punjab university for the research projects on biodiesel production strategies and their optimization.

Research Grants

Dr. Faisal Ahmad, Assistant Professor of Chemical Engineering Department won research project

Project Title: Reduction of Nitrogen Oxides (NOx) from pulverized coal-fired boiler in a standard 500 MW power plant using Artificial Intelligence and Optimization techniques

As in this era energy has become a hot topic for future concerns. Especially Pakistan has been hit by a huge energy crisis these days. The Pakistani government is concerned about this issue and trying to resolve it. Therefore in future there will be a large number of huge projects in energy sector (e.g. coal-fired power plants) will be conducted in Pakistan. One of the environmental drawbacks of coal-fired power plants is emission of Nitrogen Oxides (NOx) in huge amount. NOx has a number of adverse effects on air quality e.g., photochemical smog, visibility reduction, acid rain, etc. To reduce such adverse effects, environmental regulation authorities have imposed strict restrictions on the emission of such pollutants. Precise and reliable measurement and reduction of NOx emission is indispensable for coal-fired power plants to ensure the limitations imposed by these environmental regulation authorities. In addition, Nox reduction has direct impact on environmental quality and nation's health by reducing chances of smog and acid rain.

Research Grants

Dr. Maria Mustafa, Assistant Professor, Dept of Chemical Engineering has been awarded a research grant under HEC NRPU worth Rs. 2.8 million.

Project Title: Nanofabrication of organic light emitting diodes devices using ultrafast inkjet printing system.

Organic Light emitting devices (OLEDs) for efficient energy lighting are area of interest of significant academic research and industrial development sectors, as they potentially offer unique advantages over their inorganic counterparts in terms of cost reductions, energy utilization and printing-based manufacturing. Parametric studies of printing technologies such as printing head speed and continuous ink flowrates etc. have direct effect on film characterizations such as film morphology, elemental analysis, optical analysis and current density analysis for organic light emitting electronics device that will be analyzed and will be reported in this research project. At the end, the optimized parameters of inkjet printing system giving the best performances of OLED devices. The results are expected to highlight the thin films of solution processing materials via inkjet printing are suitable to replace their vacuum processed analogues as building blocks in organic light emitting devices fields by showing enhanced functionality of light emitting devices in terms of their high illumination, low operating voltage compared to current lighting technology and lifetime. The work will open a fabrication route for a next generation large area organic light emitting devices device which could lead to not only advancement in electronics industry but also improvement in national security and economy of overall country.

Research Grants

Dr. Um-e-Salma Amjad, Assistant Professor, Dept of Chemical Engineering has been awarded a research grant under HEC NRPU worth Rs. 9.8 million.

Project Title: Hydrogen Rich Gas Generation from Waste Plastic Phase II: Comparing Energy Efficiency and Kinetics of Reforming & Pyrolysis Process

Pakistan is facing two major crisis today namely Energy and environmental pollution. The increase in load shedding in summer time affects not only the living standard of the common man but also affects the industrial hubs. The Vision 2025 of Pakistan's Government states that there must be an increase in energy availability (67-90%) by year 2025. To increase the energy availability Pakistan must explore other energy options like solar, wind, biomass and waste to energy. In synthesized materials plastics consist of a large portion due to its non-biodegradability. Recycling of plastics is an energy intensive process compared with the cost of plastic production. Plastic to fuel is an alternative process using pyrolysis technique, but its end products are not compatible with the fuel available for common use. Gasification of plastic to H_2 rich gas using reforming process (steam reforming, oxidative reforming and auto thermal reforming) can be an alternative technology where clean H_2 gas is produced as a fuel however, in this field the information regarding process parameters and catalyst development are lacking. In this research the goal is to investigate the different catalysts that can be employed in reforming of plastic and generate kinetic data which will be helpful in developing a suitable catalyst for reforming also create a basis for designing a suitable reactor for waste plastic to energy process.

Research Impact

During the year 2018-2019, faculty members and gradate students produced a large number of research publication which were successful in securing place in high impact factor journals. The details of published research articles are enlisted below:

1. Ali, S., Rani, A., Majdi, A., Mufti, R. A., Azam, F. I., Hastuty, S., Baig, Z., Hussain, M. and Shehzad, N. The Influence of Nitrogen Absorption on Microstructure, Properties and Cytotoxicity Assessment of 316L Stainless Steel Alloy Reinforced with Boron and Niobium. *Processes*, *7* (2019), 506.
2. Shehzad, N., Tahir, M., Johari, K., Murugesan, T., & Hussain, M. Improved interfacial bonding of graphene-TiO_2 with enhanced photocatalytic reduction of CO_2 into solar fuel. *Journal of environmental chemical engineering*, *6* (2018), 6947-6957.
3. Syachruddin, A.R., Syukur, Suryaningsih, S., Rahmawati, R., Khan, A.L. Effect of shell color and nursery depth on the growth of pearl oyster pinctada maxima in Tekalok West Nusa Tenggara Indonesia. *Indonesian Journal of Science and Technology,* 3 (2018) 105-114
4. Jamshaid, A., Iqbal, J., Hamid, A., Ghauri, M., Muhammad, N., Nasrullah, A., Rafiq, S., Shah, N.S. Fabrication and Evaluation of Cellulose-Alginate-Hydroxyapatite Beads for the Removal of Heavy Metal Ions from Aqueous Solutions. *Zeitschrift fur Physikalische Chemie.* 2018
5. Haider, J., Qyyum, M.A., Hussain, A., Yasin, M., Lee, M. Techno-economic analysis of various process schemes for the production of fuel grade 2,3-butanediol from fermentation broth. *Biochemical Engineering Journal,* 140 (2018) 93-107
6. Eliseus, A., Bilad, M.R., Nordin, N.A.H.M., Khan, A.L., Putra, Z.A., Wirzal, M.D.H., Aslam, M., Aqsha, A., Jaafar, J. Two-way switch: Maximizing productivity of tilted panel in membrane bioreactor. *Journal of Environmental Management,* 228 (2018) 529-537

Research Impact

7. Hussain, A., Riaz, A., Qyyum, M.A., Lee, M. Design trade-offs in a column with side-reactor configuration for improving selectivity in multiple reaction systems. *Chemical Engineering and Processing - Process Intensification,* 134 (2018) 86-96
8. Khurram, M.S., Choi, J.H. Effect of Lower Bed Height on Collapse Velocity in the Two-Stage Bubbling Fluidized-Bed with a Standpipe for Solid Transport. *Korean Chemical Engineering Research,* 56 (2018) 864-870
9. Kim, D., Won, Y.S., Khurram, M.S., Joo, J.B., Choi, J.-H., Ryu, H.J. A model for predicting transport velocity in gas fluidized-beds. *Advanced Powder Technology,* 29 (2018) 3070-3078
10. Aslam, M., Ahmad, R., Yasin, M., Khan, A.L., Shahid, M.K., Hossain, S., Khan, Z., Jamil, F., Rafiq, S., Bilad, M.R., Kim, J., Kumar, G. Anaerobic membrane bioreactors for biohydrogen production: Recent developments, challenges and perspectives. *Bioresource Technology,* 269 (2018) 452-464
11. Al-Muhtaseb, A.H., Jamil, F., Al-Haj, L., Zar Myint, M.T., Mahmoud, E., Ahmad, M.N.M., Hasan, A.O., Rafiq, S. Biodiesel production over a catalyst prepared from biomass-derived waste date pits. *Biotechnology Reports, 20 (2018) e00284*
12. Jang, N., Yasin, M., Kang, H., Lee, Y., Park, G.W., Park, S., Chang, I.S. Bubble coalescence suppression driven carbon monoxide (CO)-water mass transfer increase by electrolyte addition in a hollow fiber membrane bioreactor (HFMBR) for microbial CO conversion to ethanol, *Bioresource Technology,* 263 (2018) 375-384
13. Eliseus, A., Putra, Z.A., Bilad, M.R., Nordin, N.A.H.M., Wirzal, M.D.H., Jaafar, J., Khan, A.L., Aqsha. Energy minimization of a tilted panel filtration system for microalgae filtration: Performance modeling and optimization. *Algal Research,* 34 (2018) 104-115

Research Impact

14. Rizwan, M., Mujtaba, G., Memon, S.A., Lee, K., Rashid, N. Exploring the potential of microalgae for new biotechnology applications and beyond: A review. *Renewable and Sustainable Energy Reviews, 92 (2018) 394-404*
15. Khan, Z., Yusup, S., Kamble, P., Naqvi, M., Watson, I. Assessment of energy flows and energy efficiencies in integrated catalytic adsorption steam gasification for hydrogen production. *Applied Energy,* 225 (2018) 346-355
16. Ahmad, R., Aslam, M., Park, E., Chang, S., Kwon, D., Kim, J. Submerged low-cost pyrophyllite ceramic membrane filtration combined with GAC as fluidized particles for industrial wastewater treatment. *Chemosphere,* 206 (2018) 784-792
17. Faisal, A., Zhou, M., Hedlund, J., Grahn, M. Zeolite MFI adsorbent for recovery of butanol from ABE fermentation broths produced from an inexpensive black liquor-derived hydrolysate. *Biomass Conversion and Biorefinery, 8 (2018) 679-687*
18. Asghar, H., Ilyas, A., Tahir, Z., Li, X., Khan, A.L. Fluorinated and sulfonated poly (ether ether ketone) and Matrimid blend membranes for CO_2 separation. *Separation and Purification Technology, 203 (2018) 233-241*
19. Ullah, Z., Khan, A.S., Muhammad, N., Ullah, R., Alqahtani, A.S., Shah, S.N., Ghanem, O.B., Bustam, M.A., Man, Z. A review on ionic liquids as perspective catalysts in transesterification of different feedstock oil into biodiesel. *Journal of Molecular Liquids,* 266 (2018) 673-686
20. Chawla, M., Rafiq, S., Jamil, F., Usman, M.R., Khurram, S., Ghauri, M., Muhammad, N., Al-Muhtaseb, A.H., Aslam, M. Hydrocarbons fuel upgradation in the presence of modified bi-functional catalyst. *Journal of Cleaner Production,* 198 (2018) 683-692
21. Ilyas, A., Muhammad, N., Gilani, M.A., Vankelecom, I.F.J., Khan, A.L. Effect of zeolite surface modification with ionic liquid [APTMS][Ac] on gas separation performance of mixed matrix membranes. *Separation and Purification Technology,* 205 (2018) 176-183

Research Impact

22. Ahmed, A., Abu Bakar, M.S., Azad, A.K., Sukri, R.S., Phusunti, N. Intermediate pyrolysis of Acacia cincinnata and Acacia holosericea species for bio-oil and biochar production. *Energy Conversion and Management, 176 (2018) 393-408*
23. Zagho, M.M., Al Maadeed, M.A., Majeed, K. Thermal Properties of TiO_2 NP/CNT/LDPE Hybrid Nanocomposite Films. *Polymers,* 10 (2018) 1270
24. Aslam, M., Ahmad, R., Kim, J. Recent developments in biofouling control in membrane bioreactors for domestic wastewater treatment. *Separation and Purification Technology,* 206 (2018) 297-315
25. Javed, F., Aslam, M., Rashid, N., Shamair, Z., Khan, A.L., Yasin, M., Fazal, T., Hafeez, A., Rehman, F., Rehman, M.S.U., Khan, Z., Iqbal, J., Bazmi, A.A. Microalgae-based biofuels, resource recovery and wastewater treatment: A pathway towards sustainable biorefinery. *Fuel,* 255 (2019) 115826
26. Yang, P., Tan, G.-Y.A., Aslam, M., Kim, J., Lee, P.-H. Metatranscriptomic evidence for classical and RuBisCO-mediated CO_2 reduction to methane facilitated by direct interspecies electron transfer in a methanogenic system. *Scientific Reports,* 9 (2019) 4116
27. Wongso, V., Chen, C.J., Razzaq, A., Kamal, N.A., Sambudi, N.S. Hybrid kaolin/TiO_2 composite: Effect of urea addition towards an efficient photocatalyst for dye abatement under visible light irradiation. *Applied Clay Science,* 180 (2019) 105158
28. Khan, Z., Yusup, S., Aslam, M., Inayat, A., Shahbaz, M., Raza Naqvi, S., Farooq, R., Watson, I. NO and SO_2 emissions in palm kernel shell catalytic steam gasification with in-situ CO_2 adsorption for hydrogen production in a pilot-scale fluidized bed gasification system. *Journal of Cleaner Production,* 236 (2019) 117636

Research Impact

29. Rehman, W.U., Merican, Z.M.A., Bhat, A.H., Hoe, B.G., Sulaimon, A.A., Akbarzadeh, O., Khan, M.S., Mukhtar, A., Saqib, S., Hameed, A., Mellon, N., Ullah, H., Ullah, S., Assiri, M.A. Synthesis, characterization, stability and thermal conductivity of multi-walled carbon nanotubes (MWCNTs) and eco-friendly jatropha seed oil based nanofluid: An experimental investigation and modeling approach. *Journal of Molecular Liquids,* 293 (2019) 111534
30. Tahir, K., Miran, W., Nawaz, M., Jang, J., Shahzad, A., Moztahida, M., Kim, B., Azam, M., Jeong, S.E., Jeon, C.O., Lim, S.-R., Lee, D.S. Investigating the role of anodic potential in the biodegradation of carbamazepine in bioelectrochemical systems. *Science of the Total Environment.* 688 (2019) 56-64
31. Atabani, A.E., Al-Muhtaseb, A.H., Kumar, G., Saratale, G.D., Aslam, M., Khan, H.A., Said, Z., Mahmoud, E. Valorization of spent coffee grounds into biofuels and value-added products: Pathway towards integrated bio-refinery. *Fuel,* 254 (2019) 115640
32. Hassan, M., Faisal, A., Ali, I., Bhatti, M.M., Yousaf, M. Effects of Cu–Ag hybrid nanoparticles on the momentum and thermal boundary layer flow over the wedge. *Proceedings of the Institution of Mechanical Engineers, Part E: Journal of Process Mechanical Engineering,* 233 (2019) 1128-1136
33. Hussain, A., Chaniago, Y.D., Riaz, A., Lee, M. Design method for the feasibility and technical evaluation of side-reactor column configurations. *Chemical Engineering and Processing - Process Intensification,* 144 (2019) 107648
34. Ahmad, N., Javed, F., Awan, J.A., Ali, S., Fazal, T., Hafeez, A., Aslam, R., Rashid, N., Rehman, M.S.U., Zimmerman, W.B., Rehman, F. Biodiesel production intensification through microbubble mediated esterification. *Fuel,* 253 (2019) 25-31

Research Impact

35. Bencheikh, K., Atabani, A.E., Shobana, S., Mohammed, M.N., Uğuz, G., Arpa, O., Kumar, G., Ayanoğlu, A., Bokhari, A. Fuels properties, characterizations and engine and emission performance analyses of ternary waste cooking oil biodiesel–diesel–propanol blends. *Sustainable Energy Technologies and Assessments,* 35 (2019) 321-334
36. Ahmad, R., Guo, J., Kim, J. Structural characteristics of hazardous organic dyes and relationship between membrane fouling and organic removal efficiency in fluidized ceramic membrane reactor. *Journal of Cleaner Production,* 232 (2019) 608-616
37. Amjad, U.-E.-S., Quintero, C.W.M., Ercolino, G., Italiano, C., Vita, A., Specchia, S. Methane Steam Reforming on the Pt/CeO_2 Catalyst: Effect of Daily Start-Up and Shut-Down on Long-Term Stability of the Catalyst. *Industrial and Engineering Chemistry Research,* 58 (2019) 16395-16406
38. Manzoor, T., Javed, T., Mustafa, G., Manzoor Ahmed, H.U., Razzaq, A. Facile synthesis of $CuxZn1-xFe_2O_4$ nanoparticles and their thermo-physical properties evaluation. *Applied Physics A: Materials Science and Processing,* 125 (2019) 626
39. Ali, S., Flores, M.C., Razzaq, A., Sorcar, S., Hiragond, C.B., Kim, H.R., Park, Y.H., Hwang, Y., Kim, H.S., Kim, H., Gong, E.H., Lee, J., Kim, D., In, S.-I. Gas Phase Photocatalytic CO_2 Reduction, "A Brief Overview for Benchmarking". *Catalysts,* 9 (2019) 727
40. Ali, S., Razzaq, A., In, S.-I. Development of Graphene Based Photocatalysts for CO_2 Reduction to C1 Chemicals: A brief Overview. *Catalysis Today,* 335 (2019) 39-54
41. Rashid, N., Nayak, M., Suh, W.I., Lee, B., Chang, Y.-K. Efficient microalgae removal from aqueous medium through auto-flocculation: investigating growth-dependent role of organic matter. *Environmental Science and Pollution Research,* 26 (2019) 27396-27406

Research Impact

42. Abbas, T., Wadhawan, T., Khan, A., McEvoy, J., Khan, E. Iron turning waste media for treating Endosulfan and Heptachlor contaminated water. *Science of the Total Environment,* 685 (2019) 124-133
43. Zhao, J., Wang, L., Tang, L., Ren, R., You, W., Farooq, R., Wang, Z., Zhang, Y. Changes in bacterial community structure and humic acid composition in response to enhanced extracellular electron transfer process in coastal sediment. *Archives of Microbiology,* 201 (2019) 897-906
44. Tahir, M., Tahir, B., Nawawi, M.G.M., Hussain, M., Muhammad, A. Cu-NPs embedded 1D/2D CNTs/pCN heterojunction composite towards enhanced and continuous photocatalytic CO_2 reduction to fuels. *Applied Surface Science,* 485 (2019) 450-461
45. Shafiq, I., Hussain, M., Shehzad, N., Maafa, I.M., Akhter, P., Amjad, U.-E.-S., Shafique, S., Razzaq, A., Yang, W., Tahir, M., Russo, N. The effect of crystal facets and induced porosity on the performance of monoclinic $BiVO_4$ for the enhanced visible-light driven photocatalytic abatement of methylene blue. *Journal of Environmental Chemical Engineering,* 7 (2019) 103265
46. Hamayun, M.H., Hussain, M., Maafa, I.M., Aslam, R. Integration of hydrogenation and dehydrogenation system for hydrogen storage and electricity generation – simulation study. *International Journal of Hydrogen Energy*, 44 (2019) 20213-20222
47. Maaz, M., Yasin, M., Aslam, M., Kumar, G., Atabani, A.E., Idrees, M., Anjum, F., Jamil, F., Ahmad, R., Khan, A.L., Lesage, G., Heran, M., Kim, J. Anaerobic membrane bioreactors for wastewater treatment: Novel configurations, fouling control and energy considerations. *Bioresource Technology,* 283 (2019) 358-372
48. Ali, S., Rani, A.M.A., Mufti, R.A., Hastuty, S., Hussain, M., Shehzad, N., Baig, Z., Aliyu, A.A.A. An Efficient Approach for Nitrogen Diffusion and Surface Nitriding of Boron-Titanium Modified Stainless Steel Alloy for Biomedical Applications. *Metals,* 9 (2019) 755

Research Impact

49. Boulal, A., Atabani, A.E., Mohammed, M.N., Khelafi, M., Uguz, G., Shobana, S., Bokhari, A., Kumar, G. Integrated valorization of Moringa oleifera and waste Phoenix dactylifera L. dates as potential feedstocks for biofuels production from Algerian Sahara: An experimental perspective. *Biocatalysis and Agricultural Biotechnology,* 20 (2019) 101234
50. Ayaz, M., Muhammad, A., Younas, M., Khan, A.L., Rezakazemi, M. Enhanced Water Flux by Fabrication of Polysulfone/Alumina Nanocomposite Membrane for Copper(II) Removal. *Macromolecular Research,* 27 (2019) 565-571
51. Ali, D., Butt, M.Z., Muneer, I., Farrukh, M.A., Aftab, M., Saleem, M., Bashir, F., Khan, A.U. Synthesis and characterization of sol-gel derived La and Sm doped ZnO thin films: A solar light photo catalyst for methylene blue. *Thin Solid Films,* 679 (2019) 86-98
52. Lau, A.K.S., Bilad, M.R., Osman, N.B., Marbelia, L., Putra, Z.A., Nordin, N.A.H.M., Wirzal, M.D.H., Jaafar, J., Khan, A.L. Sequencing batch membrane photobioreactor for simultaneous cultivation of aquaculture feed and polishing of real secondary effluent. *Journal of Water Process Engineering,* 29 (2019) 100779
53. Atabani, A.E., Shobana, S., Mohammed, M.N., Uğuz, G., Kumar, G., Arvindnarayan, S., Aslam, M., Al-Muhtaseb, A.H. Integrated valorization of waste cooking oil and spent coffee grounds for biodiesel production: Blending with higher alcohols, FT–IR, TGA, DSC and NMR characterizations. *Fuel,* 244 (2019) 419-430
54. Faisal, A., Holmlund, M., Ginesy, M., Holmgren, A., Enman, J., Hedlund, J., Grahn, M. Recovery of l-Arginine from Model Solutions and Fermentation Broth Using Zeolite-Y Adsorbent. *ACS Sustainable Chemistry and Engineering,* 7 (2019) 8900-8907

Research Impact

55. Khalid, A., Aslam, M., Qyyum, M.A., Faisal, A., Khan, A.L., Ahmed, F., Lee, M., Kim, J., Jang, N., Chang, I.S., Bazmi, A.A., Yasin, M. Membrane separation processes for dehydration of bioethanol from fermentation broths: Recent developments, challenges, and prospects. *Renewable and Sustainable Energy Reviews,* 105 (2019) 427-443
56. Ahmad, N., Abnisa, F., Wan Daud, W.M.A. Synthesis of valuable intermediate products from natural rubber under supercritical alcohol conditions. *Journal of Analytical and Applied Pyrolysis,* 139 (2019) 196-204
57. Rashid, Z., Wilfred, C.D., Gnanasundaram, N., Arunagiri, A., Murugesan, T. A comprehensive review on the recent advances on the petroleum asphaltene aggregation. *Journal of Petroleum Science and Engineering,* 176 (2019) 249-268
58. Hellier, P., Jamil, F., Zaglis-Tyraskis, E., Al-Muhtaseb, A.H., Al Haj, L., Ladommatos, N. Combustion and emissions characteristics of date pit methyl ester in a single cylinder direct injection diesel engine. *Fuel,* 243 (2019) 162-171
59. Hussain, A., Chaniago, Y.D., Riaz, A., Lee, M. Significance of operating pressure on process intensification in a distillation with side-reactor configuration. *Separation and Purification Technology,* 213 (2019) 533-544
60. Naseer, A., Jamshaid, A., Hamid, A., Muhammad, N., Ghauri, M., Iqbal, J., Rafiq, S., Khuram, S., Shah, N.S. Lignin and Lignin Based Materials for the Removal of Heavy Metals from Waste Water-An Overview. *Zeitschrift fur Physikalische Chemie,* 233 (2019) 315-345
61. Ahmad, R., Kim, J.K., Kim, J.H., Kim, J. Diethylene Glycol-Assisted Organized TiO_2 Nanostructures for Photocatalytic Wastewater Treatment Ceramic Membranes. *Water*, 11 (2019) 750

Research Impact

62. Ullah, Z., Bustam, M.A., Man, Z., Khan, A.S., Sarwono, A., Muhammad, N., Farooq, M., Shah, S.N., Ahmad, P., Haider, S. Phosphonium-based hydrophobic ionic liquids with fluorous anions for biodiesel production from waste cooking oil. International *Journal of Environmental Science and Technology,* 16 (2019) 1269-1276
63. Tabriz, A., Ur Rehman Alvi, M.A., Khan Niazi, M.B., Batool, M., Bhatti, M.F., Khan, A.L., Khan, A.U., Jamil, T., Ahmad, N.M. Tabriz, A., Ur Rehman Alvi, M.A., Khan Niazi, M.B., Batool, M., Bhatti, M.F., Khan, A.L., Khan, A.U., Jamil, T., Ahmad, N.M. *Carbohydrate Polymers,* 207 (2019) 17-25
64. Shahbaz, M., Taqvi, S.A., Minh Loy, A.C., Inayat, A., Uddin, F., Bokhari, A., Naqvi, S.R. Artificial neural network approach for the steam gasification of palm oil waste using bottom ash and CaO. *Renewable Energy,* 132 (2019) 243-254
65. Tan, M., Ma, L., Rehman, M.S.U., Ahmed, M.A., Sajid, M., Xu, X., Sun, Y., Cui, P., Xu, J. Screening of acidic and alkaline pretreatments for walnut shell and corn stover biorefining using two way heterogeneity evaluation. *Renewable Energy,* 132 (2019) 950-958
66. Hussain, A., Chaniago, Y.D., Riaz, A., Lee, M. Process Design Alternatives for Producing Ultra-high-purity Electronic-Grade Propylene Glycol Monomethyl Ether Acetate. *Industrial and Engineering Chemistry Research,* 58 (2019) 2246-2257
67. Lee, S.H., Lee, K.-S., Sorcar, S., Razzaq, A., Lee, M.-G., In, S.-I. Novel Porous Brain Electrodes for Augmented Local Field Potential Signal Detection. *Materials,* 12 (2019) 542

Research Impact

68. Ullah, Z., Bustam, M.A., Man, Z., Khan, A.S., Sarwono, A., Muhammad, N., Farooq, M., Shah, S.N., Ahmad, P., Haider, S. Phosphonium-based hydrophobic ionic liquids with fluorous anions for biodiesel production from waste cooking oil. International *Journal of Environmental Science and Technology,* 16 (2019) 1269-1276
69. Ishaq, S., Tamime, R., Bilad, M.R., Khan, A.L. Mixed matrix membranes comprising of polysulfone and microporous Bio-MOF-1: Preparation and gas separation properties. *Separation and Purification Technology,* 210 (2019) 442-451
70. Zagho, M.M., Al Maadeed, M.A.A., Majeed, K. Role of TiO_2 and Carbon Nanotubes on Polyethylene, an Effect of Accelerated Weathering on Photo Oxidation and Mechanical Properties. *Journal of Vinyl and Additive Technology,* 25 (2019) 19-25
71. Tran, X.T., Park, S.S., Song, S., Haider, M.S., Imran, S.M., Hussain, M., Kim, H.T. Electroconductive performance of polypyrrole/reduced graphene oxide/carbon nanotube composites synthesized via in situ oxidative polymerization. *Journal of Materials Science,* 54 (2019) 3156-3173
72. Shad, M.K., Lai, F.-W., Fatt, C.L., Klemeš, J.J., Bokhari, A. Integrating sustainability reporting into enterprise risk management and its relationship with business performance: A conceptual framework. *Journal of Cleaner Production,* 208 (2019) 415-425
73. Amjad, U.-E.-S., Sherin, L., Zafar, M.F., Mustafa, M. Comparative Study on the Catalytic Degradation of Methyl Orange by Silver Nanoparticles Synthesized by Solution Combustion and Green Synthesis Method. *Arabian Journal for Science and Engineering,* 2019
74. Saqib, S., Rafiq, S., Chawla, M., Saeed, M., Muhammad, N., Khurram, S., Majeed, K., Khan, A.L., Ghauri, M., Jamil, F., Aslam, M. Facile CO2 Separation in Composite Membranes. *Chemical Engineering and Technology,* 42 (2019) 30-44

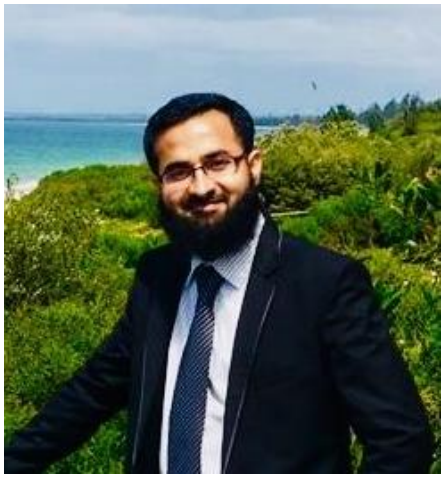
Research Impact

76. Bhutto, A.W., Bazmi, A.A., Karim, S., Abro, R., Mazari, S.A., Nizamuddin, S. Promoting sustainability of use of biomass as energy resource: Pakistan's perspective. *Environmental Science and Pollution Research,* 2019
77. Sajid, M., Ayoub, M., Uemura, Y., Yusup, S., Saleem, M., Abdullah, B., Khan, A.U. Comparative study of glycerol conversion to polyglycerol via conventional and microwave irradiation reactor. *Materialstoday: Proceedings,* 16 (2019) 2101-2107
78. Haider, M.S., Shao, G., Ahmad, A., Imran, S.M., Abbas, N., Abbas, G., Hussain, M., Kim, H.T. Facile, single-pot preparation of nanoporous SiO_2 particles (carrier) with AgNPs at core and crust for controlled disinfectant release. *Journal of Saudi Chemical Society,* 2019
79. Inayat, A., Jamil, F., Raza, M., Khurram, S., Ghenai, C., Al-Muhatseb, A.H. Upgradation of waste cooking oil to biodiesel in the presence of green catalyst derived from date seeds. *Biofuels,* 2019
80. Shehzad, N., Tahir, M., Johari, K., Murugesan, T., Hussain, M. Fabrication of highly efficient and stable indirect Z-scheme assembly of $AgBr/TiO_2$ via graphene as a solid-state electron mediator for visible light induced enhanced photocatalytic H_2 production. *Applied Surface Science,* 463 (2019) 445-455
81. Rehman, M. U., Rashid, K., Haq, E. U., Hussain, M., & Shehzad, N.. Physico-mechanical performance and durability of artificial lightweight aggregates synthesized by cementing and geopolymerization. *Construction and Building Materials*, *232*, (2020) 117290
82. Majeed, K., Ahmed, A., Bakar, A., Saifullah, M., Mahlia, I., Meurah, T., Saba, N., Hassan, A., Jawaid, M., Hussain, M. and Iqbal, J.,. Mechanical and Thermal Properties of Montmorillonite-Reinforced Polypropylene/Rice Husk Hybrid Nanocomposites. *Polymers*, *11*(10), (2019) p.1557

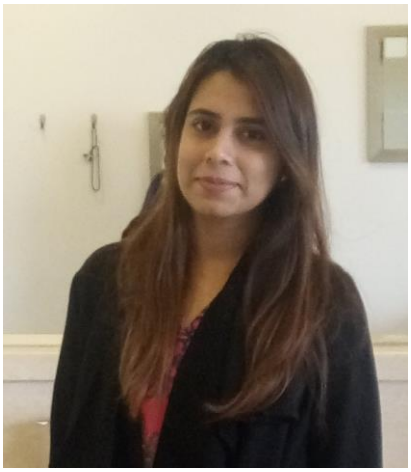
Research Impact

83. Irfan, M., Moniruzzaman, M., Ahmad, T., Osman, O. Y., Mandal, P. C., Bhattacharjee, S., & Hussain, M.. Stability, interparticle interactions and catalytic performance of gold nanoparticles synthesized through ionic liquid mediated oil palm leaves extract. *Journal of environmental chemical engineering*, *6*(4), (2018) 5024-5031
84. Shehzad, N., Tahir, M., Johari, K., Murugesan, T., & Hussain, M.. A critical review on TiO_2 based photocatalytic CO_2 reduction system: Strategies to improve efficiency. *Journal of CO_2 Utilization*, *26*, (2018) 98-122.
85. Nawi, N.I.M., Bilad, M.R., Nordin, N.A.H.M., Mavukkandy, M.O., Putra, Z.A., Wirzal, M.D.H., Jaafar, J., Khan, A.L. Exploiting the Interplay between Liquid-Liquid Demixing and Crystallization of the PVDF Membrane for Membrane Distillation. *International Journal of Polymer Science,* (2018) 1525014
86. Bhatti, H.T., Ahmad, N.M., Niazi, M.B.K., Alvi, M.A.U.R., Ahmad, N., Anwar, M.N., Cheema, W., Tariq, S., Batool, M., Aman, Z., Janjua, H.A., Khan, A.L., Khan, A.U. Graphene Oxide-PES-Based Mixed Matrix Membranes for Controllable Antibacterial Activity against Salmonella typhi and Water Treatment. *International Journal of Polymer Science,* (2018) 7842148
87. Javed, F., Shamair, Z., Ali, S., Ahmad, N., Hafeez, A., Fazal, T., Rehman, M.S.U., Zimmerman, W.B. and Rehman, F.,. “Pushing and pulling” the equilibrium through bubble mediated reactive separation for ethyl acetate production. *Reaction Chemistry & Engineering*, *4* (2019), pp.705-714

Editorial Board



Dr. Rizwan Ahmad



Engr. Zabia Sajjad