ADNAN

Associate Professor (Tenured)

Institute of Chemical Sciences, University of Swat

Address: Charbagh, Swat 19120, Khyber Pakhtunkhwa, Pakistan
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Professional Summary

Tenured Associate Professor with 16+ years of expertise in renewable energy materials, heterogeneous catalysis, and waste-to-energy conversion. Published over 40+ peer-reviewed papers (cumulative IF >170, 1000+ citations, h-index: 16); secured over PKR 40 million plus in competitive research funding. Proven track record of leading cross-functional research teams and mentoring graduate students.

Research Interests / Keywords

- Renewable Energy; Energy Storage Materials (e.g., Li-S Batteries, Supercapacitors) & Water Splitting Reactions
- Heterogenous Catalysis
- Waste to valuable chemicals and fuels
- Photocatalysis for Water Treatment
- Nanomaterial Synthesis
- Toxicant Removal
- Analytical Method development

Work Experience

01	**Institution**	**University of Swat** **(Institute of Chemical Sciences)**
	Designation	**Tenured Associate Professor**
	Duration:	**September 15, 2025, to Date**
	Address:	*Charbagh, Swat 19120, Khyber Pakhtunkhwa, Pakistan*
	Job Description:	

- **Research Leadership & Strategic Development:** Provide senior-level leadership in sustainable energy materials research, steering the long-term strategic direction of the research group. Focus on sustaining a high-output publication platform and mentoring the next generation of research leaders. Currently developing new, ambitious research initiatives and advanced grant proposals targeting national and international funding bodies to build upon the existing foundation of secured competitive research grants totaling over PKR 40M+ (≈$250,000).

- **Academic Mentorship & Capacity Building:** Provide senior supervision and strategic guidance to graduate researchers, overseeing the entire research lifecycle from project conception to thesis completion. Cultivate a collaborative and high-achieving research environment that fosters academic excellence and independent critical thinking.
- **Teaching Excellence & Curriculum Innovation:** Lead the development and delivery of advanced undergraduate and graduate courses, including *Principles of Analytical Chemistry* and *Advanced Analytical Chemistry*. Integrate cutting-edge research findings into the curriculum to provide students with a relevant and dynamic educational experience.
- **Institutional Service & Governance:** Assume a greater leadership role in departmental and university affairs. Serve as BS Program Coordinator, with responsibilities encompassing curriculum modernization, program assessment, and accreditation processes. Act as a key member of university committees, including the Board of Studies and Graduate Studies Committee, contributing to high-level academic governance and strategic planning.

02 **Institution** **INTI International University**
Designation **Research Fellow** (This is a remote position)
Duration: **June 01, 2023, to date.**
Address: *Persiaran Perdana Bbn, Putra Nilai, Nilai, Negeri Sembilan, 71800, Malaysia*

Job Description:

- Drive collaborative research on advanced materials for sustainability, leveraging international partnerships to secure grants and co-author high-impact publications.
- Supervise and mentor postgraduate researchers within INTI's research clusters, enhancing the university's global research output.

03 **Institution** **University of Swat**
(Institute of Chemical Sciences)
Designation **Assistant Professor**
Duration: **February 12, 2015, to September 14, 2025**
Address: *Charbagh, Swat 19120, Khyber Pakhtunkhwa, Pakistan*
Job Description:

- **Research Leadership:** Established a leading research program in sustainable energy materials. Secured PKR 40M+ (≈$250,000) as Principal Investigator in competitive grants, enabling groundbreaking work on catalysts and Li-S batteries.
- **Mentorship:** Supervised and graduated 20+ M.Phil. students. Currently advising 2 doctoral candidates.
- **Teaching Excellence:** Designed and delivered more than 10 courses, including *Principles of Analytical Chemistry*, *Advanced Analytical Chemistry* and *Specialized Analytical Chemistry Courses* employing innovative pedagogical methods.
- **Service:** Served as BS Program Coordinator, Member curriculum development and accreditation, proctor, events chief organizer etc.

03 **Institution** **Columbia University in the City of New York**
(Earth and Environmental Engineering Department) Designation
Staff Associate

Duration: **October 22, 13,** to **April 21, 2014**

Address: *Mudd Hall 5th Floor, 500 W 120th St, New York, NY 10027*

Job Description:

- Engineered and optimized impregnated catalyst systems for the catalytic degradation of waste polystyrene, successfully converting it into valuable hydrocarbon fuels and chemicals.
- Designed and executed comprehensive experimental studies to evaluate catalyst performance, kinetics, and efficiency under varying parameters (e.g., temperature, pressure, catalyst loading).
- Pioneered research in sustainable waste plastic valorization, contributing to the development of a novel process for polymer upcycling, resulting in a research paper “Effect of polyethylene terephthalate on the pyrolysis of polystyrene using supported catalyst; investigation of the liquid products. Journal of the Taiwan Institute of Chemical Engineers, 51, 96-102 (2015)”.
- Collaborated effectively within a multidisciplinary team under Prof. Ah-Hyung (Alissa) Park, leveraging state-of-the-art facilities to advance the group's research on environmental sustainability.

Education

- **Ph.D. in Analytical/Materials Chemistry (2015)**
  (MPhil leading to PhD Program)
  University of Peshawar, Peshawar, Pakistan
  Thesis: Studies on Impregnated Catalysts for Conversion of Waste Expanded Polystyrene into Value Added Hydrocarbons.
  Advisor: Meritorious Prof. Dr Jasmin Shah
  Co-Advisor: Emeritus Prof. Dr. Muhammad Rasul Jan

- **M.Sc. in Analytical/Inorganic Chemistry (2008)**
  Hazara University, Mansehra, Pakistan

- **B.Sc. in Physical & Biological Sciences (2004)**
  University of Malakand, Dir Lower, Pakistan

International Collaborations / Research Network

- **Prof. Ah-Hyung (Alissa) Park,** *Columbia University (formerly) / UCLA, USA*
  Focus: Catalytic conversion of waste plastics into valuable hydrocarbons and chemicals.
  (Collaboration initiated during my International Research Support Initiative Program (IRSIP) fellowship at Columbia University.)

- **Prof. Xiangwu Zhang,** *North Carolina State University, USA*
- Focus: Advanced materials for energy storage applications, including lithium-sulfur batteries and supercapacitors.

- **Prof. Ho Soonmin,** *INTI International University, Malaysia*
  Focus: Photocatalytic nanomaterials for environmental remediation and water treatment.
  (Ongoing collaboration underpins my remote Research Fellow position at INTI International University.)

- **Prof. Wei Sun,** *Hainan Normal University, China*
  Focus: Synthesis and application of novel nanomaterials for catalytic and photocatalytic processes.

- **Assoc. Prof. Soorathep Kheawhom,** *Chulalongkorn University, Thailand*
- Focus: Electrochemical systems and materials engineering for advanced energy storage solutions.

Selected Publications

Published over 40+ peer-reviewed papers (cumulative IF >170). Google Scholar: 1000+ citations, h-index: 16, i10-index: 21.

1. Izaz Ul Islam, Qurashi, A. N., **Adnan, A.**, Ali, A., Malik, S., Younas, F., Akhtar, H. T., Farishta, F., Janiad, S., Ali, F., Wang, X., Ng, S. L., & Yabalak, E. (2025). Activated Slugged and Bioremediation: Strategies for Managing Pharmaceutical Pollution in Aquatic Environment. *Water, Air, & Soil Pollution*. (IF: 3.0) - Accepted.
2. Khan, K., Younas, M., Yaseen, M., Sher, H., Maryam, A., Ibrahim, S. M., **Adnan, A.**, Ali, A., Fawad, M., Khan, A. Z., Khan, N., & Shah, I. A. (2025). Heavy Metals Pollution in Riverine Sediments: Distribution, Source, and Environmental Implications. *Environmental Monitoring and Assessment, 197*, 225. (IF: 3.0) https://doi.org/10.1007/s10661-025-13623-4
3. Ayaz, M., Shah, S. S., Younas, M., Safder, U., Khan, I., Aziz, M. A., **Adnan**, Oyama, M., Rice, J. H., & Tahir, M. N. (2025). Green Synthesis of Activated Carbon from Biomass Waste of Date Palm Seeds: A Sustainable Solution for Energy Storage and Environmental Impact. *Journal of Energy Storage, 110*, 115291. (IF: 9.8) https://doi.org/10.1016/j.est.2025.115291
4. **Adnan**, Kalsoom, Zada, F. M., Sarwat, Soonmin, H., Khan, B., Alamzeb, M., Sun, W., Ikran, J., & Rehman, N. u. (2024). Visible Light Induced Photocatalytic Degradation of Norfloxacin using xC-TiO2. *Heliyon*. (IF: 3.6) https://doi.org/10.1016/j.heliyon.2024.e41320
5. Ahmad, A., Wang, Z.-F., Khan, I. A., Ullah, S., Hussain, A., Altaf, F., Mabood, F., Bakare, A. I., Saeed, M., **Adnan**, Rehman, N. u., Khan, S. A., & Chen, C.-M. (2024). Self-sulfur doped mesoporous novel carbon electrodes derived from poly-anthraquinone sulfide for high-performance supercapacitors! A comparative study. *Journal of Energy Storage, 100*, 113763. (IF: 9.8) https://doi.org/10.1016/j.est.2024.113763
6. Shah, A., **Adnan**, Sharif, T., Khan, M. M., Abidin, Z. u., Sohail, M., Zada, F. M., Khan, N., Ali, F., & Zafar, S. (2024). Photocatalytic Degradation of Methyl Violet and Auramine-O Dyes Using Ni/ZnO Nanocomposites for An Environmental Solution for Dye Wastewater. *Biosensors and Nanotheranostics*. https://doi.org/10.25163/biosensors.319940
7. **Adnan**, Nisar, Shah, R., Zada, F. M., Khan, B., Aziz, S., Rehman, N. u., Soonmin, H., Ahmad, N., Khan, M., & Hanzala. (2024). Novel Ni/ZnO Nanocomposites for the

Effective Photocatalytic Degradation of Malachite Green Dye. *Civil Engineering Journal, 10*(8), 2601–2614. (IF: 4.9) http://dx.doi.org/10.28991/CEJ-2024-010-08-011

8. Ahmad, M., Inayat, A., Hussain, M. N., Khan, A., **Adnan**, Alam, M., Sultan, M., & Abbas, S. M. (2024). Graphene supported In2S3 nanostructure as electrode material for lithium sulfur batteries and supercapacitors. *Materials Today Sustainability, 25*, 100631. (IF: 7.9) https://doi.org/10.1016/j.mtsust.2023.100631
9. Sohail, M., BiBi, H., Omer, M., Ullah, I., Ullah, I., Rauf, A., & Ullah, Z. (2023). Development of TiO2/Al2O3 based Mg Composite Materials: Properties and Applications. *Zeitschrift für Physikalische Chemie*. (IF: 2.8) https://doi.org/10.1515/zpch-2023-0279
10. Siyar, M., Khan, H., Park, C., Javed, F., Umer, M. A., Jin, W., Saleem, M., & **Adnan**. (2023). Tuning the Electronic Properties in Facile in situ Solution Synthesis of SnSe2/rGO Nanocomposites with Enhanced Thermoelectric Performance. *Journal of Materials Research, 38*, 3913–3922. (IF: 2.9) http://doi.org/10.1557/s43578-023-01112-8
11. Ali, H., Bashir, N., **Rauf, A.,** Haroon, H., Naz, S., & Shad, S. (2023). Synthesis of Tungsten-Cerium Doped Titanium Oxide Nano catalyst to Remediate Water by the Degradation of Atrazine Herbicide. *Journal of Nano Research, 77*, 47–63. (IF: 0.8) https://doi.org/10.4028/p-hb1aa7
12. Inayat, A., Albalawi, K., Rehman, A.-u., **Adnan**, Saad, A. Y., Saleh, E. A. M., Alamri, M. A., El-Zahhar, A. A., Haider, A., & Abbas, S. M. (2023). Tunable Synthesis of Carbon Quantum Dots from the Biomass of Spent Tea Leaves as Supercapacitor Electrode. *Materials Today Communications, 34*, 105479. (IF: 4.5) https://doi.org/10.1016/j.mtcomm.2023.105479
13. Shah, R., Ali, S., Raziq, F., Ali, S., Ismail, P. M., Shah, S., Iqbal, R., Wu, X., He, W., Zu, X., Zada, A., **Adnan**, Mabood, F., Vinu, A., Jhung, S. H., Yi, J., & Qiao, L. (2023). Exploration of Metal Organic Frameworks and Covalent Organic Frameworks for Energy-related Applications. *Coordination Chemistry Reviews, 447*, 214968. (IF: 23.5) https://doi.org/10.1016/j.ccr.2022.214968
14. **Adnan**, Omer, M., Khan, B., Khan, I., Alamzeb, M., Zada, F. M., Ullah, I., Shah, R., Aziz, S., Alqarni, M., & Simal-Gandara, J. (2022). Equilibrium, Kinetic and Thermodynamic Studies for The Adsorption of Metanil Yellow using Carbonized Pistachio Shell-Magnetic Nanoparticles. *Water, 14*(24), 4139. (IF: 3.0) https://doi.org/10.3390/w14244139
15. Sohail, M., Ullah, R., Khan, S. U., Bilal, S., Omer, M., Ullah, I., & **Adnan**. (2022). Toward the Development of Novel Poly(o-toluidine)-Based Metal Composite Materials: Structural, Optical and Electrochemical Performance. *Arabian Journal for Science and Engineering*. (IF: 2.9) https://doi.org/10.1007/s13369-022-07563-1
16. Mehmood, R., Ahmad, Z., Hussain, M. B., Athar, M., Akbar, G., Ajmal, Z., Iqbal, S., Razaq, R., Ali, M. A., Qayum, A., Chishti, A. N., Zaman, F., Shah, R., Zaman, S., & **Adnan**. (2022). 2D-2D heterostructure g-C3N4 based materials for photocatalytic H2 evolution: Progress and Perspectives. *Frontiers in Chemistry, 10*, 1063288. (IF: 4.2) https://doi.org/10.3389/fchem.2022.1063288
17. Shah, R., Ali, S., Ali, S., Xia, P., Raziq, F., **Adnan**, Mabood, F., Shah, S., Zada, A., Ismail, P. M., Hayat, A., Rehman, A. U., Wu, X., Xiao, H., Zu, X., & Qiao, L. (2023). Amino Functionalized Metal-Organic Framework/rGO Composite Electrode for Flexible Li-Ion Batteries. *Journal of Alloys and Compounds, 936*, 168183. (IF: 6.3) https://doi.org/10.1016/j.jallcom.2022.168183

18. Muhammad, I., Muhammad, T., Hoji, A., Imerhasan, M., & **Adnan**. (2022). A Fluorescent Polymer Coated Sensor Chip for Mercury Ion (Hg2+) Determination in Lake Water. *ChemistrySelect, 7*, e202201326. (IF: 2.0) https://doi.org/10.1002/slct.202201326
19. Ullah, I., Ilyas, M., Omer, M., Alamzeb, M., & **Adnan**. (2022). Fluorinated Triazoles as privileged potential candidates in drug development - focusing on their biological and pharmaceutical properties. *Frontiers in Chemistry, 10*, 926723. (IF: 4.2) https://doi.org/10.3389/fchem.2022.926723
20. Sohail, M., Omer, M., **Adnan**, Sayed, M. G., Shahzad, A., Ullah, I., & Ahmad, A. (2021). Studies on Ceramic Wastes Based Composites for Capacitors Applications. *Engineering Proceedings, 12*(1), 108. (IF: 0.0) https://doi.org/10.3390/engproc2021012108
21. Usman, R., Khan, A., Tang, H., Ma, D., Alsuhaibani, A. M., Refat, M. S., **Adnan**, Ara, N., & Fan, H.-J. S. (2022). Charge transfer and hydrogen boding motifs in organic cocrystals derived from aromatic diamines and TCNB. *Journal of Molecular Structure, 1254*, 132360. (IF: 4.0) https://doi.org/10.1016/j.molstruc.2022.132360
22. Alamzeb, M., Setzer, W. N., Ali, S., Khan, B., Rashid, M.-U-, Ihsanullah, Salman, S. M., **Adnan**, Omer, M., Ali, J., & Ullah, A. (2021). Spectral, Anti-Inflammatory, Anti-Pyretic, Leishmanicidal, and Molecular Docking Studies, Against Selected Protein Targets, of a New Bisbenzylisoquinoline Alkaloid. *Frontiers in Chemistry, 9*, 711190. (IF: 3.8) https://doi.org/10.3389/fchem.2021.711190
23. Fazal, T., Iqbal, S., Shah, M., Bahadur, A., Ismail, B., Abd-Rabboh, H. S. M., Hameed, R., Mahmood, Q., Ibrar, A., Nasar, M. S., Ehsan, Y., Nauma, A., **Adnan**, & Abdul, M. (2022). Deposition of bismuth sulfide and aluminum doped bismuth sulfide thin films for photovoltaic applications. *Journal of Materials Science: Materials in Electronics, 33*, 42–53. (IF: 2.8) https://doi.org/10.1007/s10854-021-07329-9
24. Sohail, M., Ullah, S., Rahman, S. u., Ahmad, B., **Adnan**, & Ullah, I. (2022). Synthesis and Characterization of Mg-matrix based TiO2/Al2O3 Composite Materials. *Metals and Materials International, 28*, 887–896. (IF: 4.0) https://doi.org/10.1007/s12540-020-00954-9
25. Alamzeb, M., Ali, S., Rashid, M.-U-, Khan, B., Ullah, I., **Adnan**, Omer, M., Ullah, A., Ali, J., Setzer, W. N., Salman, S. M., Khan, A. J., & Shah, A. (2021). Antileishmanial potential of berberine alkaloids from Berberis glaucocarpa roots: Molecular docking suggests relevant Leishmania protein targets. *Natural Product Communications, 16*(9). (IF: 1.5) https://doi.org/10.1177/1934578X211031148
26. Khan, M., Naseer, S., Khan, M., Nazir, R., Badshah, A., **Adnan**, Shujah, S., & Parveen, A. (2021). Magnetic Solid Phase Extraction of Cd (II) From Water Samples Using Magnetic Nanoparticles Impregnated Walnut Shells Powder (MNPs-WSP). *Desalination and Water Treatment, 228*, 286–296. (IF: 1.0) https://doi.org/10.5004/dwt.2021.27352
27. Sohail, M., Khan, S., Khan, M. S., Ullah, I., Omer, M., Saeed, N., Sultana, S., **Adnan**, Shahzad, A., & Sayed, M. G. (2021). Towards the development of stable and efficient novel waste ceramics composites. *Heliyon, 7*, e06148. (IF: 3.4) https://doi.org/10.1016/j.heliyon.2021.e06148
28. Shaheen, K., Shah, Z., Khan, B., **Adnan**, Omer, M., Alamzeb, M., & Suo, H. (2020). Electrical, Photocatalytic, and Humidity Sensing Applications of Mixed Metal Oxide Nanocomposites. *ACS Omega, 5*(13), 7271–7279. (IF: 3.7) https://doi.org/10.1021/acsomega.9b04074

29. Khan, M. N., Ali, W., Shah, Z., Idrees, M., Gulab, H., & **Adnan**. (2020). A Validated Spectrofluorimetric Method for the Determination of Moxifloxacin in its Pure Form, Pharmaceutical Preparations and Biological Samples. *Analytical Sciences, 36*(3), 361-366. (IF: 1.8) https://doi.org/10.2116/analsci.19P370
30. Shah, J., Jan, M. R., & **Adnan**. (2017). Metal Decorated Montmorillonite as a Catalyst for the Degradation of Polystyrene. *Journal of Taiwan Institute of Chemical Engineers, 80*, 391-398. (IF: 5.5) https://doi.org/10.1016/j.jtice.2017.07.026
31. **Adnan**, Shah, J., & Jan, M. R. (2017). Recovery of Valuable Hydrocarbons from Waste Polystyrene Using Zinc Supported Catalysts. *Journal of the Polymer and the Environment, 25*(3), 759-769. (IF: 4.7) https://doi.org/10.1007/s10924-016-0858-4
32. Nawab, J., Ali, S., Rauf, A., Rehman, U. U., Khan, A. A., Sajjad, M., & Khan, W. (2015). Health risk associated with heavy metals via consumption of surface and groundwater in District Shangla, Pakistan. *Journal of Himalayan Earth Sciences, 48*(2), 62-73. (IF: 0.4)
33. Shah, J., Jan, M. R., & **Adnan**. (2015). Tertiary recycling of waste polystyrene using magnesium impregnated catalysts into valuable products. *Journal of Analytical and Applied Pyrolysis, 114*, 163-171. (IF: 6.2) https://doi.org/10.1016/j.jaap.2015.05.009
34. Shah, J., Jan, M. R., **Adnan**, & Zada, M. (2015). Effect of Carbon Supported Metals on the Tertiary Recycling of Waste Expanded Polystyrene. *Process Safety and Environmental Protection, 96*, 149-155. (IF: 7.8) https://doi.org/10.1016/j.psep.2015.05.004
35. **Adnan**, Shah, J., & Jan, M. R. (2015). Effect of polyethylene terephthalate on the pyrolysis of polystyrene using supported catalyst; investigation of the liquid products. *Journal of the Taiwan Institute of Chemical Engineers, 51*, 96-102. (IF: 6.3) https://doi.org/10.1016/j.jtice.2015.01.015
36. **Adnan**, Shah, J., & Jan, M. R. (2014). Polystyrene Degradation Studies using Cu Supported Catalysts. *Journal of Analytical and Applied Pyrolysis, 109*, 196–204. (IF: 6.2) https://doi.org/10.1016/j.jaap.2014.06.013
37. Shah, J., Jan, M. R., & **Adnan**. (2014). Catalytic Activity of Aluminium Impregnated Catalysts for the Degradation of Waste Polystyrene. *International Journal of Chemical, Nuclear, Metallurgical, and Materials Engineering, 8*(4), 344-350.
38. **Adnan**, Shah, J., & Jan, M. R. (2014). Thermo-Catalytic Pyrolysis of Polystyrene in the Presence of Zinc Bulk Catalysts. *Journal of the Taiwan Institute of Chemical Engineers, 45*, 2494–2500. (IF: 5.5) https://doi.org/10.1016/j.jtice.2014.05.011
39. Shah, J., Jan, M. R., & **Adnan**. (2014). Conversion of Waste Polystyrene through Catalytic Degradation into Valuable Products. *Korean Journal of Chemical Engineering, 31*(8), 1389-1398. (IF: 3.2) https://doi.org/10.1007/s11814-014-0016-4
40. Shah, J., Jan, M. R., & **Adnan**. (2014). Catalytic activity of metal impregnated catalysts for degradation of waste polystyrene. *Journal of Industrial and Engineering Chemistry, 20*(5), 3604-3611. (IF: 6.0) https://doi.org/10.1016/j.jiec.2013.12.055

Book Chapters

- Alamzeb, M., Khan, B., Ullah, I., Omer, M., & **Adnan**. (2023). Natural Antioxidants: An Update. In *Medicinal Plants - Chemical, Biochemical, and Pharmacological Approaches*.
  IntechOpen. http://dx.doi.org/10.5772/intechopen.112462

Research Funding

Principal Investigator (PI):

- **"Integrated Conductive Polymers-Coated Sulfur Enriched Porous Carbons with Single Walled Carbon Nanotubes as Self-Supported and Flexible Cathodes for Lithium-Sulfur Batteries"** (2021-2023).
    - **Funding Agency:** Higher Education Commission (HEC) of Pakistan, Local Challenge Fund (LCF).
    - **Grant Amount: PKR 27.1 Million (≈$162,000 USD)**.
    - **Objectives:** Develop and characterize novel flexible electrode materials to overcome the capacity fading in Li-S batteries.
    - **Outcomes:** Resulted in 10 publications, including *Journal of Energy Storage, Materials Today Sustainability, and Coordination Chemistry Reviews*, and trained 03 PhD and 11 MPhil students.
- **"Studies on The Co-Pyrolysis of Polystyrene with other Municipal Plastic Wastes into Valued Products using Supported Catalysts"** (2015-2016).
    - **Funding Agency:** HEC, Start-Up Research Grant Program (SRGP).
    - **Grant Amount: PKR 0.5 Million (≈$5,000 USD at the time)**.
    - **Objectives:** Investigate catalytic systems for the valorization of mixed plastic waste streams into fuels.
    - **Outcome:** Facilitated research leading to a high-impact publication in the*, Journal of the Taiwan Institute of Chemical Engineers, and Process Safety and Environmental Protection.*

Co-Principal Investigator (Co-PI):

- **"Synthesis of Phosphorus-doped Graphene Oxide/Nitrogen-doped TiO2 Nanocomposite for Water Treatments and Overall Water Splitting"** (2022-2024).
    - **Funding Agency:** HEC, National Research Program for Universities (NRPU).
    - **Grant Amount: PKR 11.9 Million (≈$50,000 USD)**.
    - **Objectives:** Design and optimize a dual-purpose nanocomposite for photocatalytic water purification and hydrogen production.

Fellowships & International Projects:

- **International Research Support Initiative Program (IRSIP)** Fellow (2013).
    - **Host:** Department of Earth and Environmental Engineering, Columbia University, New York, USA.
    - **Funding Agency:** HEC, Pakistan.
    - **Project:** "Effect of polyethylene terephthalate on the pyrolysis of polystyrene using supported catalyst; investigation of the liquid products."
    - **Outcome:** Facilitated research leading to a high-impact publication in the *Journal of the Taiwan Institute of Chemical Engineers.*

- **Indigenous 5000 PhD Fellowship Program, HEC, Pakistan,** Fellow (2009).
    - **Host:** Institute of Chemical Sciences, University of Peshawar, Peshawar, Pakistan.
    - **Funding Agency:** HEC, Pakistan.
    - **Project:** "Studies on Impregnated Catalysts for Conversion of Waste Expanded Polystyrene into Value Added Hydrocarbons."
    - **Outcome:** Facilitated research leading to a high-impact publication in the *Korean Journal of Chemical Engineering, Journal of the Taiwan Institute of*

Chemical Engineers, Journal of Analytical and Applied Pyrolysis, Process Safety and Environmental Protection, and Journal of the Polymer and the Environment

Awards & Honors

- **Research Excellence Award,** University of Swat (2021)
    - *Awarded on Pakistan Independence Day for winning an HEC grant of over PKR 27.1 million (*≈**$162,000 USD***).*
- **International Research Support Initiative Program (IRSIP) Fellowship,** Higher Education Commission, Pakistan (2013)
    - Awarded for 6-month research at Columbia University, New York, USA.
- **Indigenous 5000 Ph.D. Fellowship Program,** Higher Education Commission, Pakistan (2009-2014)
    - Awarded for Ph.D Fellowship at the Institute of Chemical Sciences, University of Peshawar.

Student Mentorship

University of Swat | 2015 – Present

- **Principal Supervisor** for 3 Ph.D. students (All in progress).
- **Principal Supervisor** for 18+ M.Phil. students to successful degree completion. Outcomes include: 4 graduates pursuing PhDs, 10+ in professional positions, and 5 with publications in quality journals.
- **Principal Supervisor for 20+ M.Sc. students** to successful degree completion. Many graduates have advanced to MPhil and PhD programs.
- **Mentored 20+ undergraduate (B.S.) students** in their final year research theses. The majority have progressed to graduate studies (MPhil) or secured industry positions.
- **Research Areas Supervised:** Lithium-sulfur batteries, supercapacitors, metal-organic frameworks (MOFs), photocatalytic degradation of dyes/pesticides/pharmaceuticals, plastic waste valorization, toxicant removal.

Technical and Analytical Skills

- **Catalyst Characterization:** XRD, XPS, SEM, TEM, BET Surface Area Analysis, FTIR, TGA.
- **Electrochemical Analysis:** Cyclic Voltammetry (CV), Galvanostatic Charge-Discharge (GCD), Electrochemical Impedance Spectroscopy (EIS).
- **Material Synthesis:** CVD, Hydrothermal/Solvothermal Synthesis, Impregnation, etc.
- **Software:** Data analysis software, OriginLab.

Teaching Philosophy & Innovation

My teaching philosophy is built on a foundation of enthusiasm, respect, and a commitment to empowering students from diverse academic backgrounds. Having taught large classes of

40-50 students at both undergraduate and graduate levels, I prioritize creating an inclusive and active learning environment that makes analytical chemistry accessible and engaging.
I move beyond rote memorization by employing strategies like open-book quizzes, group discussions, and hands-on activities to foster deep conceptual understanding and independent problem-solving skills. For non-majors, I connect course material to everyday life to develop scientific literacy, while in advanced courses, I challenge science majors to apply knowledge creatively to novel problems, mirroring real-world research scenarios. This approach, combined with my 19 years of experience in the field, ensures I effectively mentor students to become critical thinkers and skilled practitioners, prepared for academic and professional leadership.

Invited Talks & Academic Events

Invited Talks & Keynotes (02 Conferences, 01 workshop & 02 Seminars)

Conferences

- **November 28-29, 2023;** *Insights into the Thermocatalytic Degradation of Waste-Polystyrene Products with a Focus on Liquid Products Yield*, **3rd International Conference on Polymers and Composites,** Department of Materials, National Textile University, Faisalabad, Pakistan.
- **March 28-29, 2023;** *Highly Flexible Amino Functionalized Metal Organic Framework/rGO Composite Film for Advanced Anodes for Li-ion Batteries*, **3rd Multidisciplinary International Research Conference**, online by IM Group of Researchers, Pakistan.

Workshops

- **July *22-23, 2025***; *Nanomaterials: From Curious Particles to Game-Changing Technologies,* **Nanomaterial: A Journey Through Progress, Emerging,** Department of Chemistry, Hazara University Mansehra

Seminars/Webinars

- **December 21, 2018;** *Possible Ways to Keep the Environment Clean & Green,* **Clean and Green Pakistan**, Institute of Agricultural Sciences & Forestry, University of Swat, Pakistan
- **December 18, 2018**, *Possible Remedial Measures Against Environmental Degradation*, ***Environmental Degradation***, Govt. Afzal Khan Lala Degree College, Matta, Swat, Khyber Pakhtunkhwa, Pakistan in Joint Collaboration with Pakistan Army.

Leadership & Organization (## Events)

Chief and Principal Organizer

Conferences & Symposiums

- **October 08-09, 2024**; **2nd International Chemistry Conference on Recent Trends & Innovative Technologies in Chemistry 2024 (ICC-RT&ITC-2024),** Institute of Chemical Sciences, University of Swat, Swat, Pakistan, jointly funded by HEC, Pakistan, and University of Swat, Pakistan [**Principal Organizer only**]
- **June 08-09, 2023; International Chemistry Conference on Recent Trends in Chemistry & Renewable Energy Technology 2023 (ICC

RTC&RET 2023), Institute of Chemical Sciences, University of Swat, Swat, Pakistan. Funded by HEC Pak 20-LCF-278 Project, PI: Dr. Adnan.

- **March 20, 2023; Symposium on Chemistry 1st Research Poster Symposium,** Institute of Chemical Sciences, University of Swat, Swat, Pakistan

Workshops

- **December 8-9, 2022; Workshop on Hands-on Li-ion Batteries,** Institute of Chemical Sciences, University of Swat, Swat, Pakistan

Seminars/Webinars

- **January 03, 2024; Lithium based Batteries as the Future Fuel**, Institute of Chemical Sciences, University of Swat, Swat, Pakistan.
- **April 28, 2023; Strategies to Enhance Batteries Storage Capacity**, Institute of Chemical Sciences, University of Swat, Swat, Pakistan
- **March 10, 2022; Human Beings as Type 1 Civilization & The Role of Pakistan**, Institute of Chemical Sciences, University of Swat, Swat, Pakistan
- **October 21, 2022; Scientific Writings and Publications**, Institute of Chemical Sciences, University of Swat, Swat, Pakistan
- **May 20, 2022; Fundamental of Rechargeable Li-ion Batteries and the Modern World**, Institute of Chemical Sciences, University of Swat, Swat, Pakistan
- **May 13, 2022; Carbonyl-Based Electrode Materials for Rechargeable Lithium-ion Batteries and Supercapacitors**, Institute of Chemical Sciences, University of Swat, Swat, Pakistan
- **April 16, 2021; How to Win NRPU Project of HEC Pakistan**, Institute of Chemical Sciences, University of Swat, Swat, Pakistan
- **November 8, 2019; Advanced Separation Techniques in Analytical Chemistry**, Institute of Chemical Sciences, University of Swat, Swat, Khyber Pakhtunkhwa, Pakistan.

Organizing Member

- November 22, 2021; International Fellowships; Information and Guidelines, Institute of Chemical Sciences, University of Swat, Swat, Pakistan
- December 2, 2018; Studies on Advanced Materials, Institute of Chemical Sciences, University of Swat, Swat, Pakistan of Agricultural Sciences & Forestry, University of Swat, Pakistan

Conference/Symposium Presentations (18 **Oral & 04 Posters**)

Oral Presentations

- **December 9-11, 2024;** *Design and Synthesis of Polyaniline Encapsulated Sulfur Impregnated Porous Carbon Composites as Cathode Material for Advanced Lithium Sulphur Batteries*, **6th Battery and Energy Storage Conference, NY, USA,** AIChE held at NYU’s Kimmel Center for University Life New York, NY.
- **November 26-27, 2024;** *Visible light induced photocatalytic degradation of norfloxacin using xC-TiO_2*, **4th International Conference on Polymers and Composites,** Department of Materials, National Textile University, Faisalabad, Pakistan.

- **November 06-07, 2024;** Visible light induced photocatalytic degradation of norfloxacin using xC-TiO_2, **3rd International Conference on Trends and Research in Chemistry (TRIC-2024)**, Department of Chemistry, University of Education, Lahore, Pakistan.
- **February 14-15, 2024;** *PANI Coated Metal Organic Framework-Based Composite as High-Performance Flexible Cathode for Lithium-Sulphur Battery,* **6th International Conference on Recent Trends in Chemistry,** Department of Chemistry, Allama Iqbal Open University, Islamabad.
- **February 22-24, 2023;** *Highly Flexible Amino Functionalized Metal Organic Framework/rGO Composite Film for Advanced Anodes for Li-ion Batteries,* **International Conference on COMPOSITES 2023,** SETCOR Conferences & Exhibitions in Bangkok, Thailand.
- **August 24-25, 2022;** *Highly Flexible Amino Functionalized Metal Organic Framework/rGO Composite Film for Advanced Anodes for Li-ion Batteries,* **International Conference on Research Advancements in Chemistry 2022 (ICRA-C 2022),** Department of Chemistry, National University of Science and Technology (NUST), Islamabad, Pakistan.
- **August 21-25, 2022;** *Highly Flexible Amino Functionalized Metal Organic Framework/rGO Composite Film for Advanced Anodes for Li-ion Batteries,* **International Conference, ACS Fall 2022; Division; Energy and Fuels- Battery Materials & Interfaces: Anodes, Cathodes & Novel Electrolytes,** American Chemical Society, Chicago, IL, USA.

Has presented additional 11 oral and 04 poster presentations at national and international conferences.

Academic Leadership & Services

Programmatic & Departmental Leadership

- **Coordinator, BS Program** (2025 – Present): Oversee curriculum development, program assessment, and accreditation processes for the undergraduate chemistry program.
- **Programs Coordinator (BS, MSc & MPhil)** (2020 – 2021): Managed the academic and administrative functions for all undergraduate and graduate programs within the Institute of Chemical Sciences.
- **Member, Board of Studies** (2017 – Present): Contribute to the development and approval of academic curricula and program policies.
- **Member, Graduate Studies Committee** (2019 – Present): Oversaw admissions, progress reviews, and thesis defenses for graduate (M.Phil./Ph.D.) students.

University-Wide Governance & Committees

- **Member, University Industrial Advisory Board** (2022 – Present): Liaise between university leadership and industry partners to align academic programs with market needs and develop internship opportunities.
- **Member/Secretary, University Projects Evaluation Committee** (2021 – Present): Evaluate and recommend university-wide research project proposals for funding approval.
- **Member, Board of Faculty for Faculty of Chemical Sciences** (2019 – Present): Participate in high-level academic governance and strategic planning for the faculty.

Accreditation & Quality Assurance

- **Program Team Member, Self-Assessment Report** (2019, 2021): Led data collection and analysis for internal program reviews, a critical step towards national accreditation.
- **Expert Member, Inspection Committee** (2021): Served as an external evaluator to assess the readiness and recommend approval for a new BS Chemistry program at a peer institution.

Admissions & Assessment

- **Member, MSc/BS Admission Committees** (2018, 2021 – Present): Developed applicant evaluation criteria and participated in the student selection process.
- **Member, Assessment Teams** (2015 – 2019): Served on external review committees for the Departments of Economics, Environmental Sciences, and Mathematics & Statistics, evaluating their programs for quality and effectiveness.

Administrative Service

- **Member, Purchase Committee** (2017 – Present): Manage the procurement and budgeting for scientific equipment and laboratory supplies.
- **Staff Proctor** (2018): Provided academic oversight and ensured integrity during examinations.

Peer Review Services

Invited Peer Reviewer for **45+** manuscripts for leading international journals in chemistry, materials science, and environmental engineering. Including the following:

- *Bioresource Technology* (IF: 9.0)
- *Process Safety and Environmental Protection* (IF: 7.8)
- *Journal of Environmental Chemical Engineering* (IF: 7.2)
- *Waste Management* (IF: 7.1)
- *Journal of the Taiwan Institute of Chemical Engineers* (IF: 6.3)
- *Journal of Analytical and Applied Pyrolysis* (IF: 6.2)
- Journal of Inorganic and Organometallic Polymers and Materials (IF: 4.9)
- Journal of Food Biochemistry (IF: 4.2)
- International Journal of Energy Research (IF: 4.2)
- International Journal of Pavement Research and Technology (IF: 2.5)
- Chemical Engineering Communications (IF: 2.3)
- The Chemical Society of Ethiopia (IF: 2.3)
- The Canadian Journal of Chemical Engineering (IF: 1.9)
- The Japan Society for Analytical Chemistry (IF: 1.8)
- Brazilian Journal of Chemical Engineering (IF: 1.5)
- Polymer Science Peer Review Journal of Crimson Publishers (IF: 1.5)

Thesis Review

- **Served as an External Thesis Examiner** for **27+** M.Phil. candidates in Chemistry and related fields.
- **Evaluated research quality, methodology, and scholarly contribution** of dissertations for universities across Pakistan, including:
  - University of Peshawar
  - Bacha Khan University
  - Abdul Wali Khan University, Mardan
  - University of Malakand

    - Sardar Bahadur Khan Women's University
    - University of Karachi
- **Chaired and participated in thesis defense examinations** (viva voce), providing critical feedback to candidates and assessment committees.

References

References available upon request