# Dr.Nadia Khan

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**Personal Details**
**Nationality:** Pakistani **| Gender:** Female **| Date of Birth:** 09-January-1988

## SUMMARY

PhD in Fault Detection and Diagnosis with academic and research experience in applying machine learning and deep learning to complex chemical and process engineering systems. Expertise in multivariate time-series analysis, predictive modeling, fault detection, and forecasting using advanced AI architectures. Research focuses on developing interpretable and explainable AI frameworks for reliable industrial monitoring and decision support. Experienced in interdisciplinary collaboration, mentoring, and leading research initiatives that integrate data-driven methods with real-world process applications.

## EDUCATION

- Doctor of Philosophy (PhD) Data-Driven Fault Detection and Diagnosis in Acid Gas Removal Unit Using Time Series Machine Learning Algorithms (2022-2025)
- Master of Engineering (ME) in Chemical from NED University of Engineering & Technology, Pakistan (2011-2013)
- Bachelor of Engineering (BE) in Chemical Engineering from NED University of Engineering & Technology, Pakistan (2006-2010)

## WORK EXPERIENCE

| Designation | Organization | Duration |
|---|---|---|
| Assistant Professor | NED University of Engineering & Technology, Department of Polymer & Petrochemical Engineering, Pakistan | Mar 2018 – Present |
| Lecturer | | Apr 2011 – Feb 2018 |

## CORE COMPTENCIES

Machine Learning & AI Research | Explainable AI (XAI) | Multivariate Time-Series Analysis | Fault Detection & Predictive Modeling | Carbon Capture and Removal (CCUS) | Process Simulation & Modeling | Techno-Economic and Systems Analysis | Data Analysis & Scientific Computing | Research Project Leadership | Interdisciplinary Collaboration | Technical Writing & Scientific Communication | Graduate Student Mentoring | Workshop & Training Facilitation | Industry Collaboration & Stakeholder Engagement | Public Speaking & Research Presentation

## RESEARCH WORK

### Publications

- N. Khan, S. A. A. Taqvi, and M. Waqas, "A Hybrid Deep Learning and Statistical Approach for Fault Detection and Diagnosis in AGRU Systems: Integration with Aspen Plus and Explainable AI," *Period. Polytech. Chem. Eng.*, Oct. 2025, doi: 10.3311/PPch.41572.
- Nadia Khan; Asim Mushtaq; Raza Muhammad Khan; Zaeem Uddin Ali (2023). Production of Bio-lubricant from Neem Oil. Pakistan Journal of Scientific & Industrial Research Series A: Physical Sciences.
- Nadia Khan; Asim Mushtaq; Ahmed.R;Raza Muhammad Khan (2023). Development of Poly-Naphthalene Sulphonate Based Concrete Admixture.
- Khan, N., & Ammar Taqvi, S. A. (2023). Machine learning an intelligent approach in process industries: A perspective and overview. ChemBioEng Reviews.
- Nadia Khan; Asim Mushtaq; Rafiq Ahmed; Raza Muhammad Khan; Zaeem Uddin Ali (2023). Development of Poly-Naphthalene Sulphonate Based Concrete Admixture. Iranian Journal of Chemistry and Chemical Engineering.
- Khan, N., Taqvi, S. A. A., Ahmed, R., & Kazmi, B. (2021). Investigating the Effect of Temperature, Molar Ratio of Ethylene Glycol to Oil, and Catalyst Amount on Production Yield Bio Lube from Neem Seed Oil. Iranian Journal of Chemistry and Chemical Engineering.
- Khan, N. et al., Selection of Appropriate Model for the Synthesis of Coal Water Slurry (CWS) Using PVA and TEA. Iranian

Journal of Chemistry and Chemical Engineering (IJCCE), 2019. 38(2): p. 253-261.

- Khan, N. et al., Reinforcement of lime ash particles in LDPE. Journal of Basic & Applied Sciences, 2018. 14: p. 119-123.
- Nadia khan, Asra Nafees, A Hussain, "Exploring the properties of recycled tire rubber for flexible asphalt pavement." Journal of Basic and Applied sciences, 2017, 13, 335-339.

### Book Chapter

- Economic assessments and environmental challenges of natural gas sweetening technologies, Advances in Natural Gas: Formation, Processing, and Applications, Volume 2
- Natural gas sweetening standards, policies, and regulations, Advances in Natural Gas: Formation, Processing, and Applications, Volume 2

### Conference Papers – Author and Presenter

- Title: Simulation of Coal slurry burner using Fluent presented at; 1st International Conference Advanced Material and Process Engineering 2015.
- Title: Synthesis and Rheology of Coal water slurry presented at, 1st International Conference Advanced Material and Process Engineering 2015.

### Undergraduate Projects

- Prediction of $CO_2$ composition in natural gas sweetening process using ANN.
- A machine learning approach for flash point estimation of multi component mixture.
- Carbon Capture and Sequestration project for a coal-fired plant in Tharparkar, Pakistan.
- Gasification of lignite coal and plastic waste blend for syngas production.
- Technoeconomic analysis of Hydrogen production from waste plastic.
- Synthesis of Lime ash particles for gas Absorption and reinforcement.

## PROFESSIONAL DEVELOPMENT

**Professional Services:**

- Reviewer for journals including Digital Chemical Engineering, Chemical Engineering and Process Safety & Environment.
- Serve as ISO Coordinator, ensuring compliance with quality standards.
- Fulfill duties as OBE Coordinator, managing outcome-based education systems to enhance learning effectiveness.
- Develop funding strategies, write compelling grant proposals and funding requests showcasing expertise in persuasive communication and strategic planning.
- Participate in curriculum design and Program's review to align educational offerings with industry needs and accreditation requirements.
- Member of Board of studies and Industrial Advisory Board.

**Professional Development and Collaboration:**

- Acquired MOST Endowment funding.
- Conduct and organize workshops on RSI Simcon Refinery and Fertilizer DCS Systems to enhance the technical proficiency of students.
- Maintain Continuous Professional Development (CPD) through active participation in training sessions and workshops.
- Organize One day workshop on Advance Polymer Materials, Sustainability & Circular Economy.
- Organize and contribute to international conferences on Advance Material and Process Engineering (AMPE) and technical seminars, promoting knowledge exchange and networking.

**Workshops Seminars & Course Attended:**

- Course on "Driving Business Towards Sustainable Development Goals."
- Course on" Natural Gas Production and Processing."

- Course on " Generative AI."
- Course on "Machine Learning."
- Course on "Google Data Analytics."
- Course on "Deep Learning"
- Workshop on" Leadership and Engineering".
- Training on "ISO 9001-2015 Quality management system, Lead Auditor".
- Training on " IEEE, new resources for your technical research.
- Workshop on "Entrepreneurship, engine that runs the economy"
- Workshop on "How to build empathy in research".
- Workshop on "Accelerate your research using Elsevier's Scopus".

## KEY SKILLS

Aspen Plus & Aspen HYSYS | Python (TensorFlow, Keras, PyTorch, Scikit-learn) | Deep Learning Architectures (LSTM, GRU, CNN, Transformer) | Explainable AI Techniques (SHAP, LIME) | PCA-based Fault Detection ($T^2$, SPE) | Data Analysis & Visualization (NumPy, Pandas, Matplotlib)

## References available upon request