

Dr.-Ing. Adeem Ghaffar Rana



Research Scientist – Catalysis & Sustainable Processes

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Professional Summary

Research-focused academic with strong teaching credentials and international research experience in heterogeneous catalysis, photocatalysis, and sustainable fuels. Proven track record in supervising graduate and exchange students (DAAD, Erasmus), developing and delivering core chemical engineering courses, and executing externally funded research projects in collaboration with industry and academia.

Academic Appointments & Research Experience

Postdoctoral Researcher

Technical University Bergakademie Freiberg (TUBAF), Freiberg, Germany (Aug 2023 – Present)

Key Research Projects

- **Methanol-to-Olefins (MTO) for Sustainable Aviation Fuels (SAF) (REF4FU)**
 - Lead researcher for catalyst development and performance evaluation of zeolite-based systems.
 - Conducted catalyst screening, kinetic evaluation, and reaction optimization using Design of Experiments (DoE).
 - Presented results to academic and industrial stakeholders within the REF4FU framework.
- **Hydrotreating & Hydrocracking – SAF Production (Ineratec, OptiSAF)**
 - Responsible for end-to-end execution of hydrotreating and hydrocracking experiments targeting SAF-range products.
 - Led installation, commissioning, and operation of lab-scale fixed-bed reactor systems.
 - Managed day-to-day experimental campaigns, catalyst testing, and process stability runs.
 - Interpreted experimental data and presented results in technical meetings with industrial partners
- **Methanol-to-Aromatics (MTA) – Catalyst Development (Planned)**
 - Future-oriented project focused on catalyst development for methanol-to-aromatics conversion for the petrochemical industry.
 - Contributing to conceptual catalyst design and reaction pathway assessment

Research Associate

Technical University of Munich (TUM), Freising, Germany (Nov 2017 – Dec 2022)

- Developed modified graphitic carbon nitride photocatalysts for redox and hydrogen-related applications.
- Supervised DAAD- and Erasmus-funded visiting students during short- and medium-term research stays, including:
 - Definition of research objectives and experimental plans.
 - Hands-on training in catalyst synthesis and characterization.
 - Review of reports and presentations.

Assistant Professor

University of Engineering and Technology (UET), Pakistan | Nov 2015 – Nov 2017, Apr 2023 – July 2023

Teaching Portfolio (Undergraduate Level)

- Mass Transfer
- Separation Processes
- Wastewater Treatment Engineering
- Engineering Economics
- Particle Technology
- Environmental Engineering
- Maintenance Engineering

Academic Responsibilities

- Delivered core chemical engineering courses to 3rd–4th year cohorts.
- Supervised undergraduate thesis projects, guiding problem formulation, execution, and technical reporting.
- Mentored students for research-oriented and industry-relevant projects.

Assistant Manager - Research and Development

Style Textile (Pvt.) Ltd., Lahore, Pakistan (May 2010 – Feb 2013)

- Led applied R&D projects aligned with NIKE, ADIDAS, and REEBOK compliance requirements.
- Coordinated cross-functional teams for product development and quality assurance.
- Implemented process improvements to meet international quality and sustainability standards.

Education

PhD (Dr.-Ing.) in Chemical Engineering/Materials/Catalysis

Technical University of Munich (TUM), Germany (Nov 2017 – Dec 2022)

- Thesis: Modification of Graphitic Carbon Nitride (g-C₃N₄) for Redox Applications.
- DAAD Scholarship Recipient.

MS in Chemical Engineering

King Fahd University of Petroleum and Minerals (KFUPM), Saudi Arabia (Jan 2013 – May 2015)

- Thesis: Photocatalytic Conversion of CO₂ to Hydrocarbons Using Cu-Zn/TiO₂ Catalyst.
- Saudi Government Scholarship Recipient.

BS in Chemical Engineering

University of the Punjab, Pakistan (Jan 2006 – Apr 2010)

- Research: Extraction of Rare Earth Metals from Carbonatite Rock.
- Distinction Scholarship Recipient.

Key Skills

Research Supervision & Mentoring:

- Supervision of Erasmus and DAAD visiting researchers (PhD level).
- Undergraduate thesis supervision (UET).

Core Academic Competencies

- Heterogeneous & photocatalysis
- Reaction engineering and kinetics
- Graduate and undergraduate supervision
- Curriculum design (OBE)

- Scientific writing and peer-reviewed publications

Technical Expertise:

- Catalyst synthesis & modification (zeolites, metal-supported catalysts)
- Reactor operation and lab-scale plant execution
- Hydrotreating / hydrocracking concepts (SAF-oriented)
- GC-MS, NH₃-TPD, HPLC, LC-MS
- Statistical optimization (DoE, Minitab)

Professional Skills:

- Independent project management and teamwork.
- Critical thinking and problem-solving.
- Strong execution ownership from setup to data interpretation
- Experience working at academia–industry interface
- Safety-, quality-, and reproducibility-driven research mindset

Digital Tools:

- MS Office, ChemDraw, Origin, Minitab, CAD Design.

Languages:

- English (C1), German (B1), Urdu, and Punjabi (Native)

References

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