MD IRFAN KHAN

1703 Stahl St, Cayce, SC | 903-571-2284 | irfankhan.aust@gmail.com | https://mdirfankhan.netlify.app

EDUCATION

Doctor of Philosophy (PhD) in Mechanical Engineering *Expected: Dec 2029*
Thesis Title: Advancing Smart Manufacturing Through Blockchain and Federated Learning: A Secure and Decentralized Approach.
The University of South Carolina, Columbia, SC | GPA 4.00/4.00

Master of Science (MSc) in Mechanical Engineering *Dec 2024*
Thesis Title: Implication of Digital Rock Physics to improve understanding of fluid flow behavior through porous media and integrating machine learning techniques in the oil and gas industry.
The University of Texas at Tyler, Tyler, TX | GPA 4.00/4.00

Bachelor of Science (BSc) in Mechanical Engineering *Jan 2017*
Ahsanullah University of Science and Technology, Dhaka, Bangladesh | GPA 3.495/4.00

RESEARCH EXPERIENCE

Graduate Research Assistant *Jan 2025 - Present*
The University of South Carolina, Columbia, SC

- Conducting research on smart manufacturing by integrating blockchain and federated learning for secure and decentralized data sharing.
- Working with a manufacturing assembly test bed, analyzing equipment-generated data to enhance automation and predictive maintenance.
- Developing machine learning models for failure prediction.
- Implementing digital twin technology to simulate manufacturing processes and optimize efficiency and decision-making.
- Preparing research manuscripts, reports, and presentations for scientific publications and conferences.

Graduate Research Assistant *Jan 2023 - Present*
The University of Texas at Tyler, Tyler, TX

- Conducting research on the implications of Digital Rock Physics (DRP) to enhance the understanding of fluid flow behavior in porous media.
- Applying machine learning techniques to analyze and predict fluid transport properties in subsurface reservoirs for oil and gas applications.
- Utilizing computational simulations and image processing to evaluate rock properties and optimize hydrocarbon recovery strategies.
- Integrating data-driven approaches with geophysical and petrophysical models to improve reservoir characterization and CO_2 sequestration analysis.

PUBLICATIONS (ORCID: 0000-0001-9790-7386)

Peer Reviewed-

- **Md Irfan Khan**, M. V. B. Machado, A. Khanal, M. Delshad. Evaluating capillary trapping in underground hydrogen storage: A pore-scale to reservoir-scale analysis. Fuel, volume 376, 2024.
- **Md Irfan Khan**, A. Khanal. Machine Learning Assisted Prediction of Porosity and Related Properties Using Digital Rock Images. ACS Omega, vol 9/Issue 28, 2024.
- A.Khanal, **Md Irfan Khan**, M.F. Shahriar. Comprehensive Parametric Study of CO_2 Sequestration in Deep Saline Aquifers. Chemical Engineering Science, volume 287, 2024
- M.F.Shahriar, A. Khanal, **Md Irfan Khan**, R. Pandey. Current status of underground hydrogen storage: Perspective from storage loss, infrastructure, economic aspects, and hydrogen economy targets. Journal of Energy Storage, volume 97, Part A, 2024.

Conferences-

- **Md Irfan Khan,** A.Khanal. Parametric Study of CO_2 Sequestration in Deep Saline Aquifers Using Data-Driven Models. SPE Western Regional Meeting. SPE Western Regional Meeting, Palo Alto, California, USA, April 2024.
- A.Khanal, **Md Irfan Khan**. Impact of Relative Permeability Hysteresis and Capillary Pressure on Trapping Mechanisms During CO_2 Sequestration in Saline Aquifers. Carbon Capture, Utilization, and Storage Conference and Exhibition, 11–13 March, Houston, 2024.
- A.Khanal**, Md Irfan Khan**, M.F. Shahriar. Numerical Investigation of Hydrogen Storage Loss in Saline Aquifers. SPE Western Regional Meeting. SPE Western Regional Meeting, Palo Alto, California, USA, April 2024.
- **Md Irfan Khan**, N.Fumo, M.Asama, V.Bassham, C.Defor. Mitigating Energy Inefficiency: A Cost-Effective Approach to Cool Attic Spaces in Lower-Income Households in the Southeastern United States. American Society for Engineering Education. 2024 ASEE-GSW, Canyon, Texas, March 10, 2024.
- Munawar Jawad, **Md Irfan Khan**, Sheak Salman and Farah Naz Ahmad. Parametric optimization in powder-mixed electric discharge machining of titanium alloy. ICMERE, Chattogram, Bangladesh, 2021.

STANDARDIZED TEST SCORES

Graduate Record Examination (GRE) – 10th June 2020

Total	Quantitative Reasoning	Verbal Reasoning
311	162 (78th percentile)	149 (40th percentile)

WORK EXPERIENCE

Lecturer, Industrial and Production Engineering Department *Dec 2019 – Oct 2022*
European University of Bangladesh, Dhaka, Bangladesh

- Planned, prepared, and conducted research on lessons for a comprehensive curriculum
- Conducted classes and lab experiments to enhance learning
- Invigilated examinations to maintain academic integrity and evaluated students' performance

Mechanical Engineer, Research and Development (R&D) Department *Jun 2017 – Nov 2019*
Walton Digi-Tech Industries Ltd., Gazipur, Bangladesh

- Led cross-functional teams in product and process development using tools such as Six Sigma, Statistical Process Control (SPC), Design of Experiments (DOE), Root cause analysis
- Developed 20+ conceptual models and utilized DFM principles for product development
- Created 20+ prototypes using additive manufacturing techniques (SLA, FDM)
- Performed engineering calculations related to sizing, performance, tolerance analysis, and assembly
- Collaborated with a team of engineers for machinery sourcing for production and R&D
- Enhanced product quality and reduced production time by designing jigs for the assembly line
- Designed corrugated packaging solutions for consumer electronics products

TECHNICAL PROFICIENCY

- Simulation Tools: CMG, ANSYS, Tecnomatix
- Programming Skills: MATLAB, Python (TensorFlow, Keras, scikit-learn, OpenCV, Pandas, etc.)
- CAD Tools: SolidWorks, AutoCAD, CATIA, Fusion 360
- CAM Tools: HSMWorks, SolidCAM
- Documentation and Presentation: Microsoft Office (Excel, Word, PowerPoint, Visio, etc.)

HONORS and AWARDS

- Marjorie P White End Dean's Scholarship *2024*
- Bob Herd Endowed Engineering S Scholarship *2023*
- Jasper Endow Engin Scholarship *2023*
- 3rd place (Graduate Poster Presentation) at the East Texas Research Conference Showcase *2024*
- 3rd place (Graduate Poster Presentation) at the 8th annual Lyceum Research Showcase *2023*
- 2nd place at the business model competition by East Texas Entrepreneurship Center *2023*

CERTIFICATION

Semiconductor Fabrication 101 *2024*
Issuing Organization: Purdue University, University of Texas at Austin, and Intel Corporation
Mechanical Design at the Level of Professional *2021*
Issuing Organization: Dassault Systems
Additive Manufacturing at the Level of Associate *2020*
Issuing Organization: Dassault Systems
The Elements of AI *2019*
Issuing Organization: University of Helsinki
Project Management Foundations: Teams *2019*
Issuing Organization: Coursera

REFERENCES

Dr. Aaditya Khanal
Assistant Professor
The University of Tulsa
Cell: (832)-607-1689
E-mail - aak4074@utulsa.edu

Dr. Fernando Resende
Chair & Associate Professor
University of Texas at Tyler
Cell: (903)-565-6538
E-mail - fresende@uttyler.edu

- Additional references can be provided on request.