NAYEM AHMED

Norman, Oklahoma, USA

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Ph.D. candidate in Petroleum Engineering with a minor in Data Science at the University of Oklahoma. Experienced in reservoir characterization, drilling and completion design, and production system optimization under high-pressure and multiphase flow conditions. Skilled in simulation, PVT and flow assurance analysis, and data-driven modeling to improve recovery efficiency and process performance. Recognized with multiple industry scholarships for technical excellence and a strong commitment to safety, innovation, and sustainable energy operations.

Education

PhD: Petroleum Engineering-Expected Dec 2026
Graduate Certificate in Data Science and Analytics
University of Oklahoma, USA
CGPA: 3.91/4.00

MSc: Petroleum Engineering- May 2021
Shahjalal University of Science & Technology, Bangladesh
CGPA: 3.85/4.00

BSc: Petroleum & Mining Engineering- May 2018
Shahjalal University of Science & Technology, Bangladesh
CGPA: 3.72/4.00

Engineering Tools

Petrel | Eclipse | CMG | OLGA | KAPPA | PVTsim | Fusion 360 | Origin Pro | SPSS | Python | R | Node.js | MySQL

Graduate Research Experiences

University of Oklahoma, USA; Jan 2023 – Present

- Commissioned a pilot-scale system to assess the applicability of API 5L X52, X60, and X70 pipeline materials for hydrogen transportation, focusing on performance under high-pressure conditions.
- Constructed in-situ aging system to simulate realistic operational degradation of hydrogen-compatible pipeline steels, enabling long-term reliability assessment.
- Conducted tensile and fatigue testing under high-pressure hydrogen environments to evaluate pipeline integrity, fracture behavior, and compatibility, using ASTM E1820, ASTM E647, and ASTM E8/E8M standards.
- Performed microstructural characterization of vintage API steels and conducted Scanning Electron Microscopy (SEM) analysis of fracture surfaces to investigate hydrogen-assisted fatigue and fracture mechanics.
- Improved correlations between operating parameters (pressure, temperature, microstructure) and pipeline material response to enhance compliance with API 5L and ASTM material standards.
- Led techno-economic analysis of hydrogen storage and transportation infrastructure to evaluate commercial feasibility and guide infrastructure investment decisions.
- Developed machine learning models to predict hydrogen embrittlement, fatigue crack growth, and service lifetime of pipelines, integrating mechanical and materials-based features into predictive frameworks.
- Prepared technical papers and research reports and presented findings at multiple national and international conferences.

Shahjalal University of Science and Technology, Bangladesh; Aug 2019 - May 2021

- Synthesize and characterize hematite (Fe_2O_3) nanoparticles in a laboratory setting.
- Design and construct a pilot-scale drilling fluid circulation system with real-time measurement capabilities.
- Formulate and test nanoparticle-enhanced drilling fluids to evaluate improvements in rheological properties.
- Design and implement nano-enhanced drilling fluid in the Srikail exploration well, in collaboration with BAPEX (Bangladesh Petroleum Exploration and Production Company Limited).

Professional Experiences

Graduate Teaching Assistant-(PE 3313: Drilling and Completion I); Fall 2025
University of Oklahoma, USA

- Assist in teaching Drilling and Completion I to undergraduate petroleum engineering students.
- Support lecture preparation, grading, and academic evaluations aligned with course objectives.
- Conduct office hours and mentoring sessions to guide students in drilling and completion fundamentals.

Drilling Engineering Intern; May 2020-Aug 2020
Bangladesh Petroleum Exploration and Production Company Ltd., Bangladesh

- Supported the analysis of drilling data to optimize drilling operations, improve wellbore stability, and reduce non-productive time (NPT) in line with field performance goals.
- Gaining hands-on experience with drilling software and tools for wellbore design, BHA configuration, and hydraulic calculations.
- Conducted laboratory tests to assess the rheological properties of drilling fluids, ensuring their compatibility with various directional drilling and hydraulic fracturing environments.
- Assisted in the selection of additives and chemicals to enhance fluid performance, improve casing and cementing integrity, and minimize formation damage.
- Contributed to continuous improvement projects involving rig operations, safety audits, and the integration of best practices to enhance operational efficiency.
- Ensured compliance with environmental regulations, GHG emissions policies, and waste management protocols, aligning with sustainability and corporate HSE objectives.

Process Engineering Intern; May 2017-Aug 2017
Rupantarita Prakritik Gas Company Limited (RPGCL), Bangladesh

- Updated Standard Operating Procedures (SOPs) and implemented rigorous safety protocols, contributing to zero Lost-Time Incidents (LTI) and improving overall operational integrity.
- Conducted Pre-Startup Safety Reviews (PSSR) and Job Safety Analyses (JSA) in collaboration with field engineers and stakeholders to ensure compliance with industry HSE standards and reduce operational risk.
- Applied process simulation using Aspen HYSYS to optimize Natural Gas Liquids (NGL) recovery, achieving a 95% increase in production efficiency—an approach aligned with reservoir and production system optimization.
- Managed plant startup and shutdown sequences, coordinating with operations and maintenance teams to reduce unplanned downtime and enhance asset availability.
- Supported operational decision-making through fluid flow analysis and system troubleshooting, contributing to effective reservoir deliverability management.

Recognition and Awards

- **SPE Outstanding Graduate Student**, SPE - The University of Oklahoma Student Chapter, 2025.
- **Donald E. Hall Scholarship,** Mewbourne College of Earth and Energy, University of Oklahoma, 2025.
- **PHMSA Research Grant**, U.S. Department of Transportation (2023-2025).
- **DeGolyer & MacNaughton Scholarship**, Mewbourne College, University of Oklahoma, 2024.
- **Fred S. and Jeanette A. Reynolds Scholarship**, Mewbourne College, University of Oklahoma, 2024.
- **National Science and Technology Fellowship**, Ministry of Science and Technology, Bangladesh, 2019.

Conference and Achievements

- **Hydrogen Innovation and Technology Conference, 2025** – Presented a technical poster on experimental and machine learning-based modeling of hydrogen-assisted fatigue crack growth in pipeline materials, Houston, TX, USA.
- **University of Oklahoma Research Day, 2025** – Presented a poster on the effect of oxygen concentration and temperature on hydrogen embrittlement in pipeline steels, Norman, OK, USA.
- **SPE Annual Technical Conference and Exhibition (ATCE), 2024** – Presented technical paper on a novel machine learning modeling approach for fatigue failure of hydrogen-transporting pipelines, New Orleans, LA, USA.
- **U.S. Department of Transportation Research and Development Forum, 2023** – Presented a poster on machine learning-based prediction of reduction in area under hydrogen exposure in pipeline steels, VA, USA.
- **1st International Conference on Energy & Environment, 2019** – Awarded Best Poster Presentation for a project on reserve estimation using Petrel software, Sylhet, Bangladesh.

Leadership and Association

- **Secretary**, SPWLA Student Chapter, University of Oklahoma (2025-2026).
- **Active Member**, SPE & ASME, University of Oklahoma (2023-Present).
- **Vice-President**, SPE Student Chapter, Shahjalal University of Science and Technology (SUST) (2017-2019).
- **Secretary**, SPE Student Chapter, SUST (2015-2016).
- **Secretary**, A Voluntary Organization of SUST (2016-2018).