

Education

- **University of Mines and Technology, Tarkwa** **November 2022**
B.Sc. Petroleum Engineering with First Class Honors
Thesis: Application of Artificial Intelligence to Monitor Leaks from Pumps

Research Experience

- **Artificial Intelligence-Enhanced Well Control System for Safe and Efficient Drilling Operations** (November 2023 – present)
University of Mines and Technology, and XCIDrill Technology (Supervisors: Assoc. Prof. Richard Amorin, Graham Mensa-Wilmot)
 - Evaluated deep learning models such as LSTM, CNN, and transformers in developing an artificially intelligent well control system for safe and efficient drilling operations.
 - LSTM was adopted in developing the well control system.
- **Software-Driven Drilling Automation and Optimization for Enhanced Well Planning and Steering Deployment** (November 2022 – June 2023)
University of Mines and Technology, and XCIDrill Technology (Supervisors: Assoc. Prof. Richard Amorin, Graham Mensa-Wilmot)
 - Developed an algorithm to autonomously optimize the path of a well plan, considering the targets as well as the geological properties.
 - Developed an algorithm to simulate the RSS Push-the-Bit for steering the well along the well plan with minimal deviation.
- **Development of an Autonomous Digital Twin System for Directional Drilling** (October 2021 – June 2022)
University of Mines and Technology, and Kwame Nkrumah University of Science and Technology, Ghana (Supervisor: Assoc. Prof. Richard Amorin)
 - Developed a digital copy of the directional drilling process to autonomously hit target(s) whilst including human in the loop of the automated system.
 - Combined mathematical models and programming language (Python, C++, JavaScript, HTML) to develop the autonomous system.
- **Automation of Well Trajectory Selection and Drill String Design for a Given Well – Python Language Approach** (December 2022 – May 2023)
University of Mines and Technology, Ghana (Supervisor: Assoc. Prof. Richard Amorin)
 - A python program was built to simulate the performance of drill string (including new and used pipes) under different well profile conditions.
 - The performance of the drill strings were ranked in descending order for optimal selection.
- **Evaluation of Traditional Machine Learning Models for Predicting the Occurrence of Kicks** (August 2022 – October 2022)
University of Mines and Technology, Ghana (Supervisor: Dr. Eric Mensah Amarfo)
 - Evaluated five traditional machine learning algorithms with random forest having the highest accuracy in predicting kicks.

Publications

- **Mensah, J. S.**, D. E. Braimah, O. O. Osei, B. O. Amamoo, R. Amorin, and J. Kuntu Blankson. The Development of Twin Digital Autonomous System for Directional Drilling. <https://doi.org/10.2118/217258-MS>
- Brantson, E. T., Badu, F. A., Osei, H., Mensah, A. O., Duodu, E. K., Kobi, A. K., **Mensah, J. S.** Numerical Modelling and Simulation of Underground Hydrogen Storage in Porous Media – A Comprehensive Review. *Gas Science and Engineering (JGSE)*. (Under Review)

Professional Affiliations

- Society of Petroleum Engineers (SPE)
- Ghana Institution of Engineering (GhIE)
- West African Institute of Mining, Metallurgy and Petroleum (WAIMM)

Work Experience

Research and Teaching Assistant - November 2022 – Present **University of Mines and Technology**, Tarkwa

- Assist professors in teaching as well as conduct tutorial (PE 159 – Introduction to Computing, PE 272 – Drilling Engineering, PE 351 – Computer Programming, PE 370 – Computer Applications in Petroleum Engineering, and PE 472 – Alternative Energy Sources), research, and grading.
- Offer research assistance to undergraduate, masters' and PhD students.
- Sit on panels to evaluate and score research project and thesis presentation of undergraduate students.
- Represent the university at industry conferences, where I share research findings.
- Perform administrative tasks for faculty.
- Peer reviewing of research papers.

Team Lead / Coach - November 2022 – June 2023 **UMaT Drillbotics Team**, Tarkwa

- Led the team to achieve its highest accomplishment of winning the directional drilling category in the Drillbotics competition after three years of participation.
- Designed a software for planning directional well.
- Supervised all team operations and assigned tasks to each team member.
- Worked closely with XCIDrill Technology for rapid field deployment.
- Wrote monthly progress reports, phase I and phase II design reports for the drillbotics committee.
- Made presentations to the drillbotics committee.
- Drafted proposals for funding and support.

Software Skills

Microsoft Office Suite, Python, Machine learning, SPSS, Data Analytics, MATLAB, Eclipse, Octave, ArcGIS, Dart, CMG

Other Skills and Competencies

- Good communication skills
- Good presentation skills
- Self-motivated and results oriented
- Excellence team player
- Critical analyst and very innovative
- Adaptability

Leadership Experience

- Team lead, UMaT Drillbotics Team – UMaT (2022 – 2023)
- President, Visionary Missionaries – UMaT (2021 – 2022)
- Organizer, Intellecto Planning Committee (IPC) – UMaT (2021 – 2022)
- Communication Director, Society of Petroleum Engineers (SPE) – UMaT (2021 – 2022)

Seminars/Participations

- Africa Centre for Energy Policy seminar on, “Finding a Sustainable Path to Net-Zero - The African Way”, November 2023.
- GhIE seminar on, “Green Hydrogen: A Potential Technology to Meet Net-Zero Global Commitment”, September 2023.
- PESA seminar on, “The Energy Transition: The Role of the Oil and Gas Industry”, August 2022.
- SPE Ghana Section Virtual Presentation on, “How to Design a Good Reservoir Model”, March 2022.
- PetroConverge Mini-Series on Introduction to Well Completions, Introduction to Ghanaian Downstream Industry, March 2021.

Technical Presentation

- National Innovation Challenge, Deep Learning Applications in Mineral Exploration and Geological Survey, February 2024.
- Joynews Morning Show, A Presentation on UMaT Directional Drilling Software, August 2023.
[<https://www.youtube.com/watch?v=cGrBbBy9j5c>]
- SPE Nigeria Annual International Conference and Exhibition, August 2023.
- Student Paper Contest Undergraduate Division – Africa Region, May 2023.
- SPE Ghana Biennial International Conference and Exhibition-GH BICE, September 2022.
- Undergraduate Thesis Presentation, September 2022.
- Drillbotics Competition Finals, June 2022 and June 2023.
[<https://www.youtube.com/watch?v=iFjC4uSKO18>; 44:20 – 1:05:00].
- SPE UMaT Chapter Webinar, “Experiences as a National Service Personnel”, June 2023.

References

- Available on request