Prince Mensah

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EDUCATION

African Institute for Mathematical Sciences (AIMS) *Feb 2023 – Nov 2024*
Master of Science in Machine Learning

African Institute for Mathematical Sciences (AIMS) *Nov 2022 – Aug 2023*
Master of Science in Mathematical Sciences

Kwame Nkrumah University of Science and Technology (KNUST) *Oct 2017 – Nov 2021*
Bachelor of Science in Mathematics

PUBLICATION

- Mensah, P., Aderinto, P. V., Yusuf, I. S., & Pretorius, A. (2025). Physics-Informed Transformer-VAE for the inversion of the PROSAIL radiative transfer model. In Proceedings of the Pan-African Artificial Intelligence and Smart Systems Conference (PA-AISS 2025). Lecture Notes of the Institute for Computer Sciences, Social-Informatics and Telecommunications Engineering (LNICST), Springer. (*Accepted*).

RESEARCH EXPERIENCE

Dark-Soliton Quantum Bits from the Coherent Dynamics of Bose-Einstein Condensates (BECs) with Self-Defocusing Nonlinearity *May 2023*
Graduate Research *AIMS, Ghana*

- Investigated the coherent dynamics of Bose-Einstein condensates (BECs) with self-defocusing nonlinearity for quantum bit generation in dilute Bose gas systems
- Developed mathematical framework for finite-length BECs and studied quantum states induced by nonlinear BEC
- Explored novel mechanisms for encoding and manipulating quantum information in BECs with self-defocusing nonlinearity

Predicting the severity of road traffic accidents in Ghana using machine learning algorithms *May 2021*
Undergraduate Research (BSc Thesis) *KNUST, Ghana*

- Developed machine learning models (Random Forest, Logistic Regression, Neural Networks) to predict crash injury severity using crash-related parameters
- Evaluated model performance using accuracy, precision, recall, F1-scores, and ROC scores
- Implemented feature selection techniques to determine relevant crash attributes for severity prediction

Updates on Meningitis Surveillance in the Upper West region of Ghana (2012-2020) *July 2021*
Undergraduate Research *KNUST, Ghana*

- Analyzed long-term Meningitis surveillance data (2012-2020) from Ghana's Upper West region
- Utilized QGIS software to study spatial distribution of cases and deaths across 11 districts
- Extended previous research to provide comprehensive temporal analysis of disease patterns
- Developed visualizations to highlight trends and anomalies in Meningitis cases over time

WORKING EXPERIENCE

RG Partners *Sep 2025 – Present*
AI Developer *Kigali, Rwanda*

- Developing SoraAI, an AI-powered tax guidance chatbot for Rwanda's tax compliance system using Next.js, TypeScript, and advanced AI SDKs
- Implementing multilingual support (English, French, Kinyarwanda) with real-time chat functionality and voice interaction capabilities
- Building intelligent document processing pipeline for tax law database ingestion, PDF parsing, and structured compliance data extraction

SevenX *Jul 2025 – Sep 2025*
Artificial Intelligence Engineer *Kigali, Rwanda*

- Building RESTful APIs and fine-tuning large language models for healthcare applications, including medical text analysis and patient data processing systems
- Developing scalable AI architectures using Docker containers and microservices for deployment in healthcare environments with strict compliance requirements
- Implementing model versioning and monitoring pipelines for healthcare AI systems, ensuring reliability and accuracy in clinical decision support applications

InstaDeep *Dec 2024 – April 2025*
AI Research Engineer Intern *Kigali, Rwanda*

- Researched on physics-informed deep learning approaches for remote sensing applications, focusing on vegetation parameter estimation from satellite imagery
- Collaborated with research teams to develop a novel Transformer-PROSAIL-VAE architecture for environmental monitoring

ALX Africa *Sep 2022 – Dec 2022*
Software Engineer Intern *Accra, Ghana*

- Built RESTful APIs for real-time data synchronization and integrated third-party services including payment gateways and shipping providers
- Implemented automated testing suites and CI/CD pipelines using GitHub Actions and Docker for continuous deployment and quality assurance

KNUST *Oct 2021 – Nov 2022*
Research & Teaching Assistant *Kumasi, Ghana*

- Tutored undergraduate students in courses including Differential equations, Numerical methods, and Linear algebra
- Collaborated with faculty on research projects involving numerical methods, differential equations, and advanced linear algebra
- Designed tutorial materials and mid-semester exams while maintaining regular office hours for student support

Google *Feb 2020 – Aug 2020*
Data Analytics Intern *Accra, Ghana*

- Analyzed healthcare datasets to identify patterns in patient outcomes and treatment effectiveness, providing insights for healthcare providers
- Developed healthcare analytics dashboards using Tableau to visualize patient demographics, treatment protocols, and clinical performance metrics

TEACHING EXPERIENCE

Industry Immersion Africa *Sep 2023 – Nov 2023*
Course Tutor *Accra, Ghana*

- Facilitated hands-on supplementary curriculum for industry-focused students
- Tutored courses including Introduction to Power BI, Advanced Microsoft Excel for Data Analytics, Introduction to General Management, Data & Decisions, and Agile Leadership

Galois Analytics *Feb 2023 – Aug 2023*
Data Science Instructor *Accra, Ghana*

- Delivered lectures and conducted workshops on predictive analytics, machine learning, data visualization, and programming in Python and R
- Engaged in collaborative curriculum design and strategic planning with program coordinators
- Provided comprehensive guidance through hands-on practical sessions to enhance student understanding of data science concepts

KNUST *Oct 2021 – Nov 2022*
Research & Teaching Assistant *Kumasi, Ghana*

- Tutored undergraduate students in courses including Differential equations, Numerical methods, and Linear algebra
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PROJECTS

Physics Informed Transformer-VAE for Biophysical Parameter Estimation | *Transformer, PROSAIL* *2024*
ML/CV *Personal Project*

- Developed a novel architecture combining transformer networks with physics-based radiative transfer modeling for accurate biophysical parameter retrieval from Sentinel-2 satellite imagery.
- Implemented self-attention mechanisms to capture complex spectral relationships while maintaining physical consistency through the PROSAIL model, significantly improving feature extraction and parameter estimation.
- Project link: [GitHub]

Text Summarization System | *FastAPI, Streamlit, Transformers* *2024*
NLP *Team Project*

- Developed a full-stack text summarization system with FastAPI backend for authentication and transformer-based summarization
- Implemented user-friendly Streamlit frontend for text input and summary visualization, with comprehensive API documentation
- Project link: [GitHub]

Sentiment Analysis on Movie Reviews | *BERT, Apache Airflow, MLflow* *2023*
NLP *Team Project*

- Developed an end-to-end ML pipeline for sentiment analysis using BERT, orchestrated with Apache Airflow for automated workflow management
- Implemented MLflow for experiment tracking and DVC for data versioning, with FastAPI for model deployment
- Project link: [GitHub]

TECHNICAL SKILLS

- **Languages**: Python, JavaScript, TypeScript, C/C++, MATLAB, SQL, R
- **AI & ML**: PyTorch, JAX, RAG, Flux, Hugging Face Transformers
- **Backend & APIs**: FastAPI, Flask, Streamlit, Docker, RESTful APIs
- **DevOps & Deployment**: Git, MLflow, Apache Airflow, DVC, Docker, AWS

AWARDS & CERTIFICATION

Young African AI Research Fellowship (YAAR) *2023*
Research Award *Ascend 360*

- Prestigious award initiated at Deep Learning Indaba Conference 2023, sponsored by Jeff Dean, Chief Scientist at Google DeepMind and Google Research
- Selected to nurture and develop emerging AI talent across the African continent

Master's in Mathematical Sciences Scholarship *2022*
Academic Award *AIMS*

- Full scholarship awarded by African Institute for Mathematical Science in collaboration with Ghana Government
- Awarded to talented postgraduate students from the African continent for studies at AIMS-Ghana

GNPC Scholarship Award *2017*
Academic Award *Ghana National Petroleum Corporation*

- Competitive scholarship awarded to Bachelor's students demonstrating excellent academic performance
- Supported entire undergraduate education at KNUST