ODUOLA, IDRIS ADEWALE

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PERSONAL STATEMENT

As a graduate in Mathematics driven by curiosity and a passion for interdisciplinary problem-solving, I aspire to pursue a career in research and teaching, at the intersection of Mathematics and real-world applications.

EDUCATION

KING FAHD UNIVERSITY OF PETROLEUM AND MINERALS **DHAHRAN, SAUDI ARABIA**
Master of Science in Mathematics **(CGPA: 3.78/4.0)** *Aug 2022 – Jun 2024*

UNIVERSITY OF ILORIN **KWARA, NIGERIA**
Bachelor of Science in Mathematics **(CGPA: 4.91/5.0)** *Oct 2017 – Oct 2021*

PROJECTS

Full Waveform Inversion as a Gradient Flow Problem *Ongoing*

- Developing a physics-guided machine learning model to solve full-waveform inversion problems.
- Currently, the model will utilize separate networks for the forward and inversion processes, with an evolutional neural network approach.
- The forward model has a positional-encoding mechanism to ensure sequence position of seismic sources are correctly identified. *Initial progress can be found here*

Learning Eigenenergies Using Physics Informed Neural Network (PINN) with Self-Attention *Ongoing*

- Incorporating self-attention mechanism as an orthogonalization constraint, which enables PINN to output arbitrary number of eigenstates for eigenvalue problems critical in many fields in physics and engineering.
- Manuscript is in preparation. *Some open codes can be found here.*

Hands-on Scientific Machine Learning eBook *Ongoing*

- Creating an online interactive eBook for recent advances in Scientific machine learning, in collaboration with Xiaoyu Xie (*personal website*). *Project progress can be found here.*

Rayleigh quotient Physics Informed Neural Network (PINN) for Quantum Eigenvalue problems *2024*

- Developed a PINN to approximate the wavefunctions of quantum wells, and Rayleigh quotient to compute the corresponding energy levels. The model obtains multiple eigenstates using transfer learning and a deflation method, so higher eigenstates can be learned sequentially by the network. (Check project codes here)

Numerical Solution of Lorenz Equations: *Application in Fluid Dynamics and Atmospheric Convection*
KFUPM Math 571 Course *2023*

- Employed numerical techniques to investigate the solution of the Lorenz equations.
- Captured the performance of different techniques in solving the Lorenz equations and proposed the best technique.

Optimizing Neural Networks for Predicting Titanic Survivorship
Kaggle *2022*

- Built and trained a 3-layer neural network, exclusively utilizing NumPy, matplotlib, pandas, and some sklearn preprocessing tools. The model was developed for participation in the Kaggle Titanic competition, aimed at predicting survival outcomes from the 1912 Titanic disaster. Major optimization techniques were employed to enhance model performance, ultimately selecting the best-performing iteration. (Check mini-project here)

University of Michigan (Coursera)
Web Design for Everybody Capstone *2021*

- Designed and implemented a professional-quality portfolio for a travel blog, illustrating the ability to create a responsive website suitable for a minimum of three platforms. (Check project here)

- Ensured compliance with validation and accessibility standards while enhancing functionality through the incorporation of plugins, including the Bootstrap Carousel. (Check project here)

RESEARCH EXPERIENCE

Graduate Research Assistant **May 2023 - Present**
KING FAHD UNIVERSITY OF PETROLEUM AND MINERALS *DHAHRAN, SAUDI ARABIA*

- Explored the use of Machine Learning in solving Partial Differential Equations (PDEs).
- Implemented Physics-Informed Neural Network (PINN) to solve PDEs, integrating ML with traditional methods.
- Developed a PINN algorithm for the Quantum Eigenvalue Problem subject to different potentials.

Undergraduate Research Assistant **Oct 2019-May 2021**
UNIVERSITY OF ILORIN *KWARA, NIGERIA*

- Investigated factors influencing students' performance in Pure and Applied Mathematics through literature review.
- Developed a deterministic model to address the issue of waning interest in university-level Mathematics.
- Employed Jacobian Matrix to analyze equilibrium states and utilized the Differential Transform Method (DTM) to find solutions for the model.

CONFERENCES, SEMINARS AND WORKSHOPS

Data to Decisions in the E&P – Bridging the Gap with Machine Learning (Workshop)
KFUPM College of Petroleum Engineering and Geosciences *2025*

- Attended the short course titled *Data-Driven Decision Making and Predictive Modeling using AI/ML for the E&P*, and the technical session on the *Current Reality of AI/ML*.

MathConnect 2024: International Conference of Mathematics and its Applications
KFUPM *2024*

- Attended the 2024 MathConnect conference which brought together distinguished mathematicians from around the globe, fostering discussions on the latest advancements across various mathematical domains.

First KFUPM Interdisciplinary Graduate Student Conference
KFUPM *2024*

- Presented my research work with a title, "***Can Neural Networks learn Eigenpairs***?"
- Awarded the 3rd research presentation award and monetary prize for the talk.

Physics Informed Neural Networks (PINNs) for Quantum Eigenvalue Problems
KFUPM Mathematics Department Seminar *2023*

- Gave a talk on PINN and its implementation in solving Quantum Eigenvalue problems.
- Discussed the advantage of this approach over traditional numerical and approximation techniques.

CERTIFICATIONS

Deep Neural Networks with Pytorch – IBM (Coursera) *Aug 2023*
Introduction to the Pytorch library, Implementation of Linear Regression, Logistic Regression, Deep Neural Networks, Softmax, Dropout, Convolutional Neural Network using Pytorch.

Machine Learning Specialization – DeepLearning.AI (Coursera) *Jun 2022*
Supervised Machine Learning: Regression and Classification, Advanced Learning Algorithms.

Machine Learning – Stanford University (Coursera) *Feb 2022*
Linear Regression, Logistic Regression, Neural Networks, SVMs, K-Means, PCA, Anomaly Detection, Recommender Systems, Large Scale Machine Learning.

Introduction to programming with MATLAB - Vanderbilt University (Coursera) *Aug 2021*
Gained knowledge on how to solve problems in computer programming using MATLAB.

Developing the SIR Model – Imperial College London (Coursera) *Aug 2021*
Acquainted with the basic concepts of building compartmental models, including how to interpret and represent rates, durations and proportions.

TEACHING EXPERIENCE

KING FAHD UNIVERSITY OF PETROLEUM AND MINERALS **DHAHRAN, SAUDI ARABIA**
Teaching Assistant *Sep 2022-Present*

- Taught lab recitation sessions in MATLAB and Python for students enrolled in MATH 101 and 102.
- Acted as a proctor during assessments, quizzes, and exams.
- Graded assignments, quizzes, and examinations for the students.

LUMEX ACADEMY **ILORIN, NIGERIA**
Mathematics Tutor *Jun 2021- Sep 2021*

- Organized and coordinated academic notes and tutorials for a class of JUPEB students, focusing on the Fundamentals of Calculus and Elementary Differential Equations, aligning closely with the established curriculum.
- Implemented various forms of assessments to improve students' mathematical comprehension, resulting in notable enhancement in their academic performance.

BENCHMARK ACADEMY **ILORIN, NIGERIA**
Mathematics Tutor *Jan 2021-Jun 2021*

- Provided tutoring and guidance to a class of prospective undergraduate students, focusing on Pre-Calculus, Calculus, Elementary Differential Equations, and Geometry, to prepare them for their university entrance examinations.
- As a result of the guidance and support offered, almost all students achieved successful admission into prestigious universities in Nigeria, showcasing the positive impact of the tutoring program.

AWARDS AND HONOURS

First KFUPM Interdisciplinary Graduate Student Conference *2024*

- Awarded the 3rd research presentation award for my presentation at the conference, including a cash price of 2000 Saudi riyals.

King Fahd University of Petroleum and Minerals Deanship of Graduate Scholarship *2022*

- Awarded full scholarship for an MSc in Applied Mathematics.

Khalifa University Combined Master/Doctoral Research and Teaching Scholarship *2022*

- Awarded full scholarship for an MSc in Computational Data Science *(offer declined due to visa restrictions).*

Federal Scholarship Board (FSB) National Awards, Federal Ministry of Education *2020*

- Awarded to Nigerian university students with outstanding performance in their discipline and who have further distinguished themselves by performing exceptionally well in the aptitude test.

NAMSSN Unilorin Award of Academic Excellence *2019*

- Award received for having a CGPA of 4.98/5.0 after the 2018/2019 session

SKILLS

Computer	Python, C, SQL, MATLAB, R, FORTRAN, LaTeX, HTML5, CSS3, JavaScript
Personal	Creative Writing, Academic Writing, Problem Solving, Teaching

INTERESTS

Research, Volunteering, Machine Learning, Programming, Scientific History, Mathematics.