Dennis Delali Kwesi Wayo

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Nationality: Ghanaian | Date of Birth: 28 April 1991

Personal Statement

I am a computational scientist and mid-level programmer with strong expertise in quantum computing, classical and quantum machine learning, and physics-based numerical simulations. My research focuses on the development of variational quantum algorithms, photonic circuit simulation, and computational methods for sustainable energy technologies, including hydrogen production and CO_2 reduction.

Education

PhD in Chemical Engineering (Candidate)
University Malaysia Pahang Al-Sultan Abdullah, Malaysia (2022 – present)
Faculty of Chemical and Process Engineering Technology
Thesis: Quantum Dots Photonic Upcon. & Inspired Garnet Electrochem. Cell for CO_2 RR
Focus: Computational Physics, Machine Learning, Quantum Computing

MSc in Petroleum Engineering
Nazarbayev University, Kazakhstan (2020 – 2022)
School of Mining and Geosciences (SMG)
Focus: Hydraulic Fracturing, Matrix Acidizing, Numerical Methods

BSc in Petroleum Engineering
Kwame Nkrumah University of Science & Technology, Ghana (2016 – 2019)
Department of Petroleum Engineering
Focus: Drilling Fluids, Filter Cakes, Numerical Methods

HND in Mechanical Engineering
Tamale Technical University, Ghana (2011 – 2014)
Department of Mechanical Engineering
Focus: Engineering Mathematics, Fluid Mechanics, AutoCAD

WAEC Certification
Business Senior High School, Ghana (2006 – 2009)

Research Experience

Research Fellow, National Laboratory Astana, NU (2024 – 2025)
Hydrogen systems, DFT & MD simulations, photocatalytic upconversion
Center for Energy and Advanced Material Science

Graduate Research Assistant, Nazarbayev University (2021 – 2024)
CFD modeling, filter cake decomposition, ML for proppant transport
Department Petroleum Engineering

Founder & Director, Denlloyd Engineering & Services Ltd. (2016 – 2023)
Managed agricultural equipment imports, logistics, and training

Teaching Experience

Udemy Course Instructor (2024 – Present)
Quantum Computing: On latest Qiskit SDK (Pending publication)

Publications & Preprints (Selected)

- Wayo, D. D. K., Goliatt, L., & Ganji, M. D. (2025). *Linear optics to scalable photonic quantum computing.* arXiv. https://arxiv.org/abs/2501.02513. (Under review)
- Wayo, D. D. K., Dias, R. A., Ganji, M. D., Saporetti, C. M., & Goliatt, L. (2025). *Gaussian models to non-Gaussian realms of quantum photonic simulators.* arXiv. https://arxiv.org/abs/2502.05245. (Under review)
- Wayo, D. D. K., Kudryashov, V., Karibayev, M., Fynn, G. E., Rafikova, K., Saporetti, C. M., Goliatt, N., & Nuraje, N. (2024). *Exploring quantum-dot engineered solid-state photon up-conversion in PbS: Yb^{3+}, Er^{3+}/CuBiO using density functional theory and machine learning methods for water splitting.* arXiv. https://arxiv.org/abs/2501.00573. (Under review)
- Wayo, D. D. K., Irawan, S., Noor, M. Z. B. M., & others. (2025). *Nordgren physics-informed neural networks to variational quantum eigensolver: Advancing hydraulic fracturing simulations in shale reservoirs.* Research Square. https://doi.org/10.21203/rs.3.rs-5947578/v1. (Under review)
- Wayo, D. D. K., Goliatt, L., & Ganji, M. D. (2024). *AI and quantum computing in binary photocatalytic hydrogen production.* arXiv. https://arxiv.org/abs/2501.00575. (Under review)
- Wayo, D. D. K., Ganji, M. D., Goliatt, L., & Noor, M. Z. B. M. (2025). *Hybrid ab initio exploration of CO_2 splitting pathways on Ni_7 clusters using NEB, DFT and DeePMD modeling* (Under review).

Research Grants & Projects

- National Laboratory Astana: Green Hydrogen & Photocatalysis – NU Astana (2023–2025), Research Fellow
- University Malaysia Pahang: Fracturing with Fluorine-Silica Proppants – $35K, UMP Malaysia (2024–2026), Co-Member — PI: Dr Zulkifli Noor (find project under research section)
- Nazarbayev University: IoT & Climate Resilience – $500K, NU Astana (2022–2024), RA — PI: Dr Alffredo Satyanaga (Assistant Professor)
- Nazarbayev University: Proppant Flow Modeling – $297K, NU Astana (2025–2027), Grant Writer — PI: Dr. Sonny Irawan (Associate Professor)
- Nazarbayev University: Filter Cake Removal in SBMDIF – $150K, NU Astana (2020–2022), RA — PI: Dr. Sonny Irawan (Associate Professor)

Technical Skills

Software/Frameworks: Qiskit, CIrq, PennyLane, Qiskit-Metal, TensorFlow, MEEP, DeePMD-kit, Ansys Fluent, Aspen HYSYS, Pipesim, Azure, py4Vasp, PennyLane, Quantum Espresso,

VASP.
Languages: Python, SWIFT, MATLAB
Hardware: Razer Blade 18 & MacBook Pro 16 M3 max 16c-CPU/40c-GPU

Professional Affiliations

American Physical Society, Institution of Chemical Engineers, Society of Petroleum Engineers, Ghana Institution of Engineers

Selected Conferences & Courses

- MIT iQuHACK, 2025 – Quantum State Prep with Classiq
- IBM Full Stack Software Developer 2025 – IBM Team
- IBM Qiskit Summer School, 2024 – Quantum Excellence Award
- Deep Dive in iOS 18 & SwiftUI 6, 2024 – Dr Ron Erez
- Quantum Poland Hackathon, 2024 – VQLS on Classiq IDE
- Quantum Computing, 2024 – Atil Samancioglu
- Quantum Mechanics, 2024 – Dr. Borge Göbel
- CFD for Professionals, 2022 – Dr. Aidan Wimshurst
- Data Engineering on Microsoft Azure, 2022 – Alan Rodrigues
- IBM Python Basics, 2021 – Joseph Santarcangelo