Dennis Wayo

Energy & Quantum Computing

Profile

Focusing on blending cutting-edge machine learning with quantum physics and fluid dynamics, I specialize in developing innovative models to enhance fossil fuel, hydrogen production, and storage systems. Drawing on my extensive research background in both experimental and computational analysis, I excel at strategic R&D planning to drive optimization and progress in these critical energy sectors.

Experience

Udemy Course Instructor
Udemy, Online | 2024 - Present
"Quantum Computing: On latest Qiskit SDK" pending course publication for over 1,000 undergrad. students

Assistant Researcher
National Laboratory Astana, NU, Astana | 2024 - Present
Hydrogen Production | Density Functional Theory | Photocatalytics | Watersplitting

Graduate Research Assistant
Nazarbayev University, Astana | 2021 - 2024
Experimental, Numerical Approximation, and Machine learning Predictive Analysis for proppant flow, hydraulic fracturing, filter cake decomposition processes, cuttings transport, and complex particle-fluid interactions in tight reservoirs.

Founder & Director
Denlloyd Engineering, Tamale | 2016 - 2022
• Importation and sale of agricultural machinery; • Custom clearance; • Marketing and administrative duties; • Supervision of tractor servicing and training

Education

PhD. Chemical Engineering (Candidate)
University Malaysia Pahang, Kuantan | 2022 - 2025
Thesis: Quantum-Informed Electrochemical-Turbomachinery for Carbon Capture and Reduction

MSc. Petroleum Engineering
Nazarbayev University, City | 2020 - 2022
Hydraulic Fracturing, Matrix Acidizing, and Filter Cakes/Formation Damage

BSc. Petroleum Engineering
Kwame Nkrumah Uni. of Sci. & Tech, Kumasi | 2016 - 2019
Drilling, production, & reservoir engineering

Personal information

Name
Dennis Delali Kwesi Wayo
Birthdate
28th April 1991
Gender
Male
Residence
Kazakhstan
Nationality
Ghanaian

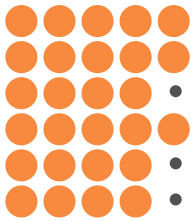
Research Communities

- Google Scholar: Dennis Wayo
- SCOPUS ID: 57890228100
- LinkedIn: https://www.linkedin.com/in/dennis-wayo-765a38b1/

Skills

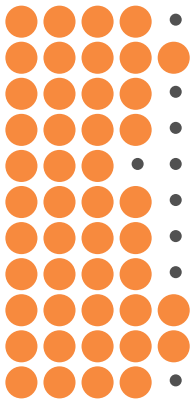
Engineering

Drilling & Completion
Hydraulic Fracturing
Matrix Acidizing
Hydrogen P&S
Data Engineering
Quantum computing



Computational Software

Qiskit**
Google TensorFlow**
Ansys Fluent & CFX*
CMG-IMEX*
Aspen Hysys*
Abaqus Sim*
Kappa*
Pipesim*
MATLAB*
Quantum Espresso**
Microsoft Azure (Cloud computing)



My mini-workstation

Programming & Simulation
1. Razer Blade 2023~ Intel Core i9-14900HX, 18" 200Hz 4K, GeForce RTX 4090, 64GB 5600MHz RAM, 4TB SSD 2. MacBook Pro 13 ~ M1 chip

Software License
*Purchased shared license
**Access on GPL

HND. Mechanical Engineering
Tamale Technical University, Tamale | 2011 - 2014
Fluid mechanics, Eng. Mathematics, AutoCAD

WAEC Senior High School Certification
Business Senior High School, Tamale | 2006
Elective Maths, Physics, Chemistry, Geography, English

Research Grants/Project Contribution

2024 **Fundamental Study of Florine-Modified Silica Proppants for Impermeable Reservoir Fracturing**
University Malaysia Pahang, Kuantan
RM 160,000 | Co-applicant
Dr. Zulkifli Noor

2022 - 2024 **Nanointerface Manipulation Aimed at Improving Light Absorption and Charge Carrier Separation in Heterostructural Photocatalysts**
National Laboratory Astana, NU, Astana
| Assistant Researcher
Dr. Vladislav Kudryashov

2022 - 2024 **Nazarbayev University: IoT-based Sensing Technology for Real-Time Identification of Unsaturated Soil Properties for Anticipation against Climate Change**
Nazarbayev University | CRP, Astana
$ 500,000 | GRA
Dr. Alfrendo Satyanaga

2020 - 2022 **Optimization of Filter Cake Removal Using Nanoparticles in Synthetic Based Mud Drill-In Fluid (SBMDIF) System**
Nazarbayev University | FDCRGP , Astana
$150,000 | GRA
Assoc. Prof. Sonny Irawan

Publications

Article
Classical and Quantum Informed Neural Algorithms for Hydraulic Fracturing Computing
Wayo, D.D.k., Irawan, S., Zafar, M., Bin Mohamad Noor , M.Z., Aitiz az Ali, A., Saporetti, C.M., Goliatt, L. | 2024
Quantum Journal, Under Review (Q1)

Conference Paper
Molecular Dynamic Prognosis for Ti-C10H16N2O8 Filter Cake Decomposition
S. Irawan, S., Wayo, D. D. K., Fathaddin, M.T. and Goliatt, L.| 2024
SPE conference paper (Q2) SCIE

Article
Quantum-Informed Energy Wave Function for Hydrogen Molecule Adsorption on Cs/Gr Surface
Wayo, D.D.K., Zafar, M., Dmitriy A. Martyushev, D.A., Saporetti, C. M., Goliatt, L. | 2024
Scientific Reports, Under Review (Q1) SCIE

References

Name, Professor Lei Wang
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Name, Dr. Leonardo Golliat
+55 (32) 99116-8203
leonardo.goliatt@ufjf.br

Name, Dr Enoch Larson
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Contact

Astana, Kazakhstan
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Springer Nature Reviewer

Journal of Petroleum Exploration and Production Technology (Q2)

Articles in draft

- *Photonic and Superconducting Quantum Processors: Scalability and Fault Tolerance*
- *Quantum Computing and Classical Deep Learning Algorithms for Material Modeling to Validate Solar to Hydrogen Conversion Efficiency*
- *Machine-inspired Binary Photocatalytic Water Splitting*
- *Kohn-Informed Deep Learning and Density Functional Theory Coupling for PbS@Graphene in Enhancing and Predicting Hydrogen Adsorption Index*
- *A Novel 3D piDMD-piNN Numerical Data Modeling for Matrix Acidizing Optimization*

Conference Paper

Numerical Analysis of Quantum Dots-Upconversion PbS: Yb3+Er3+ and CuBiO Photocatalyst for Hydrogen Production

Wayo, D.D.K., Kudryashov, V., Rafikova, K., Saporetti, CM., Goliatt , L., Nuraje, N. | 2024

Under Review, 18.06.2024 (Q1)

Conference Paper

A Multiscale and Multiphysics Extended Discretization of Metal-Oxide Proppant Settling in Hydraulic Fractured Slots

Wayo, D.D.K., Noor, M.Z.B.M., Saporetti, C.M., Golliat, L. | 2024

Journal of Physics: Conference Series, Accepted 4.06.2024 (Q3) SCIE

Article

Filter Cake Neural-Objective Data Modelling and Image Optimization

Wayo, D.D.K., Irawan, S., Satyanaga, A., Kim, J., Bin Mohamad N oor, M.Z., Rasouli, V | 2024

Symmetry 2024, 16(8), 1072. (Q1), SCIE

Article

Classical and Quantum Informed Neural Algorithms for Hydraulic Fracturing Simulation

Wayo, D.K., Irawan, S., Saporetti, C.M., Leonardo Goliatt, L.| 2024

Under review (Q2) SCIE

Article

Heterogeneous Stacking Machine Learning Models for Modeling Flowing Bottom-hole Pressure of Oil Wells

Macedo, B.S., Wayo, D.D.K., Yaseen, Z.M., Saporetti, C.M., and G oliatt, L. | 2024

Under review (Q1) SCIE

Article

Data-driven total organic carbon prediction using feature selection methods incorporated in an automated machine learning framework

Campos, D., Macedo, B.S., Wayo, D.D.K., Santis, R.B., Yaseen, Z., Saporetti, C.M., and Goliatt, L. | 2024

Under review (Q1) SCIE

Article

Evolutionary automated radial basis function neural network for multiphase flowing bottom-hole pressure prediction

Campos, D., Wayo, D.D.K., Santis, R.B., Martyushev, D.A., Yaseen, Z.M., Duru, U.I., Saporetti, C.M., and Goliatt, L. | 2024

Fuel, 377, 132666. (Q1) SCIE

Article

Study on the Interaction of Interfacial Tension Between Water and Oil Surfaces In The Presence of Aluminium Coated With Polyvinylpyrrolidone (PVP) Nanoparticles

Raffizal, M.F., Noor, M.Z.M, Desa, M.S.Z.M., Irawan, S., Wayo, D. D.K. | 2024

International Journal of Nanoelectronics and Materials, 47-52 (Q4)

Article

Global Genetic Algorithm for Automating and Optimizing Petroleum Well Deployment in Complex Reservoirs

Irawan, S., Wayo, D.D.K., Satyanaga, A. and Kim, J| 2024

Energies, 17(9), (Q1) SCIE

Summer School & Courses

IBM 2024 Qiskit Global Summer School (July 2024)

Qiskit Runtime Primitives V2, Quantum Circuit Compilation, Hardware Noise: Modeling and Characterization, Execution on Noisy Quantum Hardware, Circuit Cutting, Mapping Problems to Qubits, Quantum Combinatorial Optimization, Hamiltonian Dynamics: Applications and Simulation, Quantum Machine Learning

Quantum Computing, by Mr Atil Samancioglu (2024)

Qiskit, Python, Qubit, Superdense Coding, Quantum Teleportation, Bernstein Vazirani, Deutsch, Shor, & Grover Algorithms, Quantum Fourier Transform, Quantum Phase Estimation

Quantum Mechanics, by Dr Börge Göbel (2024)

Schrodinger equation, particle in a box and ring, tunnel effect, kronecker delta, Bra-Ket notation, Hermitian operator, Commutators, Heisenberg uncertainty, Second quantization, Hydrogen atom, Relativistic quantum theory and electron spin, computational physics and quantum conputing.

Data Engineering on Microsoft Azure, by Mr Alan Rodrigues (2024)

Azure Data Lake Gen 2 storage, SQL, ETL pipeline, Azure Stream Analytics, SPARK, Scala in Azure Databricks

CFD for Professionals, by Dr Aidan Wimshurst (2022)

Meshing using Richardson Extrapolation, RANS turbulence, Verification & Validation, Data assessment and plots

Article

Data-Driven Fracture Morphology Prognosis from High Pressure Modified Proppants Based on Stochastic-Adam-RMSprop Optimizers; tf. NNR Study

Wayo, D.D.K., Irawan, S., Satyanaga, A. and Kim, J.| 2023

Big Data and Cognitive Computing, 7(2), p. 57 (Q1)

Article

Modelling and Simulating Eulerian Venturi Effect of SBM to Increase the Rate of Penetration with Roller Cone Drilling Bit

Wayo, D.D.K., Irawan, S., Satyanaga, A. and Abbas, G.| 2023

Energies, 16(10), p. 4185. (Q1) SCIE

Article

Factors affecting drilling incidents: Prediction of stuck pipe by XGBoost model

Kizayev, T., Irawan, S., Khan, J.A., Khan, S.A., Cai, B., Zeb, N. and W ayo, D.D.K. | 2023

Energy Reports, 9, pp. 270–279 (Q2) SCIE

Article

A CFD validation effect of YP/PV from laboratory-formulated SBMDIF for productive transport load to the surface

Wayo, D.D.K., Irawan, S., Bin Mohamad Noor, M.Z., Badrouchi, F., K han, J.A. and Duru, U.I., | 2022

Symmetry, 14(11), p.2300. (Q1) SCIE

Article

CFD Validation for Assessing the Repercussions of Filter Cake Breakers; EDTA and SiO2 on Filter Cake Return Permeability

Wayo, D.D.K., Irawan, S., Khan, J.A. and Fitrianti| 2022

Applied Artificial Intelligence, 36(1), p. 2112551 (Q2) SCIE