Kwame Donkor

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Core Competencies

Power Grid Resilience & Reliability Research | Power System Modeling | Machine Learning | Deep Learning | Geospatial Analysis (GIS) & Data Analysis | Low- & Medium-Voltage Power Systems | Renewable Energy Systems | Industrial Automation & Control Systems | PLC & SCADA Programming

Technical Proficiencies

Programming: Python, Git, IEC 61131-3 Structured Text (SEL RTAC / ACSELERATOR)
Machine Learning & Data Analysis: PyTorch, PyTorch Geometric, scikit-learn, pandas, NumPy
Simulation & Design: OpenDSS, PowerWorld, Siemens TIA Portal, Rockwell RSLogix 5000, AutoCAD Electrical, EPLAN Electric, DIALux evo, HelioScope, SAM
Hardware & Commissioning: LV/MV Equipment: Generators, Protection Relays, Transformers

Education & Certifications

Doctor of Philosophy in Electrical & Computer Engineering, University of Washington, Seattle, WA

- GPA: 3.96 **Sept 2023 - June 2028 (Expected)**

Bachelor of Science in Electrical/Electronic Engineering, Kwame Nkrumah University of Science & Technology, Kumasi, Ghana **Sept 2013 - June 2017**

- GPA: 3.92 | First Class Honours; Top 5% of Graduating Class; Provost Excellent Student Award

Certified Project Management Professional **Feb 2022 – Feb 2028**

Research Experience

University of Washington, IDEAS Lab, Seattle, WA

Teaching & Research Assistant **Sept 2023 – Present**

Conduct research on the intersection of grid resilience in power systems, extreme weather events, and climate vulnerability. Served as Teaching Assistant for several courses, assisting students in understanding fundamental power systems concepts, modeling and power flow analysis.

- Apply statistical and geospatial analyses on high-resolution grid sensor data and ground based weather measurements, in Sub-Saharan Africa – to investigate grid disturbance-extreme weather interactions at granular scales.
- Develop a graph neural network (GNN) framework to predict weather-driven outages on SSA distribution grids to study the various climatic, environmental and geographic factors that influence grid failure.
- Support course instruction by preparing in-class problem sets, grading quizzes and exams, and conduct office hours to assist students with course material.
- Develop PowerWorld simulation exercises to enhance students' understanding of power flow analysis and system operation concepts and provide technical assistance to students with their end-of-quarter power system modeling project.

Electricity Market Price Forecasting Project **April – June 2026**

- Compared end-to-end and multi-stage deep learning pipelines for day-ahead and real-time electricity-price forecasting in Spain's renewable-dominated market, implementing hybrid CNN+BiLSTM-with-attention and Transformer architectures in PyTorch.
- End-to-end pipeline cut MAE and MAPE by ~50% versus the multi-stage approach.
- Contributed to codebase and co-authored resulting project paper: https://github.com/amukherjee25/forecasting-electricity-prices

Industry Experience

Schweitzer Engineering Laboratories, Charlotte, NC
Engineering Intern **June – Sept 2025**

- Developed detailed communication point lists for a microgrid project, integrating reclosers, meters, transformer relays, and a 2 MW Tesla Battery Energy Storage System operating in both grid-forming and grid-following modes.
- Configured communication parameters and logic for Real-Time Automation Controllers (RTACs) using Modbus, DNP3 and SEL FM protocols to enable secure and reliable data exchange between field devices and SCADA systems.
- Reviewed and provided markups for electrical and control drawings, including single-line diagrams, AC/DC schematics, and panel layouts, ensuring design accuracy and compliance with engineering standards.
- Developed relay settings to implement power factor correction, reverse power trip, and a Direct Transfer Trip (DTT) protection scheme.

Process & Plant Automation Ltd, Accra, Ghana
Automation & Controls Engineer **Sept 2017 – June 2023**

Oversaw field teams on electrical/automation projects, including the installation of PLC and MCC panels, medium and low voltage transformers & switchgear, protection relays, fire suppression systems, variable frequency drives, and soft starter systems. Coordinated project timelines, budgets, and reporting, providing stakeholders with progress updates and post-project reviews.

- Configured, tested, and commissioned Schneider PLCs, HMIs, and Chint inverters for a 2MW solar PV system, resulting in annual savings of $576K for a leading agro-processing company.
- Performed programming, wiring and commissioning of PLC, HMI and Soft Starter Panels for the tailings storage facility (TSF) field control room of a large mining company.
- Led a team of 15 in installing over 4K LED fixtures and 99 smart meters across six institutions, enabling remote energy monitoring as part of an $800K energy efficiency initiative spearheaded by a government agency.

Publications & Presentations

Publications

- Donkor, K., & Lukuyu, J. "Spatiotemporal Analysis of Weather Extremes and Power Quality and Reliability in Accra, Ghana." *In preparation for submission*, 2026.

Presentations

- "Modeling the Energy Transition in Africa." INFORMS Annual Meeting, Georgia World Congress Center, Atlanta, GA. October 2025.
  - Presented a hybrid talk-and-poster session on bridging climate risk and grid resilience for equitable energy transitions in Sub-Saharan Africa, focusing on Accra, Ghana.

Teaching Experience

EE 454 – Power Systems Analysis, University of Washington (Fall 2026)

EE 454 – Power Systems Analysis, University of Washington (Fall 2025)

CHEM 566 – Energy, Materials, Devices and Systems, University of Washington (Fall 2024)

Leadership & Service

Webmaster & EXCOM Member, IEEE Power & Energy Society, Seattle Chapter

Faculty Mentor, Undergraduate Capstone Project, University of Washington, Seattle, WA

iUrban Teen STEM-O-Ween Summit Volunteer, North Seattle College, Seattle WA

Team Leader, STEM Alternative Spring Break Program, University of Washington, Seattle, WA

Research Mentor, Summer Undergraduate Research Program, University of Washington, Seattle, WA

Awards

Cascade Energy Fellowship Recipient, Renewable Energy Scholarship Foundation

Languages

English, Twi (Native) | Spanish (Fluent)