# Edwin K. A. Tenkorang

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## Education

**Kwame Nkrumah University of Science and Technology** — Kumasi, Ghana
*B.Sc. in Electrical/Electronic Engineering;* ***First Class Honors*** — *08.2018 – 11.2022*

**Relevant Coursework:** Power Systems Analysis, Power Systems Protection, Power Systems Operation and Control, Power Systems Planning and Optimization, Control Systems I-II, Computer Networking.

## Research Interests

AI and Energy Systems, Control and Optimization, Security and Privacy, Networked Systems.

## Research Experience

**Power Systems Laboratory, K.N.U.S.T** — Kumasi, Ghana
*Research Assistant* — *09.2023 – Present*

- Collaborating with Dr. Elvis Twumasi on the optimal selection of propagation velocity for fault detection in underground cables.
- Supervised a team of six in the successful development of Flux Flow, a circuit simulation software specifically designed for use in ECE's Circuit Theory course.
- Enhanced and presented on the Sea Lion Optimization Algorithm and co-authored a related research paper.
- Initiated and directed the development of the lab's website, including its content, database structure, and UI.

**Department of Electrical/Electronic Engineering, K.N.U.S.T** — Kumasi, Ghana
*Research Assistant* — *01.2023 – 09.2023*

- Collaborated with Dr. Emmanuel Affum to investigate transmit power minimization in an IRS-NOMA system.
- Implemented fault detection techniques for induction motors, effectively detecting supply voltage imbalances and broken rotor bars using wavelet analysis and supervised learning algorithms.
- Developed a hybrid deep learning model for short-term load forecasting and co-authored a related research paper.

## Selected Research Projects

**Transformer Inter-turn Fault Diagnosis** | *GitHub*

- Developed a technique for transformer fault detection utilizing wavelet analysis and deep learning. The project involved using a CNN to diagnose fault severity and location, resulting in near-perfect accuracy in fault prediction after testing.

**PSO-A2C-Lnet for Short-term Load Forecasting** | *GitHub*

- A short-term load forecasting framework utilizing a CNN-LSTM model reinforced with a multi-head attention mechanism to allow the model to pick the most important features of the input sequence for prediction.

**Induction Motor Fault Detection** | *GitHub*

- Two distinct projects on the detection of supply voltage imbalances and broken rotor bars in induction motors. The projects apply wavelet transforms for signal processing, optimizable neural networks, and Principal Component Analysis for feature extraction.

**IRS-NOMA Transmit Power Minimization** | *GitHub*

- Optimized transmit power allocation for a one-cell IRS-NOMA system utilizing the SciPy library. The project involved the solution of an objective function for minimizing transmit power while ensuring a threshold SINR.

## Conference Presentations

**Improvement of Sea Lion Bio-Inspired Optimization Algorithm** — Accra, Ghana
*1st SES Engineering Conference,* ***University of Ghana*** — *11.2023*

- Presented with A. Abakah on an enhanced sea lion algorithm with sine-based chaotic mapping to speed convergence and epsilon-greedy selection to avoid local optima entrapment **(Honorable Mention - Best Oral Presentation)**.

## Selected Publications

**Transformer Inter-turn Fault Diagnosis Using Continuous Wavelet Transforms and Convolutional Neural Networks**
*ADDRI Journal of Science and Technology* *2023*
**E.K.A Tenkorang**, E.A. Frimpong, E. Twumasi.

**Short-Term Load Forecasting Using A Particle Swarm Optimized Multi-Head Attention-Augmented CNN-LSTM Model**
*International Journal of Artificial Intelligence and Soft Computing* *2023*
P.K. Quansah, **E.K.A Tenkorang**.

Under Review:

**Improvement of Sea Lion Bio-Inspired Optimization Algorithm**
*Science and Development Journal (Special Edition)* *2023*
E. Twumasi, A. A. Abakah, **E.K.A. Tenkorang**.

## Teaching

**Department of Electrical/Electronic Engineering, K.N.U.S.T** Kumasi, Ghana
*Teaching Assistant* *05.2023 – 09.2023*

- **EE 368 - Power Systems Analysis**, *Instructor: Professor E. A. Frimpong* *≈ 110 students*
- **EE 468 - Power Systems Protection**, *Instructor: Professor E. A. Frimpong* *≈ 300 students*

## Professional Experience

**University Information Technology Services, K.N.U.S.T** Kumasi, Ghana
*Cybersecurity Assistant, Information Security and Technology Assurance Dept.* *11.2022 – 09.2023*

- Configured PacketFence for network access control, implementing blacklists and whitelists to bolster security.
- Conducted real-time monitoring of network traffic and security alerts to identify threats and vulnerabilities.

**Ghana Grid Company Limited** Kumasi, Ghana
*Engineering Intern* *10.2021 – 12.2021*

- Assisted data monitoring and redesigned the parameter recording template for easier analytics.
- Participated in line patrols for tower inspection and vegetation control.
- Aided the Protection and Control team in troubleshooting faulty current transformers.

## Skills

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|---|---|
| **Programming Languages** | C/C++, MATLAB, Python, SQL |
| **Libraries** | Keras, Matplotlib, Numpy, Pandas, Scipy, Tensorflow |
| **Simulation Tools** | MATLAB/Simulink, MATPOWER, Logisim, HOMER, Packet Tracer |

## Certifications

**Cybersecurity Professional Certificate**, Google *09.2023*
**Certified in Cybersecurity**, ISC2 *08.2023*
**Certified Security, Identity and Compliance Fundamentals**, Microsoft *06.2023*

## Service & Memberships

**ISC2**, Associate *08.2023 – Present*
**National Society of Black Engineers**, Member *06.2022 – Present*
**BecauseSheCan**, Event Planning Volunteer *08.2022 – 12.2022*
**Department of Electrical/Electronic Engineering**, Student Mentor *09.2020 – 10.2022*
**Electrical Engineering Students Association**, Organizing Committee Member *06.2020 – 07.2021*