

Abel Owolabi

Ph.D. Student

Department of Electrical and Computer Engineering

University of Rochester, Rochester, NY

aowolabi@ur.rochester.edu

+1 (585) 305-4018

[LinkedIn](#) — [Google Scholar](#)

RESEARCH THEME

Ph.D. student specializing in beyond-CMOS digital circuit design for cryogenic and quantum computing. Experienced in Dynamic Single-Flux-Quantum (DSFQ) logic, asynchronous architectures, timing and path-balancing optimization, and layout design for high-speed, low-power cryogenic integrated circuits.

EDUCATION

Ph.D., Electrical and Computer Engineering

Aug. 2024 – May 2029 (Expected)

University of Rochester, Rochester, NY

M.Sc., Electrical and Computer Engineering

Aug. 2024 – May 2026

University of Rochester, Rochester, NY

Grade: Distinction

Coursework: Introduction to VLSI; Semiconductor Devices; Advanced Computer Organization;

Nanoelectronic Devices; Superconductor Electronics; Superconductivity and the Josephson Effect.

B.Tech. (Hons.), Computer Engineering

Nov. 2015 – Apr. 2022

Ladoke Akintola University of Technology, Ogbomosho, Nigeria

CGPA: 4.70/5.00 (WES GPA: 3.82/4.00)

Class Rank: 4/1000+ Engineering students

RESEARCH PROJECTS

Dynamic SFQ Full Adder Designed for High-Speed Cryogenic Electronics

2025

Design of all-dynamic Full Adder in MIT-LL 10 kA/cm² process library:

- Designed wave-pipelined data propagation for improved throughput.
- Applied path-balanced latching techniques for timing uniformity.
- Analyzed performance, benchmarking latency, and throughput.

Clockless Dynamic SFQ XOR for high-performance Computing

2025

Design and verification of asynchronous superconducting logic cells:

- Designed a low-power, high-frequency Dynamic Single-Flux-Quantum XOR gate.
- Reduced Josephson junction count by 25% by eliminating clock distribution and tuning parasitic inductance.
- Improved bias margins for robust asynchronous operation.

Quantum-Coherent Nanostructures and Single Flux Quantum Logic

2025

Research on nanoscale device physics and superconducting circuit design at cryogenic temperatures:

- Investigated quantum-coherent nanostructures for high-sensitivity radiation detection.
- Designed ultra-fast Josephson-based SFQ digital logic circuits.
- Performed simulation parameter analysis, and layout using PSCAN, InductEx, and KLayout.

Energy-Efficient Digital Trainer for Logic Education

2024

Development of an embedded system for digital logic education:

- Designed an ATmega328P microcontroller-based trainer for teaching digital electronics.
- Developed PCB circuits in ExpressPCB and simulated with Proteus and Livewire.

RESEARCH AND PROFESSIONAL EXPERIENCE

Graduate Research Assistant

May 2025 – Present

University of Rochester, Rochester, NY - Advised by Distinguished Prof. Eby G. Friedman

- Designing Dynamic Single Flux Quantum (DSFQ) logic architectures for *cryogenic integrated-circuit* platforms with emphasis on bias stability, timing determinism, and ultra-low-power switching performance.
- Designing and optimizing physical layouts for cryogenic integrated circuits (Cryo-ICs).

Graduate Teaching Assistant

May 2025 – Present

University of Rochester, Rochester, NY - ECE 230: Electromagnetic Waves.

- Led weekly recitations and labs on Maxwell's equations, wave propagation, and transmission-line theory.
- Explained electromagnetic field interactions, wave reflection, refraction, and impedance matching through analytical problem-solving.
- Graded homeworks, lab reports, and assessments, and provided constructive feedback to support student learning

Graduate Teaching Assistant

June 2023 – June 2024

Augustine University, Epe, Lagos, Nigeria

- Retained as Graduate Teaching Assistant and instructed 120+ students in *Elementary Mathematics I/II* and *Computer Architecture & Organization*.
- Supervised, graded, and verified departmental examinations to maintain academic integrity.

Graduate Assistant (NYSC)

June 2022 – May 2023

Augustine University, Epe, Lagos, Nigeria

- Streamlined academic operations, including student registration, exam logistics, and departmental documentation.
- Supported faculty with course coordination and academic reporting.

Undergraduate Engineering Intern

Aug. 2020 – Feb. 2021

Shelter Electronics Workshop, LAUTECH, Nigeria

- Designed and tested embedded systems using the ATmega328P microcontroller and Arduino IDE.
- Designed Printed Circuit Boards (PCBs) using ExpressPCB.
- Developed hybrid solar inverter and automatic hand-sanitizer prototypes from concept to demonstration.
- Authored detailed technical reports and delivered project presentations to supervisors.

PROFESSIONAL DEVELOPMENT/CERTIFICATES

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| – Semiconductor Fabrication; Purdue University, University of Texas at Austin, and Intel Corporation (link) | June 2025 |
| – Embedded Software and Hardware Architecture; University of Colorado, Boulder (link) | Aug. 2023 |
| – Introduction to the IoT and Embedded Systems; University of California, Irvine (link) | Aug. 2023 |

SKILLS

EDA Tools: Cadence Virtuoso, JSIM, WRSpipe, LTSpice, InductEx, Pscan2, KLayout, ExpressPCB.

Programming and Scripting: Python, MATLAB, Arduino C

Operating Systems: Linux, Windows

Documentation and Productivity: L^AT_EX, Microsoft Office, Microsoft Visio

Languages: English (Fluent), Yoruba (Fluent), Fon (Native)