Samuel Phiri

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EDUCATION

Duke University, Durham, NC

PhD in Electrical and Computer Engineering — *Projected June 2025*

MS in Electrical and Computer Engineering — *Completed concurrently with PhD*

Michigan State University, East Lansing, MI

BS in Electrical Engineering, Honors, **GPA: 3.75/4.0** — *2019*

EXPERIENCE

Research Intern — *May - Aug, 2023*

IBM Quantum, IBM TJ Watson Research Center, Yorktown Heights, NY

- Used Qiskit SDK to write quantum experiments and submit jobs to large-scale superconducting quantum processors.
- Conducted numerical simulations and developed physical models for quantum systems.
- Contributed to the development of a quantum simulation algorithm for thermal state preparation using dynamic circuits.
- Used composite error mitigation strategies including ZNE, PEC twirling, dynamical decoupling, and a custom M3 runtime.

Graduate Research Assistant — *Aug, 2019 - Present*

Duke Quantum Center, Duke University, Durham, NC

- Designed and validated experimental setups for ion-trap quantum computation, optimizing performance in UHV and cryogenic environments.
- Led characterization and validation of trapped-ion devices using high-precision optics, RF electronics, and laser spectroscopy techniques.
- Developed automated hardware control and data acquisition pipelines using Python for device testing and validation.
- Conducted failure analysis and troubleshooting of optical, electrical, and mechanical components in trapped-ion systems.
- Collaborated with multidisciplinary teams to optimize quantum hardware performance.
- Worked on probe station measurements and optical profilometry for microfabricated device characterization.

SELECT PUBLICATIONS

- **2023**: Badrike, K., Dalvi, A.S., Mazurek, F., D'Onofrio, M., Whitlow, J., Chen, T., **Phiri, S.**, et al. IEEE International Conference on Quantum Computing and Engineering (QCE).
- **2022**: Riesebos, L., Bondurant, B., Whitlow, J., Kim, J., Kuzyk, M., Chen, T., **Phiri, S.**, et al. IEEE Explore.
- **2022**: Chen, T., Kim, J., Kuzyk, M., Whitlow, J., **Phiri, S.**, et al. IEEE Transactions on Quantum Engineering.
- **2020**: Kim, J., Chen, T., Whitlow, J., **Phiri, S.**, et al. Optica Publishing Group.

SKILLS

- **Experimental:** Device testing and characterization, Optical profilometry, Probe station measurements, Mode-locked CW lasers, Low-noise DC & RF electronics, Laser spectroscopy, Laser cooling, Failure analysis
- **Programming:** Python (hardware control & automation), MATLAB, Mathematica, C, VHDL, Verilog, Assembly Language, Qiskit (Quantum Computing SDK)
- **Modeling and Simulation:** Zemax, SolidWorks, COMSOL, OrCAD Capture & PSPICE, Xilinx ISE, Siemens NX
- **Hardware/Systems:** Cryogenic UHV systems, Optical microscopes, Optical profilometers, Oscilloscopes, Automated data acquisition, Artiq Sinara devices, Freescale MKL25Z128vlk4, ARMSv6

MENTORING & AWARDS

- **2023**: Mentored and managed the responsibilities of an undergraduate research assistant.
- **2021**: Teaching Assistant, Fields and Waves ECE course, Duke University
- **2015 - 2019**: MasterCard Scholars Program Award