Moses Patson Phiri

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Education

University of Alabama at Birmingham Expected May 2027
Ph.D. in Applied Mathematics; Minor in Mechanical Engineering
Advisor: Prof. Zoran Grujić
Dissertation: *On Higher-Order Derivative Ratios as Turbulence Scales in 3D Hyperdissipative Navier–Stokes Flows*

University of Alabama at Birmingham April 2024
M.S. in Mathematics

African Institute for Mathematical Sciences (AIMS Ghana) July 2020
M.Sc. in Mathematical Sciences

The Copperbelt University, Zambia November 2018
B.Sc. in Mathematics Education

Research Interests

Nonlinear partial differential equations; mathematical fluid dynamics; regularity and singularity formation in classical and hyperdissipative Navier–Stokes equations; spatial analyticity, geometric sparseness, and higher-order turbulence scales.

Publications and Preprints

1. **Phiri, M. P.** *On Bridging Analyticity and Sparseness in Hyperdissipative Navier–Stokes Systems.* *Journal of Mathematical Fluid Mechanics* **28**, Article 75 (2026). doi:10.1007/s00021-026-01054-1.
2. **Phiri, M. P.** and Grujić, Z. *Dynamic Interpolation and Higher-Order Turbulence Scales in 3D Navier–Stokes Flows.* https://arxiv.org/abs/2610.33911v1 (Preprint).

Research Experience

Graduate Research Assistant, University of Alabama at Birmingham 2022–Present

- Study regularity and potential singularity formation in three-dimensional classical and hyperdissipative Navier–Stokes flows.
- Develop time-weighted derivative inequalities linking higher-order growth to analyticity and geometric sparseness scales.
- Apply harmonic-measure methods and derivative-scale comparisons to obtain conditional finite-time blow-up exclusion criteria.

Selected Research Presentations

Dynamic Interpolation and Higher-Order Turbulence Scales in 3D Navier–Stokes Flows

- Contributed talk, APS Division of Fluid Dynamics Annual Meeting, Orlando, FL, November 2026 (forthcoming).
- Invited talk, 38th Annual University of Alabama System Applied Mathematics Meeting, Tuscaloosa, AL, November 7, 2026 (forthcoming).

On Bridging Analyticity and Sparseness in Hyperdissipative Navier–Stokes Systems

- Invited talk, AMS Spring Southeastern Sectional Meeting, Savannah, GA, March 2026.
- Department of Mathematics Colloquium, University of Alabama at Birmingham, Birmingham, AL, March 2026.

Teaching Experience

Graduate Teaching Assistant, University of Alabama at Birmingham 2022–Present

Instructor of Record

- MA 110: Finite Mathematics (online) — Spring 2027 (scheduled)
- MA 126: Calculus II — Fall 2026
- MA 106: Precalculus Trigonometry — Fall 2025
- MA 105: Precalculus Algebra — Summer 2025
- MA 102: Intermediate Algebra — Spring and Fall 2024
- MA 098: Basic Algebra — Fall 2023

Designed and delivered lectures, developed assessments, evaluated student learning, and provided academic guidance.

Teaching Assistant

- MA 110L: Finite Mathematics — Spring 2026
- MA 125L: Calculus I Lab — Fall 2022; Spring 2023

Facilitated tutorials and office hours; assisted with grading and examinations.

Mathematics Lecturer, Cavendish University Zambia 2021–2022

Taught approximately 800 undergraduate students; developed instructional materials and assessments, evaluated learning, and provided academic support.

Honors and Awards

Roger T. Lewis Endowed Scholarship in Mathematics 2026

University of Alabama at Birmingham

Outstanding Graduate Teaching Assistant Award 2026

University of Alabama at Birmingham

Mastercard Foundation Scholarship 2019–2020

Supported master's study at AIMS Ghana.

Best Graduating Student 2018

The Copperbelt University, Zambia; also recognized for academic performance in the second, third, and fourth years.

Academic Service

Planning Committee Member, Graduate Research Symposium 2026

College of Arts and Sciences, University of Alabama at Birmingham

Volunteer Proctor, Math Kangaroo Competition

University of Alabama at Birmingham; supervised a mathematics competition for school-age students.

Travel and Professional Development Support

Graduate Student Travel Support, UAB 2026

Supported presentation at the AMS Spring Southeastern Sectional Meeting.

Departmental Funding, UAB Department of Mathematics 2026

Supported participation in the Erdős Institute Data Science Boot Camp.

Technical Skills

Programming and scientific computing: Python, MATLAB, Jupyter, Git/GitHub.
Computational fluid dynamics: Ansys Fluent.
Scientific writing and presentations: LaTeX, Overleaf, Beamer.

Professional Affiliations

American Mathematical Society (AMS); Society for Industrial and Applied Mathematics (SIAM); American Physical Society (APS).