

Matthias Dogbatsey | Curriculum Vitae

Department of Mathematics, The University of Alabama. – Tuscaloosa, Alabama 35401
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Education

The University of Alabama	Tuscaloosa, AL
Ph.D. Mathematics (Department of Mathematics)	08/2026
Advisors: Prof. Shan Zhao and Prof. Yuanzhen Shao .	
The University of Alabama	
M.A. Mathematics (Department of Mathematics).	05/2024
African Institute for Mathematical Sciences	Accra, GH
M.Sc. Mathematical Sciences (Kwame Nkrumah Uni. Science and Technology)	07/2020
Advisor: Prof. Farai Nyabadza (University of Johannesburg, RSA)	
University of Cape Coast	Cape Coast, GH
B.Sc. Mathematics and Economics	05/2017

Research Interests

Scientific Computing, Numerical Methods for PDEs, Mathematical Biology, Social Dynamics Modeling

Research Experience

The University of Alabama	Tuscaloosa, AL
Ph.D. Mathematics (Department of Mathematics)	05/2024 – Present
Graduate Research Assistant	
<ul style="list-style-type: none">Developed fast and effective numerical solvers for the 3D p-Laplacian operatorApplied the numerical schemes to biological problemsIncorporated the p-Laplace operator in calculating solvation-free energies	
African Institute for Mathematical Sciences	Accra, GH
M.Sc. Mathematical Sciences (AIMS-Ghana and KNUST)	08/2019-07/2020
Advisor/Supervisor: Prof. Farai Nyabadza (University of Johannesburg, RSA)	
Project: Modeling the role of imitation in crime dynamics.	
<ul style="list-style-type: none">Developed and analyzed nonlinear compartmental models to study the role of imitation in the spread of crime in Ghanaian societyPerformed bifurcation analysis and numerical simulations using Python.Applied stability theory and parameter sensitivity analysis to assess model behavior under varying assumptions	

Publications and Preprints

- Dogbatsey, M.,** Chen, Z., Shao, Y., & Zhao, S. (2026). Numerical solutions to the 3D p-Laplace equation: Finite difference methods and biological applications. Journal of Computational and Applied Mathematics, 481, 117270.

- Kwofie, T., **Dogbatsey, M.**, & Moore, S. E. (2023). Curtailing crime dynamics: A mathematical approach. *Frontiers in Applied Mathematics and Statistics*, 8, 1086745.

Professional Experience

The University of Alabama

Tuscaloosa, AL

Department of Mathematics

Aug/2021 - Present

Instructor of Record

- MATH 237, Introduction to Linear Algebra, Spring 2026
- MATH 113, Precalculus Trigonometry, Summer 2025
- MATH 227, Calculus III, Spring 2025
- MATH 238, Applied Differential Equations I, Spring 2024
- MATH 125, Calculus I, Spring 2023
- MATH 115, Precalculus Algebra and Trigonometry, Fall 2022, Fall 2023 (2 Sessions)

Teaching Assistant

- MATH 112-227, Fall 2021- Present (Tutor)
- MATH 301, Discrete Mathematics, Spring 2023 (Grader)

Talks and Presentations

- SIAM CSS 2025, The University of Arkansas, AR, 10/11/2025.
- Southeast Applied and Computational Mathematics Graduate Student Workshop, Auburn University, AL, 04/06/2025.
- SIAM SEAS 2025, The University of Tennessee, TN, 03/23/2025.
- Joint Mathematics Meetings (JMM) 2024, San Francisco, 01/03/2024.
- Applied Mathematics Seminar, Dept. of Mathematics, The University of Alabama, 10/13/2023.

Computer Skills

- **Programming Languages:** FORTRAN, Python, R
- **Mathematical Software:** MATLAB
- **Biomolecular Simulations:** VMD
- **Others:** HPC

Honors and Awards

- AMS Fall 2025 Sectional Meetings Travel Award. 2025
- SIAM CSS 2025 Travel Support, The University of Arkansas. 2025
- 2025 Southeast ACM Workshop Travel Support, Auburn University. 2025
- SIAM SEAS 2025 Travel Support, The University of Tennessee. 2025
- Graduate Student Travel Award, Graduate School, The University of Alabama. 2024, 2025
- Summer Research Fellowship, Dept. of Mathematics, The University of Alabama. 2024, 2025
- Edith & Richard Ainsworth Endowed Scholarship, The University of Alabama. 2022, 2023
- AIMS Ghana Fellowship, \$25000 2019 – 2020
- Stochastic and Applications, Research and Training Workshop Travel Grant, AIMS Ghana. 2020
- Probability, Analysis, and Applications Workshop Travel Grant, AIMS Ghana. 2019

Leadership and Community Involvement

Delegate: Graduate Students Association, House of Delegates	08/2024-05/2026
Served on the Academic Development Committee of the house, where we worked on resolutions to help graduate students in their job search and get additional funding for conferences	
Judge: SIMIODE Challenge Using Differential Equations Modelling (SCUDEM) X	2025
Served as a judge for SCUDEM IX 2024, organized by SIMIODE.	
Judge: SIAM M3 Challenge	2025
Served as a triage judge for the MathWorks Math Modeling (M3) Challenge, organized by SIAM. Graded and provided feedback to challenge teams of over 20 high school students in the United States and sixth form students in England and Wales.	
Grader: MATHCOUNTS	2022-2025
Served as a grader for the MATHCOUNTS competition for pupils in grades six to eight in West Alabama, organized by the MATHCOUNTS Foundation, and hosted by the University of Alabama.	
Judge: SIMIODE Challenge Using Differential Equations Modelling (SCUDEM) IX	2024
Served as a judge for SCUDEM IX 2024, organized by SIMIODE. Judged undergraduate students' research on modeling using differential equations and MATLAB worldwide.	
Judge: Ohio Science Day	2024
Served as a judge for the 2024 Ohio Science Day, organized by the Ohio Academy of Arts and Sciences. Judged research carried out by high school and middle school students.	
Judge: Undergraduate Research and Creative Activity Conference (URCA)	2024
Served as a judge for the 2024 URCA, organized by the University of Alabama, judging research by undergraduate students.	

Professional Memberships

• American Mathematical Society (AMS)	2021 – Present
• Mathematical Association of America (MAA)	2022 – Present
• Association of Women in Mathematics (AWM)	2021 – Present
• Society of Industrial and Applied Mathematics (SIAM)	2021 – Present