

KAOSARAT BOLA AZEEZ

Ph.D. Student in Applied Mathematics | University of Maryland, Baltimore County

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Education

University of Maryland, Baltimore County

Aug. 2026–Present

Ph.D. in Applied Mathematics | Baltimore, Maryland

Illinois State University

Aug. 2024–May 2026

M.S. in Pure and Applied Mathematics | GPA: 3.92/4.00

Master's thesis: Theoretical Analysis of Filtering and Smoothing Techniques in Stochastic Time Series.

Federal University of Technology, Minna, Nigeria

Dec. 2017–Jan. 2024

B.Tech. in Pure and Applied Mathematics | GPA: 4.56/5.00; First Class Honors

Undergraduate thesis: Mathematical Analysis of the Flow of Liquefied Petroleum Gas in Cylindrical Pipes.

Research Interests

Numerical analysis, data assimilation, and quantum computing (emerging doctoral interests); computational mathematics, mathematical modeling, smoothing filters, and predictive modeling.

Research Experience

Polynomial-Preserving Linear Filters and Time Series Smoothing

2026

Master's thesis research | Illinois State University

- Studied symmetric linear filters, moment conditions, and polynomial reproduction, including Savitzky–Golay and Spencer smoothing filters.
- Examined smoothing behavior using synthetic and real-world time series; thesis available through Illinois State University's repository.

Predictive Modeling of Medicare Claims Using Social Determinants of

Health

Feb.–Jun. 2025

Student Researcher | Illinois State University; OSF HealthCare-funded project

- Developed Random Forest models using more than 89,000 Medicare records and engineered social-determinants-of-health features to investigate claims frequency.
- Reported a 12% improvement in predictive accuracy relative to a baseline model.

Mathematical Analysis of LPG Flow in Cylindrical Pipes

2024

Undergraduate research | Federal University of Technology, Minna

- Investigated LPG flow using differential-equation-based models and MATLAB simulations across varying pipe dimensions.
- Revisiting the work collaboratively for a manuscript in preparation.

Stable Matching Using Bipartite Graphs

Sep.–Dec. 2024

Research project | Illinois State University

- Studied matching problems using the Gale–Shapley algorithm, Hall's Marriage Theorem, and Pareto optimality.

Theses

- Azeez, K. B. (2026). *Theoretical Analysis of Filtering and Smoothing Techniques in Stochastic Time Series*. Master's thesis, Illinois State University. Repository record.
- *Mathematical Analysis of the Flow of Liquefied Petroleum Gas in Cylindrical Pipes*. Manuscript in preparation with a collaborator (based on undergraduate research).

Conference Presentations and Posters

- **Oral presentation.** Azeez, K. B. (June 2026). “Polynomial-Preserving Linear Filters: A Unified Framework for Spencer and Savitzky–Golay Smoothing Filters.” *ICM 2026 Satellite Conference: Industrial and Computational Mathematics—Interdisciplinary Approaches to Numerical Analysis and Scientific Computing*, Morgan State University, Baltimore, Maryland (June 1–5, 2026).
- **Poster presentation.** Azeez, K. B. (April 10, 2026). “A Theoretical Analysis of Filtering and Smoothing Techniques in Stochastic Time Series.” *2026 University Research Symposium*, Illinois State University, Normal, Illinois.

Teaching Experience

Graduate Teaching Assistant, University of Maryland, Baltimore County

Aug. 2026–Present

Calculus II

- Facilitate two weekly problem-solving sessions, guiding students through selected Calculus II problems and exercises assigned by the course instructor.
- Grade weekly assignments and quizzes, providing feedback and evaluating students’ understanding of course material.
- Proctor examinations and quizzes, ensuring compliance with university academic integrity policies.

Graduate Teaching Assistant, Illinois State University

Aug. 2024–May 2026

Finite Mathematics (MAT 120), Applied Calculus (MAT 121) and Calculus II

- Led weekly problem-solving sessions for more than 180 undergraduate students; provided individual tutoring and graded assessments.

Volunteer Mathematics Tutor, Illinois State University

Aug. 2025– Aug. 2026

Math Tutoring Club

- Tutored students in finite mathematics and mathematical reasoning.

Additional Professional Experience

Student Intern, National Bureau of Statistics, Abuja, Nigeria

Feb.–Nov. 2022

Data processing and economic analysis

- Processed national datasets and analyzed economic trends using Excel and Power BI; supported sustainability and energy-related research.

Camp Counselor, Redbird Risk Management Challenge

Jul. 2025

Katie School of Insurance and Risk Management, Illinois State University

- Mentored high-school students in simulated risk-management and financial decision-making activities.

Honors and Awards

- Mathematics Master’s Scholarship Award, Illinois State University.
- Vice Chancellor’s Award of Academic Excellence; First Class Honors, Federal University of Technology, Minna.
- Aliu Abdulkabir Foundation Scholarship (2018–2024).
- Outstanding Student of the Year, Integral Class (2024).

Academic Service and Leadership

- Vice President, SIAM Student Chapter, University of Maryland, Baltimore County (Sep. 2026–Present; appointment to confirm).
- General Secretary, Data Science, Mathematics and Statistics Club, Illinois State University (2025–2026).
- Public Relations Officer, Nigerian Students Association, Illinois State University (dates to confirm).
- Volunteer, Illinois Council of Teachers of Mathematics (Apr. 2025).

Selected Conference Participation

Joint Mathematics Meetings (Jan. 2026); Quantum Symmetries Conference IV (May 2026); Conference on Combinatorics (COMBINATEXAS, Apr. 2025).

Technical Skills

Programming and software: Python, MATLAB, SQL/MySQL, Power BI, Microsoft Excel, LaTeX.

Mathematical and computational methods: Numerical methods, differential equations, statistical modeling, data visualization, linear algebra, mathematical modeling.