Edem Kofi Konadu Boahen, Ph.D.

PhD Candidate, Department of Mathematics, Michigan State University
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East Lansing, MI, USA

Profile

Passionate researcher specializing in compressive sensing, high-dimensional probability, and large-scale numerical algorithms. Proven track record in high-performance computing and collaborative projects with national labs. Seeking postdoctoral or industry research roles leveraging strong analytical and programming skills.

Research Interests

- Compressed sensing, high-dimensional probability, optimization
- Numerical linear algebra, graph algorithms
- High-performance computing, large-scale data analysis

Education

- **Ph.D. in Mathematics**, Michigan State University, East Lansing, MI
  Expected May 2026
  Advisor: Prof. Mark Iwen

- **M.Sc. in Mathematical Science**, African Institute for Mathematical Sciences, Accra, Ghana
  June 2020
  Thesis: Combinatorics in Hopf Algebras
  Advisor: Prof. Dr. Ulrich Krahmer (Dresden University)

- **B.Sc. in Mathematics**, University of Ghana, Accra, Ghana
  June 2018
  Thesis: Quantum Mechanics of a Particle with Spin-1/2
  Advisor: Dr. Prince Osei

Research Experience

- **Graduate Research Assistant**, Michigan State University (Aug 2024–Present)

  - Implemented MAM* method for efficient eigenvector approximation via sensing matrices.
  - Extended Johnson–Lindenstrauss embeddings to infinite-set concentration inequalities.
  - Developed streaming power-iteration algorithms with LLNL collaborators for graph dimensionality reduction.

- **Computation Student Intern**, Lawrence Livermore National Laboratory (Summer 2024, Summer 2025)

  - Advanced power-iteration methods for graph clustering under degree-corrected stochastic block models.
  - Designed sketch-based generalizations improving runtime by 40% on large graphs.

- **Research Assistant**, AIMS Ghana (Oct 2020–Jul 2021)
  Studied combinatorial Hopf-algebra structures and monoidal-category constructions.

- **Undergraduate Research**, University of Ghana (Nov 2017–Jun 2018)
  Derived angular-momentum operators and computed Clebsch–Gordan coefficients for spin systems.

- **Image Processing Project**, AIMS Ghana (Feb 2017–May 2017)
  Evaluated performance of Laplacian-based methods for image enhancement.

Work Experience

- **Algorithm Engineer**, SnooCODE, Accra, Ghana (Jul 2020–Sep 2020)
  Developed mathematical and statistical models for industry applications.

- **Teaching & Research Assistant**, University of Ghana (Sep 2018–Aug 2019)
  Assisted in lectures, tutorials, grading, and mentoring undergraduates.

- **Volunteer French Teacher**, VORSA Ghana (Dec 2017–Feb 2018)
  Tutored secondary-school students in remote communities, improving foundational French skills and academic confidence.

Publications

- Boahen E., Boedihardjo T., Rafael C., Iwen M. (2025). On extended concentration inequalities for fast JL embeddings of infinite sets. International Conference on Sampling Theory and Applications (**SAMPTA 2025**).

- Boahen E., Iwen M., Krahmer F., Chou H.-H., Brugiapaglia S. — A streaming algorithm for sketching sparse eigenvectors. Submitted to **Journal of Complexity**.

- Boahen E., Priest M., Jayram TS, Li G., Sanders G. — Approximate Multi-Matrix Multiplication for Streaming Power Iteration Clustering. Submitted to **ICLR 2026**.

Presentations

- Boahen E. (Oct 2024). "An Efficient Streaming Algorithm for Sparse Eigenvector." SIAM MDS24, Atlanta, GA.

- Poster: International Day of Mathematics, University of Ghana (2020).

- Computational Mathematics Project Presentation, University of Ghana (May 2017).

Skills & Languages

- Programming: Python, MATLAB
- Tools: LaTeX, Git, Jupyter
- OS: Windows, Linux
- Languages: English (Fluent), French (Fluent)