

ANDREWS K. BOAHEN

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EDUCATION

- Michigan State University**, East Lansing, MI Aug 2022 – Jul 2027 (Expected)
PH.D. STATISTICS, M.SC. STATISTICS (MAY 2026)
Advisor: Dr. Chih-Li Sung
- African Institute for Mathematical Sciences (AIMS-Ghana)**, Accra, Ghana Oct 2020 – Jul 2021
M.SC. MATHEMATICAL SCIENCES (*with distinction*)
Advisor: Prof. Kwabena Doku-Amponsah
- University of Ghana**, Accra, Ghana Sep 2015 – May 2019
B.SC. ACTUARIAL SCIENCE (*first-class honours*)
Advisor: Prof. Kwabena Doku-Amponsah

RESEARCH INTERESTS

Uncertainty quantification, computer model calibration, surrogate modeling, active learning and Bayesian optimization. Application areas include engineering sciences and mission-critical physical systems.

SELECTED PUBLICATIONS & MANUSCRIPTS

1. **Boahen, A.K.** and Sung, C.-L. Convergence Results for the Nonlinear Calibration Emulator for Computer Models under Squared Exponential and Matérn Kernels. (*Manuscript in preparation*)
2. **Boahen, A.K.**, Heo, J. and Sung, C.-L. Active Learning for Nonlinear Computer Model Calibration. (*Manuscript in preparation*)
3. **Boahen, A.K.**, Katsekor, T. and Doku-Amponsah, K. (2025). Large deviations for spatial telecommunication systems: The boolean model. *Journal of Information and Optimization Sciences*, 1-16. doi/10.47974/JIOS-1338.
4. **Boahen A.K.**, Davis IV, W. L. (2024). In Situ Machine Learning for Intelligent Data Capture and Event Detection. in *Computer Science Research Institute Summer Proceedings 2024*. M. B. P. Adams, T. A. Casey, and B. W. Reuter, eds. Technical Report SAND2024-16688O. Sandia National Laboratories, 2024, pp. 288–297.

SELECTED TALKS

* [Invited/ Contributed talks are in blue](#)

1. **IMSI Summer Internship Workshop** (August 2026). Network-Based Statistics for Rodent Connectomics. (*Online*).
2. [SIAM Conference on Uncertainty Quantification \(UQ26\)](#) (March 2026). Active Learning for Nonlinear Computer Model Calibration. (*Minneapolis, MN*).
3. [15th International Conference on Monte Carlo Methods and Applications](#) (July 2025). Active Learning for Nonlinear Calibration. (*Chicago, IL*).
4. [IMS/ASA Spring Research Conference](#) (May 2025). Active Learning for Nonlinear Calibration. (*New York, NY*).
5. **CSRI Lightning Talks** (July 2024). In Situ Machine Learning (ISML) for Intelligent Data Capture and Event Detection. (*Sandia National Laboratories, NM*).

6. **Sustainable Research Pathways** (SRP) Lightning Talks (July 2024). In Situ Machine Learning (ISML) for Intelligent Data Capture and Event Detection. (*Online*).

RESEARCH EXPERIENCE

Research Assistant

May 2024 – Current

Department of Statistics and Probability, Michigan State University

- Investigated large sample properties of the calibration parameter using deep Gaussian process-type surrogates.
- Enhanced the predictive performance of our Non-Additive Calibration (NAC) emulator, achieving 50–60% accuracy improvement in high-dimensional computer experiments.
- Developed novel active learning strategies, derivative-free and MCMC/SGD-based methods to advance model calibration exercises.
- Engineered simulation pipelines for UQ in complex systems, reducing computational overhead across training and active learning workflows by 50%.
- Developed an [interactive conformal prediction platform](#) with *Python's streamlit framework*, integrating various regression models.
- Developed an [open-source Python package](#) for Exact and Sparse Gaussian Process Regression, with an interactive app interface underway to extend accessibility to non-technical users.

Graduate Intern, IMSI Summer Internship Program

May 2026 – August 2026

Grignon Lab, Beckman Institute for Advanced Science and Technology, University of Illinois Urbana-Champaign

- Developed statistical methodology for detecting group-level differences in large-scale brain connectivity, applied to rodent fMRI and diffusion-tensor imaging data, where thousands of pairwise region-to-region connections make standard FWER and FDR correction (Bonferroni, Benjamini–Hochberg) severely underpowered.
- Implemented and evaluated Network-Based Statistics (NBS) and its threshold-free variant (TFNBS) in Python, benchmarking sensitivity and specificity against global multivariate tests (PERMANOVA) to characterize the trade-off between edge-level thresholding and detection power in the weak-FWER regime.
- Designed an adaptive logistic lasso for group-connectivity comparison that eliminates NBS's arbitrary threshold choice by using structural connectivity weights as adaptive penalties, extending the framework to continuous phenotypes and to prediction of subject-level outcomes from connectivity profiles.
- Built the analysis pipeline end-to-end in Python (NumPy, SciPy, nilearn), including preprocessing, connectivity-matrix construction, and permutation-based inference across thousands of edges; contributed to an ongoing methods manuscript with the lab.

Scientific Machine Learning Intern

June 2024 – August 2024

Scientific Machine Learning Department, Sandia National Laboratories

- Extended ISML algorithms with manifold-learning signatures to enable robust, real-time event detection in nonlinear climate simulations, broadening the applicability of ISML to complex dynamical systems.
- Delivered a lightning talk on ISML algorithms and manifold-learning signatures for real-time event detection to 70 interns and researchers at Sandia's CSRI Summer Symposium.
- Published technical report in CSRI Summer Proceedings 2024 (SAND2024-166880).

Research Master Student

January 2022 – August 2022

Probability Group, African Institute for Mathematical Sciences

- Improved extreme value index estimation in Pareto-type distributions by developing a generalized Pickands estimator that reduced RMSE relative to Hill and bias-corrected Hill competitors across multiple regression frameworks.

- Rigorously characterized the generalized Pickands estimator through theoretical derivations and simulation studies, establishing consistency, unbiasedness, asymptotic normality, and convergence rates under Pareto-type tail assumptions.

HONORS & AWARDS

- (2026) Selected as a **finalist for the Institute of Mathematical and Statistical Innovation (IMSI) Summer Graduate Student Internship program**, and funded to participate in the two-week Spring Coding and Data Science Bootcamp.
Awarded the Michigan State University **Graduate School Travel Fellowship**.
- (2025) Recipient of the **JMP-P&G Student-Early Career Travel Award**.
 Elected as a **full member in Sigma Xi**, The Scientific Research Honor Society.
- (2024) **Fellowship award** from the **Sustainable Research Pathways (SRP) summer program**.
- (2022) Awarded the **research master student scholarship** for the best graduating student from AIMS-Ghana.
- (2021) **Valedictorian, summa cum laude** for the 2021 graduation class at AIMS-Ghana.
Winner of the **Design Thinking Hub Hackathon** organized by AIMS-Ghana during graduation week.
 Awarded the **F.K.A. Allotey Meritorious award** given to students with at least 6 distinctions (grade $\geq 85\%$) in the review phase of the program and a distinction in their final essay.
- (2020) Awarded the **African Institute for Mathematical Sciences scholarship**.
- (2019) **Winner** of the National Inter-tertiary Actuarial Quiz.
- (2016) Awarded the **UG Sponsorship Scholarship** for brilliant but needy students, covering tuition for the academic years 2016-2017, 2017-2018 and 2018-2019.
- (2011) Selected to be part of the **English Access Micro-Scholarship Program (Access)** sponsored by the U.S. department of State.

SKILLS

Statistical Methods	Gaussian & Deep Gaussian Process Modeling, Bayesian and Variational Inference, MCMC, Conformal Prediction.
Optimization & Design	Sequential design/Active learning, Bayesian optimization and calibration, MCMC/SGD-based calibration, Optimal experimental design.
Machine Learning	Generative models, Manifold learning, CNNs/RNNs, Transformers.
Programming	RStudio, Python (PyTorch, Keras, TensorFlow), Matlab, HPC.
Languages	English (Very fluent), French (Very fluent).

TEACHING EXPERIENCE

Grader, Michigan State University

• STT 465 Bayesian Statistical Methods	2026F
• STT 481 Capstone in Statistics	2026F
• STT 874 Introduction to Bayesian Analysis	2026F
• STT 882 Probability Theory II	2026S
• STT 872 Statistical Inference	2026S
• STT 843 Multivariate Data Analysis	2026S

Instructor, Michigan State University

• STT 200 Statistical Methods	2023 Summer
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Graduate Teaching Assistant, Michigan State University

- STT 200 Statistical Methods 2022F, 2023S, 2023F, 2024S, 2024F, 2025S, 2025F

Graduate Teaching Assistant, University of Ghana

- STAT 446 Multivariate Methods 2020S
- STAT 608 Biostatistical Processes 2020S
- STAT 221 Introductory Probability I 2019F
- ACTU 407 Survival Analysis and Modelling 2019F
- STAT 451 Introduction to Stochastic Processes 2019F

SERVICE & PROFESSIONAL AFFILIATIONS

Student Member	IMSI, ASA, SIAM, Sigma Xi
General Secretary	African Graduate Student Association (2026 - 2027)
Elected Student Representative	MSU Statistics Colloquium Committee (2025 – 2026)
Graduate Student Instructional Leader	MSU STT Department (2025 - 2026)
Graduate Student Mentor	MSU STT Department (2023 - 2025)
Mentor (Volunteer)	Lumiere Education (2024-2025)
Judge	28th Annual University Undergraduate Research and Arts Forum (UURAF)
Evaluator	2025 Mid-Michigan Symposium for Undergraduate Research Experiences (MidSURE)
Outreach	12th Annual MSU Science Festival
Outreach	AIMS-Ghana Pi Day Science Event at Santoe
Quiz Team Lead	University of Ghana Actuarial Science Club

MEDIA SPOTLIGHTS

Aug 2026	Featured in STT graduate students expand their skills at IMSI internships. MSU Department of Statistics & Probability News. Link
Oct 2024	Featured in Summer 2024 Doctoral Student Internships. MSU Department of Statistics & Probability News. Link
Jun 2024	Featured Participant Profile. Sustainable Research Pathways (SRP) Program. Sustainable Horizons Institute (2024 spotlight on program alumni/participants). Link
Apr 2024	Featured in Outreach Coverage. STT Hosts Hands-on Event at MSU Science Festival. MSU STT Department News. Link
Nov 2023	Quoted in Department News. Instructional Mentoring Program for PhD Students. MSU STT Department News . Link
Jul 2021	Featured as Overall Best Student and Valedictorian. AIMS Ghana Holds its 9th Graduation Ceremony. African Institute for Mathematical Sciences (AIMS) Ghana News. Link

REFERENCES

Available upon request.