# Andrews Boahen

*(He/Him/His)*

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*Andrews Boahen*

## Research Interests

**Uncertainty quantification, Bayesian inverse problems, Monte carlo inference, active learning** and **optimization under uncertainty**. Application areas include computer experiments, engineering sciences, digital twins and mission-critical physical systems.

## Skills

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| Statistical Methods | Uncertainty quantification ▪ Gaussian Processes ▪ Bayesian and variational inference ▪ Monte Carlo/MCMC ▪ Optimal experimental design. |
| Optimization & Design | Sequential design/Active learning ▪ Bayesian optimization and calibration ▪ MCMC/SGD-based calibration |
| Machine Learning | Generative models ▪ Manifold learning ▪ CNNs/RNNs ▪ Transformers |
| Programming | R ▪ Python (NumPy, SciPy, Pandas, PyTorch, TensorFlow, PyMC) ▪ MATLAB ▪ Git ▪ Linux |

## Education

Expected May 2027 — **Ph.D. Statistics**, Michigan State University, Lansing, MI — **GPA:** 3.9/4.0.
- **Advisor:** Dr. Chih-Li Sung
  - **Awards:** JMP-P&G Student-Early Career Travel Award

Expected May 2026 — **MSc. Statistics**, Michigan State University, Lansing, MI — **GPA:** 3.9/4.0.
- **Advisor:** Dr. Chih-Li Sung

Oct 2020 – Jul 2021 — **MSc. Mathematical Sciences**, African Institute for Mathematical Sciences, Ghana.
- **Advisor:** Prof. Kwabena Doku-Amponsah
  - **Thesis:** Large deviations for spatial telecommunication systems: The Boolean model
  - **Awards:** Valedictorian, summa cum laude; F.K.A Allotey Meritorious award

Sep 2015 – May 2019 — **BSc. Actuarial Science**, university of Ghana, Ghana.
- **Advisor:** Prof. Kwabena Doku-Amponsah
  - **Honors Project:** Pricing a European put option via genetic algorithm
  - **Awards:** First class honors; National Inter-tertiary Actuarial Science Quiz winner

## Research Experience

May 2025 – Aug 2025 — **Research Assistant**, *Michigan State University*, East Lansing, MI.
- Enhanced the predictive performance of our Non-Additive Calibration (NAC) emulator, achieving 20–30% accuracy improvement in high-dimensional computer experiments.
- Developed novel active learning strategies, derivative-free and MCMC/SGD-based methods to advance model calibration exercises
- Built efficient simulation pipelines for uncertainty quantification in complex systems.

Jun 2024 – Aug 2024 — **Scientific Machine Learning Intern**, *Sandia National Laboratories*, Albuquerque, NM.
- Extended In-Situ Machine Learning (ISML) algorithms with manifold-learning signatures for real-time intelligent event detection in climate simulations.
- Contributed to weekly meetings and interdisciplinary research discussions to advance project objectives.
- Published technical report in CSRI Summer Proceedings 2024 (SAND2024-16688O)).

Jan 2022 – Dec 2022 — **Research Master Student**, *African Institute for Mathematical Sciences (AIMS-GHANA)*, Accra.
- Applied generalized Pickands estimators for extreme value index in Pareto-type distributions, evaluating performance against methods like Hill and bias-corrected Hill via least squares and ridge regression.
- Contributed to weekly research group discussions

## Publications & Preprints

1. **Boahen A.K.**, Heo J., Sung C.-L. *Active Learning for Non-Additive Calibration* (in preparation)
2. **Boahen A.K.**, Katsekpor, 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
3. **Boahen A.K.**, Davis 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 boldened)

Jul 2025 **15th International Conference on Monte Carlo Methods and Applications**. Active Learning for Nonlinear Calibration. Chicago, IL

Jun 2025 **IMS/ASA Spring Research Conference**. Active Learning for Nonlinear Calibration. New York, NY

Jul 2024 Sandia CSRI Lightning Talks. In Situ Machine Learning for Event Detection. Albuquerque, NM

Jul 2024 Sustainable Research Pathways (SRP) Lightning Talks. In Situ Machine Learning for Event Detection. Online

## Teaching & Mentorship

Aug 2022 - Present **Graduate Teaching Assistant (GTA)**, *Michigan State University*.
*Led STT 200 – Statistical Methods' recitation sections and assisted with grading.*

Aug 2025 – Dec 2025 **Graduate Student Instructional Leader**, *Michigan State University*.
*Co-organized weekly teaching workshops for first-year GTAs; Chaired fortnightly meetings with graduate student mentors to deliver targeted support and ensure effective mentoring outcomes.*

May 2024 – May 2025 **Volunteer Research Mentor**, *Lumiere Education*.
*Guided high-school students on statistics & ML research projects*

Jun 2023 - Aug 2023 **Summer Instructor**, *Michigan State University*.
*Taught statistical methods to a class of 50 students; Participated in weekly meetings with other instructors to create and grade homeworks, midterms and final exams.*

AUg 2019 - May 2020 **Teaching Assistant**, *University of Ghana*.
*Led tutorial sections for Calculus II, Introductory probability, Stochastic processes, Regression Analysis, Multivariate Data Analysis and Survival Analysis undergraduate classes.*

## Additional Honors & Awards

2025 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 as AIMS-Ghana's valedictorian.

2021 Winner of the Design Thinking Hub Hackaton organized by AIMS-Ghana in the leavers' week.

2020 Awarded the African Institute for Mathematical Sciences scholarship estimated at 25000$.

2016 Awarded the UG Sponsorship Scholarship for brilliant but needy students, covering tuition for three academic years.

2011 Selected for and participated in the English Access Microscholarship Program (Access) sponsored by the U.S. department of State.

## Service & Professional Affiliations

**Student Member,** IMSI, ASA, SIAM, Sigma Xi

**Elected Student Representative,** MSU Statistics Colloquium Committee 2025–2026

**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

## Media Spotlights

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 Department of Statistics & Probability News. Link

Nov 2023 **Quoted in Department News.** *Instructional Mentoring Program for PhD Students.* MSU Department of Statistics & Probability 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

## Languages

- English (native)
- French (native)

## References

Available upon request.