Theophilus Kwofie

Arizona State University, School of Mathematical and Statistical Sciences
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Research Interests

Machine learning and deep learning for public and population health; interpretable and trustworthy artificial intelligence; data-driven and hybrid mechanistic modeling for complex, data-limited health systems; optimization, uncertainty quantification, and fairness auditing in predictive analytics; and interdisciplinary applications of AI in epidemiology, digital health, and health equity.

Education

Ph.D. Applied Mathematics, Arizona State University, Tempe, AZ (Aug 2021–Dec 2025)
Dissertation: *Mathematical Modeling of Social Behavior Dynamics*
Advisor: Prof. Yun Kang

M.A. Applied Mathematics, Arizona State University, Tempe, AZ (2021–2023)

M.Sc. Mathematical Sciences, African Institute for Mathematical Sciences, Accra, Ghana (2019–2020)

B.Sc. Mathematics with Business, University of Cape Coast, Ghana (2014–2018)

Appointments

2025–2026 Visiting Assistant Professor, Austin Peay State University, Clarksville, TN
2021–2025 Graduate Teaching Associate (Instructor), Arizona State University, Tempe, AZ
2018–2019 Teaching Assistant, University of Cape Coast, Ghana
2016–2017 Mathematics Instructor, Annor Adjaye Senior High School, Ghana

Fellowships, Scholarships and Grants

2023 Graduate College Travel Award, Arizona State University
2023 SoMSS Travel Award, Arizona State University
2022 CBMS Travel Award, Orlando, FL
2022 Summer Fellowship Award, Arizona State University
2021–2025 Full PhD Funding, Arizona State University
2019–2020 AIMS Scholarship, Master's Program
2014–2018 Dan Borsor Scholarship Foundation, University of Cape Coast
2010–2013 General Blay Education Scholarship, Senior High School

Awards and Honors

2023 Student Leader Award, College of Liberal Arts and Sciences, ASU

Publications in Print

1. **Kwofie, T.**, Dogbatsey, M., & Moore, S. E. (2023). Curtailing crime dynamics: A mathematical approach. *Frontiers in Applied Mathematics and Statistics*, 8, 1086745. link
2. Gao, S., Pant, B., Chukwu, C. W., **Kwofie, T.**, Safdar, S., Newman, L., ... van den Driessche, P. (2023). A mathematical model to assess the impact of testing and isolation compliance on the transmission of COVID-19. *Infectious Disease Modelling*, 8(2). link

Manuscripts Under Review

1. Local Non-Inferiority Studies Between LLINs Using a Modeling Approach. **T. Kwofie**, A. Adom-Konadu*, S. Naandam, J. Prah. Under review at *Malaria Journal*.
2. Mathematical Modeling of Gang Dynamics: The Role of Fear and Reformed Individuals. **T. Kwofie**, M. Dogbatsey, Y. Kang. Under review at *Journal of Mathematical Sociology*.
3. Breaking the Opioid Crisis: A Mathematical Modeling Approach. **T. Kwofie**, C. Bustamante Orellana, Y. Kang. Under review at *PLOS Global Public Health*.
4. Mathematical Modeling of Lymphatic Filariasis with Quarantine Measures, Treatment Protocols and Drug Resistance. S. Teye, **T. Kwofie**, S. Iddi, S. E. Moore*. Under review at *Infectious Disease Modelling*.
5. Mathematical Modeling of the Obesity Epidemic: Impact of Environment and Social Behavior. **T. Kwofie**, C. Bustamante Orellana, Y. Kang. Under review at *Frontiers in Public Health*.

Manuscripts in Preparation

1. Mathematical Analysis and Optimal Control of Viral Dynamics of Hepatitis B Cellular Infection. R. Boakye, **T. Kwofie**, ... S. Moore.
2. Optimal Control and Cost-Effectiveness Analysis of Fear in Crime Dynamics. **T. Kwofie**, M. Dogbatsey, A. Adom-Konadu, J. Asamoah, S. E. Moore.

Invited Talks and Presentations

2024 Invited Talk: Mathematical modeling of obesity epidemic. AMS Special Session on Dynamical Systems Modeling, JMM, San Francisco, CA.
2023 Invited Talk: Assessing the Impact of Intervention Programs on Gang Dynamics. AMS Sectional Meeting, California State University, Fresno.
2025 Poster: CISA Student Showcase, Arizona State University.
2023 Poster: College of Integrative Sciences and Arts Showcase, ASU Mesa, AZ.
2023 Poster: Math Research Poster Session, SoMSS, ASU, Tempe, AZ.

Teaching Experience

2025–2026 **Visiting Assistant Professor**
Austin Peay State University, Clarksville, TN
Department of Mathematics and Statistics

- **Fall 2025**: MATH 4450 – Introduction to Mathematical Modeling (Count: 25 Students)
- **Fall 2025**: BUS 2100 - Business Statistics (Count: 40 students)
- **Fall 2025**: MATH 1730 – Precalculus (Count: 55 Students)

2021–2025 **Graduate Teaching Associate (Instructor)**
Arizona State University, Tempe, AZ
School of Mathematical and Statistical Sciences (SoMSS)

- **Summer 2025**: MAT 251 – Calculus for Life Sciences (Count: 60 students)
- **Summer 2025**: ECN 221 – Business Statistics (Count: 65 students)
- **Spring 2025**: MAT 251 – Calculus for Life Sciences (Count: 60 students)
- **Spring 2024**: MAT 251 – Calculus for Life Sciences (Count: 45 students)
- **Summer A 2024**: MAT 251 – Calculus for Life Sciences (Count: 8 students)

– **Fall 2024**: MAT 251 – Calculus for Life Sciences (Count: 30 students)
– **Fall 2023**: MAT 251 – Calculus for Life Sciences (Count: 50 students)
– **Summer A 2023**: MAT 251 – Calculus for Life Sciences (Count: 15 students)
– **Summer B 2023**: MAT 251 – Calculus for Life Sciences (Count: 15 students)
– **Spring 2023**: MAT 1701 – Precalculus (Count: 60 students)
– **Fall 2022**: MAT 170 – Precalculus (Count: 60 students)
– **Spring 2022**: MAT 170 – Precalculus (Count: 53 students)
– **Fall A 2021**: MAT 275 – Modern Differential Equations (Count: 60 students)
– **Fall C 2021**: MAT 275 – Modern Differential Equations (Count: 70 students)

2018–2019 **Teaching Assistant**
University of Cape Coast, Cape Coast, Ghana

– **Aug–Dec 2018**: Advanced Calculus I (Count: 470 students)
– **Jan–May 2019**: Advanced Calculus II (Count: 470 students)

2016–2017 **Instructor**
Annor Adjaye Senior High School, Ezinlibo, Ghana

– **May–Aug 2016**: Core and Elective Mathematics (Count: 100 students)

Undergraduate Research & Mentoring

2025 Anan Albalawi (ASU) — project: compartmental modeling and sensitivity (PRCC)
2025 Daniel Obeng Ampomah (AIMS) — LLIN non-inferiority model analysis
2023 College showcase posters (ASU): obesity dynamics; gang deterrence modeling

Computational & Engineering Support

Python, MATLAB, R; reproducible modeling pipelines (LHS–PRCC, ODE/PDE solvers); HPC experience; course projects using data-driven modeling suitable for 200–400-level labs.

Licenses & Certifications

Coursera *Issued March 2025*

- **Gen AI Foundational Models for NLP & Language Understanding**
  Skills: N-gram, sequence-to-sequence models, text analysis, one-hot encoding, bag-of-words, sequence transformation
- **Generative AI and LLMs: Architecture and Data Preparation**
  Skills: Transformers, BERT, NLP-based applications, Hugging Face, Generative AI architectures, Natural Language Processing (NLP), RNNs, VAEs, GANs, Diffusion Models, NLTK, spaCy, BertTokenizer, XLNetTokenizer, Tokenization
- **Neural Networks and Deep Learning**
  Skills: Machine Learning Algorithms, Deep Learning, Artificial Neural Networks, Computer Vision, Network Architecture, Human Learning

Service

2023–Present Treasurer, SIAM Student Chapter, ASU
2023–Present Co-organizer, Special Session at JMM 2024, San Francisco, CA
2023–2025 Panelist, ASU School of Mathematical and Statistical Sciences recruiting events

Professional Memberships

National Society of Leadership and Success (NSLS)
American Mathematical Society (AMS)
Canadian Mathematical Society (CMS)
Society for Industrial and Applied Mathematics (SIAM)
The New York Academy of Sciences

References

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