GERALD OHENE AGYEKUM

+1 254 413 6830 ⋄ 2251 W Tarleton St, Apt 107, Stephenville, Texas

geraldagyekum45@gmail.com ⋄ www.linkedin.com/in/gerald-ohene-agyekum/

PROFILE

Statistician and Mathematician specializing in longitudinal and survival data analysis, Bayesian inference, mathematical epidemiology, and network analysis. Experienced in infectious disease modeling and interdisciplinary public health research. Proficient in Python, R, MATLAB, and LaTeX, seeking a PhD to advance research at the intersection of statistics and public health.

EDUCATION

Master of Science in Mathematics   *Aug 2024 - May 2026 (Expected)*
Tarleton State University. GPA: 4.00/4.00

Bachelor of Technology in Health Statistics   *Sept 2019 - Aug 2023*
Kumasi Technical University. GPA: 4.62/5.00   *First Class Honors*

Relevant Courses

- <u>Graduate-level</u>: Real Analysis, Statistical Models, Linear Algebra, Mathematical Modeling, Data Science.

- <u>Undergraduate-level</u>: Stochastic Processes, Survival Analysis, Probability, Advanced Mathematics (Calculus & Linear Algebra).

Sivas Cumhuriyet University, Turkey   *Oct 2021 - Feb 2022*
Exchange Student—Erasmus Mundus Exchange Program

CERTIFICATE COURSES

Data Analytics with Python   *Dec 2023*
Ghana-India Kofi Annan Centre of Excellence in ICT (GI-KACE).

Introduction to Machine Learning in R   *Nov 2021*
Skillup by Simplilearn.

RESEARCH INTERESTS

Longitudinal Data Analysis, Bayesian Inference, Disease Progression Modeling, Survival Analysis, Network Analysis, Mathematical Epidemiology, Machine Learning, Maternal and Child Health.

RESEARCH EXPERIENCE

Advisor: Dr. Jose Herrera Diestra, Tarleton State University, Stephenville, Texas, USA *Aug 2025 - Present*
"Network-based and Network-free Surveillance Strategies: A Synergistic Approach".

- Developing Bayesian network-based and network-free surveillance strategies by simulating SEIR epidemic models across 10,000-node networks.
- Conducting stochastic analyses and applying Bayesian inference to optimize surveillance node selection and performance.

Research Assistant   *May 2025 - Aug 2025*
Tarleton State University, Stephenville, Texas, USA
Emerging Communication Technology Use and Health Attitudes, Beliefs, and Behaviors

- Assisted in drafting the manuscript, developing survey instruments, and conducting data analysis using factorial ANOVA and moderation techniques.

Advisor: Dr. Christopher Mitchell, Tarleton State University, Stephenville, Texas, USA *Feb 2025 - Present*
"Mathematical Analysis of TB–COVID-19 Co-Infection: Invasion Reproduction Numbers, Competitive Dynamics, and Control Strategies".

- Formulated a system of 11 nonlinear differential equations capturing TB–COVID-19 coinfection dynamics.

Advisor: Dr. Scott Cook, Tarleton State University, Stephenville, Texas, USA *Feb 2025 - May 2025*
"Predicting Diabetic Retinopathy Using Machine Learning Approaches".

- Utilized AutoFLAML to identify the optimal algorithm for diabetic retinopathy prediction.

Advisor: Dr. Jesse Crawford, Tarleton State University, Stephenville, Texas, USA *Oct 2024 - Dec 2024*
"Predictive Modeling of Breast Volume Using Anthropometric Measurements".

- Developed regression-based predictive models (stepwise and polynomial) for breast volume estimation using a comprehensive dataset collected in Ghana.

Research Assistant, Kumasi Technical University *Feb 2023 - Aug 2023*
Supervisor: Prof. Michael Fosu Ofori
"Modelling the Occurrence of Maternal Mortality in Kumasi Using Zero Inflated Models"

- Performed zero-inflated regression modeling on maternal mortality data collected from 12 health facilities across 8 sub-metros in Kumasi (2018–2022).
- Identified key risk factors and determined optimal modeling strategies.

Research Assistant, Kumasi Technical University *Apr 2023 - Jul 2024*
Comparative Analysis of Machine Learning Approaches for Breast Cancer Detection
Supervisor: Mr. Samuel Akwasi Adarkwa

- Compared ML algorithms for breast cancer classification using PCA and UMAP dimensionality reduction techniques.

Collaborator: Mr. Samuel Akwasi Adarkwa, Kumasi Technical University *Mar 2022 - Jan 2023*
Impact of Sample Size on Multicollinearity in High-Dimensional Logistic Regression

- Conducted R simulations analyzing multicollinearity effects in high-dimensional data and drafted the manuscript for publication.

Supervisor: Dr. Esra Gulturk, Sivas Cumhuriyet University, Turkey *Dec 2021-Jan 2022*
"Identifying the Risk Factors that Influence Air Quality in Sivas".

- Analyzed Turkish air quality data to identify pollution trends and contributing factors.

PUBLICATIONS

- Ofori, M. F, **Agyekum, G. O**, Ofori, M. A, Adarkwa, S. A. (2025). Time-Homogeneous Markov Modeling of HIV Progression in Patients Receiving Antiretroviral Therapy Treatment in the Ashanti Region, Ghana. *Canadian Journal of Infectious Diseases and Medical Microbiology*

- Adu, I. K., Wireko, F. A., Adarkwa, S. A., & **Agyekum, G. O.** (2024). Mathematical analysis of Ebola considering transmission at treatment centres and survivor relapse using fractal-fractional Caputo derivatives in Uganda. *Mathematical Modelling and Numerical Simulation with Applications, 4(3), 296-334.*

- **Agyekum, G. O**, Ofori, M. O, Adarkwa, S. A, Ofori, M. A (2024). A Cross-Sectional Study on the Occurrence of Maternal Mortality in Some Selected Hospitals in Kumasi Metropolis Using Zero-Inflated Negative Binomial. *Journal of Probability and Statistics.*

- **Agyekum, G. O.**, Adarkwa, S. A., & Kusi, R. Y. (2023). Impact of sample size on multicollinearity with high dimensional data in logistic regression analysis. *International Journal of Innovation and Development, 1(3).*

MANUSCRIPTS UNDER REVIEW & IN PROGRESS

- **Gerald O. Agyekum**, Dr. Christopher Mitchell, Sekinatu Ansong. "Mathematical Analysis of TB–COVID-19 Co-Infection: Invasion Reproduction Numbers, Competitive Dynamics, and Control Strategies". *Scientific Reports*.

- **Gerald O. Agyekum**, Michael Fosu Ofori, Michael A. Ofori, Alhassan Ismail. "A Comprehensive Analysis of Social Determinants and Clinical Predictors of Tuberculosis Treatment Success: A 5-year retrospective study from Ghana" *Health & Social Care in the Community*.

- Michael Fosu Ofori, **Gerald O. Agyekum**, Matilda Kyerewaa, Felicia O. Tettey, Michael A. Ofori. "Socio-Economic and Dietary Determinants of Maternal Malnutrition: A Cross-Sectional Study in Ghana" *Maternal & Child Nutrition*.

- **Gerald O. Agyekum**, Samuel A. Adarkwa, Frank K. Owusu, Richard Y. Kusi. "Comparative Analysis of Machine Learning Approaches for Breast Cancer Detection utilizing PCA and UMAP as Dimensionality Reduction Techniques".

TEACHING EXPERIENCE

Teaching Assistant   *Sept 2024 - Present*
Tarleton State University   *Stephenville, Texas*

- College Algebra (Instructor of record)
- Assist with Statistics and Probability, Calculus I & II at the Math Achievement Center (MAC)

Teaching Assistant   *Oct 2023 - Aug 2024*
Kumasi Technical University   *Kumasi, Ghana*

- Demography, Research Methods, Epidemiology, Stochastic Processes.

Teaching Assistant   *Oct 2021 - Feb 2022*
Sivas Cumhuriyet University   *Sivas, Turkey*

- Assisted with course instruction, grading, and exam supervision during Erasmus exchange.

CONFERENCE PRESENTATIONS

- 104th Annual Meeting of the Texas Section of the Mathematical Association of America, Prairie View A&M University, TX   *Mar 2025*
  Time-Homogeneous Markov Modeling of HIV Progression in Patients Receiving Antiretroviral Therapy in the Ashanti Region, Ghana.

- 7th International Conference on Applied Sciences and Technology, Kumasi Technical University   *Mar 2023*
  Impact of Sample Size on Multicollinearity with High-Dimensional Data in Logistic Regression Analysis.

- Attachment Seminar, Kumasi Technical University   *Mar 2022*
  Risk Factors for Gestational Diabetes in Pregnant Women: A Logistic Regression Analysis.

HONOURS & AWARDS

- President's List, Tarleton State University   *Fall 2024, Spring 2025*

- Davidson Presidential Scholarship, Tarleton State University   *Aug 2025*

- College of Graduate Studies Scholarship, Tarleton State University   *Aug 2025*

- Encouraging Graduate Academic Progress Scholarship   *Aug 2024, 2025*
  Tarleton State University

- Best Graduating Student, Faculty of Applied Sciences and Technology   *Jan 2024*
  Kumasi Technical University

- Best Graduating Student, Department of Statistical Sciences   *Jan 2024*
  Kumasi Technical University

- Statistical Knowledge Contest Winner, Ghana Statistical Service *Nov 2023*
- Dean of Students Scholarship, Kumasi Technical University *Feb 2022*
- Erasmus Mundus Exchange Program, Sivas Cumhuriyet University *Oct 2021*

VOLUNTEERING

Volunteer Tutor, Student Development Project *May 2020 - Present*
Kumasi Technical University, Ghana

- Tutor students in statistical courses including regression analysis, data analysis, and experimental design.

LEADERSHIP

- **Financial Secretary** *Oct 2021 - Sept 2022*
  Department of Statistical Sciences, Kumasi Technical University *Kumasi, Ghana*
- **Head of media (Graphic designer)** *Feb 2020 - Sept 2021*
  Department of Statistical Sciences, Kumasi Technical University *Kumasi, Ghana*

SKILLS

Programming Languages R, Python, Matlab, Mathematica, LaTeX
Statistical Software SPSS, Minitab, STATA
Design Software Adobe Photoshop.
Languages English (fluent), Fante (fluent)

REFERENCES

Available upon request.

Last Updated: December 15, 2025