Benjamin Osafo Agyare

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EDUCATION

PhD Statistics 2021 - 2026
University of Michigan, Ann Arbor, MI, USA

MS Statistics and Data Science 2019 - 2021
University of Nevada, Reno, NV, USA

Certificate in Teaching Practice in Higher Education 2020 - 2021
Association of College and University Educators (ACUE), USA

BS Actuarial Science 2013 - 2017
Kwame Nkrumah University of Science and Tech., Ghana
Honors First Class

RESEARCH INTERESTS

Statistical Modeling, Longitudinal Data Analysis, Quantile and Expectile Regression, Statistical Machine Learning, Computational Statistics

TEACHING

- **Graduate Student Instructor**, *University of Michigan, Ann Arbor*
  - **STATS 401 - Applied Statistical Methods II** (Undergrad level Regression and ANOVA) *Winter 2024/Fall 2023*
  - **STATS 513 - Regression and Data Analysis** (Graduate Level) *Winter 2023*
  - **STATS 501 - Applied Statistics II** (GLMs, Mixed Models & Semi-Parametric Models) *Winter 2023*
  - **STATS 306 - Introduction to Statistical Computing** ($\sim$ 40 students) *Winter/Fall 2022*
  - **STATS 406 - Computational Methods in Data Science** ($\sim$ 75 students) *Fall 2021*
- **Graduate Teaching Assistant**, *University of Nevada, Reno*
  - **MATH 127 - Pre-Calculus II** ($\sim$ 70 students) *Spring 2021*
  - **MATH 181 - Calculus I** ($\sim$ 90 students) *Fall 2020*
  - **MATH 126 - Pre-Calculus I** ($\sim$ 140 students) *Fall 2019*
- **Teaching Assistant**, *University of Ghana*
  - **STAT 224 - Introductory Probability II** ($\sim$ 60 students) *Spring 2018*
  - **STAT 222 - Data Analysis I** ($\sim$ 95 students) *Spring 2018*
  - **STAT 221 - Introductory Probability I** ($\sim$ 60 students) *Fall 2017*
  - **ACTU 409 - Introduction to Actuarial Mathematics** ($\sim$ 140 students) *Fall 2017*

WORKING

- **Summer Actuarial Intern**, *CAS Student Central* *Sept 2018 - July 2019*
  - Casualty Actuarial Society P&C training in:
    - Ratemaking • Reserving • Predictive Modeling • Data Visualization

- **Predictive Modeling Intern**, *Employers Insurance Group* *May 2020 - Aug 2020*
  - Performed Territorial Analysis on claim frequencies using Spatially Constrained Clustering Algorithms and Generalized Additive Models to re-cluster rating territories for refining pricing models
  - Built Loss Development Models to estimate future losses using Elastic-Net Poisson GLM
  - Built Pure Premium models using GLMs and Zero-Inflated Models to predict future loss costs.
- **Math Instructor**, *International Community School, Ghana* *Sept 2018 - July 2019*
  - Taught Cambridge O and A Level Mathematics to prepare students for the IGCSE exams.
  - Rated distinction in teaching within first 3 months into the job.

REPORTS AND COURSE PROJECTS

- A Simulation Study on High Dimensional Shrinkage Feature Selection Using MCMC Methods, *University of Michigan, Ann Arbor* *Fall 2022*
  - Performed a simulation study to compare the efficiency of the two-Block (2BG) and the three-Block Gibbs sampler (3BG) MCMC algorithms in estimating the posterior distributions of two commonly used Bayesian shrinkage models. (pdf)
  - Techniques adopted include: *Gibbs sampler, Bayesian Lasso, Spike-and-Slab priors, parallel computing.*
- Prediction of Metastasis Event using Hierarchical Classification with Elastic Nets, *University of Michigan, Ann Arbor* *Fall 2022*
  - Built a hierarchical classification algorithm to predict the origin of primary cancer tissue and whether the primary cancer has metastasized or not using gene expression expression profile of cancers from primary sites with or without distal metastasis. (slide)
  - Techniques adopted include: *Hierarchical classification, Elastic-net multinomial regression model, Cancer metastasis.*
- A Distributed Optimization Package for R, *University of Michigan, Ann Arbor* *Winter 2022*
  - Created an R package that implements a distributed optimization algorithm namely distributed gradient descent (DGD). (pdf)
  - Techniques adopted include: *Convex Optimization, Apache Spark, OLS and Logistic Regression*
- Pricing A European Call Option Using the Geometric Brownian Motion and Monte Carlo Methods, *University of Nevada, Reno* *Spring 2020*
  - Used Geometric Brownian Motion to predict stock prices and priced European call option on the stocks using Monte Carlo simulations (in R). (slide)
  - Techniques adopted include: *Geometric Brownian Motion (GBM), Stochastic Differential Equations (SDEs), Monte Carlo Simulation, Options Greek*
- A Bayesian Hierarchical Model for US Election Data, *University of Nevada, Reno* *Spring 2020*
  - Modeled US election results and estimated the partisan lean for all 50 states using election data from 1992 to 2018 (in R). (poster)
  - Techniques adopted include: *Hierarchical Bayesian Modeling, Markov Chain Monte Carlo (MCMC), Rstanarm*

- Boston Crime Data Analysis: Monthly Prediction with Autoregressive Integrated Moving Average and Gaussian Process Regression (GPR), *University of Nevada, Reno* *Spring 2020*
  - Predicted total monthly crimes using Boston Crime Data from June 2015 to September 2018 (in R). (poster)
  - Techniques adopted include: *Gaussian Process Regression (GPR), Autoregressive Integrated Moving Average (ARIMA) —Specifically the AR(p) Model*
- A Survival Analysis of The Surrender of Life Policies of Life Insurance Companies in Ghana (A Case Study of SIC Life), *Kwame Nkrumah Univ. of Sci. and Tech, Kumasi, Ghana 2016 - 2017*
  - Calculated survival probabilities for policy surrendering and identified factors affecting policy surrenders. (pdf)
  - Techniques adopted include: *Survival Modeling, Kaplan-Meier Estimator, Cox-Proportional Hazards Model*

COMPUTING SKILLS

Programming/Scripting Languages
R, PYTHON, SAS, SQL

Operating Systems
WINDOWS, LINUX, MAC

Reproducible Research/Publishing & High Performance Computing
LaTeX, R MARKDOWN, TERMINAL, GIT, SLURM

ACTUARIAL EXAMS

- **SOA Exams: F**inancial **M**athematics, **P**robability, **S**tatistics for **R**isk **M**odeling
- **VEE: Applied Statistical Methods, Economics, Corporate Finance**

PROFESSIONAL ENGAGEMENTS

- ***Student Member***, Royal Statistical Society (RSS)
- ***Student Member***, Society of Actuaries (SOA)
- ***Member***, International Association of Black Actuaries (IABA)
- ***Member***, CAS Student Central

LEADERSHIP & EXTRACURRICULAR

Member	Computing Committee, Dept. of Stats, U of M	*Sept* 2023 - *Present*
Member	Recruitment & Admissions Committee, Dept. of Stats, U of M	*Jan* 2022 - *Present*
Member	Curriculum Committee, Dept. of Stats, U of M	*Sept* 2023 - *Present*
Student Member	Royal Statistical Society (RSS)	*Aug* 2019 - *Present*
Member	University of Nevada Actuarial Club	*Aug 2019 - April 2021*
Vice President	Actuarial Science Students Association, KNUST	*Aug* 2015 - *May 2016*

HONORS & AWARDS

- **IABA Foundation Scholar** (2021)
- **Graduate Awards**
  - Winter 2022, ***1st Place***, Capstone Project Competition in Statistical Learning, The University of Michigan, Ann Arbor
  - Spring 2020, ***1st Place***, Capstone Project Competition in Bayesian Statistics, The University of Nevada, Reno

- Fall 2019, ***1st Place***, Capstone Project Competition in Statistical Computing, The University of Nevada, Reno

- **Undergraduate Student Awards**
  - January 2017, ***1st Place***, KNUST Actuarial Club Annual Interclass Quiz Competition

MASSIVE OPEN ONLINE COURSES (MOOCS)

Course(*on Coursera*)	**Institution**	**Date**
Bayesian Statistics: From Concept to Data Analysis (with Honors)	*Univ. of California, Santa Cruz*	March 2018
Bayesian Statistics: Techniques and Models (with Honors)	*Univ. of California, Santa Cruz*	July 2018
Practical Time Series Analysis	*State University of New York*	July 2018
Designing, Running, and Analyzing Experiments	*Univ. of California, San Diego*	July 2018
Financial Markets (with Honors)	*Yale University*	June 2018

RELEVANT COURSEWORK

University of Michigan, Ann Arbor

Applied Probability and Stochastic Processes, Statistical Theory I & II, Regression Analysis, Statistical Learning, Computation and Optimization Methods, Data Science and Analytics using Python, Machine Learning in Computational Biology, Topics in Causal Inference.

University of Nevada, Reno

Probability, Statistical Theory, Stochastic Processes and Simulation, Applied Regression, Multivariate Data Analysis, Bayesian Statistics, Categorical Data Analysis, Statistical Computing, Statistical Learning, Computational Statistics.

Kwame Nkrumah University of Science and Technology

Mathematics: *Pure Math (Calculus), Real Analysis, Vector Analysis, Linear Algebra, Differential Equations, Numerical Methods and Computation (Using MathLab), Discrete Math, Logic and Set Theory*

Statistics: *Probability and Statistics, Stochastic Processes, Operations Research, Time Series Analysis, Regression Analysis, Design of Experiments, Analysis of Survival Data, Statistical Methods for Process Improvement, Demographic Statistics, Sample Survey Theory.*

Actuarial: *Mathematical Models in Finance, Asset Liability Management, Mathematics of Finance and Investment, Mathematical Corporate Finance, Elements of Economics, Financial Accounting, Actuarial Mathematics, Loss Models*