Joseph Baafi

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PROFILE

Mathematical biologist with expertise in computational modeling, biological data analysis, and public health simulation. Experienced in R, Python, and Git-based workflows for reproducible research. Strong interest in applying computational biology to pharmaceutical and biomedical innovation.

KEY COMPETENCIES

Scientific

- R, Python, Git, LaTeX
- Statistical and predictive modeling
- High-throughput data analysis
- Bioinformatics pipelines and workflows

Transferable

- Cross-functional collaboration
- Scientific communication and reporting
- Mentoring and academic instruction
- Project coordination and documentation

PROFESSIONAL EXPERIENCE

Doctoral Researcher (Computational Biology & Modeling) 2020 – Present
Memorial University of Newfoundland – St. John's, NL

- Designed mechanistic and stochastic models to study infectious disease and population dynamics.
- Analyzed large-scale ecological and climate data using R for statistical modeling and visualization.
- Synthesized insights for publications and interdisciplinary teams, emphasizing data interpretation and clarity.

Teaching Assistant (Data & Ecological Studies) 2020 – 2025
Memorial University of Newfoundland – St. John's, NL

- Led R-based labs on data analysis, model implementation, and reproducible workflows.
- Co-developed coding guides and visualization materials for undergraduate instruction.
- Mentored students on statistical techniques and interpretation of ecological data.

Research Intern (Health Data Modeling) 2019 – 2020
Mila - Quebec AI Institute – Montreal, QC

- Applied machine learning methods (regression, classification) to public health datasets in Python and R.
- Developed and validated predictive models using real-world clinical data.
- Maintained reproducibility through Git-based version control and documented workflows.

EDUCATION

Ph.D. Candidate, Biology (Mathematical Biology)
Memorial University of Newfoundland – St. John's, NL May 2020 – Present
Expected Completion: December 2025

- Modeled climate-driven vector and disease dynamics to inform public health strategies.
- Authored 2 peer-reviewed papers and presented at 6 academic conferences.

M.Phil., Applied Mathematics
Kwame Nkrumah University of Science and Technology – Kumasi, Ghana Aug 2015 – Nov 2016

- Developed data-driven models for infectious disease and control optimization.
- Published 3 papers and gave 2 symposium presentations.

M.Sc., Mathematical Sciences
African Institute for Mathematical Sciences – Accra, Ghana Aug 2014 – Jun 2015

B.Sc., Mathematics
Kwame Nkrumah University of Science and Technology – Kumasi, Ghana Aug 2009 – Jun 2013

TEACHING & ACADEMIC INSTRUCTION

Mathematics Lecturer 2016 – 2019
Valley View University & Anglican University College of Technology – Ghana

- Taught university-level courses in Statistics, Algebra, and Differential Equations with application to life sciences.
- Supervised 13 student research projects, fostering analytical and scientific writing skills.
- Developed interactive materials and assessments to enhance student engagement and learning outcomes.

Mathematics Teacher 2016 – 2019
Kwabre Senior High School – Akuma, Ghana

- Taught core and elective mathematics and supported students' preparation for national exams.
- Provided mentorship in quantitative reasoning and career pathways in STEM.

Teaching Assistant 2013 – 2014

Kwame Nkrumah University of Science and Technology – Kumasi, Ghana

- Conducted tutorials in Differential Equations and Mathematical Methods for undergraduates.
- Supported final-year student research and grading of technical coursework.

LEADERSHIP AND TRAINING

- **Committee Lead, OMNI-RÉUNIS Seminar Series** (2 years): Directed a team in organizing hybrid research seminars on infectious disease modeling, fostering interdisciplinary exchange and science communication.
- **AARMS-EIDM Summer School (Canada)**: Trained in model calibration, parameter estimation, and data-informed public health modeling using R.
- **Epidemiological Modeling Clinic (AIMS-Ghana)**: Applied dynamical systems and computational techniques to analyze real-world disease data.
- **CareerTech Data Analytics Workshop**: Enhanced practical skills in data wrangling, R-based visualization, and results communication for research audiences.

PUBLICATIONS

1. **Baafi, J.**, & Hurford, A. (2025). Modeling the Impact of Seasonality on Mosquito Population Dynamics: Insights for Vector Control Strategies. *Bulletin of Mathematical Biology*, 87(2), 33. DOI: 10.1007/s11538-024-01409-7
2. Martignoni, M. M., Renault, J., **Baafi, J.**, & Hurford, A. (2022). Downsizing of COVID-19 contact tracing in highly immune populations. *Plos one*, 17(6), e0268586. DOI: 10.1371/journal.pone.0268586
3. **Baafi, J.**, Darko, I. O., & Asenso, F. W. (2017). Vaccination as a control of infectious diseases. *J Appl Computat Math*, 6(357), 2. Available online
4. Oduro, F. T., **Baafi, J**., & Apaaboah, G. (2016). Modelling the effect of post-mortem contact on the spread of ebola with quarantine as an intervention. *Journal of Mathematics Research*, 8(4), 176. https://doi.org/10.5539/jmr.v8n4p176
5. Oduro, F. T., Apaaboah, G., & **Baafi, J.** (2016). Optimal control of Ebola transmission dynamics with interventions. *British Journal of Mathematics & Computer Science*, 19(1), 1-19. Available online