Joseph Baafi

438-221-7008 jbaafi89@gmail.com Personal Website LinkedIn St. John's, NL

PROFILE

Mathematical biologist specializing in infectious disease modeling and population dynamics in ecological systems. Experienced in developing deterministic and stochastic models to assess vector-borne disease risks and inform public health strategies. Skilled in data analysis, sensitivity analysis, statistical analysis, and scientific communication, with the ability to effectively present complex findings to diverse audiences. Proficient in R and LaTeX, with intermediate proficiency in Python. Comfortable working in both macOS and Linux environments, with practical experience using Git and GitHub for version control and collaborative projects.

KEY COMPETENCIES

Scientific

- Data Analysis & Interpretation
- Climate-Driven Modeling
- Statistical Analysis
- Multitasking & Detail-Oriented

Project Management

- Strategic Project Planning
- Managing Project Evolution
- Collaboration & Teamwork
- Presentation & Public Speaking

PROFESSIONAL EXPERIENCE

Doctoral Researcher 2020 – Present
Memorial University of Newfoundland – St. John's, NL

- Worked on projects investigating downsizing of COVID-19 contact tracing in highly immune populations.
- Developed climate-driven models to assess mosquito population dynamics.
- Conducted sensitivity analysis using PRCC and LHS methods.
- Presented findings at 6 academic meetings, including an invited talk at the Super Spreader Seminar Series.

Teaching Assistant 2020 – 2025
Memorial University of Newfoundland – St. John's, NL

- Supported undergraduate instruction through demonstrations and practical session guidance.
- Taught R programming and supported students with R-based assignments.
- Supported assessments through exam invigilation and grading.
- Co-developed an R programming manual for quantitative training of science undergraduates.
- Supported undergrad and graduate students with research proposals, data analysis, and data visualization.

Research Intern 2019 – 2020
Mila - Quebec Artificial Intelligence Institute – Montreal, QC

- Analyzed the opioid epidemic using data-driven modeling techniques and AI.
- Delivered bi-weekly presentations and gathered project feedback in team meetings.
- Collaborated with ML researchers to refine predictive models.
- Collaborated with research coordinator to organize monthly social events.

Mathematics Lecturer 2018 – 2019
Anglican University College of Technology – Nkoranza, Ghana

- Taught undergraduate courses including Basic Statistics, Quantitative Methods, Subsidiary Mathematics, and Mathematical Methods.
- Assessed student performance through mid-semester and end-of-semester examinations.
- Advised students on academic progress and supported their understanding of core mathematical concepts.
- Integrated digital tools and interactive teaching methods to enhance student engagement and comprehension.
- Designed assignments and problem sets to reinforce theoretical knowledge and assess learning outcomes.

Mathematics Lecturer 2016 – 2018
Valley View University – Ghana

- Taught undergraduate courses including Algebra, Vectors, Statistics, Probability and Differential Equations.
- Assessed students through midterm and final examinations.
- Supervised 13 undergraduate research and group projects, mentoring teams of up to 4 students and providing mathematical guidance and feedback.

Mathematics Teacher (Ghana Education Service) 2016 – 2019
Kwabre Senior High School – Akuma, Nkoranza-South, Ghana

- Taught both core and elective mathematics to senior high school students.
- Assessed student performance through quizzes, assignments, and examinations.
- Provided academic mentoring and career guidance to students.
- Prepared students for national examinations, contributing to improved academic performance.

Teaching Assistant 2013 – 2014
Kwame Nkrumah University of Science and Technology – Kumasi, Ghana

- Conducted tutorial sessions for undergraduate courses including Integral Equations, Differential Equations, and Mathematical Methods.
- Assisted final-year students with their project work.
- Supported exam invigilation and grading.

EDUCATION

Ph.D. Candidate, Biology (Mathematical Biology)
Memorial University of Newfoundland – St. John's, NL 2020 – Present
Expected Completion: December 2025
Research Focus: Climate-Driven Mosquito Population Dynamics and Malaria Transmission Modeling

- 2 peer-reviewed publications and 6 conference presentations

Master of Philosophy, Applied Mathematics
Kwame Nkrumah University of Science and Technology – Kumasi, Ghana 2015 - 2016
Thesis: Effect of Post-Mortem Contact on Ebola Transmission and Intervention

- Published 2 papers and presented findings at 2 academic symposia

Master of Science, Mathematical Sciences 2014 – 2015
African Institute for Mathematical Sciences – Accra, Ghana
Thesis: Control of Infectious Diseases

Bachelor of Science in Mathematics 2009 – 2013
Kwame Nkrumah University of Science and Technology – Kumasi, Ghana
Undergraduate Project: Applications of Differential Equations in Dynamical Systems

LEADERSHIP AND TRAINING

- **OMNI-RÉUNIS Super Spreader Seminar Series Committee Lead** (2 years): Led a team of four in organizing a biweekly hybrid seminar series focused on infectious disease modeling.
- **Customer Service Representative** (1 year): Developed interpersonal and conflict-resolution skills while addressing customer inquiries and complaints in a team environment.
- **Pathfinder Director** (2 years): Provided structured discipline and life-skills training to children aged 4–15 through educational and recreational activities.
- **Epidemiological Modeling Clinic Participant**: Completed advanced training in mathematical modeling of infectious diseases at AIMS-Ghana.
- **AARMS-EIDM Summer School Participant**: Completed advanced training in infectious disease modeling, focusing on mathematical epidemiology and data-driven decision support models. Held at the Bonne Bay Marine Station, Memorial University of Newfoundland.
- **CareerTech Data Analytics Workshop Participant**: Completed training in data analytics and visualization using R, organized at Memorial University, St. John's.

ADDITIONAL SKILLS

- Ecological modeling
- Nonlinear systems modeling
- Quantitative analysis of population dynamics
- Calibration and validation of empirical models
- Programming: Proficient in R, intermediate in Python
- Scientific communication and academic writing
- Cross-disciplinary collaboration and teamwork

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