

James Mba Azam

Curriculum Vitae

London School of Hygiene and
Tropical Medicine (LSHTM),
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Education

- Feb, 2018 – Apr, 2022 **PhD Applied Mathematics**, *DSI-NRF Centre of Excellence in Epidemiological Modelling and Analysis (SACEMA), Stellenbosch University, South Africa*
Thesis title *Modelling outbreak response intervention strategies for decision-making*
Supervisors Prof. Juliet R.C. Pulliam & Prof. Matthew J. Ferrari
- Mar, 2016 – Mar, 2018 **MSc Mathematics**, *DSI-NRF Centre of Excellence in Epidemiological Modelling and Analysis (SACEMA), Stellenbosch University, South Africa*
Thesis title *Assessment of a measles outbreak response vaccination campaign, and two measles parameter estimation methods*
Supervisor Prof. Juliet R.C. Pulliam
- Aug, 2014 – Jun, 2015 **Structured MSc Mathematical Sciences**, *African Institute for Mathematical Sciences (AIMS), Senegal*
Thesis title *Hedging Conditional Value at Risk*
Supervisor Dr. Maciej J. Capinski
- Aug, 2009 – Jun, 2013 **BSc Actuarial Science**, *Kwame Nkrumah University of Science and Technology, Ghana*
Thesis Title *Predicting optimal periods for the sale of cocoa in Ghana for the year 2013, using futures contracts*
Supervisor Mr. Vincent K. Dedu

Professional Experience

- Nov, 2022 – Current **Research Software Engineer**, *EpiVerse Initiative, London School of Hygiene and Tropical Medicine, London, United Kingdom*
Duties:
- In general, lead and contribute to the development of free, open-source software (R packages) for outbreak analytics, to support national and international preparedness and response.
 - Maintain the `bpmodels` and `epichains` R packages for simulating and handling transmission chains with branching models.
 - Contribute to the maintenance and enhancement of the `EpiNow2` and `epinowcast` R packages for real-time forecasting and nowcasting of infections and the time-varying reproduction number.

Feb, 2022 – Nov, 2022 **Junior Researcher**, *DSI-NRF Center of Excellence in Epidemiological Modelling and Analysis*, Stellenbosch, South Africa

Duties:

- Co-developed an analysis pipeline (using *R* and *GNU make*) for detecting changes in the trends of reported COVID-19 severity in South Africa,
- Developed a model to analyse strategies for mitigating a hypothetical pathogen in the face of emerging variants,
- Contributed to the activities of SACEMA Modelling and Analytics Response Team (SMART),
- Co-developed a mathematical model of polio to provide analytics decision support to South Africa's National Advisory Group on Immunization in preparation towards a potential threat of polio re-emergence.

Feb, 2021 – Sep, 2021 **Data Science Consultant (Part-time)**, *Winning Insights and Models for Marvellous Yields (Wimmy)*, Cape Town, South Africa

Duties:

- Extended an existing COVID-19 model to analyse the impact of vaccine rollout in South Africa, Chile, Peru, and Zimbabwe,
- Contributed to a process to improve the calibration, validation, and run-time of the COVID-19 model,
- Led and contributed to LinkedIn articles about various health issues of immediate concern, including the potential impact of emerging COVID-19 variants, and addressing the issue of blood clotting following COVID-19 vaccination,
- Drafted guidelines for code testing and review within Wimmy.
- Contributed to the design of proposals for new analyses for Anglo America, including a study about Noise-Induced Hearing Loss mines.

Fellowships, Honors, and Awards

Sept, 2020 & Sept, 2021 **Best student oral presentation**, *DSI-NRF SACEMA Research Days*

Dec, 2019 **Stellenbosch University Library Open Access Fund, £405**

A competitively awarded subsidy towards an Open Access Publication fee.

May, 2019 **Professional Certificate Program in Health and Humanitarian Supply Chain Management, \$5,000/6,000 of course fee waived**, Georgia Tech Center for Health & Humanitarian Systems, Georgia, United States

A course fee waiver awarded competitively. I could not attend because of unforeseen circumstances.

Oct, 2018 **Big Data Policy Fellowship, £4000**, Development in Africa with Radio Astronomy (DARA), University of Manchester, United Kingdom

A one month fellowship that provided training in science and policy communication in the context of Big Data projects and in particular, the Square Kilometre Array in South Africa and Australia.

Feb, 2018 **PhD Bursary, R 140, 000**, DSI-NRF South African Centre of Excellence in Epidemiological Modelling and Analysis (SACEMA), Stellenbosch University

South Africa

Aug, 2017 **Best student oral presentation**, *DSI-NRF SACEMA Research Days*

Feb, 2016 **Masters Bursary, R 120, 000**, DSI-NRF SACEMA, Stellenbosch University

South Africa

Research Interests

- Utilising quantitative models and methods to quantify the impact of outbreak response interventions to inform public health decision-making

- Developing open-source software/tools and pipelines for reproducible outbreak response analytics
- Investigating and contributing insights in effective science and public health policy communication

Publications

Published

Azam, J. M., Pang, X., Are, E. B., Pulliam, J. R., & Ferrari, M. J. (2023). Modelling outbreak response impact in human vaccine-preventable diseases: A systematic review of differences in practices between collaboration types before COVID-19. *Epidemics*, 100720.

Kent, B. A., Holman, C., Amoako, E., Antonietti, A., **Azam, J. M.**, Ballhausen, H., ... & Weissgerber, T. L. (2022). Recommendations for empowering early career researchers to improve research culture and practice. *PLoS biology*, 20(7), e3001680.

Azam, J.M., Saitta, B., Bonner, K., Ferrari, M.J. and Pulliam, J.R. (2021). Modelling the relative benefits of using the measles vaccine outside cold chain for outbreak response. *Vaccine*. DOI: 10.1016/j.vaccine.2021.08.053

Czachur, M. V., Todd, M., Loureiro, T. G., **Azam, J. M.**, Nyeleka, S., Alblas, A., & Davies S. J. (2021). Opening the floor for discussion: A perspective on how scholars perceive attitudes to science in policymaking in South Africa. *South African Journal of Science*, 117, DOI: 10.17159/sajs.2021/7948

Azam, J. M., Are, E. B., Pang, X., Ferrari, M. J., & Pulliam, J. R. (2020). Outbreak response intervention models of vaccine-preventable diseases in humans and foot-and-mouth disease in livestock: a protocol for a systematic review. *BMJ open*, 10(10), DOI: <http://dx.doi.org/10.1136/bmjopen-2019-036172>

Lukwa, A. T., Siya, A., Zablou, K. N., **Azam, J. M.**, & Alaba, O. A. (2020). Socioeconomic inequalities in food insecurity and malnutrition among under-five children: within and between-group inequalities in Zimbabwe. *BMC Public Health*, 20(1), DOI: <https://doi.org/10.1186/s12889-020-09295-z>

Media engagements

Forbes.com. Will Coronavirus Measures Slow The Spread Of Measles? Ask This Ghanaian. Jul 2020. URL: <https://www.forbes.com/sites/andrewwright/2020/07/29/will-coronavirus-measures-slow-measles-ask-this-ghanaian/>

Working Papers

Azam, J. M., Pulliam, J. R. C., & Ferrari, M. J. Modelling the use of vaccination and non-pharmaceutical interventions to mitigate an infectious disease outbreak in the face of an emerging variant.

Open Source Contributions

Developer & maintainer	<code>epichains</code> & <code>bpmodels</code> - R packages for simulating and analysing transmission chains using branching process models.
Co-author	<code>epinowcast</code> - An R package for flexible and efficient hierarchical nowcasting of right-truncated epidemiological time-series using a semi-mechanistic Bayesian model with support for a range of reporting and generative processes.
Co-author	<code>EpiNow2</code> - An R package for estimating real-time case counts and time-varying epidemiological parameters.
Co-maintainer	Data Carpentry lesson: "R for data analysis and visualization of Ecological Data"

Technical Competencies

Programming tools	R, Stan, Bash, GNU Make, Github & Git
Dashboard tools	RShiny, Quarto Dashboards
Markup languages	Quarto, LaTeX, Markdown, R Markdown, HTML
Operating Systems	Microsoft Windows, Linux/Ubuntu, MacOS
Presentation	Quarto Presentations, MS PowerPoint, LaTeX Beamer
Project management	Agile/scrum
Graphic Design	Inkscape, Adobe suite, Camtasia, Canva

Presentations

Conference Oral Presentations

- Aug, 2023 **JM Azam**. Superseding R packages – lessons learned from transitioning to the *epichains* R package from *bpmmodels*. *RSLondonSouthEast, Imperial College, London, United Kingdom*
- Nov, 2021 **JM Azam**, MJ Ferrari, JRC Pulliam. Modelling the relative benefits of using the measles vaccine outside cold chain for outbreak response. *Epidemics8, Elsevier (Virtual presentation)*
- Oct, 2019 **JM Azam**, MJ Ferrari, JRC Pulliam. Measles outbreak response: is it worthwhile to use the vaccine outside of the cold chain?. *Modelling in the Context of African Health (MoCAH)*, Durban, South Africa.
- Sept, 2019 **JM Azam**, P Xiaoxi, AB Elisha, MJ Ferrari, JRC Pulliam. Outbreak response models of human vaccine preventable diseases (1970-2019) - A systematic review. *DSI-NRF SACEMA Research Days (PhD Student Presentation)*, Stellenbosch, South Africa.
- Sept, 2017 **JM Azam**, JRC Pulliam. Measles in a school in Stellenbosch, South Africa. *DSI-NRF SACEMA Research Days (MSc Student Presentation)*, Stellenbosch, South Africa.

Conference Poster Presentations

- Dec, 2019 **JM Azam**, MJ Ferrari, JRC Pulliam. A framework for evaluating vaccine delivery strategies for responding to measles outbreaks in hard-to-reach populations. *Epidemics7, Charleston, United States (Presented on my behalf)*.
- Sept, 2018 **JM Azam**, JRC Pulliam. Measles outbreak response vaccination: how can we optimize the vaccine supply chain for efficient responses?. *DSI-NRF SACEMA Research Days (PhD Student Presentation)*, Stellenbosch, South Africa.
- Jun, 2016 **JM Azam**, MI Andersson, E du Toit, M Nieuwoudt. Modelling Hepatitis B Transmission in sub-Saharan Africa - A Focus on the Impact of Vaccination Within Existing HIV MTCT Infrastructure. *Meaningful Modelling of Epidemiological Data, MMED (Student Presentation)*, African Institute for Mathematical Sciences (AIMS), Muizenberg, South Africa.

Invited Seminars

- Jun, 2022 *Modelling outbreak response strategies for decision-making (Presented virtually)*, Center for Epidemiological Modelling and Analysis, University of Nairobi, Kenya.
- Jul, 2020 *Modelling the benefits of using the measles vaccine outside cold chain for outbreak response*, Médecins Sans Frontières (MSF) Vaccine Working Group meeting (Presented virtually)
- Apr, 2019 *Measles outbreak response vaccination: the role of the vaccine supply chain in low-income settings*, Department of Logistics, Stellenbosch University

Teaching Experience

- Aug, 2022 **Short course instructor**, *Introduction to R: Management, Exploration, and Communication of Data*, SACEMA, South Africa
- May, 2019; May, 2018; Oct, 2017 **Short course mentor/tutor**, *Introduction to R: Management, Exploration, and Communication of Data*, SACEMA, South Africa
- Aug, 2016 – Jun, 2017 **Teaching assistant**, *Introductory Calculus and Algebra*, Department of Mathematical Sciences, Stellenbosch University, South Africa
- Sept, 2013 – Jul, 2014 **Teaching assistant**, *Introductory Probability and Statistics, and R for statistical analyses*, Department of Mathematics, Kwame Nkrumah University of Science and Technology, Ghana

Professional Development

Workshops Attended

- Apr, 2024 **R Developer Day**, *Imperial College*, London, united Kingdom
An open, collaborative event for people interested in contributing to base R. I worked with two others to submit a patch for an improvement to the base package's `substr()` and `substring()` functions to help clarify their similarities and differences and demonstrate some previously obscure features.
- Dec, 2023 **Curriculum development workshop for the short course, “Modelling for pandemic preparedness and response”**, *German-West African Centre for Global Health and Pandemic Prevention/Technische Universität Berlin*, Berlin, Germany
This workshop involved a meeting of experts to design the named two week short course to be offered in Ghana.
- Aug, 2023 **RSLondonSouthEast 2023**, *Imperial College London*, London, United Kingdom
This workshop aimed to provide a regional focus on research software activities, offer an opportunity to present work to a regional audience, and help participants develop links with the wider Research Software Engineering community.
- Mar, 2023 **Forecasting natural and social systems**, *The Royal Society*, London, United Kingdom
This meeting aimed to convene leading experts in forecasting across disciplines to discuss the predictability of different systems, to exchange expertise, and to identify common challenges and possible solutions.
- Dec, 2022 **100 days and 100 lines of code**, *Epiverse Initiative, London School of Hygiene and Tropical Medicine*, London, United Kingdom
- Oct, 2022 **Measles modelling workshop**, *Vaccine Impact Modelling Consortium*, Virtual
- Nov, 2020 **FameLab - Science Communication Competition**, *DSI-NRF Center of Excellence in Epidemiological Modelling and Analysis*, Stellenbosch, South Africa
- Jan, 2020 **Software Engineering for Applied Mathematical Sciences**, *SACEMA*, Stellenbosch
- Nov, 2019 **The Annual African Vaccinology Course**, *Vaccines for Africa Initiative (VACFA)*, University of Cape Town, South Africa
- Feb, 2019 **FameLab - Science Communication Competition**, *DSI-NRF Center of Excellence in Epidemiological Modelling and Analysis*, Stellenbosch, South Africa
- May, 2018 **The Conversation Writing Workshop**, *Stellenbosch University*, South Africa
- Dec, 2017 **FameLab - Science Communication Competition**, *CSIR International Convention Centre*, Pretoria, South Africa
- Dec, 2017 **Spatial Disease Mapping**, *University of Cape Town*, Cape Town
- Nov, 2017 **The Use of Measles Vaccines Under Extended Controlled Temperature Conditions**, *Medicins sans Frontieres*, Paris, France
- May, 2017 **Data Science**, *AIMS-South Africa*, Muizenberg, Cape Town, South Africa

- Aug, 2016 **Science Communication and Public Engagement**, *AIMS-South Africa*, Muizenberg, Cape Town, South Africa
 - Jul, 2016 **Clinic on the Meaningful Modeling of Epidemiological Data (MMED)**, *University of Florida, SACEMA-Stellenbosch University, AIMS-South Africa*, Muizenberg, Cape Town, South Africa
 - May, 2016 **Global Change Impact on Infectious Diseases and Alien Species Expansion**, *AIMS-South Africa in collaboration with 16 other societies/organisations*
 - Jul, 2015 **Computing in Applied Mathematical Sciences (CAMS)**, *AIMS-Ghana*
- [Short Courses Completed](#)
- Nov, 2020 **Learn to write for the media**, *The Conversation Africa*
An online course that teaches the basics of how to write media/popular articles based on scientific findings.
 - Jul, 2018 **The Systematic Review**, *African Doctoral Academy*, Stellenbosch University, South Africa
 - May, 2018 **Individual-based Modelling in Epidemiology - A Practical Introduction**, *SACEMA, Stellenbosch University*, South Africa
 - August, 2017 **Introduction to Scientific Writing Skills**, *The Writing Center*, Stellenbosch University, South Africa
 - Oct, 2016 **Bayesian Analysis of Longitudinal Data**, *SACEMA*, Stellenbosch University, South Africa
 - Sept, 2016 **Mathematical Modeling of Infectious Diseases (MMID)**, *University of Cape Town*, Cape Town, South Africa
 - Mar - Aug, 2016 **Introduction to Epidemiology and Research Methodology**, *SACEMA*, Stellenbosch University, South Africa
 - May, 2016 **Applying Quantitative Bias Analysis to Epidemiologic Data**, *SACEMA*, Stellenbosch University, South Africa
 - March, 2016 **Bayesian Biostatistics**, *SACEMA*, Stellenbosch University, South Africa

Panel Discussions

- Jul, 2023 **Career Panel**. *HDR-UK Black Internship Programme*. We shared our career journeys and experiences, and answered questions from the mentees.
- Dec, 2020 **The New African Scientist**. *STEM - For Us, By Us conference, Visibility STEM Africa*. We discussed on topics including the future of the academic/research environment in Science Technology Engineering Mathematics (STEM) in Africa, mental health among young African researchers, how we find the motivation to do work outside of research, and our vision for STEM in Africa in the next few years.
- Dec, 2018 **Science Communication for Policy Engagement**. *Science Forum South Africa (SFSA), CSIR International Convention Centre, Pretoria, South Africa*. We discussed the relationship between science communication and science engagement, and the challenges that early career researchers face in communicating the policy implications of their research. We also discussed (South) Africa's readiness for the Forth Industrial Revolution and the emerging challenges.

Professional Memberships

- Dec, 2022 – Current **Member**, *Society of Research Software Engineering*, United Kingdom
- Sep, 2023 – Current **Member**, *Models of Infectious Disease Agent Study (MIDAS)*, University of Pittsburgh US

Reviewer

- Journey of Open Science Software
- PLOS Global Health

Committees & Working Groups

Nov, 2022 – Current **Member**, *Equity, Diversity, Inclusion, and Accessibility sub-committee*, Society of Research Software Engineering, United Kingdom

Mentoring

Apr, 2023 – Jun, 2023 **Mentor**, *Research Software Camp*, The Software Sustainability Institute, United Kingdom

In 3 months, I helped my mentee to develop a working knowledge of using R for running generalised linear mixed models. We worked our way up from no knowledge of R to running regression models.

Competitions

Aug, 2019 **Participant**, **Stellenbosch University Hackathon, in partnership with Innovus and sponsored by Entersekt, Capitec Bank, and Explore** My team of three successfully reclassified an underclassified group of transactions and suggested a loan service to help customers replace their old appliances with new ones to save electricity and the environment.

Feb, 2018 **Runner up (alongside two others)**, **Famelab organised by SACEMA, Stellenbosch University, a science communication competition run by the British Council, Jive media, and SAASTA**. I successfully passed the first heats but was eliminated at the final heats.

Dec, 2017 **Heat finalist**, **Famelab, a science communication competition organized by the British Council, Jive media, and SAASTA**.

Jun, 2009 **Contestant**, **National Science and Mathematics Quiz, Ghana**. My team was eliminated in 1/16th stage of competitions.

Positions of Responsibility

Jul, 2020 – Jul, 2021 **President**, *Association of Ghanaian Students in Stellenbosch University*, Stellenbosch University, South Africa

Jun, 2019 – Jun, 2020 **Vice President**, *Association of Ghanaian Students in Stellenbosch University*, Stellenbosch University, South Africa

2017 **Student Representative**, *SACEMA Research Days planning committee*, Stellenbosch University, South Africa

2017 **Student Representative**, *SACEMA Strategic Planning Meeting*, Stellenbosch University, Stellenbosch University

2009 – 2013 **Member of Several committees**, *Pax Romana Local and Pax Romana Choir*, Kwame Nkrumah University of Science and Technology, Ghana

Referees

Available upon request.