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Maurice Wanyonyi

Curriculum Vitae

"Be the change that you want to see in the world."

Summary

Ph.D. candidate in Statistics at the University of Embu, Kenya, with expertise in applied statistics, machine learning, and explainable artificial intelligence. Published researcher with 20+ peer-reviewed articles spanning statistical process control, predictive modelling, survival analysis, and climate/health applications. Active peer reviewer for international journals and AI Champion for the Google DeepMind AI Research Foundations programme, Kenya Cohort 2.

Education

2024–Present **Ph.D. in Statistics**, *University of Embu*, Kenya
Thesis: **Hybrid Modeling Approaches for Predicting Coronary Heart Disease: Integrating Classical Statistical Models, Machine Learning, and Explainable Artificial Intelligence**

2019–2021 **M.Sc. in Statistics**, *University of Embu*, Kenya
Thesis: **Modelling COVID-19 Pandemic in Kenya**

2015–2019 **B.Sc. in Statistics**, *University of Embu*, Kenya

Experience

2026–Present **Adjunct Research Scientist**, *African Institute for Capacity Development (AICAD)*, Kenya
- Conduct independent and collaborative research in applied statistics, artificial intelligence, and machine learning.
- Contribute to interdisciplinary research projects addressing regional development priorities.
- Develop research grant proposals and mentor early-career researchers.

2026–Present **Tutorial Fellow**, *University of Embu, Dept. of Mathematics and Statistics*, Embu, Kenya
- Develop and manage Moodle learning modules.
- Teach undergraduate courses in statistics and mathematics.
- Supervise undergraduate research projects.
- Contribute to curriculum development and review.
- Participate in research proposal development and grant writing.

2024–2026 **Teaching Assistant**, *University of Embu, Dept. of Mathematics and Statistics*, Embu, Kenya
- Assist in undergraduate teaching and practical sessions.
- Develop Moodle learning modules.
- Support student supervision and academic advising.
- Participate in curriculum development and grant writing.

2021–2024 **Part-Time Lecturer**, *University of Embu, Dept. of Mathematics and Statistics*, Embu, Kenya

- Prepare lesson plans and deliver undergraduate lectures and tutorials.
- Assess student coursework, examinations, and projects.
- Supervise undergraduate research projects.
- Integrate modern statistical and data science tools into teaching.

Departmental Responsibilities

2026–Present **AI Champion – Google DeepMind AI Research Foundations**, *University of Embu, Dept. of Mathematics and Statistics*, Embu, Kenya

- Selected as an AI Champion for the Google DeepMind AI Research Foundations programme, Kenya Cohort 2.
- Participate in the programme's train-the-trainer activities to strengthen AI research and teaching capacity within the university.

2025–Present **Webometric Champion**, *University of Embu, Dept. of Mathematics and Statistics*, Embu, Kenya

- Manage content updates including faculty publications, research projects, student achievements, and departmental events.

Curriculum Review Contributor, *University of Embu*, Embu, Kenya

- Contributed to the review of the Ph.D. in Statistics, M.Sc. in Statistics, B.Sc. in Statistics, and B.Sc. in Mathematics and Computer Science programmes.

Technical Skills

Programming	R, Python, MATLAB
Statistical Software	Stata, SPSS
Document Preparation	LaTeX
Machine Learning	Predictive modelling, ensemble learning, explainable artificial intelligence (XAI)
Data Visualization	ggplot2, Shiny, Matplotlib, Seaborn, Plotly

Professional Memberships

IAENG Member, International Association of Engineers (Membership No. 540250). Affiliated with the Societies for Artificial Intelligence, Bioinformatics, Data Mining, and Operations Research.

Peer Review Activities

2023–Present Reviewer for the following peer-reviewed journals:

- JMR Medical Informatics
- Journal of International Medical Research
- Statistics, Optimization & Information Computing
- African Journal of Pure and Applied Sciences
- Hacettepe Journal of Mathematics and Statistics
- PLOS ONE

Awards & Scholarships

2019–2021 **Full Studentship (Scholarship)**, *M.Sc. in Statistics, University of Embu*, Kenya

Publications

2026

[1] Wanyonyi, M., Gogo, J. A., Mbithi, J. N., Morris, Z. N., Wafula, J. K., Wafula, I., Kimani, P. M., Nyaluke, W. K., Warue, E., Mugambi, J. M., Sindiga, E. C., & Njenga, V. N. (2026). An Interpretable Machine Learning Framework for Classifying Malaria Transmission States in Kenya. *IAENG International Journal of Computer Science*, 53(10), 4110-4124. https://www.iaeng.org/IJCS/issues_v53/issue_10/IJCS_53_10_14.pdf

[2] Mbithi, J. N., **Wanyonyi, M.**, Mavyala, R., & Odhiambo, C. (2026). Anomaly Detection Feature Engineering for Enhanced Prediction of HIV Viral Load Suppression Using DHIS2 Data. *Asian Journal of Probability and Statistics*, 28(9), 164-184. https://doi.org/10.9734/ajpas/2026/v28i9949

[3] Mbithi, J. N., **Wanyonyi, M.**, & Simion, N. B. A. (2026). Calibration and Uncertainty Quantification for Machine Learning Models in Imbalanced HIV Viral Load Prediction: A Reliability-Based Evaluation. *Asian Journal of Probability and Statistics*, 28(9), 141-163. https://doi.org/10.9734/ajpas/2026/v28i9948

[4] **Wanyonyi, M.**, & Gogo, J. (2026). Robust adaptive EWMA-CUSUM control charts for monitoring autocorrelated and non-normal processes. *Hacettepe Journal of Mathematics and Statistics*, Advanced Online Publication, 1-42. https://doi.org/10.15672/hujms.1913358

[5] Mugambi, J. M., **Wanyonyi, M.** (2026). Competing Risks Survival Analysis of Cervical Cancer Progression and Regression Among Women in Kenya. *Asian Journal of Probability and Statistics*, 28(7), 89-117. doi:10.9734/ajpas/2026/v28i7920

[6] **Wanyonyi, M.**, Wafula, J. K., & Mbithi, J. N. (2026). Does Nutritional Support Improve Treatment Outcomes Among Undernourished Tuberculosis Patients? *Asian Journal of Probability and Statistics*, 28(7), 135-162. https://doi.org/10.9734/ajpas/2026/v28i7922

[7] **Wanyonyi, M.**, Gogo, J. A., Kinini, D. M., Mbithi, J. N., Wafula, J. K., & Wafula, I. (2026). SHAP-Based Explainable Machine Learning for Predicting Loan Default Among Women-Owned Microenterprises in Kenya. *Journal of Advances in Mathematics and Computer Science*, 41(7), 276-308. https://doi.org/10.9734/jamcs/2026/v41i72179

[8] **Wanyonyi, M.**, Gogo, J. A., Mbithi, J. N., & Sindiga, E. C. (2026). Spline-based generalised additive models for interpretable nonlinear regression: An application to air quality data. *Asian Journal of Probability and Statistics*, 28(7), 1-28. https://doi.org/10.9734/ajpas/2026/v28i7915

[9] **Wanyonyi, M.**, Akelo, J. G., Njenga, V. N., Keraro, F. O., & Kioko, T. M. (2026). Comparative and complementary use of Bayesian inference and supervised learning for predictive modeling of coffee rust incidence among Kenyan smallholder farmers. *PLOS Climate*, 5(4), e0000754. doi:10.1371/journal.pclm.0000754

[10] **Wanyonyi, M.**, Morris, Z. N., Musyoka, F. M., Makaa, D., & Kitavi, D. M. (2026). Balancing Interpretability and Accuracy: A Comparative Evaluation of Logistic Regression and Machine Learning Approaches for Coronary Heart Disease Risk Prediction. *IAENG International Journal of Computer Science*, 53(3), 1135-1154. https://www.iaeng.org/IJCS/issues_v53/issue_3/IJCS_53_3_19.pdf

2025

[1] **Wanyonyi, M.**, Kioko, T. M., Wafula, J. K., Keraro, O. F., Gogo, J. A., & Maiyo, A. K. (2025). Modelling and Forecasting the Impact of Exchange Rates, Public Debt, and Tourism Inflows on Kenya's Economic Growth Using Machine Learning Techniques. *General Letters in Mathematics*, 15(3), 74-92. doi:10.31559/g1m2025.15.3.1

[2] **Wanyonyi, M.**, Morris, Z. N., Musyoka, F. M., & Kitavi, D. M. (2025). Enhanced machine learning and hybrid ensemble approaches for coronary heart disease prediction. *PLOS ONE*, 20(12), e0328338. doi:10.1371/journal.pone.0328338

[3] **Wanyonyi, M.**, Morris, Z. N., Musyoka, F. M., & Kitavi, D. M. (2025). Predicting Coronary Heart Disease Using Classical Statistical Models: Logistic Regression and Cox Proportional Hazards. *IAENG International Journal of Applied Mathematics*, 55(12), 4173-4190. https://www.iaeng.org/IJAM/issues_v55/issue_12/IJAM_55_12_21.pdf

[4] Ouma, F. O., Atitwa, E. B., Morris, Z. N., & **Wanyonyi, M.** (2025). Comparative Analysis of Spline-Based and Standard Frailty Models. *IAENG International Journal of Applied Mathematics*, 55(11), 3630-3649. https://www.iaeng.org/IJAM/issues_v55/issue_11/IJAM_55_11_17.pdf

[5] Kioko, T. M., & **Wanyonyi, M.** (2025). Impact of Public Debt on Private Investment in Kenya. *Asian Journal of Probability and Statistics*, 27(4), 122-131. doi:10.9734/ajpas/2025/v27i4744

[6] **Wanyonyi, M.**, Kiliyi, J. W., & Okango, A. A. (2025). Optimization of a Functional Beverage Formulation. *Asian Journal of Probability and Statistics*, 27(1), 1-16. doi:10.9734/ajpas/2025/v27i1699

2024

[1] Keraro, O. F., Morris, Z. N., Kitavi, D. M., & **Wanyonyi, M.** (2024). Forecasting Kenya's Public Debt Using Time Series Analysis. *International Journal of Advanced and Applied Sciences*, 11(8), 119-126. https://doi.org/10.21833/ijaaas.2024.08.013

[2] **Wanyonyi, M.**, & Mbithi, J. (2024). Tourism and Economic Growth in Kenya. *Asian Journal of Probability and Statistics*, 26(8), 107-117. doi:10.9734/ajpas/2024/v26i8640

2023

[1] **Wanyonyi, M.** (2023). Modeling the Manufacturing Sector's Contribution to Kenya's GDP. *Media Statistika*, 15(2), 117-128. doi:10.14710/medstat.15.2.117-122

2022

[1] Mugambi, J. M., Atitwa, E. B., Morris, Z. N., & **Wanyonyi, M.** (2022). Probabilistic Analysis of COVID-19 Transmission in Kenya. *International Journal of Advanced and Applied Sciences*, 10(3), 108-113. https://doi.org/10.21833/ijaaas.2023.03.014

[2] Gechore, D. O., Atitwa, E. B., Kimani, P., & **Wanyonyi, M.** (2022). Predicting Tourist Inflows to Kenya Using SARIMA. *African Journal of Hospitality, Tourism and Leisure*, 11(6), 1913-1923. https://www.ajhtl.com/uploads/7/1/6/3/7163688/article_6_11_6_1913-1923.pdf

[3] Kinyili, M., & **Wanyonyi, M.** (2022). Forecasting COVID-19 Deaths in South Africa. *General Letters in Mathematics*, 11(2), 26-35. doi:10.31559/glm2021.11.2.2

2021

[1] **Wanyonyi, M.**, Kitavi, D. M., Mugo, D. M., & Atitwa, E. B. (2021). COVID-19 Prediction in Kenya Using the ARIMA Model. *International Journal of Electrical Engineering and Technology*, 12(8), 105-114. https://iaeme.com/Home/article_id/IJEET_12_08_009

Manuscripts Under Review

- Wanyonyi, M., & Gogo, J. A. (2026). Beyond Prediction: Explaining Health Disparities in Diabetes Risk through Fairness-Aware Machine Learning and Causal Inference. *Discrete Dynamics in Nature and Society*.
- Wanyonyi, M. Comparative Evaluation of Machine Learning Algorithms for Maize Lethal Necrosis Disease Detection Under Class Imbalance. Submitted to *PLOS ONE*.

Preprints

[1] **Wanyonyi, M.**, Morris, Z. N., Musyoka, F. M., Makaa, D., & Kitavi, D. M. (2025). Balancing interpretability and accuracy: A comparative evaluation of logistic regression and machine learning approaches for coronary heart disease risk prediction in low-resource settings. *TechRxiv*.

[2] **Wanyonyi, M.**, Kitavi, D. M., Musyoka, F. M., & Morris, Z. N. (2026). Machine learning models for predicting stroke risk among patients with coronary heart disease. *medRxiv*, 2025-12.

[3] **Wanyonyi, M.**, & Gogo, J. A. (2026). Machine Learning and Explainable AI for Multi-State Classification of Malaria Transmission Dynamics in Kenya. *medRxiv*, 2026-05.

[4] **Wanyonyi, M.**, Gogo, J. A., & Warue, E. (2026). Predicting Tungiasis Hotspots in Western Kenya Using Machine Learning and Explainable Artificial Intelligence. *medRxiv*, 2026-07.

[5] **Wanyonyi, M.**, Akelo, J. G., Njenga, V. N., Keraro, F. O., & Kioko, T. M. (2025). Integrating Bayesian Inference and Supervised Learning for Predictive Modeling of Coffee Rust Incidence Among Kenyan Smallholder Farmers. *EarthArXiv*.

[6] **Wanyonyi, M.**, Akelo, J. G., Kimani, P. M., Nyaluke, W. K., Warue, E., Wafula, I., & Njenga, V. N. (2026). Integrating climate projections and machine learning to predict survival of drought resistant trees for climate smart reforestation. *EarthArXiv*.

Conference Presentations

2026

- Wanyonyi, M., Gogo, J., Kimani, P., Wurue, E., Nyaluke, W., Keraro, F., Wafula, I., & Nyokabi, V. (2026, August 10-13). Integrating Climate Projections and Machine Learning to Predict Survival of Drought-Resistant Trees for Climate-Smart Reforestation [Oral Presentation]. 2nd HEARTS4Climate International Conference, Kenyatta University, Nairobi, Kenya.
- Wanyonyi, M. (2026, March 25-26). Integrating Bayesian Inference and Supervised Learning for Predictive Modeling of Coffee Rust Incidence Among Kenyan Smallholder Farmers [Oral Presentation]. 9th Annual International Virtual Conference on Innovation, Digital Transformation and Industry Resilience for Global Sustainability, Kirinyaga University, Kenya (Virtual).

2025

- Wanyonyi, M. (2025). Enhanced Machine Learning and Hybrid Ensemble Approaches for Coronary Heart Disease Prediction. Presented at the 9th International Conference on Science, Technology, Innovation and Entrepreneurship (STI&E 2025), Dedan Kimathi University of Technology (DeKUT), Nyeri, Kenya.
- Kioko, T. M., & Wanyonyi, M. (2025). Impact of Public Debt on Private Investment in Kenya. Presented at the 8th International Multidisciplinary Research Conference, Gretsa University, Thika, Kenya (Virtual).

Referees

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