

Maurice Wanyonyi

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Maurice-Wanyonyi
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Education

- 2024–Present **Ph.D. in Statistics**, *University of Embu*, Embu, Kenya
2019–2021 **M.Sc. in Statistics**, *University of Embu*, Embu, Kenya
2015–2019 **B.Sc. in Statistics**, *University of Embu*, Embu, Kenya

Academic Experience

- 2026–2029 **Adjunct Research Scientist**, *African Institute for Capacity Development (AICAD)*
 - Conducted independent and collaborative research in applied statistics, artificial intelligence, and machine learning.
 - Contributed to interdisciplinary research projects addressing regional development priorities.
 - Developed research grant proposals and mentored early-career researchers.
- 2026–Present **Tutorial Fellow**, *University of Embu*, Department of Mathematics and Statistics
 - Developed and managed Moodle learning modules.
 - Taught undergraduate courses in statistics and mathematics.
 - Supervised undergraduate research projects.
 - Contributed to curriculum development and review.
 - Participated in research proposal development and grant writing.
- 2024–2026 **Teaching Assistant**, *University of Embu*, Department of Mathematics and Statistics
 - Assisted in undergraduate teaching and practical sessions.
 - Developed Moodle learning modules.
 - Supported student supervision and academic advising.
 - Participated in curriculum development and grant writing.
- 2021–2024 **Part-Time Lecturer**, *University of Embu*, Department of Mathematics and Statistics
 - Prepared lesson plans and delivered undergraduate lectures and tutorials.
 - Assessed student coursework, examinations, and projects.
 - Supervised undergraduate research projects.
 - Integrated modern statistical and data science tools into teaching.

Curriculum Review

- University of Embu Lead reviewer for the **Ph.D. in Statistics**, **M.Sc. in Statistics**, **B.Sc. in Statistics**, and **B.Sc. in Mathematics and Computer Science** programmes.

Workshops and Professional Development

- 2025 **Africa Universities' Day Celebration (AAU)** – Participated in the hybrid conference hosted in Accra, Ghana.
- 2025 **Kenya Open Education Knowledge Exchange (KOEKE)** – Participated in the workshop organized in collaboration with GO-GN and KLISC, Naivasha, Kenya.
- 2025 **Integration of Artificial Intelligence in Teaching and Learning** – University of Embu.
- 2025 **Grant Writing for Early-Career Researchers**– University of Embu.

Technical Skills

Programming	R, Python, MATLAB
Statistical Software	Stata, SPSS
Document Preparation	L ^A T _E X
Machine Learning	Predictive modelling, ensemble learning, explainable artificial intelligence (XAI)
Data Visualization	ggplot2, Shiny, Matplotlib, Seaborn, Plotly
Research Methods	Experimental design, sampling techniques, impact evaluation, quantitative and qualitative data analysis
Data Governance	GDPR, Kenya Data Protection Act

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:

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

Awards and Scholarships

2019–2021 Full Studentship (Scholarship) for the Master of Science in Statistics, University of Embu.

Publications

- 2026 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
- 2026 **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>
- 2026 **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>
- 2026 **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>
- 2026 **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.org/10.1371/journal.pclm.0000754

- 2026 **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 **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.org/10.31559/glm2025.15.3.1
- 2025 **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.org/10.1371/journal.pone.0328338
- 2025 **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
- 2025 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
- 2025 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.org/10.9734/ajpas/2025/v27i4744
- 2025 **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.org/10.9734/ajpas/2025/v27i1699
- 2024 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/ijaas.2024.08.013>
- 2024 **Wanyonyi, M.**, & Mbithi, J. (2024). Tourism and Economic Growth in Kenya. *Asian Journal of Probability and Statistics*, 26(8), 107-117. doi.org/10.9734/ajpas/2024/v26i8640
- 2023 **Wanyonyi, M.** (2023). Modeling the Manufacturing Sector's Contribution to Kenya's GDP. *Media Statistika*, 15(2), 117-128. 10.14710/medstat.15.2.117-128
- 2022 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/ijaas.2023.03.014>
- 2022 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
- 2022 Kinyili, M., & **Wanyonyi, M.** (2022). Forecasting COVID-19 Deaths in South Africa. *General Letters in Mathematics*, 11(2), 26-35. doi.org/10.31559/glm2021.11.2.2
- 2021 **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

- 2026 **Wanyonyi, M.**, Gogo, J., & Warue, E. Predicting Tungiasis Hotspots in Western Kenya Using Machine Learning and Explainable Artificial Intelligence. Submitted to *PLOS ONE*.

- 2026 **Wanyonyi, M.** Comparative Evaluation of Machine Learning Algorithms for Maize Lethal Necrosis Disease Detection Under Class Imbalance. Submitted to *PLOS ONE*.
- 2026 **Wanyonyi, M.**, Kioko, T., Gogo, J., Ndiku, Z., Kiliyi, J., Wafula, I., Kimani, P., Nyaluke, W., Warue, E., Keraro, F., & Nyokabi, V. Machine Learning and Explainable AI for Multi-State Classification of Malaria Transmission Dynamics in Kenya. Submitted to *IAENG International Journal of Computer Science*.
- 2026 **Wanyonyi, M.**, Gogo, J., Kimani, P., Warue, E., Nyaluke, W., Keraro, F., Wafula, I., & Nyokabi, V. Integrating Climate Projections and Machine Learning to Predict Survival of Drought-Resistant Trees for Climate-Smart Reforestation. Submitted to *PLOS Climate*.
- 2026 **Wanyonyi, M.**, & Gogo, J. Robust Adaptive EWMA-CUSUM Control Charts for Monitoring Autocorrelated and Non-Normal Processes. Submitted to *Haceteppe Journal of Mathematics and Statistics*.
- 2026 **Wanyonyi, M.** Socioeconomic and Environmental Determinants of Multimorbidity Among Middle-Aged and Older Adults in Kenya: An Explainable Machine Learning Analysis Using Nationally Representative Survey Data. Submitted to *General Letters in Mathematics*.
- 2025 **Wanyonyi, M.**, Gogo, J. A., Njenga, V. N., Kiliyi, J. W., & Wafula, I. Optimization of Nutritional Composition in a Five-Component Porridge Blend Using a Quadratic Mixture Design. Submitted to *General Letters in Mathematics*.
- 2025 **Wanyonyi, M.**, Gogo, J. A., Njenga, V. N., Kimutai, K. A., Malenge, M., Wafula, J. K., Keraro, O. F., & Mungania, J. M. Explainable AI for Real-Time Fraud Detection in Mobile Money Transactions in Kenya. Submitted to *General Letters in Mathematics*.

Conference Presentations

- 2026 **Wanyonyi, M.** (2026). *Integrating Bayesian Inference and Supervised Learning for Predictive Modeling of Coffee Rust Incidence Among Kenyan Smallholder Farmers*. Presented at the **9th Annual International Virtual Conference on Innovation, Digital Transformation and Industry Resilience for Global Sustainability**, Kirinyaga University, Kenya (Virtual), 25–26 March 2026.
- 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.
- 2025 Kioko, T. M., & **Wanyonyi, M.** (2025). *Impact of Public Debt on Private Investment in Kenya*. Presented at the **8th International Multidisciplinary Research Conference**, Grets University, Thika, Kenya (Virtual).

Referees

References are available upon request.