

Maurice Wanyonyi

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ORCID

ResearchGate

Profile

Versatile Statistician with over five years of university teaching, applied statistical modeling, and machine learning research. Strong record of peer-reviewed publications, curriculum review and development, and student supervision. Research spans machine learning applications, econometrics, and health analytics.

Education

Ph.D. in Statistics (2024–Present) — University of Embu, Kenya

M.Sc. in Statistics (2019–2021) — University of Embu, Kenya

B.Sc. in Statistics (2015–2019) — University of Embu, Kenya

Academic Experience

Adjunct Research Scientist

2026–2029

African Institute for Capacity Development (AICAD)

- Independent and collaborative research in applied statistics and machine learning.
- Interdisciplinary projects aligned with regional development priorities.
- Grant proposal development and early-career mentorship.

Teaching Assistant

2024–Present

University of Embu — Moodle module development, undergraduate teaching, supervision, grant writing, curriculum development.

Part-Time Lecturer

2021–2024

University of Embu — Lesson plans, lecturing, tutorials, grading, project supervision, modern data tools integration.

Curriculum Review and Development Experience

- Lead reviewer for PhD in Applied Mathematics, PhD in Statistics, MSc in Statistics, BSc in Statistics, and BSc in Mathematics and Computer Science at the University of Embu. Aligned programs with international standards and industry trends.
- Developed curricula for the BSc in Applied Statistics, BSc in Data Science and Analytics, and BSc in Artificial Intelligence and Machine Learning programs at Kiriri Women's University. Contributed to curriculum design, program structuring, course content development, and alignment with emerging industry and technological demands.

Selected Workshops

- Africa Universities' Day Celebration 2025 (AAU) – hybrid, Accra.
- Kenya Open Education Knowledge Exchange (KOEKE) with GO-GN and KLISC, Naivasha 2025.
- Integration of AI in Teaching and Learning, University of Embu 2025.
- Grant Writing for Early Career Researchers, 2025.
- Data Analysis using R/RStudio, 2021; Elsevier Publication Process, 2020.

Skills

Data Analysis: R, Python, MATLAB, STATA, SPSS, LaTeX

Machine Learning: Predictive modeling, ensemble methods, explainable AI

Visualization: Matplotlib, Seaborn, Plotly, ggplot2, Shiny

Research Design: Sampling, impact evaluation, quantitative/qualitative analysis
Compliance: GDPR, Kenya Data Protection Act

Professional Memberships

IAENG (International Association of Engineers) Member (No. 540250) — Societies: Artificial Intelligence, Bioinformatics, Data Mining, Operations Research.

Peer Review Activity

Reviewer for JMIR Medical Informatics, Statistics Optimization & Information Computing, African Journal of Pure and Applied Sciences, hacettepe Journal of Mathematics and Statistics (2023–present).

Awards

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

Publications

Peer-Reviewed Journal Articles

1. **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
2. **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
3. **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
4. **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
5. **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
6. 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
7. 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
8. **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
9. 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>
10. **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
11. **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](https://doi.org/10.14710/medstat.15.2.117-128)
12. 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>
13. 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

14. 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
15. 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 Submitted

- Wanyonyi, M., & Gogo, J. (2026). Detecting and Visualising Nonlinear Relationships in Real-World Data Using Spline-Based Generalised Additive Models. *PLOS Complex Systems*.
- Wanyonyi, M. (2026). Comparative Evaluation of Machine Learning Algorithms for Maize Lethal Necrosis Disease Detection Under Class Imbalance. *PLOS ONE*
- Wanyonyi, M., Gogo, J. A., Ndiku, Z. M., Kinini, D. M., Wafula, J. K., Kimani, P. M., Nyaluke, W. K., Wafula, I., Warue, E., & Mungania, M. J. (2026). Explainable machine learning for predicting loan default in women-owned microenterprises in Kenya. *IAENG International Journal of Computer Science*.
- Wanyonyi, M., Kioko, T., Gogo, J., Ndiku, Z., Kiliyi, J., Wafula, I., Kimani, P., Nyaluke, W., Warue, E., Keraro, F., & Nyokabi, V. (2026). Machine Learning and Explainable AI for Multi-State Classification of Malaria Transmission Dynamics in Kenya. *IAENG International Journal of Computer Science*.
- Wanyonyi, M., Gogo, J., Kimani, P., Warue, E., Nyaluke, W., Keraro, F., Wafula, I., & Nyokabi, V. (2026). Integrating climate projections and machine learning to predict survival of drought resistant trees for climate smart reforestation. *Plos Climate*.
- Wanyonyi, M., & Gogo, J. (2026). Robust Adaptive EWMA-CUSUM Control Charts for Monitoring Autocorrelated and Non-Normal Processes. *hactep Journal of Mathematics and Statistics*.
- Wanyonyi, M. (2026). Socioeconomic and environmental determinants of multimorbidity among middle-aged and older adults in Kenya: an explainable machine learning analysis using nationally representative survey data. *General Letters in Mathematics*
- Wanyonyi, M., Kitavi, D. M., Musyoka, F. M., Makaa, D., & Morris, Z. N. (2025). Machine Learning Models for Predicting Stroke Risk Among Patients with Coronary Heart Disease. *Scientific Reports*.
- Wanyonyi, M., Gogo, J. A., Njenga, V. N., Kiliyi, J. W., & Wafula, I. (2025). Optimization of Nutritional Composition in a Five-Component Porridge Blend Using a Quadratic Mixture Design. *General Letters in Mathematics*.
- Wanyonyi, M., Gogo, J. A., Njenga, V. N., Kimutai, K. A., Malenge, M., Wafula, J. K., Keraro, O. F., & Mungania, J. M. (2025). Explainable AI for Real-Time Fraud Detection in Mobile Money Transactions in Kenya. *General Letters in Mathematics*.

Conference Presentations

- Wanyonyi, M. (2026). Integrating Bayesian Inference and Supervised Learning for Predictive Modeling of Coffee Rust Incidence Among Kenyan Smallholder Farmers. 9th Annual International Virtual Conference on “Innovation, Digital Transformation and Industry Resilience for Global Sustainability”, Kirinyaga University, Kenya (virtual, March 25–26).
- Wanyonyi, M. (2025). Enhanced Machine Learning and Hybrid Ensemble Approaches for Coronary Heart Disease Prediction. 9th International Conference on Science, Technology, Innovation and Entrepreneurship (STI&E 2025), DeKUT, Nyeri, Kenya.
- Kioko, T. M., & Wanyonyi, M. (2025). Impact of Public Debt on Private Investment in Kenya. 8th International Multidisciplinary Research Conference, Grets University, Thika (virtual).

References

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