

Dr Robert Mathenge Mutwiri

Lecturer, Department of Mathematics and Actuarial Science
South Eastern Kenya University (SEKU), Kenya

Academic profile

Statistician and mathematical modeller with research in time-series forecasting, stochastic processes, Bayesian methods and artificial intelligence. Current collaborative interests include physics-informed AI, climate and agricultural risk, digital twin early warning systems, and interdisciplinary doctoral training.

Education

- PhD in Statistics, University of KwaZulu-Natal, South Africa, 2012–2014. Thesis: Statistical distributions and modelling of GPS-telemetry elephant movement data including the effect of covariates.
- MSc in Social Statistics, University of Nairobi, Kenya, 2008–2009. Thesis: Spatial Analysis and Mapping of Infant Mortality in Kenya Based on DHS Data 2003.
- BSc in Applied Statistics, Maseno University, Kenya, 2003–2007. Diploma in Project Planning and Management, Kenya Institute of Management, 2007.

Academic appointments

2021–present	Lecturer, Department of Mathematics and Actuarial Science, SEKU.
2018–2019	Lecturer, Department of Mathematics and Actuarial Science, Kabarak University.
2016–2018	Lecturer, Department of Mathematics, Computing and Information Technology, University of Embu.
2016	Lecturer, School of Pure and Applied Sciences, Kirinyaga University College.
2012–2014	Lecturer, School of Mathematics, Statistics and Computer Science, University of KwaZulu-Natal.

Teaching and methodological expertise

Probability and statistics; stochastic processes; design and analysis of experiments; statistical computing; time-series analysis; econometrics; statistical modelling; Bayesian methods; R, Python, Stata, MATLAB, SAS, ArcGIS, GeoDa and SQL.

Selected research themes

Hybrid statistical and AI forecasting for rainfall and agricultural prices; mathematical and computational models of climate risk; animal movement modelling; geospatial health statistics; explainable AI and digital twin decision support.

Selected publications

- Ochola, N.J., Kimathi, M., Mutwiri, R.M., Lang'at, R.C. & Odhiambo, S.S. (2026). Computational Fluid Dynamics Approach to Climate Resilience in Semi-Arid Regions. *Open Journal of Modelling and Simulation*, 14, 84–125. DOI: 10.4236/ojmsi.2026.143006.
- Ndengele, T.R., Mutwiri, R.M. & Odhiambo, F.O. (2025). Application of Markov Chain Model to Analysis and Prediction of Green Gram Price Transitions in Kitui County, Kenya. *Asian Journal of Probability and Statistics*, 27(7), 139–158. DOI: 10.9734/ajpas/2025/v27i7782.
- Mutwiri, R.M. (2019). Forecasting of tomatoes wholesale prices of Nairobi in Kenya: Time series analysis using SARIMA model. *International Journal of Statistical Distributions and Applications*, 5(3), 46–53.
- Mutwiri, R.M., Mwambi, H. & Slotow, R. (2019). Application of stable Paretian time series models to animal movement GPS telemetry data. *International Journal of Contemporary Applied Research*, 6(1).
- Mutwiri, R.M., Mwambi, H. & Slotow, R. (2016). Application of circular-linear multiple regression model of GPS tracking data to elephant movement. *IOSR Journal of Mathematics*, 12(2), 1–13.
- Tartisio Njoki Filder, Muraya, M. & Mutwiri, R.M. (2019). Application of SARIMA models in the time-series analysis and forecasting of rainfall data of Embu County in Kenya. *Asian Journal of Probability and Statistics*, 4(4), 1–15.

Postgraduate supervision

- Tartisio Njoki Filder (2018–2022), MSc, Chuka University. Empirical statistical modelling of annual rainfall patterns in Embu County, Kenya, using regression models. Graduated.
- Ndegele Richard Tom (2023–2026), MSc, SEKU. Application of Markov chain models to the analysis and forecasting of green gram prices in Kitui County, Kenya. Complete.
- Nzilani Faith (2026–present), MSc, SEKU. Constraint-Aware Multi-Agent Reinforcement Learning for Inventory Replenishment in Multi-Echelon Beer Distribution Networks under Supplier Ordering Constraints. Supervisor: Dr Robert M. Mutwiri.
- Mwangi, Jimmy (2026–present), PhD thesis proposal, SEKU. Development and Validation of a Multilevel Wavelet-Guided Dynamic Graph Transformer Framework for Label-Efficient Hyperspectral Image Classification. Supervisor: Dr Robert M. Mutwiri.
- Mogire, Obwaya (2025–present), PhD thesis. A Clinician-Centred Multimodal Explainable AI-Enabled mHealth System for Early Paediatric Pneumonia Screening. Supervisors: Dr Shibwabo, Dr Jennipher and Dr Robert M. Mutwiri.

Additional ongoing PhD supervision concerns stochastic differential equation models of wildlife movement and human interaction.

External examiner appointments: MSc theses, Chuka University

- Daniel Mwangi Ireri (graduated 2019). Application of central composite design in modelling and optimisation of yields and yield components of sweet potatoes (*Ipomoea batatas* (L.) Lam.) using organic manure and phosphate fertiliser.
- Charles Mugendi Kinyua (graduated 2019). Modelling and application of response surface methodology for optimisation of weight gain of eight-week-old Kenbro chickens served with pumpkin (*Cucurbita pepo*) seed extract.
- Mwendwa N. Mutwiri (graduated 2019). Modelling of the effects of mindfulness-based stress on breast cancer survival rate among women in Meru and Nyeri counties, Kenya, using a Cox proportional hazards model.
- Kimtai Leonard Masai (graduated 2019). Modelling and application of response surface methodology to optimise yields of common bean (*Phaseolus vulgaris* L.) using animal organic manure.
- Casty Gatwiri Mugoh (graduated 2018). Predicting the effect of demographic characteristics on parity using regression models.
- Obare Domini Mongare (graduated 2018). Comparative analysis of loan default prediction using support vector machines and logistic regression models.
- Peter Kinyua Gachoki (graduated 2018). Modelling flight delays at Jomo Kenyatta International Airport using logit, random forest and support vector machine models.

Current consortium interest

SEKU seeks MSCA Doctoral Network partners for hybrid mathematical modelling, physics-informed AI and climate-risk digital twins. Subject to call rules and institutional arrangements, SEKU is ready to employ and host one doctoral candidate as a beneficiary, co-supervise doctoral research and host visiting PhD researchers in mathematics and AI for 3–6 months.

Contact

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