Joseph Ivivi Mwaniki

Associate Professor of Financial Mathematics and statistics, University of Nairobi

Head of Financial and Actuarial mathematics div ision- School of Mathematics
Mobile number: (+254)711349438
Email address: Ivivi.mwaniki@gmail.com
jimwaniki@uonbi.ac.ke

CAREER OBJECTIVE

(i) To make a significant contribution to the university's performance in research, networking, and innovation.
(ii) To contribute to a successful design, delivery, and development of curriculum.
(iii) To add value to the organization by applying both theoretical and practical knowledge to a challenging work environment.
(iv) To become a world-class consultant in my area of specialization as I embrace teamwork.
(v) To pursue excellence in all undertakings.
(vi) To be aware of the impact of a political undertaking within my area of operation.

SOFT SKILLS

Communication skills
Time management
Problem-solving
Decision making

ACADEMIC PROFILE

2016 – 2016: University of Cape Town- South Africa.
Post Doc in Mathematical finance

2005 – 2010: The University of Nairobi (In collaboration with Uppsala University Sweden) Doctor of Philosophy in Financial Mathematics
Ph.D. Title: *On APARCH Levy filter option pricing formula for developed and emerging markets*
Graduated on 24th September 2010.

1997– 1999: The University of Nairobi
Master of Science (MSc). in Mathematical Statistics
Graduated on 29th November 1999

1990 – 1995: The University of Nairobi

Bachelor of Science (BSc) Second class honor's Upper Division
Graduated on 11^{th} December 1995

WORK EXPERIENCE

1. **Employer: The University of Nairobi-**
   Position: Associate professor of Financial Mathematics and Statistics
   CBPS School of mathematics
   Period: 15^{th} Oct 2019 to-date

Duties and Responsibilities

(i) Teaching both undergraduate and postgraduate students.
(ii) The setting, marking and assessing students work and provide feedback to them.
(iii) Supervising undergraduate term papers, master's projects, and graduate research projects.
(iv) Engaging with other researchers internally, nationally, and internationally to contribute to research initiatives as well as attracting research/development funds.
(v) Participate in university-wide staff development initiatives related to learning and teaching.

2. **Employer: The University of Nairobi**
   Position: Senior Lecturer
   CBPS School of mathematics
   Period: September 2015 to 14^{th} October 2019

Duties and Responsibilities

(i) Teaching both undergraduate and postgraduate students.
(ii) The setting, marking and assessing students work and provide feedback to them.
(iii) Supervising undergraduate term papers, master's projects, and graduate research projects.
(iv) Engaging with other researchers internally, nationally, and internationally to contribute to research initiatives.
(v) Participate in university-wide staff development initiatives related to learning and teaching.

3. **Employer: The University of Nairobi**
   Position: Lecturer
   CBPS School of Mathematics
   Period: 8^{th} August 2005 to August 2015

Duties and Responsibilities

(i) Teaching both undergraduate and graduate students.
(ii) Setting, marking, and assessing student's work as I provide feedback.
(iii) Supervise undergraduate term papers, master's projects, and graduate research projects.
(iv) Engage with other researchers internally, nationally, and internationally to contribute to research initiatives.
(v) Participate in university-wide staff development initiatives related to learning and teaching

4. **Employer The University of Nairobi**

Position Tutorial Fellow
CBPS Department of Mathematics
Period Oct 2001- July 2005:

Duties and Responsibilities

(i) To teach at the undergraduate level
(ii) To set, mark and assess undergraduate work
(iii) To provide feedback to undergraduate students

5. **Employer Strathmore University**
   Position Part-time Lecturer in the following divisions
   SIMS (Strathmore University of Mathematical Sciences)
   FIT Faculty of Information Technology
   Strathmore institute of management and technology
   Period January 2008 up-to December 2021

6. **Employer: Pan African University Institute for Basic sciences**
   Position: PhD Part-time lecturer 1st semester 2020/2021 academic year
   27th April 2020 to 18th September 2020
   PUM4105 Advanced probability and stochastic theory

Taught undergraduate courses
Computational methods and data analysis
Basic Mathematics
Calculus
Business Mathematics
Discrete Mathematics,
Management statistics,
Integral calculus and differential calculus
Probability modeling
Time series analysis
Decision theory and Bayesian Inference
Programing methodology
Financial time series analysis
Computation finance
Linear models and forecasting and
supervision of fourth year projects

Postgraduate courses taught include
Mathematical methods of finance,
Stochastic Calculus
Advanced financial modeling
Advanced probability and stochastic theory

Supervised masters students as part of duties and responsibilities

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OTHER RESPONSIBILITIES

(a) Senate representative to the graduate school board

(b) Thematic head of Financial and actuarial mathematics division
(c) School of mathematics Chairman of timetabling committee
(d) Member of School Of Mathematics post graduate committee
(e) Member of the School Of Mathematics anti-corruption committee
(f) Fourth-year student mentor school of mathematics
(g) SOM Timetabling representative at the senate timetabling committee
(h) School of Mathematics representative at the senate
(i) Member of School of mathematics academic Board
(j) Member of College(CBPS) Academic Board

SPONSORSHIP AND AWARDS

Jan 2016:-April 2016
International Science Programme(ISP) Sweden and African Collaboration for Quantitative Finance and Risk Research(ACQuFRR) supported my Post Doc studies in University of Cape Town South Africa

Sept 2013:-Nov 2013
ACQuFRR Research visit UCT South Africa

April 2005- 2009:
International science program in collaboration with Eastern Africa University Mathematics Program(EAUMP)

MEMBERSHIP

(i) Member of TASK, The Actuarial Society of Kenya
(ii) Member of MANU, Mathematics club
(iii) Member of ACQuFRR, UCT South Africa
(iv) Member of ISP alumni Network

Publications Since the last appointment of senior lecturer (2015-2019)

1. *Langat KK, Mwaniki IJ, Kiprop GK: Pricing options using trinomial lattice method Journal of finance and economics 2019 vol. 7 No.3 pages 81-87 DOI:10.12691/jfe-7-3-1*
2. IjMwaniki: On Heteroscedastic, skewed and leptokurtic log returns and spectral density of standardized residuals. *Journal of advances in Economics in finances. 2019 vol.4 No. 2 pages 79-90. https://dx.doi.org/10.22606/jaef.2019.42004*
3. *IjMwaniki: Modeling heteroscedastic, skewed and leptokurtic returns in discrete time. Journal of Applied finance and banking volume 9. No 5 2019 pages 1-14 ISSN:1792-6580*
4. *IjMwaniki: Geometric Brownian motion assumption and the generalized hyperbolic distribution on modeling returns. Journal of advances in applied mathematics. 2019; volume 4 (3): pages 103-111. https://dx.doi.org/10.22606/jaam.2019.43002*
5. *IjMwaniki: On long term memory volatility and asymmetry in TOP40 and NSE20 index log returns. Journal of economics and international finance, Manuscript submitted accepted in April 2019.*
6. Metto MK; Karanja AN; IjMwaniki; Influence of teacher qualification on student performance in mathematics in Uasin Gishu county Kenya. *The International Journal*

of humanity and social studies Vol 6, issue 5 pages 1-6,.2018

7. Njeru, K; Karanja NA, IjMwaniki; Forecasting future customer call volumes: A case study. *International Journal on future revolution in computer science and communication* pages 12-16,2018
8. Mwambora, SK; Ijmwaniki; Estimation of waiting times for the three transient states of HIV infection in Kenya. *International Journal of mathematics and physical sciences research. Vol 5, issue 1, pages 73-76.* 2017
9. Magnus, Cogutu, SSilverstrove, Pweke, Ijmwaniki; A Comprehensive study of lattice pricing beyond Black and Scholes. *Journal of methodology and computing in applied probability, Springer*; Forthcoming publication 2017
10. IJMwaniki; On skewed leptokurtic returns and pentanomial lattice option valuation via minimal entropy martingale measure. *Cogent Economics and Finance 5(1) 2017* https://doi.org/10.1080/23322039.2017.1358894
11. IJMwaniki; Modeling heteroscedastic, skewed and leptokurtic returns in discrete-time *Journal of applied finance and banking vol 9 no.5 pp 1-14 (2019)*
12. *Okeyo J; IJmwaniki, Ngare, P;* Modeling inflation rate volatility in Kenya using ARCH type model family. *Research journal of finance and accounting. vol 7,no 23 pages 10-17,2016*
13. Ntwiga, Pweke, MManene; IJMwaniki*;* Modeling trust in social networks *International Journal of mathematical archive pages 64-68,2016*
14. JAduda, PWeke, PNgare, IJMwaniki*;* Financial time series modeling of trends and patterns in the energy markets*; Journal of mathematical finance7(2)pp64-68,2016.*
15. *SKalovwe, IJMwaniki;* Modeling stock returns volatility of the Nairobi securities exchange index and other indices *Journal of advanced statistics.vol1.No2pp87-93 ,2016.*
16. Ntwiga, Pweke, Mmanene, IJMwaniki, Trust, and distrust: A reputation rating approach. I*nternational advanced research, Journal in science, engineering, and technology.* vol3,(2)pp111-114,2016.

Peer-Reviewed conference papers (2015-2019)

1. Sarguta RJ and IJMwaniki(2016) Mixed Poisson distribution in explicit form and their properties. The 3rd Eastern Africa universities mathematics programme (EAUMP) conference. Advances of Mathematics and its applications. Makerere University Kampala Uganda 26th -28th October 2016.
2. IJMwaniki(2017) Modeling heteroscedastic and leptokurtic returns in discrete time. 4th Strathmore International Mathematics Conference. June 19th -23rd 2017
3. IJMwaniki(2017) Skewed leptokurtic returns and pentanomial lattice option valuation via minimal entropy martingale measure. University of Rwanda Scientific Conference Week. Mathematics and Its Applications. 14th -16th June 2017. Kigali Conference and Exhibition Village
4. IJMwaniki(2018) Modeling volatility asymmetry and long term memory of index returns. The First Kiriri Women's University of Science and Technology Research conference. July 20th, 2018.
5. Muya. KB, IJMwaniki(2018). Application of ordinal logistic regression in analyzing student performance at Kenya Certificate of secondary education level in Kiambu county. Conference on science for development, University of Nairobi July 2018.
6. OsiemboPO, Owuor N, IJMwaniki(2018); Survival Trees for doubly interval-censored data: A study in medical research. Conference on Science for development, University of Nairobi, July 2018.

Publications as the lecturer 2005-2015

1. IJMwaniki, Long term memory, and volatility asymmetry of Nairobi securities exchange NSE20 index returns. *International Journal of science and research* Vol 4 issue 8 2015.
2. IJMwaniki, Modeling returns and unconditional variance in the risk-neutral world for liquid and illiquid market. *Journal of mathematical finance* Vol 5 pages 15-25, 2015. 10.4236/jmf.2015.51002
3. Mbae DM, IJMwaniki. Long term memory effects in stock prices: An empirical study from the stocks market. *Proceedings of the first international research conference. Pages 352-361,2014.*
4. Ssebugenyi, Vkonlack IJMwaniki; On the minimal entropy martingale measure and the multinomial lattices with cumulants" *Applied mathematical finance* Vol20 issue4 pages 359-379(2013). https://doi.org/10.1080/1350486X.2012.714286

5. IJMwaniki; "On APARCH Levy filter option pricing formula for developed and Emerging markets; *University of Nairobi Thesis*.
6. *Ijmwaniki, Vkonlack;* Generalized hyperbolic model: European option pricing in developed and emerging markets: 5th international conference on Levy processes. Theory and applications. pages78-79.2007

SELECTED CONFERENCES/WORKSHOPS ATTENDED

2019: Kiriri Women's university 26th-27th September 2019: Presented a talk entitled
Applications of mathematics in powering technology for future growth.
2018: Attended and participated in Bayesian Data analysis Workshop.
November 19th -23rd held at SAJOREC JKUAT.
2018**:** Attended open data kit short course held on 7-10 March at the school of mathematics, university of Nairobi
2017: University of Rwanda Scientific conference week. Mathematics and applications June 2017. Presented one of my papers.
2017: Participated in 4th Strathmore International Mathematics Conference
June 19th -23rd 2017 Strathmore university
2016: The 3rd EUMP conference: Advances in mathematics and its applications
Makerere university, Kampala Uganda.
2015: Attended training workshop on PhD supervision in CBPS
2013: ACQFFR group invitation for research culminating to a lecture in the university of cape town.
2012: participated in Strathmore university international mathematics meeting
2011: Proposal writing workshop sponsored by university of Nairobi Enterprises and service limited.
2008: Presented OnAparch Levy filter: A closed form option pricing model
Uppsala university Sweden
2007: Presented on APARCH model and Levy residual calibration in developed and emerging market. Financial markets workshop 2007 for PhD students.
Lunds university Sweden
2007: Poster presentation : On generalized hyperbolic model: option pricing in developed and emerging markets. 5th international conference on Levy processes theory and applications in Copenhagen Denmark.

SELECTED EXTERNAL EXAMINER'S REPORT

2019 **University of Dar es salaam**

Panga Paul Andrew *Time series analysis for predicting rainfall and temperature in Dar es salaam***:** Msc Mathematical modeling

2018 **University of Dar es salaam**

Pemu Wanjara *Analysis of wind speed using Markov Chain Model: Acase study of Kilimanjaro International Airport(KIA)*

2017 **University of Dar es salaam External Examiner**

(a) Kessy R Salvatory: Msc Title: *Pricing a Zero-coupon bond when the term structure in non-affine using numerical methods*

(b) Hamisi Sudi: Msc Title: *Statistical analysis of the factors affecting the growth of the small and medium enterprises in Tanzania*

2017 **University of Nairobi** member of Ph.D. Board of Examiner

Reuben Muiruri Ndung'u Ph.D. Title: *Modeling the effect of periodic environmental factors on endemic malaria*

2016 **University of Dar es salaam**

Joseph James *Statistical regression analysis of road traffic accidents in Tanzania*

2016 Keriri Women's University external examiner. Ongoing.

2014 University of Nairobi Ph.D. Board of Examiner

Emma Anyika Shileche Ph.D. Title: S*ystematic modeling of white noise and financial time series in decision making*

2013 **University of Nairobi Member of Ph.D. Board of Examiner**

Ndiritu M John: Ph.D. Title: *Mathematical and statistical population models: Elephant population modeling*

2013 **University of Kwa-Zulu Natal South Africa External Examiner**

Mzamane *TP* Msc dissertation*: GARCH modeling of volatility in Johanessburg stock exchange*

SELECTED Ph.D STUDENT SUPERVISION

Aduda *Jane A; PhD Thesis Title: Application of multivariate volatility models in estimating optimal dynamic hedge ratios for crack spreads with volatility spillovers in energy markets. Defended her thesis 2017 and graduated same year*

Bundi *Davis N: PhD Thesis Title: On default risk and hidden Markov processes Defended his thesis and graduated 2016*

Sarguta *Rachel J. PhD Thesis Title: Four routes to Poisson Mixtures Defended her thesis and graduated 2017*

Ogutu *Carolyne A. PhD Thesis Title: Construction of multinomial lattices for option pricing Defended her thesis and graduated in the year 2017*

Sebastian K. Kalovwe PhD thesis Title: Modeling stock returns volatility and trading volume using GARCH and Regime switching models: its ongoing project

SELECTED MASTERS STUDENT SUPERVISION (GRADUATED)

Actuarial students

1. *Aduda Jane Akinyi(2008): A comparison of the classical Black-Scholes model and the GARCH option pricing model for currency options. (University of Nairobi)*
2. *Otunga Michael Mwangale (2010) :Evaluating portfolio value at risk using GARCH models.(University of Nairobi)*
3. *Wamue Esther Nyatugah(2011):Stochastic modeling of the default rates and recovery rates of bank loans. University of Nairobi.*
4. *Ikimari Cynthia Amai(2012): Application of credit default swaps to commercial banks. University of Nairobi.*
5. *Karanja Tabitha Wanjiku(2013): Multivariate Markov chain model for credit risk management. University of Nairobi.*
6. *Wanjohi Rose Wanjiru(2016) Option valuation using Fast fourier transform in the carbon emissions market. University of Nairobi*
7. *Kenneth Kiprotich Langat(2016) ;Pricing options using trinomial lattice method. University of Nairobi*
8. *Vanis Kemunto Makori(2017); Modeling of auto insurance claims using discrete probability distributions; University of Nairobi*
9. *John Gikonyo(2017); Option pricing with stochastic volatility correlated to the underlying process . University of Nairobi.*
10. *10.Amanda Onyango (2018) Frontier stock market linkages: An African perspective; Strathmore university.*
11. *Brian Wesley Muganda(2018) Exotic derivatives pricing using copula based martingale approach; Strathmore University.*
12. *Magero Eric Nyaanga(2018) Pricing of Micro insurance product for medical insurance in Kenya using Black Scholes model. University of Nairobi*
13. *Nyaribo Miller Nyamari(2018) Pricing of futures with basis risk, University of Nairobi*
14. *Simon Muoria Kamau (2019) Currency option valuation using Esscher and Fourier transforms*
15. *Nancy K.Murule(2019) Real option analysis in Real estate*
16. *Onsoti Alex Nyong'a (2020) European option pricing using truncated normal distribution*
17. *Isaac Mwaura Njoroge (2020) Hybrid GARCH(1,1) European option pricing model with Ensemble Empirical Mode decomposition*

Social statistics

1. *Osiemo Pily Quinter(2011): Application of ARIMA and GARCH models in forecasting pump oil prices in Kenya . University of Nairobi.*
2. *Barasa Doughlas O. (2011): Application of GARCH to model the KES/US foreign exchangerate return. University of Nairobi*
3. *Oriema John Omanyo(2012): Behavioral credit scoring model for credit card holders.University of Nairobi*
4. *Halima Ali Mohammed (2012): Hierachical linear modeling of student and school effect On academic achievement; University of Nairobi.*
5. *Mulinge Anthony K. (2013): A parsimonious multivariate Markov chain model for NSE stocks. University of Nairobi*

6. *Maringa B. Samuel(2013): Application of Linear logistic and discriminant analysis onforecasting creditworthiness of an individual borrowers. University of Nairobi.*
7. *Mwabora Stephen Kinyanjui(2014):Analysis of staged Markov models to HIV disease propagation. Catholic University of Eastern Africa*
8. *Sebastian K. Kalovwe(2015) Modeling stock market volatility of the nse index and other indices based on GARCH models, Catholic university of Eastern Africa*
9. *Kenneth Benson Muya(2018) Application of Ordinal Logistic Regression in analyzing student's performance at Kenya certificate of secondary Education level in Kiambu County. University of Nairobi*
10. *David M. Mutinda(2018) Factors influencing place of delivery in Kenya: A Multilevel analysis. University of Nairobi*

Postgraduate diploma Actuarial Science(PGDE)

1. *Jones,Kyalo Oloo(2012): A comparison of the moving average GARCH volatility of returns. University of Nairobi*
2. *Mbugu, Stella Kainyu(2013): Analysis of the long run and short run dynamic relationship between the stock prices and exchange rate in Kenya*
3. *Maina Ndung'u Sammy (2020) Hedging European options against risks experienced in the derivative market*

UNDERGRADUATE FOURTH PROJECT SUPERVISION

I have supervised more than forty five different undergraduate fourth year projects. Complete List may be available on request.

Computer skills: Ms Office suite; R statistical programming; LATEX.
Interests and hobbies: Travelling, listening to music, avid reader; networking

LANGUAGES

- English (Native, Fluent)
- Kiswahili (Native, Fluent)

REFERENCES

Prof Stephen Luketero
School of Mathematics
University of Nairobi
P.O.Box 30197-00100
Nairobi
sluketero@uonbi.ac.ke
Cell: 0722882684

Prof. Patrick Weke
University of Nairobi
School of Mathematics
P.O.Box 30197-00100
Nairobi
pweke@uonbi.ac.ke
Cell: 0722317855

Prof. Robinson J. Musembi.
Department of Physics
P.O.Box 30197-00100
Nairobi
Email:
musembirj@uonbi.ac.ke
Cell: 0788696935