

Curriculum Vitae

Prof. George N. Kamucha

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1. Current Status

Associate Professor and Chairman, Department of Electrical and Information Engineering, University of Nairobi, Kenya.

2. Education

1999 – 2003: **PhD.** in Electrical Engineering (Thesis: Computer Assisted Surgery using Laser Techniques), University of Kassel, Germany.

1993 – 1994: **MSc.** in Biomedical Engineering (Specializing in Medical Electronics), University of Aberdeen, UK.

1987 – 1990: **BTech. (First Class Honours)** in Electrical & Communications Engineering, Moi University, Kenya.

1985 – 1986: **KACE.** (3A's in Maths, Physics and Chemistry, 19 points), Mang'u High School, Kenya.

1981 – 1984: **KCE.** (First Division), Kerugoya Boys High School, Kenya.

3. Work Experience

University of Nairobi

Oct 2022 – To date: Associate Professor, Dept. of Electrical & Information Engineering.

May 2018 – To date: Chairman, Dept. of Electrical & Information Engineering.

April 2010 – To Oct 2022: Senior Lecturer, Dept. of Electrical & Information Engineering.

Main Duties include:

- **PhD and MSc Supervision**
- **Teaching Postgraduates**
 - i) Digital and Analogue Electronics
 - ii) Research Methodology.
- **Teaching Undergraduates**
 - i) Microprocessors
 - ii) Analogue Electronics

iii) Final Year Projects Supervision.

- **Chairman of Departmental Postgraduate Committee**
April 2014 to May 2018
- **Departmental Examination Coordinator**
March 2012 to March 2014

**Kimathi University College of Technology, a Constituent College of
Jomo Kenyatta University of Agriculture & Technology, Nyeri, Kenya**

Feb 2009 – Mar 2010: Director, Directorate of Research Extension & Postgraduate Studies (DREPS)

Sep 2008 – Feb 2009: Director, School of Engineering.

Moi University, Eldoret, Kenya

2005 – 2008: Senior Lecturer, Dept. of Electrical & Communications Engineering.

2004 – 2005: Head, Dept. of Computer Services & Instrumentation, Moi University, Kenya. *The department was later in September 2005 merged with the Dept. of Electrical & Communications Engineering.*

1996 – 2005: Lecturer, Dept. of Electrical & Communications Engineering.

1994 – 1996: Tutorial Fellow, Dept. of Electrical & Communications Engineering.

1990 – 1994: Graduate Assistant, Dept. of Electrical & Communications Engineering.

University of Kassel, Kassel, Germany

1999 – 2003: Research Assistant, University of Kassel, Germany

- PhD. studies
- Coordination of the Opto-electronics Group
- Supervision of MSc. Students

4. Professional Memberships

- Member, Institute of Electrical & Electronics Engineer (IEEE)
- Registered Graduate Engineer, Engineers Board of Kenya (EBK B6357)
- Graduate Member, Institute of Engineers of Kenya
- Professional Engineer Registration's application submitted, approved and full fees paid

5. Computer Programming Skills

- C++ under Unix, Linux and Windows
- MATLAB
- Visualization Toolkit (VTK)
- PSPICE
- AUTOCAD

6. Language Skills

- Fluent in Kikuyu, Kiswahili, English and German.

7. Funding Attracted for Research, Development and Educational Activities

- Initiated set up of a modern calibration center in 2019. Documentation process is at the final stage for the center to be accredited by Kenya Accreditation Service (KENAS) by Dec 2022. The center is projected to make a profit of KSh 2,755,984 in the first year, KSh 11,790,000 in the second year and KSh 23,890,000 in the third year of operation.
- Application in 2020 for funding amounting to £ 35,000 from Innovate UK under African agriculture knowledge transfer partnerships (AAKTP): 2020 to 2021, round 4, was successful. This was application 95355: Solargen / Aston University / University of Nairobi - Smart Irrigation System powered by Renewable Energy. The project is expected to run for 5 years. PI: Prof. Eng. Ayub Gitau.
- In 2019, Prof. Elijah Mwangi and I obtained funding from Hendrix Family Foundation of Holland to the tune of US \$7,500 to hold a five day workshop in the department on the application of Raspberry-pi. Twelve final year and MSc students were trained by Prof. Chris Hendricks. The funding covered acquisition of hardware components, sensors and software as well as travel and accommodation.

8. External Examination

2019 – To date: External examiner for BSc programme of the Department of Electrical and Communication Engineering, Moi University.

9. Postgraduate Supervision

- **PhD Theses**

- i) “Acquisition and Reconstruction of Sparse Magnetic Resonance Images Using Compressive Sampling Methods”, Henry Kiragu Macharia, UoN (Completed, 2020).
- ii) “Resource Allocation in TV White Space Network Using a Novel Hybrid Firefly Algorithm” Ronoh Kennedy Kibet, UoN (Completed, 2020).
- iii) “Reduction of Peak-to-Average Power Ratio in OFDM Radio Systems”, Stephen Kiambi Ngure, UoN (Submitted).
- iv) “A Mean-Field Game-Theoretic Approach to Interference Management in Future 5G HetNets”, Mureithi George Maina, UoN (ongoing)
- v) “Classification and Counting of Plants in Low Altitude Images Using Convolutional Neural Networks”, Ngocho Boniface M., UoN (ongoing)

- **MSc Theses**

- i) “Graphical User Interface for Registration in Computer Assisted Hip-joint Replacement using Laser Radar Imaging”, Yong Zhang, University of Kassel, Germany (Completed, 2001).
- ii) “Analysis of the Co-Existence Between Mobile Earth Stations and Terrestrial Communication Services in the Ka Band”, Menanor Samuel Kwamena, Pan African University (PAU), JKUAT (Completed, 2019).
- iii) “Centralized Opportunistic Scheduling Technique based on LEACH for TVWS spectrum”, Bugingo Jean de Dieu, UoN (Completed, 2021).
- iv) “Design of High Efficiency and Improved Bandwidth Doherty Power Amplifier for 5G Applications”, Gremah Ary Issoufou Grah, Pan African University (PAU), JKUAT (Completed, 2022).

- v) “Performance Evaluation of Heterodyne Detection and Time-domain Chromatic Dispersion Equalization in Coherent Optical Transceivers”, Nsengiyumva Isidore, Pan African University (PAU), JKUAT (Completed, 2022).
- vi) “Multi Factor Based Mobile Voice and Data Traffic Forecasting Using Artificial Neural Networks”, Thomas Wambua Luti, UoN (Submitted).
- vii) “Hybrid approach of Geolocation database and Spectrum Sensing in TV White Space”, Stella N. Sitati, UoN (Ongoing).
- viii) “Deep Convolutional Neural Network Cloud-Based Detection and Enhancement of Backlit Images for Mobile phone Applications”, Shaffa Korvawu Kokro, UoN (Ongoing).
- ix) “Particle Swarm Optimization of Self-Consumption for Solar PV Integrated Buildings”, James Murithi, UoN (Ongoing)

10. Publications

- **Book**

G. Kamucha, *A Non-invasive Registration Technique in Hip-joint Replacement Surgery Using Laser Radar Imaging*, Kassel University Press, 2004. ISBN: 3-89958-054-0.

- **Peer Reviewed Journals**

1. Isidore Nsengiyumva, Elijah Mwangi, George Kamucha, “Performance Analysis of a Linear Gaussian- and tanh-Apodized FBG and Dispersion Compensating Fiber Design for Chromatic Dispersion Compensation in Long-haul Optical Communication Networks”, *International Journal of Optics*, Vol. 2022, pp. 1-14, Sep. 2022.
2. Issoufou G. Gremah Ary, George N. Kamucha, and Franklin Manene, “Design of a high-efficiency Doherty power amplifier for 5G applications using Wilkinson power divider”, *Journal of Communications*, Vol. 17(8), Aug. 2022.
3. S. Kiambi, E. Mwangi and G. Kamucha, “Reducing PAPR of OFDM Signals Using a Tone Reservation Method Based on ℓ_1 -Norm Minimization,” *Journal of Electrical Systems and Information Technology (JESIT)*, vol. 9(12), pp. 1-15, Jun. 2022.

4. Isidore Nsengiyumva, Elijah Mwangi, George Kamucha, “A comparative study of chromatic dispersion compensation in 10 Gbps SMF and 40 Gbps OTDM systems using a cascaded Gaussian linear apodized chirped fibre Bragg grating design”, *Heliyon*, Vol. 8(4), pp. 1-7, Apr. 2022.
5. Ronoh Kennedy and Kamucha George, “TV White Space Network Power Allocation Using Hybrid Grey Wolf Optimizer with Firefly Algorithm and Particle Swarm Optimization”, *WSEAS TRANSACTIONS on COMMUNICATIONS*, Vol. 20, pp. 66-75, 2021.
6. Stephen Kiambi, Elijah Mwangi and George Kamucha, “PAPR Reduction in MIMO-OFDM Systems Using Low-Complexity Additive Signal Mixing”, *Journal of Communications*, Vol. 16(11), pp. 468–478, Nov. 2021.
7. Jean Bugingo, George Kamucha and Abraham Nyete, “Centralized Opportunistic Scheduling technique based on LEACH for TVWS Network“, *International Journal of Scientific & Technology Research*, (Accepted)
8. Ronoh Kennedy and Kamucha George, “Comparison of Hybrid Firefly Algorithms for Binary and Continuous Optimization Problems in a TV White Space Network”, *WSEAS TRANSACTIONS on COMMUNICATIONS*, Vol. 19, pp. 155-172, 2020.
9. Stephen Kiambi, Elijah Mwangi and George Kamucha, “A Low-Complexity Signal Addition Method for PAPR Reduction in OFDM Systems”, *International Journal of Computer Application*, Vol. 5(10), pp. 21-34, 2020.
10. Henry Kiragu, Elijah Mwangi and George Kamucha, “A Novel Compressive Sampling MRI Method Using Variable-Density k-Space Under-sampling and Substitution of Coefficients”, *WSEAS TRANSACTIONS on SIGNAL PROCESSING*, Vol. 15, pp. 114-120, 2019.
11. Kennedy Ronoh, George Kamucha, and Tonny Omwansa, “Comparison of Hybrid Firefly Algorithms for Power Allocation in a TV White Space Network”, *International Journal of Computer Applications*, Vol. 178(38), pp. 37-43, 2019.
12. K. Ronoh, G. Kamucha, T. Olwal and T. Omwansa, “A Survey of Resource Allocation in TV White Space Networks”, *Journal of Communications*, vol. 14(12), pp. 1180–1190, Dec. 2019.
13. Stephen Kiambi, Elijah Mwangi and George Kamucha, “An Iterative Re-weighted Least-Squares Tone Reservation Method for PAPR Reduction in OFDM Systems”, *WSEAS TRANSACTIONS on COMMUNICATIONS*, Vol. 18, pp. 153-161, 2019.

14. Samuel Kwamena Menanor, Elijah Mwangi and George Kamucha, "Impact Of Motion-Induced Antenna Pointing Errors In Mobile Satellite Communication", *International Journal of Scientific & Technology Research*, vol. 8(10), pp. 1745-1749, 2019.
15. K. Ronoh, T. Omwansa and G. Kamucha, "Novel Resource Allocation Algorithm for TV White Space Networks Using Hybrid Firefly Algorithm," *International Journal of Computer*, vol. 32(1), pp. 34-53, 2019.
16. Henry Kiragu, Elijah Mwangi and George Kamucha, "An Agile and Robust Sparse Recovery Method for MR images Based on Selective k-space Acquisition and Artifacts Suppression", *The International Journal of Information Science*, Vol. 2(2), pp. 1-7, 2018.
17. Kennedy Ronoh, George Kamucha, Thomas Olwal and Tonny Omwansa, "Improved Resource Allocation for TV White Space Network Based on Modified Firefly Algorithm", *Journal of Computing and Information Technology*, Vol. 26(3), pp. 167-177, 2018.
18. Henry Kiragu, George Kamucha, and Elijah Mwangi, "An Improved Reconstruction Method for Compressively Sampled Magnetic Resonance Images using Adaptive Gaussian Denoising," *The Springer LNEE Journal*, Vol. 416 issue 1, pp. 192-200, 2017.

- **Peer Reviewed Conferences and Proceedings**

1. Samuel Menanor, Elijah Mwangi and George Kamucha, "Assessment of the Interference effects from Land Earth Station in Motion to Fixed Service Station", *IEEE Africon*, pp. 1-4, Accra, Ghana, Sept. 2019.
2. Henry Kiragu, Elijah Mwangi and George Kamucha, "A Robust Compressive Sampling Method for MR Images Method Based on Partial Scanning and Apodization", *Proceedings of the IEEE ISSPIT Conference*, pp. 35-40, Kentucky, USA, Dec. 2018.
3. Henry Kiragu, Elijah Mwangi and George Kamucha, "A Rapid MRI Reconstruction Method Based on Compressive Sampling and Concomitant Artifacts Suppression", *Proceedings of IEEE Mediterranean Electrotechnical Conference (MELECON)*, pp. 198-203, Marrakech, Morocco, May 2018.
4. Kennedy Ronoh, George Kamucha, William Okelo-Odongo, Thomas Olwal and Tonny Omwansa, "Firefly Algorithm based Power Control in Wireless TV White Space Network", *IEEE Africon*, pp. 172-177, Cape Town, South Africa, Sept. 2017.

5. Stephen Kiambi, Elijah Mwangi and George Kamucha, "Effect of OFDM Signal Structure and Subcarrier Modulation on the Reduction of the Signal Peak Power", *IEEE Africon*, pp. 279-283, Cape Town, South Africa, Sept. 2017.
6. Henry Kiragu, Elijah Mwangi and George Kamucha, "A Hybrid MRI Method Based on Denoised Compressive Sampling and Detection of Dominant Coefficients", *Proceedings of 22nd International Conference on Digital signal processing*, pp. 1-5, London, U.K., Aug. 2017.
7. H. Kiragu, G. Kamucha and E. Mwangi, "A Robust Magnetic Resonance Imaging Method Based on Compressive Sampling and Clustering of Sparsifying Coefficients", *Proceedings of IEEE Mediterranean Electrotechnical Conference (MELECON)*, pp. 1-6, Limassol, Cyprus, Apr. 2016.
8. H. Kiragu, G. Kamucha and E. Mwangi, "A Fast Procedure for Acquisition and Reconstruction of Magnetic Resonance Images Using Compressive Sampling", *IEEE Africon*, pp. 462-466, Addis Ababa, Ethiopia, Sept. 2015.
9. K. Ronoh, G. Kamucha and Oduol V. K., "TV White Spaces in Africa: Trials and Role in Improving Broadband Access in Africa", *IEEE Africon*, pp. 186-190, Addis Ababa, Ethiopia, Sept. 2015.
10. S. Chege and G. Kamucha, "Design and Implementation of a Low Cost High Bandwidth Sampling Bridge", *Moi University 10th Annual International Conference, Symposium IV*, pp. 17-26, Eldoret, Kenya, Sept. 2014, ISBN: 9966-254-76-2.
11. G. Kamucha and G. Kompa, "Clinical Trial of Intraoperative Laser Radar Imaging in Hip-joint Replacement Surgery", *Proceedings of ODIMAP IV, 4th Topical Meeting on Optoelectronic Distance Measurements and Applications*, University of Oulu, Finland, June 2004, ISBN: 951-42-7368-0.
12. G. Kamucha and G. Kompa, "Non-invasive Intraoperative Imaging using Laser Radar System in Hip-joint Replacement Surgery", *Medical Robotics, Navigation and Visualization, MRNV2004*, pp. 1-8, Remagen, Germany, Mar. 2004, ISBN: 3-9807690-5-4.
13. G. Kamucha and G. Kompa, "A Non-invasive Approach to Patient Registration in Computer Assisted Hip-joint Replacement Surgery using Pulsed Laser Radar Imaging", *Proceedings of ODIMAP III, 3rd Topical Meeting on Optoelectronic Distance Measurements and Applications*, pp. 105-111, University of Pavia, Italy, Sept. 2001, ISBN: 88-87-237-06-09-2.
14. M. Joodaki, G. Kompa, S.M. Golam Arshad, G. Kamucha, V. Ahmadi, and M.K. Moravvej-Farshi, "Application of Neural Networks for Distance Measurement in

Pulsed Laser Radar (PLR)”, *Proceedings of ODIMAP III, 3rd Topical Meeting on Optoelectronic Distance Measurements and Applications*, pp. 99-104, University of Pavia, Italy, Sept. 2001, ISBN: 88-87-237-06-09-2.

15. G. Kamucha and G. Kompa, “High Resolution Hip-joint Socket Imaging using Pulsed Laser Radar”, *30th European Microwave Conference*, pp 321-324, Paris, France, Oct. 2000, ISBN: 0-86213-212-6.

11. Consultancies

Jun 2021 – Nov 2021: Led a departmental technical team in successfully resolving the problem of intermittent tripping of the main incomer breaker at UoN Towers and the inability of the system to automatically transfer the load to the generator after such tripping. This problem had persisted since UoN Towers were commissioned in 2016.

2014 – To date: Metrocom Consultants Limited
Main responsibility: Working on Preliminary and Detailed Electrical Services Design.

Sample of Projects Worked on:

- Country Homes for Red Hill Park, Naivasha, LR No. 168/25
- Apartments on Brookeside Drive, LR. 1870/111/161
- Apartments for Chelsea Holdings Ltd, LR No. 4580/15
- Hotel for Samchi Telcom Ltd, Biashara Street
- Yare Plaza, Eastleigh, LR. No. 36/VII/525

12. Community Service

2020 – To date: Chairman, Electrical and Electronic Committee of Mang’u High School Alumni Association

2019 – To date: Chairman, Riverside Drive Resident Association-Ngoigwa, Thika

13. References

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Certification

I confirm that the information given in this document is correct.



Prof. G. N. Kamucha

29th Oct 2022