



Eng. (Dr) Charles Mwaniki, Ph.D; PE

Licensed Electrical and Electronics Engineer and

Senior Lecturer,

Department of Electrical and Electronics Engineering

School of Engineering and Technology

Machakos University

P.O Box 136-90100 Machakos,

TEL: +254733318441

Email: cmwaniki@mksu.ac.ke OR cmwaniki2014@gmail.com

ACADEMIC QUALIFICATIONS:

- 2013- 2017** **Doctor of Philosophy in Electrical Engineering,**
Jomo Kenyatta University of Agriculture and Technology.
Specialized in Electrical Power Systems
- 2009 – 2012:** **Master of Science in Electrical and Electronic Engineering,**
University of Nairobi.
Specialized in Electrical Power Systems and Electrical Machines
- 1994 – 1999:** **Bachelor of Science in Electrical & Electronic Engineering,**
University of Nairobi

PROFESSIONAL QUALIFICATIONS:

- August 2021:** Institution of Engineers of Kenya (IEK) Registered Corporate Member (M5727)
- July 2021:** Engineers Board of Kenya (EBK) Engineer’s Practising License
- July 2021:** Engineers Board of Kenya (EBK) Registered Professional Engineer (A3855).
- March 2016** Institution of Engineers of Kenya (IEK) Registered Graduate Member (G.5727)
- March 2012:** Engineers Board of Kenya (EBK) Registered Graduate Engineer (B6798).
- 2002 – 2003:** Postgraduate Diploma in Education, Kenyatta University.

RESEARCH WORK AND PUBLICATION

- Nov 2019** Contribution of FACTS devices to the transient Stability Improvement of a Power System Integrated with PMSG-based Wind Turbine, *Engineering ,Technology & Applied Science Research(ETASR), Vol 9, Issue 6, 2019, pg 4893 - 4900*
- Oct 2019** The Italian-Kenyan International Postgraduate Course in Capacity Building in Astronautis, *70th International Astronautical Congress (IAC), Washington D.C., United States Vol. 8, issue 10, October 2019, pg. 1290 -1296*

- Oct 2019** Strengthening the Transient Stability of a Power Grid Coupled with Wind Turbine using Thyristor Controlled Series Capacitor, *International Journal of Scientific & Technology Research (IJSTR)*, Vol. 8, issue 10, 2019, pg. 1290 -1296
- Aug 2019:** Optimal Sizing and Analysis of a Hybrid Energy System for a Community Microgrid in Nigeria, *Journal of Engineering and Applied Sciences (JEAS)*, Vol.14, Issue 23, 2019, pg 8769 – 8778
- May 2019:** Analysis of Operational Differences of Grid Integrated PMSG and DFIG based Wind Turbine Generators, *2019 International Annual Conference on Sustainable Research and Innovation (SRI)*, JKUAT Main Campus, Juja, Kenya. May 2019, Pg. 52-55
- May 2019:** Optimal Sizing of Hybrid Energy System in a Microgrid, *2019 International Annual Conference on Sustainable Research and Innovation (SRI)*, JKUAT Main Campus, Juja, Kenya. May 2019, Pg. 86-98
- 2013 – 2017:** “Optimal Load shedding Algorithm based on Cuckoo Search with Levy Flight”. Ph.D. Thesis, Department of Electrical & Electronic Engineering. Jomo Kenyatta University of Agriculture & Technology, Nairobi, Kenya, 2017
- Dec. 2015** Amalgamated Optimal Load Shedding using Cuckoo Search with Levy Flight Algorithm for Frequency and Voltage Stability Improvement, *International Journal of Emerging Technology and Advanced Engineering (IJETAE)*, Volume 5, Issue 12, December 2015, Pg. 9-15
- Oct 2015** Optimal Under-frequency Load Shedding using Cuckoo Search with Levy Flight Algorithm for Frequency Stability Improvement, *International Journal of Emerging Technology and Advanced Engineering (IJETAE)*, Volume 5, Issue 10, October 2015, Pg. 8-14
- July 2015:** Optimal Under-voltage Load Shedding using Cuckoo Search with Levy Flight Algorithm for Voltage Stability Improvement, *International Journal of Engineering Science Invention (IJESI)*, Volume 4, Issue 7, July 2015, Pg. 34-41
- May 2015:** Simultaneous Consideration of Bus Voltage and Frequency in Load Shedding in a High Voltage AC Network, *2015 International Annual Conference on Sustainable Research and Innovation (SRI)*, Kenya School of Monetary Studies, Nairobi, Kenya. May 2015, Pg. 30-34
- May 2014:** The Dependency of Bus Voltage and Frequency in Load Shedding, *2014 International Annual Conference on Sustainable Research and Innovation (SRI)*, JKUAT, Juja, Kenya. May 2014, Pg. 31-35
- Sep 2013:** Nature Inspired Metaheuristic Optimization: A new approach to load shedding, *2013 KSEEE-JSAEM International Engineering conference, DeKUT, Nyeri, Kenya. September 2013, Pg. 145-150*

April 2012: Voltage Stability Improvement using the 21st century Power Transformer, *Innovative Systems Design and Engineering Journal*, Vol. 3, No 4, 2012, Pg.21-28

2009 – 2012: “The Impact of Power Transformer Parameters on Voltage Collapse in a High Voltage A.C Network”. M.Sc. Thesis, Department of Electrical & Electronic Engineering, University of Nairobi, Nairobi, Kenya, 2012

GRANTS

Aug 2018 Participated in joint capacity building 4,000 EURO grant proposal writing to Royal Academy of Engineering Higher Education Partnership in sub-Saharan Africa Programme (**HEP SSA**), which is supported by Anglo American Group Foundation and UK government through Global Challenges Research Fund. Partners in this grant are: Technical University of Kenya, Machakos University, Muranga University and Masinde Muliro University of Science and Technology. The programme aims to ensure that the higher education system in sub-Saharan Africa produces engineers with the skills and knowledge required to meet the needs of industry, tackle local challenges, address the engineering skills shortage in sub-Saharan Africa, and to showcase engineering’s role in driving economic development in the region. The project commenced on 5th April 2019.

ON-GOING RESEARCH WORK

United Nations/ China Cooperation on Utilization of the China Space Station (CSS) initiative, being implemented by Office for Outer Space Affairs (OOSA) and China Manned Space Agency (CMSA) respectively. The participating organizations are Machakos University, Sapienza University of Rome and In-Quattro srl. The project entitled: *BARIDI SANA- High performance micro-2-phase cooling system for Space Applications* objective is to develop and test in-orbit a two phase mechanically pumped thermal management system, cooled by an organic refrigerant, with a micro-multichannel heat sink to verify its performance in space applications. My assignment is Spacecraft Power electronics and Power systems

POST GRADUATE SUPERVISION

M.Sc. Thesis Completed

1. **Obiero Aluoch Elizabeth** ~ Improvement of Transmission Line performance using HT Superconducting Cables in developing countries – Case study of Kenya – Ethiopia interconnector line, M.Sc. Electrical Engineering, University of Rwanda. (Graduated in 2022)

2. **Kanyarwanda Daniel** - Feasibility study of an off-grid based on renewable Energy option for rural electrification in Rwanda, M.Sc. Electrical Engineering, University of Rwanda. (Graduated in 2022)
3. **Ntihinyurwa Jean Bosco** - Feasibility Study of Electric Vehicle Integration in Rwandan Distribution Network, M.Sc. Electrical Engineering, University of Rwanda. (Graduated in 2022)
4. **Nkurunziza Silas** - Study and Mitigation of Rwandan Grid Blackout and Instability: A Case Study Huye City, M.Sc. Electrical Engineering, University of Rwanda. (Graduated in 2022)
5. **Nice Enyonam Akpeke** - Transient Stability Enhancement of a Grid Connected PMSG-Based Wind Energy Conversion System Using FACTS Devices, M.Sc. Electrical Engineering, PAUSTI, (Graduated in 2019)
6. **Samuel Nosakhale Okhuegbe** - Optimal Sizing in a Micro Grid with Hybrid Energy Mix: A Case Study of Itele Community in Nigeria, M.Sc. Electrical Engineering, PAUSTI, (Graduated in 2019)

M.Sc. Thesis On-going

1. **Winnie Wambui Ngugi** - Aggregation for Large Wind Power Penetration for Transient Stability Analysis, M.Tech. (Electrical and Electronics Engineering), Murang'a University of Technology.

LINKAGES AND COLLABORATIONS INITIATED

- Dec 2020** Spear-headed the establishment of a partnership with Transfer Multisort Elektronik (TME) Education under a memorandum of agreement between Machakos University and TME
- July 2019** Actively involved in establishing collaboration between Tianjin City Vocational College (TCVC) and Machakos University to set up Lu Ban Workshop at Machakos University ADB Building
- July 2018:** Spear-headed the establishment of a collaboration between National Construction Authority (NCA) and Machakos University School of Engineering & Technology in research and capacity building.
- June 2018:** Actively involved in establishing a collaboration between Huawei Academy and Machakos University School of Engineering & Technology on ICT capacity building.
- March 2018:** Actively involved in setting up a collaboration between Sapienza University of Rome (Italy) faculty of science and Machakos University school of Engineering in mounting of programmes and writing of research proposal.

May 2016: Spear-headed a collaboration between Kenyatta University School of Engineering & Technology and Machakos University School of Engineering & Technology on Engineering Programmes.

TEACHING EXPERIENCE

Jan 2021 – To Date: Senior Lecturer, Machakos University. Teaching Electrical Power Systems and Electrical Machines. In addition I have spearheaded the review of Bachelor of Science in Electrical & Electronic Engineering Programme. I have managed to set up Microcontroller and Microprocessor laboratory through partnership with Transfer Multisort Elektronik (TME) Education.

Nov 2017 – Dec 2020: Lecturer , Machakos University. Teaching Electrical Power Systems and Electrical Machines. I have been rated Excellent after performance appraisal exercises done during 2017/2018 period.

Nov 2014 – Oct 2017: Assistance Lecturer, Machakos University. Teaching Electrical Power Systems and Electrical Machines. I have been rated Excellent after performance appraisal exercises done during 2017/2018 period. I developed laboratory manual in Electrical Machines that are used in the practical lessons. In addition I designed the laboratory workbenches in Electronics and Electrical Machines Laboratories.

2010-2014: **Part-time Lecturer,** Technical University of Kenya. Teaching Electrical Power Systems, Control Systems & Electrical Principles.

2011-2014: **Part-time Lecturer,** Dedan Kimathi University of Technology. Teaching Microprocessors systems, Digital Systems Design, Electrical Machines, Power Electronics and Electric Circuit Theory. I have been rated very highly (**above 82% overall**) after regular appraisal exercises done during the last three semesters.

2011- 2014: **Part-time Lecturer,** Kenya Power Training school.
Have produced excellent results (98% pass) in Microcontroller and Microprocessor systems in the National Technical Examinations

2003 – 2014: **Lecturer,** Thika Technical Training Institute. Teaching Microprocessor Systems, Control Systems, Have produced excellent results (**100% pass**) in Control systems and Microprocessor systems in the National Technical Examinations

AWARDS

Dec 2013 Awarded by Thika Technical Training Institute Board of Governors for being the second best performed administrative head of department during the 2012 – 2013 Academic year.

INVOLVEMENT IN ADMINISTRATION

March 2022 – Present: Dean, School of Engineering & Technology, Machakos University.

October 2015 – February 2021: Acting Dean, School of Engineering & Technology, Machakos University.

May 2015 – Sep 2015: Chairman of Department, Electrical and Electronic Engineering, Machakos University College.

2013 – 2014 Head of Department (Examinations), Thika Technical Training Institute. Duties included registration and administration of internal and national examinations.

2005 – 2009: Assistant Registrar (Examinations), Thika Technical Training Institute. Duties included registration and administration of internal and national examinations.

June 2008: TIVET Curriculum design, Kenya Institute of Education. Participated in design of Control Engineering Course for Mechanical and Automotive Engineering.

COMMUNITY WORK

2022 – Present Member, Board of Governors, Thika Technical Training Institute.

2022 – Present Member, Board of Management, St Augustine Secondary School - Gatundu.

2016-2018 Design, Installation and supervision of electrical works during the construction of Offices Complex of PCEA Elijah Kagiri Church.

2012-2013 Supervision of electrical works during the construction of PCEA Thika Town Church.

Aug 2011 Supervised the installation and commissioning of audio-visual system at PCEA Elijah Kagiri Church

Dec 2009 Supervised installation of 5kVA 240V, 50Hz standby Diesel generator at PCEA Elijah Kagiri Church

INVOLVEMENT IN COMMITTEES AND BOARDS

June 2020 Member, E-learning Monitoring and Evaluation Committee, Machakos University

Sep 2019 Member, TVET Management Board, Machakos University

Aug 2019 **Member,** Machakos University 3rd Annual International Conference Committee
Feb 2019 **Chairman,** Committee for Access to Information (ATI), Machakos University
Aug 2018: **Member;** Committee for Establishment of Centre for Pedagogy and Andragogy
Jun 2018: **Member;** Editorial Board, Machakos University Journal
May 2018: **Member;** Income Generating and Consultancy Committee.
Jan. 2018: **Member;** Committee on Centre of Excellence in Mechanical and Manufacturing Engineering, Machakos University.
Dec. 2017: **Member;** Quality Assurance Board of Management, Machakos University.
Oc.t 2017: **Member,** Machakos University 1st Annual International Conference Committee, Machakos University.
May 2017: **Member;** Management Board, Directorate of Research, Innovation & Technology. , Machakos University.
Dec 2016 **Member;** Engineers Board of Kenya (EBK) Accreditation Committee for Engineering Programmes; Machakos University
Nov. 2016: **Member;** Tender Evaluation Committee, Machakos University.
Nov. 2016: **Member;** Staff Welfare Committee, Machakos University.
Jun. 2016: **Member;** Adhoc Students Appeals Committee, Machakos University.
May. 2016: **Member;** Adhoc Postgraduate Examinations Committee, Machakos University.
Jan. 2016: **Member;** Board of Postgraduate Studies, Machakos University.
Jan. 2016: **Member;** Income generating and Consultancy Committee, Machakos University.
Sep. 2015: **Member;** Budget Implementation Committee, Machakos University.
Oct. 2015: **Member;** Integration & Corruption Committee, Machakos University.
Oct. 2015: **Member;** Committee on Preparation of Documents and Instrument of Charter Award, Machakos University.