

Dr. David Wafula Wekesa Curriculum Vitae

Dr. David Wafula Wekesa
Department of Physics
Multimedia University of Kenya
P.O. BOX: 15653-00503
Nairobi-Kenya
Cell Phone: +254 725037264
Email: dwekesahit@gmail.com or dwekesa@mmu.ac.ke
Website: <http://www.mmu.ac.ke>

CURRENT AFFILIATION

1. Renewable Energy & Technology Lecturer, Department of Physics, MMU, Kenya.
 2. Consultant & VET4Africa Master Trainer-Renewable Energy Research Consortium (RERC).
 3. Member and Lead Expert- Association of Energy Professionals Eastern Africa (AEPEA).
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PERSONAL INFORMATION

Nationality : Kenyan
PF Number : 2690
ID Number : 24244314
Passport No. : A1928404
Scopus ID. : 56410822900
ORCID ID. : 0000-0002-9353-2182
Religion : Christian
Marital Status : Married

RESEARCH INTERESTS

Renewable Energy Projects Design and Development: Solar and Wind Resource Assessment and Measurement; Hybrid Renewable Energy Systems Design; Stand-alone and Grid-Tie Renewable Energy Systems; Wind Tunneling Instrumentation; Stability and Control of Decentralized Energy Systems; Unsteady Wind Fluctuations and Modelling; Renewable Energy Systems Instrumentation.

ACADEMIC BACKGROUND

2013 – 2016: Doctor of Philosophy (Renewable Energy Mechanics), School of Energy Science and Engineering, Harbin Institute of Technology (HIT), Peoples' Republic of China.

Thesis title: **‘Aerodynamic Loading and Performance of Vertical Axis Wind Turbines under Unsteady Wind conditions’**

2010 – 2012: Master of Science in Physics (Renewable Energy and Environment), Department of Physics, Jomo Kenyatta University of Agriculture & Technology (JKUAT), Kenya.

Thesis title: ‘**Microcontroller-based Data Logging Instrumentation System for Wind Speed and Direction Measurements**’

2005 – 2009: Bachelor of Science Education Science (Physics), 2nd Class Honors Upper Division (Physics major), Masinde Muliro University of Science & Technology (MMUST) Kenya.

2000 – 2003: Kivaywa Secondary School, Kenya Certificate of Secondary Education (KCSE) Grade B+ (Plus) 71/84 Points.

PROFESSIONAL AND CAREER EXPERIENCE

CURRENT CAREER POSITION

1. Physics Lecturer (Renewable Energy and Technology) –Department of Physics, MMU (2019-to-date).

Main duties:

- i. Undertake Renewable Energy research and consultancy at Multimedia University of Kenya.
- ii. Academic Leader for MSc. in Renewable Energy and Technology program; coordinating academic and research activities of the program at the Department of Physics.
- iii. Teaching Units: Renewable Energy Technology; Wind Energy Technology; Solar Thermal Energy; Solar PV Systems; Biomass Energy; Research Methods for Renewable Energy Systems; Energy Management & Auditing; Wind Energy & Measurements; Renewable Energy Resource; Fluid Mechanics; Wind & Hydropower Technologies.

2. Lead Consultant & Researcher at Renewable Energy Research Consortium (RERC)–MMU (2019-to-date).

Main duties:

- i. **Research:** <https://www.mmu.ac.ke/renewable-energy-research-consortium-rerc/>
 - Identify, formulate and propose joint research projects.
 - Conduct research, as contract research or academic research projects.
 - Publish results in theses, reports, papers and articles.

ii. Consultancy:

- Specialist consulting, e.g. feasibility studies and assessments.
- Policy advice for the University and public sector on renewable technologies.
- Workshops, awareness, specialized and in-house short courses.

iii. Training:

- Coordinate Renewable Energy Professional short courses at RERC.

3. External Examiner and Associate Faculty–Institute of Energy & Environmental Technology (IEET) and Physics Department of Jomo Kenyatta University of Agriculture & Technology, respectively (2016-to-date).

Main duties:

- As an external Examiner, independently assess written theses at Institute of Energy and Environmental Technology (IEET) whether they are adequate in form and content.
- As an associate Faculty, I supervise research work of MSc. Energy Technology and MSc. Physics students at IEET and Physics Department of JKUAT, respectively.

PREVIOUS POSITIONS HELD

1. Founding Director Centre for Renewable Energy–Machakos University (2018-to-2019).

Main duties: Founding Director; development, administration and implementation of renewable energy projects; including fostering utilization of Renewable Energy (RE) sources.

2. Physics Lecturer (Renewable Energy and Technology)–Physics Sciences Department-Machakos University (2016-2019).

Main duties: Taught Units: Renewable energy units, Electrodynamics, Instrumentation Systems, Electronics, Microprocessor applications, Waves & optics, Wind Energy, Semiconductor physics, Solar Thermal Energy, Solar Photovoltaic Systems, Biomass energy.

3. Chairman of Department, Physical Sciences Department-Machakos University (2016-2018)

Main duties: Administrative duties and coordination of RE teaching and research activities.

4. Departmental Examinations & Timetable Coordinator–Physical Sciences Dept. (2016).

Main duties: Administrative duties for departmental examination coordination and timetabling.

5. Research Assistant–Harbin Institute of Technology (2013–2016).

Main duties: Carrying out Renewable energy research on wind tunnelling and Hybrid Solar PV and wind systems.

6. **Tutorial Fellow** – Department of Physics, JKUAT, Kenya (2012-2013).

Main duties: Teaching: Wind Energy, Electronics and Instrumentation, Physics for Engineers

7. **Teaching Assistant**– Department of Physics, JKUAT, Kenya (2010-2012).

Main duties: Administer practicals and invigilate continuous tests for undergraduate student

8. **Physics and Computer Studies graduate Tutor**–Kakamega High School (2009-2010).

Main duties: Taught Physics & Computer-appointed Chair of Computer Studies Department.

FUNDS ATTRACTED

1. Flexible Solar PV Technology Project by Midsummer Company, Sweden (\$ 13740) Project title: *Installation of 5 kW Flexible solar PV Plant for Laboratory Demonstration at MMU.*

Role: Coordinate installation of 5 kW flexible solar PV technology system for research and training at Renewable Energy Laboratory.

2. International Science Council Research Fund for the year 2018/2019 (90,000 Euros)

Research Project title: *Enhancing Sustainability and Resilience of African Cities through a Water-Energy-Food Nexus (WEF) Approach.* <https://council.science/what-we-do/funding-programmes/leading-integrated-research-for-agenda-2030-in-africa/projects-funded-in-2019>

Role: As a project Co-PI, coordinated overall fieldwork and investigate how synergies and trade-offs between WEF resources are managed from top-down (city level) and bottom-up (urban households) in an unequal city under climatic changes.

3. Machakos University (MksU) Research Fund for the year 2017/2018 (Ksh. 450,000)

Research Project title: *Development of Hybrid Renewable Energy Digesters in Machakos County.*

Role: As a Principal Investigator (PI) of the project, coordinated the assessment of Solar PV resource potential for rooftop applications in Machakos County. The project is complete.

4. National Research Fund (NRF) grant for the year 2016/2017 (Multidisciplinary Research Grant No. NRF/1/MMC/450 of Ksh.18, 475,000), Kenya.

Research Project title: *Development of Small Wind-Solar Hybrid System for Electrification of Rural Households in Kenya.* secretariat@researchfund.go.ke.

Role: Project coordinator for developing modular designs for small Wind-Solar Hybrid system and perform Computational Fluid Dynamics (CFD) Simulations.

5. Chinese government Scholarship (CSC) for year 2013/2014 (Grant No. 2013404003) to study a doctoral degree programme at Harbin Institute of Technology (HIT), Peoples' Republic of China. Research Project title: *Aerodynamic Loading and Performance of Vertical Axis Wind Turbines under Unsteady Winds*.
 6. National Commission for Science Innovation and Technology (NACOST) 2011/2012 Research grant (Kshs. 200,000) for postgraduate (MSc.) research programme at JKUAT, Kenya. www.nacosti.go.ke/newsletter/doc
Research Project title: *Microcontroller-based Data Logging Instrumentation System for Wind Speed and Direction Measurements*.
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ACADEMIC HONORS AND AWARDS

1. Received the Vice Chancellor's recognition during the Multimedia University of Kenya (MMU) 2020 graduation for outstanding scholarly research and innovation in renewable energy.
 2. Outstanding Foreign Doctorate Student Award for the year 215/2016 by the Ministry of Education (MoE), People's Republic of China (5000 USD).
 3. Won the 2014/2015 Harbin Institute of Technology excellence star award (1000 USD).
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BOOK PUBLICATIONS

1. **Baum C. and Wekesa D.W.** (2019) Basics in Solar Photovoltaics, *DBTA*, ISBN: 978-9966-1972-0-7.
 2. **Wekesa D.W.** (2018) New Advances in Wind Energy Technologies, *Lambert*, ISBN: 978-620-0-10048-1.
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PROGRAMMES DEVELOPED

1. MSc. in Renewable Energy and Technology (MMU)-2019-2020. As a Programme Developer and Renewable Energy expert, ensured proper and structured technical aspects of the programme in consultation with the relevant stakeholders. The programme is expected to admit the first cohort of postgraduate students in 2021/2022 academic year.
 2. BSc. in Applied Physics & Technology and BSc. in Analytical Chemistry (MksU)-2016-2018. As a Chairman of Physical Sciences Department at Machakos University, I spearheaded the development of the two programmes. The programmes started admitting KUCCPS students in September, 2018/2019 academic year.
 3. Training manual for “T3 Grid-Tied Solar PV Training”. This was done under the auspices of the international Division of the Professional Training Centre of the Bavarian Business Associations (bfz gGmbH), Germany. Three batches of trainees have been trained.
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CONSULTANCIES

1. **Ksh. 1.1 M.** Design and develop *E-Learning modules for Renewable Energy-Solar PV System modules* to be used by Kenya Power Institute of Energy Studies and Research (IESR), 2019.
 2. **Ksh. 2.0 M.** Construction of a daisy around the swimming pool and a parking bay fitted with Building Integrated Photovoltaic (BIPV) system to power the swimming pools’ pump and the lighting system. Consultancy project at Machakos Academy. *Sponsored by Machakos Academy Foundation*, 2019.
 3. **Ksh. 1.8 M.** T3 Grid Tie Solar PV course Training (ToT) from 10th-14th April 2019 and 24th-28th June 2019. *Sponsored by KenGen, Speed Limited and International Care.*
 4. **Ksh. 0.5 M.** Developed the Solar training manual book for DON BOSCO Tech Africa (DBTA) funded by *International Division of the Professional Training Centre of the Bavarian Business Associations (bfz gGmbH)*, Germany, 2018.
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THESES EXAMINED

1. *On the existence and uniqueness of the solution of one dimensional coupled system of Burgers' equation using energy method (Graduated 2020)*–By Rochna Chako, Multimedia University of Kenya (MMU). M.Sc. (Applied Mathematics) thesis.
2. *Factors affecting sustainability of Mini-grid energy in Kenyan areas: A case study of Kisii County (Graduated 2020)*–By Odhiambo Ponde George, Jomo Kenyatta University of Agriculture and Technology (JKUAT). M.Sc. (Energy Technology) thesis.
3. *Technical-economic evaluation and modelling of a small wind turbine system in Kenya (Graduated 2020)*)–By Hannah Wanjiru Muroki, Jomo Kenyatta University of Agriculture and Technology (JKUAT). M.Sc. (Energy Technology) thesis.
4. *Performance evaluation of off-grid power supply for rural electrification in Kenya (Graduated 2019)*–By Isaac Nzue Kiva, Jomo Kenyatta University of Agriculture and Technology (JKUAT). M.Sc. (Energy Technology) thesis.
5. *Evaluation of technical and economic performance of a commercial scale solar PV system in a Kenyan agro-industry (Graduated 2019)*–By Jackson Bukachi Ongeru, Jomo Kenyatta University of Agriculture and Technology (JKUAT). M.Sc. (Energy Technology) thesis.
6. *Evaluating the Performance of Solar Water Heaters in Nairobi County, Kenya (Graduated 2019)*–By Serem Gilbert Kiplimo, Jomo Kenyatta University of Agriculture and Technology (JKUAT). M.Sc. (Energy Technology) thesis.
7. *Development of Optimization Strategies for a Wind-Solar Hybrid System: A Case Study of S.t Francis Girls Secondary School in Naivasha, Kenya (Graduated 2019)*–By Laban Thimo Kamau, Jomo Kenyatta University of Agriculture and Technology (JKUAT). M.Sc. (Energy Technology) thesis.
8. *Hybrid Power Systems Optimization for Commercial Application in Kenya: A Case Study of East African School of Aviation (Graduated 2019)*–By Leonard Kipyegon Rotich, Jomo Kenyatta University of Agriculture and Technology (JKUAT). M.Sc. (Energy Technology) thesis.
9. *Effect of Static Magnetic effect on Power Output in Silicon Poly Crystalline Solar cells (Graduated 2018)*–By Martin Ndeto Paul, Jomo Kenyatta University of Agriculture and Technology (JKUAT). M.Sc. (Energy Technology) thesis.
10. *Assessment of Ngong Wind Farm Performance in Kenya (Graduated 2018)*–By John Keru Mwangi, Jomo Kenyatta University of Agriculture and Technology (JKUAT). M.Sc. (Energy Technology) thesis.

11. *Design of PV Solar Energy system for Wajir town, Wajir county, Kenya (Graduated 2018)*–By Mohamed Diyad Elmi, Jomo Kenyatta University of Agriculture and Technology (JKUAT). M.Sc. (Energy Technology) thesis.
 12. *Design, fabrication and testing of a Savonius wind turbine rotor blades for low wind speed applications (Graduated 2017)*–By Kasera Alice Achieng, Jomo Kenyatta University of Agriculture and Technology (JKUAT). M.Sc. (Energy Technology) thesis.
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RECENT PEER-REVIEWED PUBLICATIONS

1. **Wekesa D.W.**, Saoke C.O., Kamau J.N. An experimental investigation into performance characteristics of H-shaped and Savonius-type VAWT rotors. *Scientific African*, Vol. 10, 2020.
2. Ndeto M.P., **Wekesa D.W.**, Kinyua R., Njoka F. Investigation into the Effects of the Earth's Magnetic Field on the Conversion Efficiency of Solar Cells. *Renewable Energy*, Vol. 159, 2020.
3. Bundi J.M., Ban X., **Wekesa D.W.** Pitch Control of Small H-Type Darrieus Vertical Axis Wind Turbines using Advanced Gain Scheduling Techniques. *Renewable Energy*, Vol. 157, 2020.
4. Bundi J.M., Ban X., **Wekesa D.W.** Advanced Gain Scheduled Control of A DFIG based on a H-Darrieus Wind Turbine for Maximum Power Tracking and Frequency Support. *Control Engineering & Applied Informatics Journal*, Vol. 20, 2020.
5. Odhiambo O.B., **Wekesa D.W.**, Saoke C.O., J.N. Kamau. Assessment of the Economic Viability of Standalone Photovoltaic Systems for Rural Households in Kathiani, Machakos County, Kenya. *International Journal of Green Technology*, Vol. 6, 2020, pp. 1-6.
6. Lodenyi K., Kamau J.N., **Wekesa D.W.** Experimental Investigation into the Influence of Turbulence Intensity on Aerodynamic Performance of a Small-Scale Vertical Axis Wind Turbine, *International Journal of Innovative Science and Research Technology*, Vol. 4 (6), 2019.
7. Mulei D.Z., Njogu P.M., **Wekesa D.W.** Post Occupancy Energy Efficiency and Indoor Environment Performance in Selected Commercial Buildings in Nairobi, Kenya. *International Journal of Green Technology*, Vol. 5, 2019, pp. 68-75.

8. Mwanzia J., **Wekesa D.W.**, Kamau J.N. Analysis of Wind Resource Potential for Small-Scale Wind Turbine Performance in Kiseveni, Kenya. *International Journal of High Energy Physics*, Volume. 6 (1), 2019, pp. 17-29.
9. Muchiri K., **Wekesa D.W.**, Kamau J.N. Solar PV Potential and Energy Demand Assessment in Machakos County. *2nd Annual International Machakos Conference*, 24th - 26th April, 2019.
10. Binama M., Su W., **Wekesa D.W.** Investigation on reversible pump turbine flow structures and associated pressure field characteristics under different guide vane openings. *Science China Technological Sciences*, Vol. 62 (11), pp. 2052-2074.
11. Muchiri K., Mutuku J.N., **Wekesa D.W.** Digital to Analog TV decoder design and fabrication, *Journal of Electronics and Communication Engineering*, Vol. 13, 2018, pp. 23-31.
12. **Wekesa D.W.**, Wang C., Wei Y., Danao L.A. Analytical and numerical investigation of unsteady wind for enhanced energy capture within a fluctuating free-stream, *Energy* Vol. 121, 2017, pp. 122-132.
13. Zhang X., Wang C., **Wekesa D.W.** Numerical and Experimental Study of Pressure-wave Formation around an Under-water Ventilated Vehicle, *European Journal of Mechanics B/Fluids* Vol. 92, 2017.
14. **Wekesa D.W.**, Wang C., Wei Y., Zhu W. Experimental and numerical study of turbulence effect on aerodynamic performance of a small-scale vertical axis wind turbine. *Journal of Wind Engineering and Industrial Aerodynamics* Vol. 157, 2017, pp. 1-14.
15. **Wekesa D.W.**, Wang C., Wei Y. Empirical and computational analysis of small-scale wind turbine aerodynamic performance at a plateau terrain in Kenya. *Renewable Energy*, Vol. 90, 2016, pp. 377-385.
16. **Wekesa D.W.**, Wang C., Wei Y., Kamau J.N., Danao L.A. A numerical analysis of unsteady inflow wind for site specific vertical axis wind turbine: A case study for Marsabit and Garissa in Kenya. *Renewable Energy*, Vol. 76, 2015, pp. 648-661.
17. **Wekesa D.W.**, Wang C., Wei Y., Danao L.A. Influence of operating conditions on unsteady wind Performance of vertical axis wind turbines operating within a fluctuating free-stream. *Journal of Wind Engineering and Industrial Aerodynamics*, Vol. 135, 2014, pp. 76-89.

18. **Wekesa D.W.**, Kamau J.N., Mutuku J.N. Calibrated data logging instrumentation system for wind speed and direction measurements. *Basic Research Journal of Engineering Innovation*. Vol. 1(3), 2013, pp. 53-57.
19. **Wekesa D.W.**, Mutuku J.N., Kamau J.N. Microcontroller-based data logging instrumentation system for wind speed and direction measurements. *Journal of Agriculture Science and Technology*, Volume. 14(1), 2012, pp. 176-189.
20. **Wekesa D.W.**, Wang C., Wei Y., Kamau J.N., Kinyua R. *Experimental investigation into effect of blade number on aerodynamic performance of H-Darrieus turbines*. 4th International Symposium on Fundamental and Applied Sciences (ISFAS), Kyoto, Japan, 29th-31st March 2016.
21. **Wekesa D.W.**, Wang C., Wei Y., Kamau J.N. *Wind resource assessment and numerical simulation for wind turbine airfoils*. 15th International Workshop on Research and Education in Mechatronics (REM). El Gouna, Egypt, IEEE, 9th-11th September 2014.
22. **Wekesa D.W.**, Wang C and Kamau J.N (2014). *Wind resource data logging measurement system*. 5th International Conference on Energy, Environment and Materials Engineering, Shenzhen City, China, 22nd-23rd February 2014, pp.102-105.
23. **Wekesa D.W.**, Kamau J.N and Mutuku J.N (2013). *Automated data logging Instrumentation System for Wind Speed and Direction Measurements*. Mechanical Engineering Conference on Sustainable Research and Innovation, Juja, Kenya, 24th-26th April 2013, Vol. 5, pp.102-105.
24. **Wekesa D.W.**, Nsegimana P., Kinuthia, S. *Catalytic converter for carbon sink*. Eskom Expo for Young Scientist workshop, Intel Educator Academy, Johannesburg, S. Africa, 4th-6th October 2012.

CONFERENCES/WORKSHOPS ATTENDED

1. ToT-Training (as a Master Trainer and coordinator) on Renewable Energy Technology - Construction of a Modular PV Training System - 15th - 26th, March 2021, Multimedia University of Kenya, Renewable Energy Research Consortium, Nairobi, Kenya.
2. Solar PV (T1/T2) Training (as a Trainer and coordinator) from 18th-22nd January 2021, Multimedia University of Kenya, Renewable Energy Research Consortium, Nairobi, Kenya.

3. Solar PV Grid Tie (T3) Training (as a trainer and coordinator) from 14th-18th December 2020, Multimedia University of Kenya, Renewable Energy Research Consortium, Nairobi, Kenya.
4. *Online Bridge Course for Master Trainers on Solar PV Training System* from 12th to 13th December 2020 by VET4Africa Senior Master Trainers (GIZ/BBW Germany program)
5. Solar PV (T1/T2) Training (as a trainer and coordinator) from November 31st-December 4th 2020, Multimedia University of Kenya, Renewable Energy Research Consortium, Nairobi, Kenya.
6. The 2nd Strathmore University Research and Innovation Conference on Clean Energy with a presentation titled '*Investigating the influence of geomagnetic on fill factor on the performance of pc-Silicon photovoltaic solar cells*' from 2nd-6th November 2020 at Strathmore University, Nairobi, Kenya.
7. The 19th MRSK/CTheP Materials Science Webinar Series with a presentation titled '*Geomagnetic Field Effect on Silicon Solar Cell Conversion Efficiency*' on 22nd July 2020.
8. The 6th Global Off-Grid Solar Forum and Expo organized by GOGLA and World Bank Group from 18th-20th February 2020 at Safari Park Hotel, Nairobi, Kenya.
9. The 2nd Research and Innovation Symposium on Clean Energy with a presentation titled '*Simultaneous Wind and Solar Energy-harvesting Flags for Portable Applications*' from 4th-8th November 2019 at Strathmore University, Nairobi, Kenya.
10. Water-Energy-Food Nexus Project Inception, Co-design and Co-production workshop sponsored by Swedish International Development Cooperation Agency (SIDA) from 11th-12th September 2019 in Kampala, Uganda.
11. Water-Energy-Food Nexus Project Inception, Co-design and Co-production workshop sponsored by Swedish International Development Cooperation Agency (SIDA) from 15th-31st July 2019 in Accra, Ghana.
12. Solar PV (T3) Grid Tie Training (as a trainer and coordinator) from 24th-28th June 2019, Machakos University Centre for Renewable Energy, Machakos, Kenya.
13. Solar PV (T3) Grid Tie Training (as a trainer and coordinator) from 14th-18th April 2019, Machakos University Centre for Renewable Energy, Machakos, Kenya.

14. The 2nd Annual International Machakos Conference on 24th -26th April 2019 at Machakos University, Machakos, Kenya.
15. Solar PV (T3) Grid Tie Training on December 10th-15th 2018, Strathmore University Energy Research Centre, Nairobi, Kenya.
16. Training of the Trainers Wind/Solar PV-Installers & Hybrid Systems course Sponsored by the USAID on November 19th-30th 2018, Institute of Energy Studies and Research (IESR), Nairobi, Kenya.
17. DAAD International Conference on Science, Technology, and Innovation for Sustainable Development in Dryland Environments on November 21st-23rd 2018, Umma University, Kajiado, Kenya.
18. Resource Mobilization and Grant Writing Course organized by the Training Centre in Communication Africa on October 17th-19th 2018 in Nairobi, Kenya.
19. Joint MSSEESA and DAAD International Conference Materials Science Research for Sustainable Energy on 26th and 27th September 2018, University of Nairobi, Kenya.
20. Transdisciplinary Research Training (Training of Trainers) Workshop sponsored by International Science Council on 1th- 8th September 2018 in Abidjan, Ivory Coast.
21. Training of Trainers Solar PV-Installers (Level I) course sponsored by the Federal Ministry of Economic Cooperation and Development, June 24th-July 7th 2018, Wildpoldsried, Bavaria, Germany.
22. The 5th Alexander Von Humboldt Fellows Conference, 19th-21st June 2018, Sportsman Arm's Hotel, Nanyuki, Kenya.
23. Workshop on Grant Proposal Writing organized by Division of Research Innovation and Linkages on Wednesday 26th April 2018 at Machakos University, Machakos, Kenya.
24. The 1st Annual International Machakos Conference on Tuesday 22nd -24th April 2018 at Machakos University, Machakos, Kenya.
25. Workshop by German Academic Exchange Service (DAAD) organized by Division of Research Innovation and Linkages on Wednesday 26th April 2017 at Machakos University, Machakos, Kenya.
26. Research, Innovation and Technology Workshop organized by Machakos University on September 15th-16th 2016 at Machakos University, Kenya.

27. The 4th International Symposium on Fundamental and Applied Sciences, 29th-31st March 2016, Kyoto, Japan.
28. The 15th International Workshop on Research and Education in Mechatronics, 9th-11th September 2014, El Gouna, Red Sea, Egypt.
29. The 5th International Conference on Energy, Environment & Materials Engineering, 22th-23th February 2014, Shenzhen, P.R. China.
30. Eskom Expo for Young Scientist workshop from 4th - 6th October 2012, Intel Educator Academy in Johannesburg, South Africa.
31. Mechanical Engineering Conference on Sustainable research and Innovation conference on Wednesday 24th - Friday 26th April 2013 at JKUAT, Juja, Kenya.
32. Research Proposal Writing Training Workshop organized by Kenya DAAD Scholars Association on July 25th-27th 2012 at JKUAT, Juja, Kenya.
33. Faculty of Science 6th annual scientific conference on 3rd July 2011 at JKUAT, Juja, Kenya.
34. Faculty of Science 5th annual scientific conference on 22nd June 2010 at JKUAT, Juja, Kenya.

POSTGRADUATE RESEARCH SUPERVISION

a. Completed PhD. Supervision:

Pitch Control of Small H-Type Darrieus Vertical Axis Wind Turbines using Advanced Gain Scheduling Techniques—(Josephat Machoka Bundi). Remark: *Graduated 2021* (Doctor of Philosophy-HIT).

b. Completed MSc. Supervision:

1. Energy Efficiency, Adequacy of Ventilation and Sustainability Testing of Selected Green and non-green Buildings in Learning Institutions in Nairobi County, Kenya—(Nzioka M. David). Remark: *Graduated 2020* (MSc. Energy Technology-JKUAT).
2. Performance Assessment and Economic Viability of Standalone Photovoltaic Systems for Rural Households in Machakos County— (Odhiambo O. Barrack). Remark: *Graduated 2020* (MSc. Energy Technology-JKUAT).

3. Experimental Investigation into the Influence of Turbulence on the Performance of a Small-Scale Vertical Axis Wind Turbine in a Wind Tunnel Environment–(Lodenyi L. Kelvin). Remark: *Graduated 2020* (MSc. Physics-JKUAT).
4. Wind potential assessment for a small-scale wind turbine at Kiseveni in Kitui County, Kenya– (Mwanzia N. Justus). Remark: *Completed 2019* (MSc. Physics-JKUAT).

b. Ongoing research:

1. Muchiri K. Ph.D. (Physics) research, “*A small-scale Wind-Solar Embedded Hybrid System for Power Electrification in Machakos County*”. Ongoing (JKUAT).
2. Ndeto M. P. Ph.D. (Energy Technology) research, “*Multifaceted Analysis of the Performance of Silicon Mono-crystalline, Amorphous and Thin Films Solar Cells Under the Influence of Static Magnetic Field*”. Ongoing (JKUAT).
3. Ndiwa D. M. M.Sc. (Physics) thesis on “*Experimental investigation into effect of unsteady wind on aerodynamic performance of vertical axis wind turbine*”. Ongoing (KU).
4. Owano J.K. MSc. (Energy Technology) thesis on “*Optimization of Stand-Alone Hybrid Distributed System for Off-grid Application*”. Ongoing (JKUAT).
5. Nguku M. M.Sc. (Energy Technology) thesis on “*A Measurement Interface for Solar Photovoltaic System*”. Ongoing (JKUAT).
6. Ondieki J.G. MSc. (Energy Technology) thesis on “*Development of Solar Work Tool Kit for TVET Institutions in Kenya*”. Ongoing (JKUAT).

c. Peer reviewing in refereed scientific journals:

I have undertaken peer review tasks for the following published selected scholarly articles:

1. Impacts of Gurney flap and solidity on the aerodynamic performance of vertical axis wind turbines in array configurations. *Energy*, Vol. 215, 2021, pp. 444-460 (Elsevier).

2. The Effect of Blade Geometry on the Structure of Vertical Axis Wind Turbine Wakes. *Journal of Wind Engineering & Industrial Aerodynamics*, Vol. 204, 2020, pp. 34-41 (Elsevier).
3. Effect of Na Doping on the Performance and the Band Alignment of CZTS/CdS Thin Film Solar Cell. *Solar Energy*, Vol. 72, 2019, pp. 115-127 (Elsevier).
4. The Effect of Blade Geometry on the Structure of Vertical Axis Wind Turbine Wakes. *Journal of Wind Engineering & Industrial Aerodynamics*, Vol. 171, 2019, pp. 52-66 (Elsevier).
5. Performance Analysis of a Small-Scale Orthopter-Type Vertical Axis Wind Turbine. *Journal of Wind Engineering & Industrial Aerodynamics*, Vol. 132, 2018, pp. 49-63 (Elsevier).
6. The aerodynamics of a camber-bladed vertical axis wind turbine in unsteady wind. *Energy*, Vol. 97, 2017, pp. 82-93 (Elsevier).
7. Wind tunnel testing of the Deep-Wind demonstrator in design and tilted operating conditions. *Energy*, Vol. 111, 2016, pp. 484-497 (Elsevier).
8. Scale effects for rudder bulb and rudder thrust fin on propulsive efficiency based on computational fluid dynamics. *Ocean Engineering*, Vol. 117, 2016, pp. 199-209 (Elsevier).
9. Darrieus Wind Turbine Blade Unsteady Aerodynamics: a Three-Dimensional Navier-Stokes CFD assessment. *Energy*, Vol. 54, 2016, pp. 81-94 (Elsevier).
10. CFD-based shape optimization of airfoil geometry for H-Darrieus rotors using a Genetic Algorithm. *Energy*, Vol. 53, 2016, pp. 48-61 (Elsevier).

UNDERGRADUATE AND POSTGRADUATE TEACHING AREAS

Renewable Energy Technology; Wind Energy Technology; Solar Thermal Energy; Solar Photovoltaic Systems; Biomass Energy; Research Methods for Renewable Energy Systems; Energy Management & Auditing; Wind Energy & Measurements, Renewable Energy Resource.

MEMBERSHIP OF SCIENTIFIC SOCIETIES

1. Member African Astronomical Society (AfAS): Instrumentation (INS)-ID No. AfS50319
 2. Member Association of Energy Professionals Eastern Africa (AEPEA)-Membership No. A229
 3. Member Kenya Renewable Energy Association (KEREAA)- Corporate full Member
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ADDITIONAL COMPETENCIES

1. Certified VET4Africa Solar PV Master Trainer (GIZ GmbH, Germany).
 2. Trained T3 Grid-Tied Solar PV installer (Strathmore University).
 3. Trained by IERC/USAID (Germany) on Solar PV (T3) and Hybrid Systems.
 4. Trained by IERC/USAID (Germany) on Wind and Hybrid Systems.
 5. Trained by BFZ GmbH (Germany) as a PV installer (License No. EU2009/28/EC).
 6. Trained by Training Centre in Communication Africa on Grant & Resource Mobilization.
 7. Trained by DAAD on Research Proposal Writing.
 8. Proficiency with MATLAB.
 9. Proficiency with TeX/LaTeX.
 10. Trained by USAID on HIV, TB and Malaria Prevention.
 11. Trained Scout by the Kenya Scouts Association on Preliminary scouting skills.
 12. Trained by Gate-Tech Computer College, Nairobi, on Computer software and programming.
 13. Trained by Centre for Disaster Management and Humanitarian Assistance on Fire Modules.
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ACADEMIC AND PROFESSIONAL REFEREES

Prof. Robert Kinyua,
Professor of High Energy Physics,
Deputy Vice Chancellor (Academics),
Jomo Kenyatta University of Agriculture &
Technology,
P.O. Box 62000-00200, Nairobi, Kenya.
Tel: +254-722-330488
E-mail: kinyua@fsc.jkuat.ac.ke

Prof. Joseph N. Kamau,
Professor of Environmental Physics & Energy
Director Institute of Energy & Environmental
Technology (IEET),
P.O. Box 62000-00200, Nairobi, Kenya.
Tel: +254-721-317928
E-mail: ngugikamau@jkuat.ac.ke

Prof. Izael Pereira Da Silva,
Professor of Power System Engineering,
Deputy Vice-Chancellor (Research and
Innovation),
Strathmore University,
P.O. Box 59857-00200, Nairobi, Kenya.
Tel.: +254-733-900400
E-mail: idasilva@strathmore.edu

Prof. Dr. Alan Wang,
Professor of Energy Science and Dynamics,
School of Energy Science & Engineering,
Harbin Institute of Technology,
PO Box 137, Harbin 150001, PR China.
Tel.: +86 (0)451-86413510
E-mail address: alanwang@hit.edu.cn