

## Julius Mwakondo Mwabora

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### Education

|            |   |
|------------|---|
| 1995-1999: | Ph.D (Physics), University of Dar es Salaam, Tanzania |
| 1990-1993: | M.Sc. (Physics), University of Nairobi, Kenya         |
| 1987-1990: | B.Sc. (Physics), University of Nairobi, Kenya         |
| 1984-1985: | KACE, Kenyatta High School, Mwatate, Kenya            |
| 1980-1983: | KCE, Kenyatta High School, Mwatate, Kenya             |
| 1973-1979: | CPE, Kizumanzi Primary School, Sagalla, Kenya         |

**Computer Literacy:** MS-DOS, Windows, MS office, Excell, Kaleidograpg, Origin

### Academic positions held

|            |   |
|------------|---|
| 1992-1994  | Graduate Assistant, Department of Physics, University of Nairobi, Nairobi, Kenya.   |
| 1994-2000  | Tutorial Fellow, Department of Physics, University of Nairobi, Nairobi, Kenya.  |
| 1997-1998  | Visiting Researcher, Institute of Energy Conversion, University of Delaware, USA.   |
| 2000-2003  | Lecturer, Department of Physics, University of Nairobi, Nairobi, Kenya.   |
| 2001&2002  | Visiting Scholar, Ångström Laboratory, Uppsala University, Sweden. (Six months).  |
| 2005& 2009 | Visiting Researcher, Hahn Meitner Institute, Berlin (Now Helmholtz Centre for Materials and Energy Berlin), Germany (2 & 3 months). |
| 2003-2009  | Senior Lecturer, Department of Physics, University of Nairobi, Nairobi, Kenya.  |
| 2009-2014  | Associate Professor, Department of Physics, University of Nairobi, Nairobi, Kenya.  |
| Since 2013 | Chairman, Department of Physics, University of Nairobi, Nairobi, Kenya  |
| Since 2014 | Professor, Department of Physics, University of Nairobi, Nairobi, Kenya.  |

### Professional activities

- **Student Supervision:**5 PhD and 10 M.Sc. students to completion, 4 PhD and 3 M.Sc. ongoing.
- **External Examiner:**(a) Academic programmes: (i)Kenya-Moi University; Egerton University, University of Kabianga;(ii) Tanzania-University of Dar es Salaam; Dar es Salaam University College of Education; (b) Several M.Sc. and Ph.D thesis.
- **Peer Reviewer:**(a) Journals-Journal of Applied Physics, East African Journal of Pure and Applied Sciences; African Journal of Science and Technology; Journal of Agriculture, Science and Technology, British Journal of Applied Science and Technology. (b) Grants-University of Nairobi, NCST (Now NACOSTI), NRF(South Africa; DAAD, ERAfrica (c) Academic Programmes-Applied Physics, Technical University of Mombasa, (d) Commission for University Education-Academic programmes
- **Professional bodies:**Country Liaison Physicist, International Union of Pure and Applied Physics (2012-present), Member-Kenya National Academy of Sciences (2004-present), European Physical Society(2008-present), Institute of Physics (2009-present), Physical Society of Kenya(1992-present), NANOSciences African NETwork(2007-present), University of Nairobi Alumni Association(2008-present), Fulbright Alumni-Kenya Chapter(1998-present)
- **Board Membership:**Board of Governors-Mwakichuchu Sec. School, 2008-2014, and Voi Sec. School, 2012-present; Material Science and Solar Energy Network for Eastern and Southern Africa, 2006-present; Interim Management Board, University of Nairobi Science, Technology and Innovation Park, April 2011-present, Kenya National Academy of Sciences, September 2011-present.
- **Research Areas:**(1) Dye sensitized solar cells, (2) Solar energy materials (3) Nanomaterials for Energy and Environment, (4) Engineered nanomaterials and nature interface , (5) Energy
- **Scientific contributions:**Over 80.

## APPENDIX

### CONTACTS AND PERSONAL DETAILS

Department of Physics, University of Nairobi,  
P. O. Box 30197, 00100 GPO Nairobi, Kenya.  
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**Fax:** 254 - 20 - 4449616  
**E-mail:** [mwabora@uonbi.ac.ke](mailto:mwabora@uonbi.ac.ke)

**DATE /PLACE OF BIRTH:** 26<sup>th</sup> July 1965, Taita-Taveta County.  
**MARITAL STATUS:**Widower with two children.  
**CITIZENSHIP:** Kenyan

### SHORT COURSE/TRAINING/SEMINAR

- Fundamentals of Reactor Regulations and Fundamentals of Reactor Safety, Nairobi, Kenya, 13-17 February 2012. (Presented Draft Policy and Bill for Atomic Energy Commission).
- Network of African Academy of Sciences (NASAC) Programme Officers' Training Seminar on Enhancing Communication Strategies for Science Academies in Africa, French Academy of Sciences, 26-28 January 2012.
- Nuclear Electricity Project Retreat, Naivasha, 21-25 November 2011 (Presented Draft Policy and Bill for Atomic Energy Commission)
- Dialogue on Innovative Higher Education Strategies (DIES) Seminar: Proposal writing for international research projects, 8<sup>th</sup>-13<sup>th</sup> December 2008, Entebbe, Uganda.
- Kenya Education Staff Institute (KESI) Induction Course for Board of Governors members, Coast Institute of Technology, Voi: 29<sup>th</sup> September-1<sup>st</sup> October, 2008.
- The Abdus Salaam African College on "Science at Nanoscale", Cape Town, South Africa: 19-30 November 2007
- Workshop on Good Laboratory Practices, Nairobi, Kenya: 24-26 October 2007.
- Pedagogy training for academic staff, University of Nairobi, Kenya: 1-3 October 2007.
- ICTP-NCNNC-ICTS Asian Pacific Regional College on "Science at Nanoscale" Beijing, P. R. China: 14-25 August 2006.
- Intensive Course in the English Language and an Introduction to American Studies, American Language Program, Columbia University, New York, USA: 21 July -15 August 1997.
- Growth and Characterization of Semiconductors Course, Imperial College, U.K. 12 -15 May 1997.
- 4th College on Thin Film Technology, University of Dar es Salaam, Tanzania: 2-16 August 1996.

- Application of Microprocessors in Science and Mathematics, Institute of Computer Science, Makerere University, Uganda:28 June to 7 July, 1993
- Coupled Climate Systems Modeling Graduate Summer School, Macquarie University, Australia: 8-19 February 1999.
- Pre-University Programme (Military drill, first aid, Physical fitness and Voluntary work), National Youth Service, Gilgil Barracks, Kenya: February to May 1987

## **SUMMARY OF RELEVANT EXPERIENCE**

### **(a) Board Membership**

#### **Over five years experience in Academic and Scientific Boards.**

- College of Biological and Physical Sciences, University of Nairobi, Academic Board
- School of Physical Sciences, University of Nairobi Academic Board,
- Kenya National Academy of Sciences Executive Committee,
- Physical Society of Kenya Executive Committee.
- Coordinating Board Member, Materials Science and Solar Energy Network for Eastern and Southern Africa
- Interim Board Member, University of Nairobi Science Technology and Innovation Park (STIP)

### **(b) Over 15 years of teaching, research, community work and administrative duties at the University of Nairobi.**

- Research in *thin* films, solar energy materials, photocatalysis, solar cells and nanotechnology. (Over 80 publications-theses, peer review articles, conference proceedings and presentations)
- Teaching basic physics courses to students of sciences including physical & biological, engineering, computer science, and education.
- Teaching advanced courses in solid state physics, semiconductor physics and laboratory techniques to senior undergraduate and postgraduate students in physics.
- Mentoring and supervision of both undergraduate (Over 20) postgraduate students (Over 10).
- External Examiner (both academic programmes and theses for departments of Physics in 3 local and 2 regional universities).
- Coordinator and chairman/member of several academic, administrative, exhibition, strategic plan and procurement committees
- Acting Chairman, Department of Physics, several occasions.

### **(c) National duty**

- Chairman, Task Team for the Development of a Draft National Nuclear Science and Technology Policy and a Draft Bill for Atomic Energy Commission, June 2011 – June 2012.
- Pre-Feasibility Study Team Leader and Member at the Nuclear Electricity Project (Now Kenya Nuclear Electricity Board), Ministry of Energy since March 2012- September 2013.
- Country Liaison Physicist, International Union of Pure and Applied Physics (IUPAP), C/o Institute of Physics, London, January 2012-present.
- Board of Governors Member: (a) Mwakichuchu Secondary School (2008 to 2014; was Chairman of Board (July 2008 to March 2012) and (b) Voi Secondary School (August 2012 to date).

### **ADMINISTRATIVE EXPERIENCE-UNIVERSITY OF NAIROBI**

- Chairman, Department of Physics, College of Biological and Physical Sciences, University of Nairobi: 3.11.2013 to date.
- Director, Industrial Electronics Unit, Department of Physics, College of Biological and Physical Sciences, University of Nairobi: 3.11.2013 to date.
- Acting Dean, School of Physical Sciences: 5-6 February 2015, 10-21 August 2015.
- Member, University of Nairobi Senate: November 2013-To date
- Coordinator, Self Study Centre, College of Biological and Physical Sciences, University of Nairobi: February 2006-November 2013.
- Acting Chairman, Department of Physics: 23-27 May 2005, 13-14 July 2006, 12 November 2009; 9-12 April 2010 and 24 December 2010 to 10 January 2011, 19-23 August 2013.
- Interim Board Member, Science Technology and Innovation Park (STIP): April 2011- to date.
- College Academic Board, December 2009-todate.
- School Academic Board, 2000-to date.
- College Representative (College of Biological and Physical Sciences) and member (University of Nairobi -wide committee), Kenyan Universities Exhibition: 2003- November 2013.
- School of Physical Sciences Coordinator, University Open House: April 2008.
- Deputy Group leader, Condensed Matter Research Group, Department of Physics, University of Nairobi: 2000 – present.
- Chairman, Departmental laboratory Experiments Committee: 2006-November 2013.
- Chairman, Departmental Welfare Committee: 2003-November 2013.
- Library Representative, Department of Physics: 2003- November 2013.
- Steering Committee Member, ANSTI Sub-Network on Renewable Energy Network, C/o UNESCO Nairobi Office: February 2002 – present

- Chairman, Technical Evaluation Committee (appointed by Vice Chancellor)- Tender for the proposed Installation of Wireless Local Area Network for College of Health, UON/T/13/2011-2012: September-December 2011.
- Member, Technical Evaluation Committee (appointed by Vice Chancellor) - Purchase of UV-VIS-NIR Spectrophotometer for Dept. of Physics: July-August 2006.
- Chairman, Technical Evaluation Committee (appointed by Vice Chancellor)-Quotations for computer servers, desktop computers, printers, and software and data loggers to be used in the Northern corridor transport improvement project, UNES (UON/Q/712/06): May-June 2006.
- Member, Technical Evaluation Committee (appointed by Vice Chancellor)-Purchase of 14 laptops for BPS (UON/Q/824/06) and Ten LCD projectors for School of Business (UON/Q/823/056): August – October 2006.
- Member, Technical Evaluation Committee (appointed by Vice Chancellor) - Upgrading of the UON Data Centre, UON/T/01/2006-2007: October-November 2006.
- Chairman, Technical Evaluation Committee (appointed by Vice Chancellor)- CCTV for Department of Surgery (UON/T53/2006-2007):May-July 2007
- Chairman, Technical Evaluation Committee (appointed by Vice Chancellor) - CCTV for Department of Human Pathology (UON/T54/2006-2007): May-July 2007.
- Chairman, Technical Evaluation Committee (appointed by Vice Chancellor) - Tender for the supply, installation and customization of permanent LCD projectors in the Taifa Hall, The Millennium Theatres and 8.4.4 Lecture (UON/T/32/2007-2008): March-April 2008.
- Chairman, Technical evaluation Committee (appointed by Vice Chancellor)-Supply of LCD projectors and LAPTOPS (CAVS/0700/08): August-October 2008.
- Member, Department of Physics Strategic Plan Committee, 2005.
- Member, Faculty of Science Strategic Plan Committee, 2005
- Member, College of Biological and Physical Sciences Strategic Plan Committee, 2005.

## **PUBLICATIONS**

Over 80: theses, peer-reviewed journals, conference proceedings, invited lecturers, presentations, and teaching materials

### **a) Theses**

2. “Copper Indium Diselenide (CIS) based solar cells: Effect of CIS preparation conditions and thickness on performance”, Ph.D. thesis University of Dar es Salaam, Tanzania, 1999.

**Supervisors:** Prof. R. T. Kivaisi (University of Dar es Salaam, Tanzania) & Prof. R. W. Birkmire (University of Delaware, USA).

1. .“Transparent conducting SnO<sub>2</sub>:F thin films for SIS solar cells”, M.Sc. thesis, University of Nairobi, Kenya, 1993.  
**Supervisors:** Dr. A. K. Raturi and Dr. E. Sahrene, University of Nairobi

## **b) Peer-reviewed publications**

29. “Observation of Meyer-Nedel Rule in Se<sub>100-x</sub>(M = In, Sb)<sub>x</sub> and Se<sub>100-x</sub>In<sub>10</sub>Sb<sub>x</sub> chalcogenide glasses”, Cosmas M. Muiva, Stephen Sathiaraj, **Julius M. Mwabora**, Kelebogile Maabong, *Ceramics International* **41** (2), Part A, 2348-2352 (2015).
28. “Investigation of the Effect of film Thickness on the Optical Properties of Amorphous Se<sub>85-x</sub>Te<sub>15</sub>Sb<sub>x</sub>”, A. A. Mulama, **J. M. Mwabora**, A. O. Oduor, Cosmas M. Muiva and Boniface Muthoka, *African Journal of Physical Sciences* **1** (1), 38-42 (2014).
27. “Effect of substrate temperature on the optical properties of amorphous Se-Bi thin films”, A. A. Mulama, **J. M. Mwabora**, A. O. Oduor and C. Muiva, *Indian Journal of Pure & Applied Physics* (Submitted, October 2013).
26. “Optical properties and Raman studies of amorphous Se-Bi thin films”, A. A. Mulama, **J. M. Mwabora**, A. O. Oduor and C. Muiva, *The African Review of Physics* **9**, 33-38 (2014).
25. Light Soaking Induced Increase in Conversion Efficiency of eta Solar Cell Based on In(OH)<sub>x</sub>Sy/Pb(OH)<sub>x</sub>Sy”, Robinson Musembi, Bernard Aduda, **Julius Mwabora**, Marin Rusu, Konstantinos Fostiropoulos, Martha Lux-Steiner, *Material Science and Application* **4** (11), 718-722 (2013) [DOI:10.4236/msa.2013.411090](https://doi.org/10.4236/msa.2013.411090)
24. “Effect of Recombination on Series Resistance in eta Solar Cell Modified with In(OH)<sub>x</sub>Sy Buffer Layer”, Robinson Musembi, Bernard Aduda, **Julius Mwabora**, Marin Rusu, Konstantinos Fostiropoulos, Martha Lux-Steiner, *International Journal of Energy Engineering* **3** (3), 183-189 (2013), DOI:10.5923/j.ijee.20130303.09.
23. “Dye-Sensitized and Amorphous Silicon Photovoltaic (PV) Devices’ Outdoor Performances: A comparative study”, R. V. M. Otakwa, J. Simiyu, **J. M. Mwabora**, *International of Emerging Technology* **3** (7), 532-538 (2013).
22. “Dark Current Voltage (I-V) Characteristics of a Commercialized Dye-Sensitized Solar Module Ideal for use in the Tropics”, R. V. M. Otakwa, J. Simiyu, S. M. Waita, **J. M. Mwabora**, *International Journal of Professional Practice* **3**(1&2), 165-168 (2012).
21. “Optical properties of flash evaporated amorphous Se<sub>100-x</sub>In<sub>x</sub> thin films for CuInSe<sub>2</sub> solar cell applications”, *Acta Press* **760-029** (2012) , 86-90 (2012). DOI: 10.2316/P.2012.760-029.
20. “Application of Dye-Sensitized Solar Cell Technology in the Tropics: Effect of Air Mass on Device Performance”, R. V. M. Otakwa, J. Simiyu, S. M. Waita, **J. M. Mwabora**, *International Journal of Renewable Energy Research* **3**(3), 369-375 (2012).

19. "Chemical Bond Approach to Optical Properties of some Flash Evaporated  $Se_{100-x}Sb_x$  Chalcogenide Alloys", Cosmas M. Muiva, Stephen Santhiaraj, **Julius M. Mwabora**, European Physical Journal of Applied Physics, **59**, 10301p1-10301p7 (2012).
18. "Application of Dye-Sensitized Solar Cell Technology in the Tropics: Effect of Radiation Intensity and Temperature on DSSC Performance", R. V. M. Otakwa, J. Simiyu, S. M. Waita, **J. M. Mwabora**, International Journal of Advanced Renewable Energy Research **1** (2), 109-116 (2012).
17. "Thermal and Compositional defects in Chemical Spray Pyrolysed Indium Selenide ( $In_2Se_3$ ) Thin Films: Effects on film properties", Cosmas M. Muiva, Stephen Santhiaraj, **Julius M. Mwabora**, Journal of Optoelectronics and Advanced Materials **13**(9), 1240-1245 (2011).
16. "Crystallization kinetics, glass forming ability and thermal stability in glassy  $Se_{100x}In_x$  chalcogenide alloys", Cosmas M. Muiva, Stephen Santhiaraj, **Julius M. Mwabora**, Journal of Non Crystalline Solids **357**, 3726-3733 (2011).
15. "Electrochemical characterization of  $TiO_2$  blocking layers prepared by reactive DC magnetron sputtering" Sebastian M. Waita, Bernard O. Aduda, **Julius M. Mwabora**, Gunnar A. Niklasson, Claes G. Granqvist, Gerrit Boschloo, *Journal of Electroanalytical Chemistry* **637**, 79(2009).
14. "Titania Nanotubes prepared by synthesis method for Dye-sensitized Electrochemical Solar Cells", J. Simiyu, **J. M. Mwabora**, B. O. Aduda, G. Boschloo, A. Hagfeldt, and S-E. Lindquist, African Physical Review **2**, 161(2008).
13. "Solar cell with  $Pb(OH)_xS_y$  Extremely Thin Absorber (ETA) based on novel ETA concept", R. J. Musembi, B. O. Aduda, **J. M. Mwabora**, and R. Bayon, *African Journal of Science and Technology* **9**, 55(2008).
12. "Intensity and Temperature Dependent of eta Solar Cell", R. J. Musembi, M. Rusu, **J. M. Mwabora**, B. O. Aduda B. O., K. Fostiropoulos and M. Ch Lux-Steiner, *Physica Status Solidi* **205**, 1713(2008).
11. "Sputtered  $TiO_2$  layers on  $SnO_2:F$  substrates: a Raman and SPS study", **J. M. Mwabora**, K. Ellmer, A. Belaidi, J. Rappich and Th. Dittrich, *Thin Solid Films* **516**, 3841(2008).
10. "Effect of nitration on pressed  $TiO_2$  photoelectrodes for dye-sensitized solar cells", H. B. Wafula, J. Simiyu, S. Waita, B.O. Aduda and **J. M. Mwabora**, *African Journal of Science and Technology (AJST)* **8**, 63(2007).
9. "Electron Transport and Recombination in Dye Sensitized Solar Cells fabricated from obliquely sputter deposited and thermally annealed  $TiO_2$  films", S. M. Waita, B. O. Aduda, **J. M. Mwabora**, C. G. Granqvist, S. -E. Lindquist, G. A. Niklasson, A. Hagfeldt, G. Boschloo, *Journal of Electroanalytical Chemistry* **605**, 151(2007).
8. "Performance of Dye Sensitized Solar Cells fabricated from Obliquely DC Sputtered  $TiO_2$  Films", S. M. Waita, **J. M. Mwabora**, B. O. Aduda, G. A. Niklasson, S.-E. Lindquist, and C.-G. Granqvist, *African Journal of Science and Technology* **7**, 1(2006).
7. "Structure, composition and morphology of photoelectrochemically active  $TiO_{2-x}N_x$  thin films deposited by reactive magnetron dc

- sputtering”, **J. M. Mwabora**, T. Lindgren, E. Avendano, T. F. Jaramillo, J. Lu, S. -E. Lindquist and C. G. Granqvist, *J. Phys. Chem. B***108**, 20193(2004).
6. “Anthocyanin sensitized Nanoporous TiO<sub>2</sub> Photoelectrochemical (PEC) Solar Cells Prepared by Sol Gel Process”, J. Simiyu, B. O. Aduda and **J. M. Mwabora**, *Progress in Colloid & Polymer Science***125**, 34(2004).
  5. “Photoelectrochemical and Optical Properties of Nitrogen doped Titanium Dioxide Prepared by reactive D.C. Magnetron Sputtering, T. Lindgren, **J. M. Mwabora**, E. D. Avendano, J. Jonsson, A. Hoel, C. G. Granqvist and S. -E. Lindquist, *J. Phys. Chem. B* **107**, 5709(2003).
  4. “Stability of Anthocyanin sensitized TiO<sub>2</sub> Photoelectrochemical (PEC) Solar Cells Prepared by Sol Gel Process”, J. Simiyu, B. O. Aduda and **J. M. Mwabora**, *African Journal of Science and Technology***3**, 56(2002).
  3. “Causes of Film Property Reproducibility Problems in Magnetron sputtering”, **J. M. Mwabora** and R. T. Kivaisi, *African Journal of Science and Technology***1**, 87(2001).
  2. “Metallic Cu and In Films deposited by DC magnetron sputtering”, **J. M. Mwabora** and R. T. Kivaisi, *Journal of Material Science: Materials in Electronics***12**, 75(2001).
  1. “Coupled Climate System Modelling: A Southern Hemisphere Perspective”, S. Torok, K. Skemp, **J. Mwabora** and M. Keyte, *Bull Aust. Met. And Ocean Soc.***6**, 32(1993).

### **c) Published conference proceedings**

41. “Niobium Doped TiO<sub>2</sub> (Nb:TiO<sub>2</sub>): Effects of Doping Concentration on the Optical Properties of TiO<sub>2</sub>”, P. Ajuoga, A. Ogacho, **J. Mwabora** and B. Aduda, 1<sup>st</sup> Young Scientist MSSEESA Conference on Materials Science and Solar Cell Technology, United Kenya Club, Nairobi, 28-29<sup>th</sup> November 2013, Book of Abstracts, Pg. 47.
40. “Deposition and Characterization of CuAl<sub>x</sub>B<sub>1-x</sub>Se<sub>2</sub> Thin Film Deposited by DC-RF Co-sputtering for Photovoltaic Application”, C. K. Wangati, W. Njoroge, P. K. Karanja, **J. M. Mwabora**, R. J. Musembi, J. Simiyu, 1<sup>st</sup> Young Scientist MSSEESA Conference on Materials Science and Solar Cell Technology, United Kenya Club, Nairobi, 28-29<sup>th</sup> November 2013, Book of Abstracts, Pg. 40.
39. “The Complementary of Dye-Sensitized and Amorphous Silicon Photovoltaics in Field Application in the Tropics”, R. V. M. Otakwa, **J. M. Mwabora** and J. Simiyu 1<sup>st</sup> Young Scientist MSSEESA Conference on Materials Science and Solar Cell Technology, United Kenya Club, Nairobi, 28-29<sup>th</sup> November 2013, Book of Abstracts, Pg. 38.
38. “Preparation and Characterization of Transparent and Conducting Doped Tin Oxide”, V. Muramba, M. Mageto, F. Gaitho, V. Odari, R. Musembi, J. Simiyu, **J. Mwabora**, 1<sup>st</sup> Young Scientist MSSEESA Conference on Materials Science and Solar Cell Technology, United



- Kenya Club, Nairobi, 28-29<sup>th</sup> November 2013, Book of Abstracts, Pg. 33.
37. “Effects of Oxygen Partial Pressure and Substrate Temperature on Optical Properties of Sputter Deposited  $CuCrO_2$  Thin Films”, A. Alfred, **J. M. Mwabora**, R. J. Musembi, S. M. Waita, 1<sup>st</sup> Young Scientist MSSEESA Conference on Materials Science and Solar Cell Technology, United Kenya Club, Nairobi, 28-29<sup>th</sup> November 2013, Book of Abstracts, Pg. 31.
36. “Ab-initio Studies of Point Defects in  $TiO_2$ : A Density Functional Approach”, P. V. Mwonga, N. W. Makau, G. O. Amolo, S. Lutta, M. D. O. Okoth, **J. M. Mwabora**, R. J. Musembi, C. M. Maghanga, R. Gateru, 1<sup>st</sup> Young Scientist MSSEESA Conference on Materials Science and Solar Cell Technology, United Kenya Club, Nairobi, 28-29<sup>th</sup> November 2013, Book of Abstracts, Pg. 29.
35. “Optical and Electrical Properties of Magnesium Doped Zinc Oxide for Photovoltaic Applications”, M. G. Assiimwe, T. Otit, **J. M. Mwabora**, 1<sup>st</sup> Young Scientist MSSEESA Conference on Materials Science and Solar Cell Technology, United Kenya Club, Nairobi, 28-29<sup>th</sup> November 2013, Book of Abstracts, Pg. 27.
34. “Fabrication and Characterization of Aluminium and Gallium Mono and Co-doped Zinc Oxide Thin Films by Radio Frequency Sputtering for Photovoltaic Applications”, J. P. Eneku, Otit Tom, **J. M. Mwabora**, 1<sup>st</sup> Young Scientist MSSEESA Conference on Materials Science and Solar Cell Technology, United Kenya Club, Nairobi, 28-29<sup>th</sup> November 2013, Book of Abstracts, Pg. 26.
33. “Hydrogen as an alternative fuel: An ab-initio study of Lithium Hydride and Magnesium Hydride”, D. Magero, N. W. Makau, G. O. Amolo, S. Lutta, M. D. O. Okoth, **J. M. Mwabora**, R. J. Musembi, C. M. Maghanga, R. Gateru 1<sup>st</sup> Young Scientist MSSEESA Conference on Materials Science and Solar Cell Technology, United Kenya Club, Nairobi, 28-29<sup>th</sup> November 2013, Book of Abstracts, Pg. 16.
32. “A Density Functional Theory Study of Electronic Structure of  $TiO_2$  Rutile (110) Surfaces with Catechol Adsorbate”, V. K. Mengwa, N. W. Makau, G. O. Amolo, S. Lutta, M. D. O. Okoth, **J. M. Mwabora**, R. J. Musembi, C. M. Maghanga, R. Gateru, 1<sup>st</sup> Young Scientist MSSEESA Conference on Materials Science and Solar Cell Technology, United Kenya Club, Nairobi, 28-29<sup>th</sup> November 2013, Book of Abstracts, Pg. 13.
31. “Optical Properties of Flash Evaporated  $Se_{100-x}Bi_x$  Thin Films: Effect of Film Thickness”, A. A. Mulama, **J. M. Mwabora**, A. O. Oduor and C. Muiva, 1<sup>st</sup> Young Scientist MSSEESA Conference on Materials Science and Solar Cell Technology, United Kenya Club, Nairobi, 28-29<sup>th</sup> November 2013, Book of Abstracts, Pg. 10.
30. “Structural and Electronic Properties of  $TiO_2$ , Nb: $TiO_2$  and Cr: $TiO_2$ : A first principles study”, W. Mulwa, N. W. Makau, G. O. Amolo, S. Lutta, M. D. O. Okoth, **J. M. Mwabora**, R. J. Musembi, C. M. Maghanga, R. Gateru, 1<sup>st</sup> Young Scientist MSSEESA Conference on Materials

- Science and Solar Cell Technology, United Kenya Club, Nairobi, 28-29<sup>th</sup> November 2013, Book of Abstracts, Pg. 9.
29. "The Role of Communication in a Nuclear Power Programme", Lilian N. Matu and **Julius M. Mwabora**, Proceedings of the Mechanical Engineering Annual Conference on Sustainable Research and Innovation, Jomo Kenyatta University of Agriculture and Technology, Nairobi, 24-26<sup>th</sup> April 2013, Pg. 82-90.
  28. "Importance of Law and Policy on Successful Utilization of Nuclear Technology for Electricity Generation", Catherine K. Kianji, Njeri W. kaniaru, Philip K. Mutai and **Julius M. Mwabora**, Proceedings of the Mechanical Engineering Annual Conference on Sustainable Research and Innovation, Jomo Kenyatta University of Agriculture and Technology, Nairobi, 24-26<sup>th</sup> April 2013, Pg. 82-90.
  27. "Optical Properties of flash evaporated amorphous  $\text{Se}_{100-x}\text{In}_x$  thin films for  $\text{CuInSe}_2$  solar cell applications", C. Muiva, S. Santhiaraj and **J. M. Mwabora** and K. Maabong, Proceedings of the IASTED conference on Power and Energy Systems, 3<sup>rd</sup> -5<sup>th</sup> September 2012, Gaborone, Botswana, Acta Press, Vol. 760-029 (2012), Pg. 86-90. DOI: [10.2316/P.2012.760-029](https://doi.org/10.2316/P.2012.760-029).
  26. "Chemical Bond approach to Crystallisation Kinetics and Thermal Stability in some  $\text{Se}_{90-x}\text{In}_{10}\text{Sb}_x$  Chalcogenide Glassy Alloys", C. Muiva, S. Santhiaraj and **J. M. Mwabora**, Proceedings 2<sup>nd</sup> African Materials Science and Engineering Network (AMSEN) workshop, Silver Springs Hotel, Nairobi, 21-23<sup>rd</sup> March 2012, Pg. 33-34.
  25. "Poverty as a factor in determining Education achievement in Kenya: A case Study of Nyanza and Coast Provinces in Kenya", Anne. A. Aseej and **Julius M. Mwabora**, Oral Presentation, Regional Symposium on Poverty and Human Right, Lake Naivasha County Club, 28-30 September, 2011. (To appear)
  24. "Properties of Spray Pyrolysed  $\text{In}_2\text{Se}_3$  Chalcogenide Glass Thin Films", C. Muiva, S. Santhiaraj and **J. M. Mwabora**, Poster presentation, Regional Initiative in Science and Education (RISE) Network meeting Johannesburg, South Africa, 4-8 October 2010. (To appear)
  23. "Transport Mechanism Analysis of  $\text{TiO}_2/\text{Pb}(\text{OH})_x\text{Sy}/\text{PEDOT}:\text{PSS}$  et a Solar Cell Modified with  $\text{In}(\text{OH})_x\text{Sy}$  Buffer Layer, Robinson J. Musembi, Bernard O. Aduda, **Julius M. Mwabora**, Marin Rusu, Konstantinos Fosti-ropoulos, and Martha Ch. Lux-Steiner Conclave of Afro Asia Young Scientists: on the theme "Energy, Climate and Development", Jawaharlal Nehru Centre for Advanced Scientific Research; Jakukur, Bangalore-560 64, India, February 11 – 13, 2010. (To appear)
  22. "Optical, electrical and structural properties of Se-In-Bi chalcogenide glasses: Phase change materials for data storage", C. Muiva, S. Santhiaraj and **J. M. Mwabora**, Proceedings 1<sup>st</sup> African Materials Science and Engineering Network (AMSEN) workshop, Windhoek, Namibia, 27-29<sup>th</sup> January, 2010, Pages 15-16.
  21. "Nanostructured materials: From nanoscience to structure determination", **J. M. Mwabora**, *Proc. 1<sup>st</sup> International Conference on*

- Solar Energy Materials Research*, 13-15 October 2009, Dar es Salaam, Tanzania (To appear).
20. "Investigation of effect of film thickness on electron transport and lifetimes in TiO<sub>2</sub> dye sensitized solar cells fabricated by screen-printing technique", J. Simiyu, B. O. Aduda, **J. M. Mwabora**, G. Boschloo and A. Hagfeldt, *Proc. 1<sup>st</sup> International Conference on Solar Energy Materials Research*, 13-15 October 2009, Dar es Salaam, Tanzania (To appear).
  19. "Temperature dependent characterization of TiO<sub>2</sub>/In(OH)<sub>x</sub>S<sub>y</sub>/PBS/PEDOT:PSS ETA solar cell", R. J. Musembi, M. Rusu, **J. M. Mwabora**, B. O. Aduda, K. Fostropolous and M.Ch. Lux-Steiner, *Proc. 1<sup>st</sup> International Conference on Solar Energy Materials Research*, 13-15 October 2009, Dar es Salaam, Tanzania (To appear).
  18. "Structural and morphological characterization of pressed nitrogen doped TiO<sub>2</sub> photoelectrodes for dye-sensitized solar cells", H. B. Wafula, J. Simiyu, S. Waita, B. O. Aduda and **J. M. Mwabora**, *Proc. 1<sup>st</sup> International Conference on Solar Energy Materials Research*, 13-15 October 2009, Dar es Salaam, Tanzania (To appear).
  17. "Optical Characterization of sputtered TiO<sub>2</sub> compact layers for dye-sensitized solar cell applications", S. M. Waita, B. O. Aduda, **J. M. Mwabora** and G. A. Niklasson, *Proc. 1<sup>st</sup> International Conference on Solar Energy Materials Research*, 13-15 October 2009, Dar es Salaam, Tanzania (To appear).
  16. "Optical Characterization of sputtered TiO<sub>2</sub> compact layers for dye-sensitized solar cell applications", S. M. Waita, B. O. Aduda, **J. M. Mwabora** and G. A. Niklasson, *Proc. 1<sup>st</sup> International Conference on Solar Energy Materials Research*, 13-15 October 2009, Dar es Salaam, Tanzania (To appear).
  15. "Conduction band edge of (Ti, Sn)O<sub>2</sub> solid mixtures tuning for photoelectrochemical solar cells", J. Simiyu, B. O. Aduda and **J. M. Mwabora**, *Proc. Materials Research Society*, April 2009, USA, S05-04 (DOI: 10.1557/PROC-1171-S05-04).
  14. "Titania Nanotubes prepared by synthesis method for Dye-sensitized Electrochemical Solar Cells", J. Simiyu, **J. M. Mwabora**, B. O. Aduda, G. Boschloo, A. Hagfeldt, and S-E.Lindquist, *Proc. International Conference on Microstructures and Nanotechnologies (ICMNT2006)*, 19-23 November 2006, Tizi-Ouzou, Algeria, 226(2006). (<http://www.ummt0.dz/icmnt06/proceedicmnt06final.pdf>)
  13. "Effects of concentration of dopant states on photactivity in niobium-doped TiO<sub>2</sub>", P. Ajuoga, A. Ogacho, **J. M. Mwabora**, B. O. Aduda, *Proc. 7<sup>th</sup> College on Thin Film Technology 9.7*, 24<sup>th</sup> July-4<sup>th</sup> August 2006, Dar es Salaam, Tanzania, 49(2006).
  12. "Fabrication and Characterization of nitrogen-doped titanium dioxide dye sensitized solar cells", S. W. Mugo, J. M. Ngaruiya and **J. M. Mwabora**, *Proc. 7<sup>th</sup> College on Thin Film Technology 9.7*, 24<sup>th</sup> July-4<sup>th</sup> August 2006, Dar es Salaam, Tanzania, 13(2006).
  11. "Research and Post-Graduate Training Programmes in Renewable Energy / Energy Systems in Kenya: Case Study of Kenyan Public Universities", **J. M. Mwabora**, *Proc. 1<sup>st</sup> Workshop and Meeting on Renewable Energy & Post-Graduate Training in Africa*, School of

- Engineering, Kwame Nkrumah University of Science and Technology, Kumasi, 18-22 February, 2002, Ghana, 18(2002).
10. "Obliquely sputter deposited Titanium Dioxide Photoelectrodes: Dependence of Incident Photon to Current Conversion Efficiency (IPCE) on Deposition Angle", S. M. Waita, B. O. Aduda, **J. M. Mwabora**, G. Niklasson, S.-E. Lindquist and C.-G Granqvist, *Proc. 7<sup>th</sup> College on Thin Film Technology 7.7*, University of Dar es Salaam, Tanzania, August 2002, 48(2002).
  9. "A low Pressure System for Thin Film Heat Treatment Experiments", B.J.M Muthoka, W. Barasa and **J. M. Mwabora**, *Proc. 7<sup>th</sup> College on Thin Film Technology 7.7*, University of Dar es Salaam, Tanzania, August 2002, 33(2002).
  8. "Degradation studies of Multilayer Coatings Exhibiting Angular Dependent Transmittance", R. J. Musembi, **J. M. Mwabora** and G. W. Mbise, *Proc. 6<sup>th</sup> College on Thin Film Technology 6.7*, University of Dar es Salaam, July/August 2000, 49(2000).
  7. "Nano-porous TiO<sub>2</sub> Thin Film Solar Cells Sensitized with Delphinidin Purple Dyes (Habiscus sabdariffa)", J. Simiyu, B. O. Aduda and **J. M. Mwabora**, *Proc. 6<sup>th</sup> College on Thin Film Technology 6.7*, University of Dar es Salaam, August 2000, 22(2000).
  6. "Reaction Temperature Dependence of CuInSe<sub>2</sub> Based Solar Cells Performance Using CuIn Precursors Selenized Using H<sub>2</sub>Se Gas", **J.M. Mwabora**, W.N. Shafarman and R.W. Birkmire, *Proc. 5th Kenya Physical Society (KPS) Regional Workshop*, September 2000, Nairobi, Kenya, 27(2000).
  5. "Absorber Thickness Dependence on CuInSe<sub>2</sub> Solar Cells Performance using CuIn Precursors Selenized using H<sub>2</sub>Se gas", **J. M. Mwabora**, W. N. Sharfaman and R. W. Birkmire, *Proc. World Renewable Energy Congress-VI (WREC2000)*, Brighton, UK, 2049(2000).
  4. "Transverse magnetic field strength and deposition rate changes in magnetron sputtering", **J. M. Mwabora** and R.T. Kivaisi, *Proc. 5th College on Thin Film Technology 4.7*, University of Dar es Salaam, Tanzania, July/August 1998, 12(1998).
  3. "DC Sputtered Copper Films ", **J. M. Mwabora** and R.T. Kivaisi (1996), *Proc. 4th College on Thin Film Technology 4.7*, University of Dar es Salaam, Tanzania, July/August 1996, 10(1996).
  2. "SnO<sub>2</sub>:F/SiO<sub>2</sub>/Si SIS Solar Cell", **J. M. Mwabora** and A. K. Raturi, *Proc. 1st Regional/6th Annual Conference of the Kenya National Association of Physicists*, University of Nairobi, Kenya, Sept. 1992, 17(1992).
  1. "Transparent Conducting SnO<sub>2</sub>:F films", **J. M. Mwabora** and A. K. Raturi, *Proc. World Renewable Energy Congress-II (WREC1992) 1*, Reading, U.K, 388(1992).

**d) Presentations/Attendance at professional meetings (Invited lecturer marked by \*, Attended marked by \*\*)**

- \*36. “An overview of the Global situation in the Energy sector: A comparative study”, **Julius Mwabora**, Parliament National Assembly Committee on Implementation Retreat on Liberalization of Power Distribution, Simba Lodge, Naivasha, 21<sup>st</sup> August 2015
- \*35. “Renewable Energy Research at the University of Nairobi”, **J. M. Mwabora**, Invited Lecturer, First Learning Visit, Leadership in Higher Education and Research (LEADHER) Program, University of Petroleum and Energy Studies, Dehradun, India, 30 April – 8<sup>th</sup> May 2012.
- \*34. “Solar Cells to Modules to Arrays”, **J. M. Mwabora**, Invited Lecturer, Course on Solar Photovoltaic Installation and Maintenance, 16-27 April, 2012, University of Nairobi, Kenya.
- \*33. “Draft Policy and Bill for Atomic Energy Commission”, **J. M. Mwabora**, Invited Lecturer, Fundamentals of Reactor Regulations and Fundamentals of Reactor Safety Workshop, Nairobi, Kenya, 13-17 February 2012.
- \*32. “Challenges Facing Kenya Physical Society in the last Decade”, **J. M. Mwabora**, Invited Lecturer, National Physics Forum: Mainstreaming Physics in National Development and Kenya Vision 2030”, Chepkoilel University College, Eldoret, 9-10 February, 2012
- \*\*31. Nanotechnology Workshop, 12-13<sup>th</sup> December 2012, Silver Springs Hotel, Nairobi
- \*30. “Draft Policy and Bill for Atomic Energy Commission”, **J. M. Mwabora**, Invited Lecturer, Nuclear Electricity Project Retreat, Naivasha, 21-25 November 2011.
- \*\*29. Pan African University Stakeholder Curriculum Validation Workshop, 14-18 November 2011, Addis Ababa, Ethiopia.
- \*\*28. Workshop on Draft Mining and Minerals Bill, 19<sup>th</sup> August 2011, Jomo Kenyatta University of Agriculture and Technology, Taita-Taveta Campus, Voi, Kenya.
- \*\*27. The 4<sup>th</sup> Regional Metrology Conference (RMC 2008), 1-2 December 2008, Severin Sea Lodge, Mombasa, Kenya.
- \*26. “Dye Sensitized Solar Cells”, **J. M. Mwabora**, *Invited lecturer, Cost-effective Photovoltaics Research Summer School for East Africa*, Jomo Kenyatta University of Agriculture and Technology, 19 August-1 September 2007, Nairobi, Kenya. (Oral)
- \*25. “III-V Semiconductor Solar Cells”, **J. M. Mwabora**, *Invited lecturer, Cost-effective Photovoltaics Research Summer School for East Africa*, Jomo Kenyatta University of Agriculture and Technology, 19 August-1 September 2007, Nairobi, Kenya. (Oral)
- 24. “Titania Nanotubes prepared by synthesis method for Dye-sensitized Electrochemical Solar Cells”, J. Simiyu, A. Ogacho, **J. M. Mwabora**, B. O. Aduda, S-E. Lindquist, A. Hagfeldt and G. Boschloo, *International Conference on Electroceramics*, 31 July – 3 August 2007, Arusha, Tanzania. (Oral)

23. "Temperature-dependent characterization of  $\text{TiO}_2/\text{In}(\text{OH})_x\text{Sy}/\text{PbS}/\text{PEDOT}:\text{PSS}$  eta solar cell", R. J. Musembi, **J. M. Mwabora**, B. O. Aduda, R. Bayon, A. Belaidi, M. Bär, T. Gumiskaya, Th. Dittrich, M.Ch. Lux-Steiner, presented in the *International Conference on Nano Science and Technology (ICN+T 2007)*, 2-6 July 2007, Stockholm, Sweden. (Poster).
22. "Status of Renewable Energy Use in Kenya", **J. M. Mwabora**, presented at the *International Workshop on Renewable Energy for Sustainable Development in Africa*, 18-21 June 2007, Mauritius. (Poster).
21. "Solar cell with PbS extremely thin absorber (eta) based on novel eta concept", R. J. Musembi, B. O. Aduda, **J. M. Mwabora**, R. Bayon, A. Belaidi, M. Bär, T. Gumiskaya, Th. Dittrich, M.Ch. Lux-Steiner, presented at the *6<sup>th</sup> Edward Bouchet Abdus Salam Institute International Conference on Physics & Technology for sustainable development in Africa (EBASI 2007)*, 23-26 January 2007, Capetown, South Africa. (Oral).
20. "Columnar and passivated nanoporous  $\text{TiO}_2$  based excitonic solar cell", B. O. Aduda, S. M. Waita, A. A. Ogacho, **J. M. Mwabora**, R. J. Musembi and J. Simiyu, presented at *US/Africa workshop of frontiers in materials in materials research and education*, 20-26<sup>th</sup> January 2007, Abuja, Nigeria. (Oral).
19. "Nanostructured  $\text{TiO}_2$  for Dye Sensitized Photoelectrochemical Solar Cells", **J. M. Mwabora**, J. Simiyu, S. Waita, B. Muthoka, B. O. Aduda, presented at the *ICTP-NCNNC-ICTS Asian Pacific Regional College on "Science at Nanoscale"*, 14-25 August 2006, Beijing, P. R. China. (Poster).
18. "Development Trend in Materials Science", **J. M. Mwabora**, presented at the *National Symposium on "Science, Technology, Innovation and Society: The African Perspectives and Experiences"*, June 29-30, 2006, Lenana House, Nairobi, Kenya. (Oral)
17. "Reactively sputtered  $\text{TiO}_2$  layers on  $\text{SnO}_2:\text{F}$  substrates: a Raman and SPS study", **J. M. Mwabora**, K. Ellmer, A. Belaidi, J. Rappich and Th. Dittrich, presented at the *Germany Physical Society (Deutschen Physikalischen Gesellschaft-DPG) Conference (in conjunction with 21<sup>st</sup> General Conference of the EPS Condensed Matter Division)*, 26-31<sup>st</sup> March, 2006, Dresden, Germany. (Poster).
16. "Fabrication and characterization of nitrogen doped titanium dioxide thin films for photoelectrochemical solar cell applications", **J. M. Mwabora**, T. Lindgren, E. Avendano, G. Niklasson, S.-E. Lindquist, and C. G. Granqvist, presented at the *International Conference on partnership in Scientific Research Capacity Development*, Dar es Salaam, 4-7th August 2003, Tanzania, Abstract page no. 26(2003). (Oral).
15. "Solar Photovoltaic (PV) Power and Services: Demonstration Kit, Consultancy and Installation", **J. M. Mwabora**, presented at the *Workshop on Implementation of Phase one of the Chiromo Science Park at Reef Hotel*, Mombasa, 9-12 July, 2003, Kenya. (Oral)
14. "Status of Renewable Energy in Kenya", P. Magoha, **J. M. Mwabora**, M. Agumba and M. Mwamburi, presented at *ISES Solar World*

- Congress 2003, Forum for developing countries at Gotebörg, June 14-19, 2003, Sweden. (Oral).
13. "Accelerated Degradation Studies for MgF<sub>2</sub>/Ag/MgF<sub>2</sub> Multilayer Coatings", R. J. Musembi, **J. M. Mwabora** and G. W. Mbise, presented at *ISES Solar World Congress 2003 at Gotebörg*, June 14-19, 2003, Sweden, Paper P2 89,156(2003) (Oral)
  12. "DC Sputter Deposited TiO<sub>2</sub> Photoelectrodes: Effect of Deposition Angle on the Efficiency of Dye Sensitized Solar Cells", S. M. Waita, B. O. Aduda, **J. M. Mwabora**, G. Niklasson, S. E. Lindquist, C. G. Granqvist, presented at *ISES Solar World Congress 2003 at Gotebörg*, June 14-19, 2003, Sweden, Paper W5 12, 99(2003) (Oral).
  11. "Photoelectrochemical Solar Cells based on Nitrogen-doped TiO<sub>2</sub> electrodes", **J. M. Mwabora**, T. Lindgren, E. Avendano, S.-E. Lindquist and C. G. Granqvist, presented at the *ISES Solar World 2003 Congress at Gotebörg*, June 14-19, 2003, Sweden, Paper W5 13, 99(2003).(Oral).
  10. "Photoelectrochemical and Optical Properties of nitrogen doped titanium dioxide films prepared by reactive DC magnetron sputtering", T. Lindgren, G. R. Torres, **J. M. Mwabora**, E. Avendano, J. Johnsson, A. Hoel, C. G. Granqvist and S.E. Lindquist:, presented at the *203<sup>rd</sup> meeting of the Electrochemical Society at Paris*, May 2003, France, Abstract volume no. 1724(2003). (Oral).
  - \*9. "Theoretical and practical determination of densities", **J. M. Mwabora**, *Invited Lecturer, Seminar on metrological control, checking the net content in prepackages and identifying counterfeit goods for weight and measures officers*, Wida Motel and Conference Centre, Nairobi 2-6 December, 2002, Kenya. (Oral)
  - \*8. "*Determination of density of aerosols*", **J. M. Mwabora**, *Invited Lecturer, Seminar on metrological control, checking the net content in prepackages and identifying counterfeit goods for weight and measures officers*, Wida Motel and Conference Centre, Nairobi, 2-6 December, 2002, Kenya. (Oral)
  7. "Photoelectrochemical and Optical properties of nitrogen doped titanium dioxide", T. Lindgren, **J. M. Mwabora**, J. Jonsson, E. D. Avendaño, A. Hoel, S. E. Lindquist, and C. G. Granqvist, presented at the *14<sup>th</sup> International Conference on Photochemical Conversion and Storage of Solar Energy-IPS14 at Sapporo*, 4-9 August 2002, Japan. (Oral).
  6. "Anthocyanin sensitized Nanoporous TiO<sub>2</sub> Photoelectrochemical (PEC) Solar Cells Prepared by Sol Gel Process", J. Simiyu, B. O. Aduda and **J. M. Mwabora**, presented at the *8<sup>th</sup> Conference on Colloid Chemistry*, Keszthely, 18-20 September 2002, Hungary. (Oral).
  5. "The Role of Physics and other sciences in Technological advancement in Kenya", J. M. Odote and **J. M. Mwabora**, presented at the *Launch of Kericho District Physics Teachers Association and Workshop on "Physics Education in Kericho District:Trends and Challenges"*, Kericho High School, Kericho, Kenya, 27<sup>th</sup> June, 2002, Kenya. (Oral)

4. “Self Learning in Physics”, **J. M. Mwabora**, presented at the *Self Study Centre Workshop and Open day*, University of Nairobi, Kenya, 16<sup>th</sup> August 2001, Nairobi, Kenya. (Oral).
- \*\*3. 1998 Fulbright Foreign Student Washington Seminar –“Global Leaders for a Civil Society”, Washington DC, USA, 1-5 April, 1998 (Attended).
- \*\*2. The 49<sup>th</sup> Annual Student Conference on United States Affairs(SCUSA49), Military Academy, West Point, New York, USA, 19-22 November 1997 (Attended).
- \*\*1. Applicability of Environmental Physics and Meteorology in Africa Workshop, Nairobi, Kenya.16-20 August 1993 (Attended).

#### **d) Books and E-learning materials**

##### **i) Books**

2. “Practical Physics II”, **J. M. Mwabora** and A. C. K. Mjomba, A Distance Education Learning Material for Part IV (3<sup>rd</sup> Year level) B.Ed (Science) and B.Sc. (Science), University of Nairobi, Kenya. (2006).
1. “Practical Physics I”, **J. M. Mwabora** and A. C. K. Mjomba, A Distance Education Learning Material for Part III (3<sup>rd</sup> Year level), B.Ed (Science) and B.Sc. (Science) University of Nairobi, Kenya. (2005).

##### **ii) E-learning materials**

3. “Practical Physics II”, **J. M. Mwabora** and A. C. K. Mjomba, E-Learning Material (CD) for Part IV (3<sup>rd</sup> Year level) B.Ed (Science) and B.Sc. (Science), University of Nairobi, Kenya. (2008)
2. “Practical Physics I”, **J. M. Mwabora** and A. C. K. Mjomba, E-Learning Material (CD) for Part III (3<sup>rd</sup> Year level), B.Ed (Science) and B.Sc. (Science) University of Nairobi, Kenya. (2008)
1. “Mechanics”, **J. M. Mwabora**, E-learning Material for Part I (1<sup>st</sup> Year level) B.Ed (Science) and B.Sc. (Science), University of Nairobi, Kenya. (2006).

#### **STUDENT RESEARCH SUPERVISION**

##### **a) Ph.D Student supervision to completion**

5. Cosmas Muiva, Optical Properties, Crystallization Kinetics and Glass Forming ability of  $Se_{100-x}M_x$  ( $M = In, Sb$ ) and  $Se_{90-x}In_{10}Sb_x$  Chalcogenide Glasses”, Current affiliation-Lecturer, Botswana International University of Science and Technology, Botswana (2013, Ph.D.-University of Botswana).
4. Justus Simiyu, “Characterization of Anthocyanin Dyes and Investigation of Charge Transport in  $TiO_2$  Dyes Sensitized Solar Cells”, Lecturer, Current Affiliation-Department of Physics, University of Nairobi, Kenya (2010, Ph.D-University of Nairobi).
3. Alex Awuor Ogacho, “Passivation of ultrathin nanoporous  $TiO_2$  for Photovoltaic applications”, Current Affiliation-Lecturer, Department of



- Physics, University of Nairobi, Kenya (2010, Ph.D-University of Nairobi).
2. Robinson J. Musembi, "Fabrication and Characterization of  $\text{In}(\text{OH})_x\text{S}_y$  Modified Highly Structured  $\text{TiO}_2/\text{Pb}(\text{OH})_x\text{S}_y/\text{PEDOT:PSS}$  eta Cell and study of its Transport mechanism" , Current Affiliation-Lecturer, Department of Physics, University of Nairobi, Kenya (2009, Ph.D-University of Nairobi).
  1. Sebastian Waita, "Dye Sensitized Solar Cells fabricated from Obliquely Sputtered Nanoporous  $\text{TiO}_2$  Thin Films: Characterization, Electron Transport and Lifetime Studies", Current Affiliation-Lecturer, Department of Physics, University of Nairobi, Kenya (2008, Ph.D-University of Nairobi).

#### **b) M.Sc. Student supervision to completion**

10. John W. Masika, "Atannic Rutile Tetragonoal Tin Oxide Ground State and Optical Properties studied by Local Spin Density approximation, The Greens function and Bethe Salpeter equation, Current Affiliation, Self employed (2015, M.Sc.- UoN)"
9. Mulama Austine Amukaya, "", Current affiliation-Tutorial Fellow, Maseno University (2013, M.Sc.-Maseno University).
8. Paul Ajuoga, "Effect of concentration of dopant states on photoreactivity of Nb-doped  $\text{TiO}_2$ ", Current affiliation-District Education Officer, Kisumu County (2012, M.Sc.-UoN).
7. Alfred Alex, "Effects of  $\text{O}_2$  partial pressure and substrate temperature on optical properties of DC magnetron sputtered  $\text{CuCrO}_2$  and  $\text{CuYO}_2$  thin films", Deceased- Was Lecturer, Open University of Tanzania, Tanzania (2012, M.Sc-UoN.).
6. Raphael Makokha Otakwa, "Performance characterization of a dye-sensitized solar module under tropical weather conditions: A case of Nairobi, Kenya, Current Affiliation-Lecturer, Daystar University, Nairobi, Kenya (2012, M.Sc-UoN.)
5. Joseph Ouko Olwendo, "Mobility of photo-Injected carriers in Dye-Sensitized Solar Cell", Current Affiliation-Lecturer, Pwani University College, Kenya (2008, M.Sc-UoN.)
4. Stanley Wambugu Kahuthu, "Transport Phenomenon of injected electrons in Dye Sensitized Solar Cells", Current Affiliation-Lecturer, Kenyatta University, Kenya (2008, M.Sc.-UoN).
3. Henry B. Wafula, "Effect of nitration on pressed  $\text{TiO}_2$  Photoelectrodes for dye-sensitized solar cells", Current Affiliation-Lecturer, Department of Physics, Masinde Muliro University, Kenya (2006, M.Sc.-UoN)
2. Robinson J. Musembi, "Degradation Studies of Multilayer Coatings exhibiting Angular Dependent Transmittance" , Current Affiliation-Lecturer, Department of Physics, University of Nairobi, Kenya. (2002, M.Sc.-UoN)
1. Justus Simiyu, "Sensitisation and Stability Studies of Anthocyanin based Dyes on Nanoporous  $\text{TiO}_2$  Photoelectrochemical Thin Film Solar Cells", Current Affiliation-Lecturer, Department of Physics, University of Nairobi. (2002, M.Sc.-UoN).

- Over 20 undergraduate students

## **b) Current students**

1. Victor Odari, Ph.D. program, University of Nairobi.
2. Eneku John Paul, Ph.D. Makerere University
3. Zipporah Wanjiku, Ph.D program, University of Nairobi
4. Dinfa Luka, Ph.D. Student, University of Nairobi
5. Godwin Mwebaze, M.Sc., Makerere University
6. Hellen Ouma, M.Sc., University of Nairobi
7. Fredrick Paakwah Buabeng, M.Sc., University of Ghana

## **PROFESSIONAL ACTIVITIES AND COMMUNITY SERVICE**

### **a) National Activities**

- Team Leader and Member, Pre-feasibility Study for Kenya's Nuclear Power Programme, Nuclear Electricity Project–Now Kenya Nuclear Electricity Board (Nominated by the Executive Chairman, Nuclear Electricity Project Committee), Ministry of Energy, March 2012- to September 2013 (Report submitted to International Atomic Energy Agency for Review).
- Chairman, Task Team for the Development of a Draft National Nuclear Science and Technology Policy and a Draft Bill for Atomic Energy Commission, June 2011 – June 2012(Appointed by the Secretary, National Council for Science and Technology –Now NACOSTI). The Draft Atomic Energy Policy and Bill were presented at Atomic Energy Draft Policy and Bill Stakeholders Validation Workshop at Laico Regency, Nairobi on 17<sup>th</sup> May 2012. The Policy and Bill are now being handled by an InterMinisterial Ad hoc Committee on Harmonisation of Nuclear Energy Policies.
- Country Liaison Physicist, International Union of Pure and Applied Physics (IUPAP), C/o Institute of Physics, London, January 2012-present.
- Member, Board of Governors (Appointed by the Minister for Education): (a) Mwakichuchu Secondary School (27<sup>th</sup> March 2008 to Present; Chairman B. O. G.(4<sup>th</sup> July 2008- 26<sup>th</sup> March 2012) and (b) Voi Secondary School (August 2012 to date).

### **b) External Examiner –Academic programmes and Syllabus**

- Department of Physics, Moi University, Eldoret, Kenya: 2007/08-2010/2011.

- Department of Physics, Egerton University, Njoro, Kenya: 2008/10-2010/2011.
- Department of Physics, Dar es Salaam University College of Education, Dar es Salaam, Tanzania: 2009/2010-2011/2012.
- Department of Physics, University of Dar es Salaam, Dar es Salaam, Tanzania: 2009/2010-2011/2012.
- Kabianga University College (Now University of Kabianga), Kericho, Kenya: 2009/10-present
- Department of Mathematics and Physics, The Mombasa Polytechnic University College (Now Technical University of Mombasa), B.Tech in Applied Physics Syllabus: February 2012.

### **c) External Examiner –Ph.D. and M.Sc. theses**

- Ph.D. Thesis (Physics), University of the Free State, South Africa, September 2015-“Tailoring Luminescence Properties of RE Doped Aluminate and Garnet phosphors” by Ali Halake Wako
- M.Sc. Thesis (Physics), Kenyatta University, August 2013-“System Sizing of Solar Energy Requirement for an “All-Direct Stand –alone Telecommunication System” by Nyagha Muriithi Symon
- M.Phil. Thesis (Physics), Chepkoilel University College, November 2012- “Modeling of artifacts and the temperature effect on the output characteristics of a monocrystalline silicon solar cell using the laser beam induced current/voltage (LBIC/LBIV) technique” by Stellamaris Lydia Kioko.
- M.Phil. Thesis (Physics), Chepkoilel University College, October 2012-“Aluminium Doped Tin Oxide Thin Films Prepared by Chemical Spray Pyrolysis” by NyarwandaCalvince Odhiambo.
- M.Sc. Thesis (Physics), Kenyatta University, Nairobi, Kenya, June 2012-Electrical and Optical Characterisation of  $CdxZn_{1-x}S$  and  $PbS$  Thin Films for Photovoltaic Applications” by Cliff Orori Mosiori
- M.Sc. (Physics) thesis, University of Dar es Salaam, Tanzania, May 2012-“Structural, Electrical and Optical Properties of  $ZnO:B$  Films Prepared by DC magnetron Sputtering” by Lwitiko Pholds
- M.Sc. (Physics) thesis, University of Dar es Salaam, Tanzania, October 2011-“ Establishment of baseline Data of External Ionizing radiation Dose at Proposed Uranium Mining Sites and their Neighbouring Residential Areas in Tanzania: The Case of Mkuju River” by Farida Lolila.
- M.Sc. (Physics) thesis, University of Dar es Salaam, Tanzania, , October 2011-“Determination of Lateral Dispersion of Gaseous Emissions in an Urban Roadway” by Ferdinand Stanley
- Ph.D. (Physics) thesis, Moi University, Eldoret, Kenya, November 2009-“ Preparation and Characterization of a Spectrally Selective Reflector Surface based on  $TiO_2:Nb$ . ” by Christopher Maghanga Mkiema
- M.Sc. (Physics) thesis, Moi University, Eldoret, Kenya, May 2009-“ The effect of Niobium doping on the electrical and optical properties of

titanium dioxide thin films prepared by DC magnetron sputtering” by Zephania Birech.

- Ph.D. (Physics) thesis, Maseno University, Maseno, Kenya, May 2009-“ On the design and functionality of a solar chimney, solar pressure-staged wind tunnel electric power generating plant and an integrating sphere calorimeter” by Reccab Ochieng Manyala.
- M.Sc. (Physics) thesis, Kenyatta University, Nairobi, Kenya, January 2007-“ Influence of deposition parameters on the optical properties of thin tungsten oxide film prepared by reactive dc magnetron sputtering” by Wangati Charles Kiama.
- M.Sc. (Physics) thesis, University of Dar es Salaam, Tanzania, August 2004 – “Heat Reflecting Compound Parabolic Concentration Photovoltaic applications” by Damasen Ikwaba Paul.

#### **d) Reviewer of Journal Papers and Research Grants and Scholarship Applications**

- British Journal of Applied Science and Technology-1 paper (November 2012).
- East African Journal of Pure and Applied Sciences – 7 papers (August 2007).
- African Journal of Science and Technology- 2 papers (October 2006, May 2008).
- Journal of Agriculture, Science and Technology – 1 paper (Dec. 2002).
- Journal of Applied Physics – 1 paper (March 2009)
- British Journal of Applied Science & Technology – 1 paper (December 2012).
- National Council for Science and Technology, Kenya (2009 to date)
- National Science Foundation, South Africa (2009- to date).
- German Academic Exchange Service (DAAD) (2003 – to date)
- University of Nairobi Research Grants.
- ERAfrica Project, Experts Committee meeting to review referees comments, 9-11 October 2011, Madrid, Spain.

#### **e) Membership to Professional Bodies**

- Member, Kenya National Academy of Sciences (Membership No. 100), (2004 – present); Assistant Secretary, Physical and Chemical Sciences, Sept. 2011-to date).
- Member, Physical Society of Kenya (1992 – present); Secretary (April 2012 to date).
- Bronze Life Member, University of Nairobi Alumni Association (since March 2008).
- Member, European Physical Society, (2008-present).
- Member (Membership No. 80021828), Institute of Physics, (2009-present)
- Member, NANOSciences African NETWORK, (2007-present).
- Member, Material Science and Solar Energy Network for Eastern and Southern Africa (2006 – present).

- Member, Fulbright Alumni-Kenya Chapter (1998-present).
- Member, Coordinating Board, Materials Science and Solar Energy Network for Eastern and Southern Africa, 2006 –present.
- Treasurer, Kenya DAAD Scholars Association (2006-2010).
- Chairman, Kenya DAAD Scholars Association-University of Nairobi Chapter (2006-2011).

#### **e) Other Activities**

- Gave a motivational talk to form three and four students on 26<sup>th</sup> July 2007 at Kenyatta High School, Mwatate.
- Participated in KDSA Day on 10.11.2007 where we donated books and gave motivational talks to Our lady of Fatma School, Kariobangi, Nairobi.
- Donated books and gave motivational talks to 4 primary and 4 secondary school in Voi Constituency, September 2008.
- Gave motivational talks to Kizumanzi, Kirumbi, Mwambiti and Sagalla Primary school class 7& 8 and teachers in Sagalla location, Voi district on 31<sup>st</sup> May 2010 and June 2011
- Gave motivational talk to M. M. Shah Primary School class 8, Kisumu on 15<sup>th</sup> October 2010.
- Gave a motivational talk ,“Poverty and how to rise above it” to Murray Girls High School on 26<sup>th</sup> May 2011

### **SCHOLARSHIP/FELLOWSHIP AWARDS AND GRANTS APPLICATION**

#### **a) Awards**

- German Academic Exchange Service (DAAD) Fellowship, Germany (2009).
- German Academic Exchange Service (DAAD) Fellowship, Germany (2005).
- International Science Programs Fellowship, Sweden (2002).
- International Science Programs Fellowship, Sweden (2001).
- Junior Fulbright Scholarship, USA (1997).
- German Academic Exchange Service (DAAD) scholarship, Germany (1994).

#### **b) Grants Applications**

- Carnegie-IAS Regional Initiative in Science and Education (RISE) Proposal, Regional proposal as part of the Materials Science and Solar energy Network for Eastern and Southern Africa, Submitted January 2008: US \$ 800,000 (Not successful).
- The effect of temperature on solar cell parameters and recombination analysis of dye sensitized solar cell, KES 1,287,000, Principal Investigator, submitted on 17<sup>th</sup> March 2008 to the chairman Dept. of

- Physics for onward transmission and consideration for University of Nairobi Staff Research support.
- Integrated Approach towards Quantum Dot Nanocomposite Photovoltaics, US \$ 200,000, Principal Investigators ( Dr. J. M. Mwabora, UoN and Prof. S. Ismat Shah, Departments of Physics and Astronomy & Materials Science and Engineering), Submitted in November 2007 to National Science Foundation (NSF), USA under the Materials World Network (MWN) program (Not successful).
  - Equipment (Monochromator) donation to the Department of Physics from Hahn-Meitner Institute, Berlin German following my research visit in 2005, Approximately KES 1 Million.
  - Research and Development of Solar Cells based on Dye-Sensitized Nanocrystalline TiO<sub>2</sub> Semiconductor Thin Film, Cells, 2000-2003, 2001-2004, 2003-2005, 2006-2008, 2009-2011, 2012-2014: (Approx. KES 100 million in total from International Science Programmes, Uppsala University, Sweden)-Participated as a Condensed Matter Research Group member (Principal Investigator-Prof. B. O. Aduda).
  - Materials Science and Solar Energy Network for Eastern and Southern Africa (MSSEESA), 2009 (200,000 SEK), 2010 (600,000 SEK ), 2011 (600,000 SEK) , 2012 (SEK 625,000) and 2013 (SEK 300,000) from International Science Programmes, Uppsala University, Sweden)-participated as a MSSEESA Coordinating Board member (Principal investigator-Prof. R. T. Kivaisi, University of Dar es Salaam).
  - Leadership in Higher Education and Research (LEADHER) 2012 Grant, EURO 10,000 (Principal Investigators-Prof. Julius M. Mwabora, University of Nairobi, Kenya and Prof. Sanket Goel, University of Petroleum and Energy Studies, India).
  - National Council for Science and Technology (Now NACOSTI), 2012 (K.Sh. 6 Million). (Principal Investigator, Dr. George Amolo, Chepkoilel University College)-Co Investigator, Modelling and fabrication of Energy materials-Solar and Hydrogen Storage Materials.
  - The UK Research Council, 2.7 Million £, University of Nairobi Principal Investigator (with other Principal investigators from the University of Sussex (UK), Loughborough University (UK), United International University (Bangladesh), Kwame Nkrumah University of Science and Technology (Ghana) and University of Petroleum and Energy Studies (India). Proposal entitled “Cross Country Analysis of Solar Lightning and Solar Home System” submitted in February 2013. (Not Successful)
  - Royal Society-DFID Africa Network Grants, 25,000 £. Collaborators-Pooja Panmatia-Principal Investigator, University of Huddersfield, UK; Prof. Bruno G. Pollet, University of Western Cape, South Africa and Mr. Moses Yilleng, National Research Institute for Chemical Technology, Nigeria. Proposal entitled “Functional Fuel Cell Materials: From Design to Demonstration ” Submitted in March 2013. (Not successful).
  - Materials Science and Solar Energy Network for Eastern and Southern Africa, US \$ 55,155 to host Technical Training in Instrumentation Workshop, 26-27 November 2013 and 1<sup>st</sup> Young Scientist MSSEESA Conference on Materials Science and Solar Energy Technology, 28-29 November 2013 at the Department of Physics, University of Nairobi.

## **RECENT COLLABORATORS**

- Drs. Thomas Dittrich and Klaus Ellmer, Helmholtz Centre Berlin for Materials and Energy, Germany.
- Professors Claes-Göran Granqvist, Sten-Eric Lindquist, Gunnar Niklasson, Anders Hagfeldt, Uppsala University, Sweden.
- Dr. Gerrit Boschloo, Uppsala University, Sweden.
- Prof. S. Ismat Shah, Departments of Physics and Astronomy & Materials Science, University of Delaware, USA.
- Prof. R. T. Kivaisi, University of Dar es Salaam, Tanzania.
- Dr. Sylvester Hatwambo, University of Zambia, Zambia.
- Prof. Mghendi Mwamburi, University of Eldoret, Kenya.

## **REFEREES**

### **Prof. Lucy Irungu**

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