

## **BIODATA**

Date of Birth: 29<sup>th</sup> October, 1969  
Sex: Male  
Marital status: Married  
Religion: Protestant

## **EXPERTISE**

Solar cell and solar module characterization, Photovoltaics, Renewable Energy, Electronics and Instrumentations, Solar Energy materials and solar cells.

## **SUMMARY**

- Demonstrated achiever with exceptional knowledge of Physics in research and teaching the undergraduate and post-graduate courses. Well versed with undergraduate and post-graduate physics practical and experiments.
- Skilled at learning new concepts quickly, working well under pressure and communicating ideas clearly and effectively.
- Extensive computer literacy with good knowledge of multiple computer networking environments, academic and research software programming packages.
- Enthusiastic and experienced in local and overseas travel.

## **EDUCATION**

Nelson Mandela Metropolitan University, Port Elizabeth, South Africa 2007 to 2011

### **Philisopiae Doctor (PhD in Physics)**

Thesis Title: Characterization of concentrator solar cell devices and materials using Light-Beam Induced Current measurements.

Egerton University, Nakuru, Kenya 2002 to 2004

### **Post-Graduate Diploma in Education (PGDE)**

Project Title: The studies of the possible causes of poor performance in Mathematics at Kenya certificate of Secondary Education (KCSE): A case study of Koibatek District Secondary Schools.

Moi University, Eldoret, Kenya 1993 to 1997

### **Master of Philosophy (MPhil in Physics)**

Thesis Title: The fabrication and use of a capacitance-voltage (C-V) meter.

Moi University, Eldoret, Kenya <b>Bachelor of Science (Bsc)</b> Qualification: Second Class Honours Upper Division Subjects: Physics and Mathematics: Area of specialization: Applied Electronics Project Title: The design and construction of a power supply unit to axially excite a N <sub>2</sub> gas laser.	1989 to 1992
Sacho High School <b>A Level: Kenya Advanced certificate of Education (KACE)</b> <b>Qualification: Mathematics, Physics and Chemistry 3P 0S 8 points</b>	1987 to 1988
Kabarnet Secondary school <b>O Level: Kenya certificate of Education (KCE)</b> <b>Qualification: 23 Points DIV II</b>	1983 to 1986
Tiripkatoi Primary School <b>Certificate of Primary Education (CPE) 28 Points</b>	1976 to 1982

#### AWARDS

<b>African Lacer Center (ALC) fellowships tenable in South African Universities and centers of excellence for PhD studies</b>	<b>2007 – 2011</b>
<b>Nelson Mandela Metropolitan university fellowships for PhD studies in support of existing fellowships within the university</b>	<b>2007 – 2011</b>
<b>GOK-Moi University: Master of Philosophy fellowships</b>	<b>1993 – 1995</b>

#### UNIVERSITY TEACHING EXPERINCE

Department of Physics, Kenyatta University <b>Lecturer and Researcher</b> Lecture both Post graduates and undergraduates and supervised Msc and PhD thesis	<b>2011 to present</b>
Department of Physics, Kenyatta University <b>Tutorial Fellow</b> Lecture Undergraduates and supervise undergraduate laboratory experiments	<b>2006 to 2011</b>
Department of Mathematics and Computer Sciences, Moi University	<b>2004 to 2006</b>

**Part-Time lecturer**

Lecture Physics and Electronics units to Computer Science students

Department of Physics, Moi University

**Part-Time lecturer**

**2004 to 2006**

Lecture basic Physics and Electronics to Undergraduates

**RELATED TEACHING EXPERINCE**

Teacher Service Commission

**Graduate Teacher**, Torongo Secondary School, Baringo County

**2004 to 2006**

Teaching Mathematics and Physics to High school students and prepare them for final KCSE examination. School career master and Examination master

Teacher Service commission

**Untrained Graduate Teacher**, Torongo Secondary School, Baringo County

**1993 to 2004**

Teaching Mathematics and Physics to High School students and preparing them for KCSE examinations

Poror High School

**Untrained Graduate Teacher** under School BOG

**1992 to 1993**

Teaching mathematics and Physics

**CARREER HISTORY AND ACCOMPLISHMENTS**

**Teaching and Research Kenyatta University, Nairobi, Kenya (Lecturer 2011 to present)**

- Acting chairman, Departmental board of post graduate studies May to August, 2019
- Acting chairman, Department of physics, Kenyatta university for short periods in 2015, 2016, 2017, 2018 and 2019
- Acting chairman, Departmental board of post graduate studies (May to August, 2015) and for short durations in 2014 and 2016
- Appointed member, Train The Trainer (TTT) workshop (2017-2020). A Kenyatta University Neu-Ulm university Germany-Project on applied Entrepreneurship Academy in Renewable Energy
- Member of local organizing committee the 6<sup>th</sup> ICAT workshop held at Kenyatta University in 2014 (16<sup>th</sup> to 22<sup>nd</sup> November, 2014 at School of Engineering Boardroom)

- Member of School of Pure and Applied Sciences building committee
- Member of School of Pure and Applied Sciences scientific awareness committee
- Teaching physics courses to both the undergraduates and post graduates students
- Supervise researched thesis for Msc and PhD studies
- Attended student placement meeting at department board of postgraduate committee
- Attended postgraduate research and evaluation seminars
- Physics field trips coordinator.
- Physics First years academic advisor
- Physics First years laboratory director

**Teaching and research Kenyatta University, Nairobi, Kenya (Tutorial Fellow 2006 to 2007)**

- Taught physics courses to the undergraduates
- Coordinate and supervise physics experiments to the undergraduates
- Attended student placement meeting at department board of undergraduate committee
- Attended postgraduate research and evaluation seminars

**Departmental Field trips course coordinator Kenyatta University, Nairobi, Kenya**

- Handled administrative functions of departmental fields trip division catering primarily for the planning and implementing departmental fields trips
- Solicits for departmental fields trip funds from the university
- Organize, plan and administer departmental fields trip in line with departmental academic work and per university field trip policy

**Part time teaching, Moi university. Eldoret, Kenya.**

Taught physics and electronics course to the undergraduates in the Department of Physics and the Department of Mathematics and Computer Science, specific courses taught were Basic Physics, Physics for Agriculture, Digital Electronics, Microwaves, Semiconductor Physics and Electronics

**TSC Teaching; Torongo High School, Nairobi, Kenya**

- Taught Physics and Mathematics to High School students.
- Prepare students for their final end of course (KCSE) examinations.
- Career and Examination Master; Help, plan and disseminate yearly academic program. Assist and do student placement.

### **PUBLICATIONS AND PAPERS**

1. NM Musila, **MK Munji**, J Simiyu, E Masika, RL Nyenge , (2018) Characteristics of TiO<sub>2</sub> Compact Layer prepared for DSSC application, *Trajectoria Nauki= Path of Science*, 4(10) Pp 3006-3012
2. Muchiri, K, **Munji, KM**, Mutuku, JN and Wekesa, DW, (2018) Digital To Analog TV Decoder design And Fabrication, *IOSR Journal of Electronics and Communication Engineering (IOSR-JECE)* e-ISSN: 2278-2834,p-SSN: 2278-8735. Volume 13(5), Pp 23-31 [www.iosrjournals.org](http://www.iosrjournals.org)
3. NM Musila, **MK Munji**, J Simiyu, E Masika, RL Nyenge , (2018) Effect of TiO<sub>2</sub> Compact Layer on DSSC Performance, *Trajectoria Nauki= Path of Science*, 4(9) Pp 5001-5008
4. Wycliffe Omwansu, **Mathew Munji** and Charles Migwi (2018) Electrically Switchable Nano Crystals-in-Glass Coatings That Dynamically Filter Heat and Light, *International Journal of Thin Films Science and Technology* 7(3):113-121
5. Nicholas Musila, **Mathew Munji**, Justus Simiyu, Eric Masika and Raphael Nyenge (2018) Optical Properties and Analysis of OJL Model's Electronic inter-band Transition Parameters of TiO<sub>2</sub> Films, *Trajectoria Nauki = Path of Science*. 4(7):3001-3012
6. Nyasani, E.I., **Munji K.M.**, Mukuru, S.A., Lenatha, M.A. and Nyabuga D. (2018) Wind Energy assessment as a potential alternative energy source in Kisumu city in Kenya. *World Journal of Engineering Research and Technology* 4:75-104
7. P.N. Onkundi, **K.M. Munji**, D.B. Bem and B. Muthoka (2018) Effect of Deposition Parameters on Optical and Electrical Properties of SnO<sub>2</sub>:Al Thin Films Prepared by Spray Pyrolysis Technique for Optoelectronic Devices. *International Journal of Thin Films Science and Technology* 7(1):25-33
8. Nelson Mugambi, **Mathew Munji**, Robinson Musembi, John Gitonga and Geoffrey Gitonga (2017) Optical Characterization of Sn<sub>x</sub>Se<sub>y</sub>: SnO<sub>2</sub>-Ni Prepared by Spray Pyrolysis for Photovoltaic Application, *American Journal of Materials Science*, 7(6):240-249
9. Cliff Orori Mosiori, Robert Magare, **Mathew Munji** (2017) Impact of Annealing Thin Films In(OH)<sub>x</sub>Sy grown by Solution Technique, *Trajectoria Nauki = Path of Science*. 3(7):3.1-3.8

10. John Gitonga, **Mathew Munji**, Robinson Musembi, Nelson Mugambi and Geoffrey Gitonga (2017) Effect of Substrate Temperature on the Optical Properties of  $\text{Sn}_x\text{Se}_y/\text{ZnO}:\text{Al}$  P-N Junction Solar Cell, *American Journal of Materials Science*, 7(6):250-257
11. W. Okullo, E.E. van Dyk, F. J. Vorster, **M. K. Munji**, W. J. Alistoun (2017) Maximum Power Point Tracking Algorithm Performance Assessment of Grid-Assist Photovoltaic System, *International Journal of Scientific and Engineering Research* 8(12):358-362
12. Geoffrey Gitonga Riungu, **Mathew Munji**, Robinson Musembi, Nelson Mugambi and John Gitonga (2017) Optical Characterization of  $\text{Sn}_x\text{Se}_y/\text{SnO}_2$ : Co P-N Junction Deposited by Spray Pyrolysis for Photovoltaic Application, *American Journal of Materials Science*, 7(6):258-265
13. Opiyo S.O., **Munji M.K.**, Njoroge W.K., Makori N.E. and Obare B.M. (2016) Electrical Characteristics of Zn Doped  $\text{In}_2\text{Se}_3$  Thin Films for Phase Change Memory (PRAM) Applications, *American Journal of Condensed Matter Physics* 6(2):21-26
14. Mosiori C.O., **Munji K.M.**, Maera J. and Magare R.O. (2015) Modeling transfer of electrons between energy states of an electrolyte and CdS thin films using Gerischer model, *Engineering International* 3:35-44
15. Patrick Mwinzi Mwathe, Robinson Musembi, **Mathew Munji**, Francis Nyongesa, Benjamin Odari, Walter Njoroge, Bernard Aduda and Boniface Muthoka (2015) Effect of Annealing and Surface Passivation on Doped  $\text{SnO}_2$  Thin Films Prepared by Spray Pyrolysis Technique, *Advances in Materials*, 4(3):51-58
16. N. Kwarikunda, E.E. van Dyk, F.J. Vorster, W. Okullo and **MK. Munji**, (2014) Application of LBIC measurements for characterization of triple junction solar cells, *Physica B*, 439:122-125
17. Patrick Mwinzi Mwathe, Robinson Musembi, **Mathew Munji**, Benjamin Odari, Lawrence Munguti, Alex Alfred Ntilakigwa, John Nguu, Bernard Aduda and Boniface Muthoka (2014) Influence of surface passivation on optical properties of spray pyrolysis deposited Pd-F: $\text{SnO}_2$ . *International Journal of Materials Science and Applications*, 3(5):137-142
18. Patrick Mwinzi Mwathe, Robinson Musembi, **Mathew Munji**, Benjamin Odari, Lawrence Munguti, Alex Alfred Ntilakigwa, Julius Mwabora, Walter Njoroge1, Bernard Aduda and Boniface Muthoka (2014) Surface passivation effect on  $\text{CO}_2$  sensitivity of spray pyrolysis deposited Pd-F:  $\text{SnO}_2$  thin film gas sensor, *Advances in Materials*; 3(5): Pp 38-44
19. Shikali Collins, **Munji Mathew** and Ambusso Willis (2014) Radionuclide Content of Sands Used for Construction in Kakamega County, Kenya and Associated Indoor Radon Diffusion Fluxes, *Journal of*

*Environment and Earth Science*, 4:123-128

20. Patrick Mwathe, Robinson Musembi, **Mathew Munji**, Victor Odari, Lawrence Munguti, Alex Ntilakigwa, John Nguu and Boniface Muthoka (2014) Effect of Surface Passivation on Electrical Properties of Pd-F:SnO<sub>2</sub> Thin Films Prepared by Spray Pyrolysis Technique. *Coatings*, 4:747-755
21. B.A. Butler, E.E. van Dyk, F.J.Vorster, W.Okullo, **M.K.Munji** and P.Booyesen (2012) Characterization of a low concentrator photovoltaics module, *Physica B*, 407(10):1501-1504.
22. R.D. Schultz, F.J. Vorster, **M.K. Munji** and E.E. van Dyk (2011) *Analysis of degradation of CPV cells using solar light beam induced current measurement*, in the proceeding of European Materials Research Society (EMR-S) Nice France, 9th-13th May, 2011.
23. W. Okullo, **M.K. Munji**, F. J. Vorster and E.E. van Dyk, (2011) Effects of spectral variation on the device performance of copper indium diselenide and multi-crystalline silicon photovoltaic modules, *Solar Energy Materials and Solar Cells*, 95(2):759 – 764.
24. **M.K. Munji**, W. Okullo, E.E. van Dyk, and F.J. Vorster (2009) Local device parameter extraction of a concentrator photovoltaic cell under solar spot illumination, *Solar Energy Materials and Solar Cells*, 94:(12):2129–2136
25. **M.K. Munji**, E.E. van Dyk, and F.J. Vorster (2009) *Inhomogeneities in silicon-based back-contact concentrator photovoltaic devices*, In the Proceeding of the 24<sup>th</sup> European Union Photovoltaic and Solar Energy Conference, vol. 24:717–720.
26. **M.K. Munji**, E.E. van Dyk, and F.J. Vorster (2009) Experimental analysis and modeling of the I–V characteristics of photovoltaic solar cells under solar spectrum spot illumination, *Physica B*, 404(22):4457–4460.

### Conferences Attended

1. IM Kwembur, EE van Dyk, JI Crozier, FJ Vorester, RM Dix-Peek and **MK Munji**, Assessment of Photovoltaic module degradation using Electroluminescence and other optical techniques, 10<sup>th</sup> ALC student workshop, STIAS Wallenberg research center, Stellenbosch University, South Africa, (December, 2017)
2. The first young scientist MSSEESA conference on material science and Solar cell technology. United Kenya Club, Nairobi, 27<sup>th</sup> to 30<sup>th</sup> November, 2013
3. **MK Munji**, W Okullo, EE van Dyk, FJ Vorster, Inaugural conference on nanotechnology and material

science development in Kenya, Kenyatta University Conference Center, Kenyatta University, Kenya (July, 2012)

4. **MK Munji**, W Okullo, EE van Dyk, FJ Vorster, Solar cell parameter extraction from illuminated current-voltage data using particle swarm optimization, 55th South Africa Institute of Physics Conference, CSIR, Pretoria, South Africa 27<sup>th</sup> Sept, to 4<sup>th</sup> Oct, 2010
5. **MK Munji**, W Okullo, EE van Dyk, FJ Vorster, Variation of device parameters of multi-crystalline silicon solar cells on defects regions, 55th South Africa Institute of Physics Conference, CSIR, Pretoria, South Africa, 27<sup>th</sup> Sept, to 4<sup>th</sup> Oct, 2010
6. **MK Munji**, W Okullo, EE van Dyk, FJ Vorster, Solar cell parameter extraction from spot illuminated light beam induced current data, 3rd ALC student symposium, Zevenwacht wine estate, South Africa, 23<sup>rd</sup> – 26<sup>th</sup> September, 2010
7. **MK Munji**, EE van Dyk, FJ Vorster, Inhomogeneities in silicon-based back-contact concentrator photovoltaic devices, 24th European Union Photovoltaic Solar Energy conference (EUPVSEC), Hamburg, Germany, 20th-26<sup>th</sup> September, 2009
8. **MK Munji**, EE van Dyk, FJ Vorster, Analysis of back point-contact silicon cell maps from Solar-Light Beam Induced Current (S-LBIC) measurement, 54th South Africa Institute of Physics Conference, UKZN, South Africa, 6th-11th July, 2009
9. **MK Munji**, M. Mwamburi, EE van Dyk, FJ Vorster, Application of an algorithm for extraction of electrical parameters of multi-crystalline silicon solar cells, 2nd ALC student symposium, Kariega game reserve, South Africa, 2th-5<sup>th</sup> July, 2009
10. **MK Munji**, EE van Dyk, FJ Vorster, Experimental analysis and modeling of the I-V characteristics of photovoltaic solar cells under solar spectrum spot illumination, Conference on Photonic materials, Mabula game reserve, South Africa, 23<sup>rd</sup> - 25<sup>th</sup> March, 2009
11. **MK Munji**, EE van Dyk, FJ Vorster, Laser Beam Induced Current analysis of surface defects and grain boundaries in Edge defined Film-fed Growth silicon solar cell, 1st ALC student symposium, Kariega game reserve, South Africa, 7<sup>th</sup> – 9<sup>th</sup> May, 2008

### **Papers presented in Conferences**

1. IM Kwembur, EE van Dyk, JI Crozier, FJ Vorester, RM Dix-Peek and **MK Munji**, Assessment of Photovoltaic module degradation using Electroluminescence and other optical techniques, 10<sup>th</sup> ALC student workshop, STIAS Wallenberg research center, Stellenbosch University, South Africa, (December, 2017)
2. N Kwarikunda, EE van Dyk, FJ Vorster, W Okullo and **MK Munji**, Integrating spectral measurements into solar light beam induced current (S-LBIC) measurements.
3. N Kwarikunda, EE van Dyk, FJ Vorster, W Okullo and **MK Munji**, Application of LBIC measurements for characterization of triple junction solar cells, 5th Conference on Photonic Materials, Kariega Game Reserve, South Africa (May 2013).
4. P Kinyua, R J Musembi and **MK Munji**, Stability Monitoring of  $\text{Sn}_x\text{Se}_y/\text{ZnO}:\text{Sn}$  solar cells prepared by resistive evaporation, ANSOLE Mini-Symposium in Kenya, University of Nairobi, Kenya (May, 2013)



5. N. Kwarikunda, E.E. van Dyk, F.J. Vorster, W. Okullo and **M.K. Munji**, Integrating spectral measurements into solar light beam induced current (S-LBIC) measurements. 5<sup>th</sup> ALC student workshop, Hotel Safari, Windhoek, Namibia (November, 2012)
6. W Okullo, **MK Munji**, EE van Dyk, FJ Vorster, Analysis of Degradation of CPV Cells using Laser Beam Induced Current Measurements, 4th African Laser Centre Student Workshop, Zevenwacht Wine Estate, Stellenbosch, South Africa (November 2011).
7. R.D. Schultz, F.J. Vorster, **M.K. Munji** and E.E. van Dyk, Analysis of degradation of CPV cells using solar light beam induced current measurement, European Materials Research Society (EMR-S) conference, Nice France, 9th-13th May, 2011.
8. BA Butler, EE van Dyk, FJ Vorster, **MK Munji**, W Okullo, P Booyesen Characterization of a Low Concentrator Photovoltaics Module 4th Conference on Photonic Materials, Kariega Game Reserve, South Africa (May 2011).
9. W Okullo, **MK Munji**, EE van Dyk, FJ Vorster, Spectral characterization of photovoltaic devices, 55th South Africa Institute of Physics Conference, CSIR, Pretoria, South Africa 27<sup>th</sup> Sept, to 4<sup>th</sup> Oct, 2010
10. EE van Dyk, BA Butler, FJ Vorster, **MK Munji**, W Okullo, P Booyesen, Characterization of a low concentrator photovoltaic module, 55th South Africa Institute of Physics Conference, CSIR, Pretoria, South Africa 27<sup>th</sup> Sept, to 4<sup>th</sup> Oct, 2010
11. W Okullo, **MK Munji**, EE van Dyk, FJ Vorster, Characterization of CIGS and mc-Si photovoltaic modules, 3rd ALC student symposium, Zevenwacht wine estate, South Africa, 23<sup>rd</sup> – 26<sup>th</sup> September, 2010

## **POSTGRADUATE THESIS SUPERVISION AND EXAMINATION**

### **Thesis supervision**

### **PHILOSOPAE DOCTOR**

#### **PhD in Material Science**

#### **Graduated 2019**

1. Musila Nicholas Muendo, I84/32270/2015, Characterization and efficiency improvement studies of TiO<sub>2</sub> based dye-sensitized solar cells

#### **PhD supervision from 2016 to present**

1. Muchira Irene Wanjiku, I84/32275/2015, Crystallization kinetics and structural properties of In-Se-Bi thin films for reversible phase change memory (PRAM) applications
2. Makunda Crucifixa Maloba, I84/32274/2015, Optical and electrical characterization of poly(3,hexylthiophene): phenyl (carbon60butyric acid methylester polymer blends doped with hexagonal

boron nitride for solar cell applications

3. Nyakundi Evans Makori, I84/32281/2015, Effects of deposition pressure on optical and thermal-electric of Nitrogen doped tin selenide thin film prepared by thermal evaporation

Co-Promoter

1. Kwembur Mokwo Isaac: (2017 – Present) Nelson Mandela University, South Africa,

## **MASTER DEGREE**

**Msc (Physics), Msc (Materials Science) and Msc (Electronics and Instrumentation)**

### **Graduated 2019**

1. Nyakiti Kevin Ochieng, I56/CE/22395/2010, Investigating characterization of SnSe-ZnS:Al p-n junction thin film for solar cell application
2. Kabaraka James Otieno, I56/22402/2010, Influence of i-ZnO buffer layer on Cu<sub>2</sub>O-ZnO:Al p-n junction for solar cell applications
3. Chumo K. Cosmas, I56/CE/14136/2009, Optical and Electronic Characterization of CuS and CdS:B Thin Films For Solar Cell Application
4. Kineene Miriam M., I56/23514/2011, Synthesis and characterization of Niobium Oxide Thin Film for DSSC Application
5. Majau Agriphina Mugure, I56/24240/2013, Design and fabrication of an autonomous line follower robot capable of picking and dropping objects from one point to another
6. Nafuna Elizabeth Wanyonyi, I56/CE/24489/2012, A novel synthesis and characterization of dyes in TiO<sub>2</sub> matrix for low cost solar energy conversion
7. Magare Aondo Douglas, I56/27970/2014, Design and analysis of micro-strip antenna for 2.4GHz applications
8. Omwoyo Jared Gisemba, I56/CE/24509/2012, Characterization of Cu<sub>2</sub>S/SnO<sub>2</sub>:F P-N junction for solar cell applications
9. Otieno Philip Jeremia, I56/CE/22396/2010, Investigating the optical and electrical properties of Cu<sub>2</sub>O and ZnS:Al thin films for solar cell applications

### **Graduated 2018:**

1. I56/CE/22400/2010, Duke Ateyh Oeba, Electrical and optical characterization of Cu<sub>4</sub>SnS<sub>4</sub> and CdS:B thin films for photovoltaic applications
2. I56/20406/2012, Magare O. Robert, Fabrication and Characterization of TiO<sub>2</sub>/In(OH)<sub>x</sub>S<sub>y</sub>/SnS Composite ETA Solar Cell
3. I56/CE/22398/2010, Edward Omuga Ntambo, Study of SnS and Cd<sub>x</sub>Zn<sub>1-x</sub>S Thin Film Deposited by Spray Pyrolysis for Photovoltaic Applications
4. I56/CE/28336/2013, Ndwiga Nicholus Kariuki, Design and construction of a PIC microcontroller-based five degree of freedom robotic arm using servo-motors
5. I56/CE/26623/2011, Irungu Moses Kahura, Design and fabrication of a microcontroller based smart door lock

**Graduated 2017:**

1. I56/CE/11000/2006, Andrew Yotui Chepyegon, Sound compression by modified discrete cosine transform: the MP3 coding standard
2. I56/CE/22773/2010, Kennedy Muchiri, A Simple Manual Digital to Analogue Decoder Design for Analogue TV Reception
3. I56/CE/26186/2011, Ephantus Nyaga Njeru, Characterization of  $Cd_xSe_{1-x}S/Cu_2S$  p-n Junction for Solar Cell Application Prepared by Chemical Bath Deposition Method
4. I56/CE/26613/2011, Omwansu O. Wycliffe, Solution-based Fabrication of  $Ni_xOTi_{1-x}/CeO_2-TiO_2$  Nanostructured Thin Film for Energy-efficient Applications in Smart Window

**Graduated 2016:**

1. I56/CE/22377/2010, Obare Benard Mosoti, Characterization of  $Cu_xN_y$  and  $CdO:Al$  thin films for solar cell applications
2. I56/CE/22416/2010, Mogunde Charles Moraro, Optical and electrical characterization of  $Cd_xSe_{1-x}$  and  $Cu_2S$  thin films for solar cell application
3. I56/CE/26184/2011, Kang'ethe Michael, Optical, Electrical and Structural Analysis of  $Cd_{1-x}Fe_xS/CuS$  p-n Junction for Solar Cell Application
4. I56/CE/26617/2011, Mugambi Nelson, Characterization of Tin Selenide : Nickel-doped Tin Prepared by Spray Pyrolysis for Photovoltaic Application
5. I56/CE/25987/2011, Gitonga John Mbae, Analysis of Optimized Deposition Temperature of  $ZnO:Al$  Thin Films on  $Sn_xSe_y/ZnO:Al$  p-n Junction Solar Cell
6. I56/CE/26614/2011, Riungu Geoffrey Gitonga, Characterization of  $Sn_xSe_y:SnO_2-Co$  p-n Junction Deposited by Spray Pyrolysis for Photovoltaic Application
7. I56/21149/2010, Nyasani Eric Isaboke, Wind energy assessment as a potential alternative energy source in Kisii and Kisumu towns in Kenya

**Graduated 2015:**

1. I56/CE/22404/2010, Opiyo Samwel Olaka, Investigating effect of Zn doping on  $In_2Se_3$  thin film for phase change random access memory (PRAM) applications
2. I56/CE/22374/2010, Patrick Mwinzi Mwathe, Effect of surface passivation on doped tin (IV) oxide thin films for gas sensor application
3. I56/7707/2002, Francis Mwaura Ng'ang'a, Measurements and evaluation of radio frequency radiation at cellular base station
4. I56/CE/22378/2010, Njeru Elosy Gataka, Performance evaluation of silicon based photovoltaic modules found in the Kenyan market
5. I56/21439/2012, Josephat Waithuki Kariuki, Analysis of Microstrip Antenna Using Arbitrarily Shaped Patches Having Similar Surface Area
6. I56/CE/20980/2010, Nyangaresi P. Onkundi, Characterization of  $SnO_2:Al-ZnO:Al$  p-n Junction Deposited by Spry Pyrolysis Technique for LED Application

**Graduated 2014:**

1. I56/14298/2009, Nyaga Peter Kinyua, Stability monitoring of  $Sn_xSe_y/ZnO:Sn$  solar cell prepared by resistive evaporation method
2. I56/CE/22375/2010, Mukere Moffat Kiruthu, Sizing a standalone photovoltaic electrical solar system

for domestic consumption

3. I56/23507/2011, Musila Nicholas Muendo, Characterization of low cost TiO<sub>2</sub> based dye-sensitized solar cell prepared by screen printing method

#### **Graduated 2013**

1. I56/20426/2010, Morko Kwembur Isaac, Design and fabrication of current-voltage curve meter for electrical characterization of photovoltaic modules
2. I56/CE/15221/2008, Collins Shikali Ndega, Radionuclide content of sands used for construction Dr. W. Ambusso Graduated in in Kakamega and associated indoor radon diffusion doses
3. I56/CE/22385/2010, Nyaga Muriithi Symon, System sizing of solar energy requirement for an 'all-direct current' standalone telecommunication system

#### **On Going Projects and thesis supervision**

Msc (Physics), Msc (Materials Science) and Msc (Electronics and Instrumentation)

1. Onyango Edwin, I56/CE/14132/2009, Increasing the Efficiency of the Dye-Sensitized Solar Cells by Incorporating Imidazolium Salts
2. Kirui Geoffrey Kipkemoi, I56/20422/2010, Analysis of Effect of Substrates on the Radiation of Rectangular Microstrip Antenna Array of Various Patch Sizes
3. Sarah Aseda, I56/20404/2012, Reduction of Errors Caused by Cross-Polarization In A Microchip Antenna
4. Shikambe R. Tsisambo, I56/CE/14120/2009, Optical and Electrical Characterization of Cd<sub>x</sub>Ni<sub>1-x</sub>S and Sb<sub>2</sub>S<sub>3</sub> Thin Film for Photovoltaic Applications
5. Ndonge Sally Mutheu, I56/CE/23512/2011, Effects of Substrate Deposition Temperature on the Properties of Sn<sub>x</sub>Se<sub>y</sub>/ZnO:Sn Thin Film Solar Cells
6. Muchangi Philip M. M., I56/CE/26172/2011, Effect of Deposition Temperature on the Properties of Al Doped SnO<sub>2</sub> in Sn<sub>x</sub>Se<sub>y</sub>-SnO<sub>2</sub>:Al p-n Junction Solar Cell
7. King'ang'i James Mwiti, I56/CE/22372/2010, Characterization of CuO/ZnO:Al P-N junction for solar cell application
8. Onger Evans Machuki, I56/CE/26169/2011, Characterization of CuO<sub>2</sub>/SnO<sub>2</sub>:F P-N Junction for Solar Cell Applications
9. Okinyi Dennis Ombagi, I56/CE/24511/2012, Characterization of SnS/SnO<sub>2</sub>:Sb P-N junction for solar cell applications
10. Wekesa Evelyne Nafula, I56/CE/24513/2012, Investigation of temperature effect on hydrothermal synthesized nanoparticles Dye Sensitized Solar Cell
11. Kereu Shem, I56/24958/2013, Optical and electrical characterization of ZnS:In /CuS thin films grown by CBD technique for solar cells
12. Lydia M. Kinari, I56/CE/26629/2011, Analysis of SnO<sub>2</sub>:F/ZnO Nano composite for Gas Sensing Application
13. Kisavi Peter Kioko, I56/CE/28363/2013, Design and fabrication of an adaptive sensor control device
14. Mirriam Mumbua Muema, I56/27930/2014, Analysis of optical and electrical properties of

CuO/SnO<sub>2</sub>:F nanocomposite for carbon monoxide gas sensor application

15. Nyaga Janeleah Wanja, I56/CE/28337/2013, Design of a microcontroller based home access system using a GSM module
16. Mwaha Paul Irungu, I56/CE/28332/2013, Design and construction of a microcontroller-based human audial noise monitoring system
17. Ontita Zachariah Monda, I56/CE/24517/2012, Fabrication and characterization of SnS-SnO<sub>2</sub>:F P-N junction for solar cell applications
18. Nyabuto Achuka Denis, I56/CE/28333/2013, Optical and electrical characterization of Sb<sub>2</sub>S<sub>3</sub> and In<sub>2</sub>O<sub>3</sub>:Sn thin films for photovoltaic applications prepared by solution growth technique\
19. Gichuru Martin Gitonga, I56/30742/2015, Optical and electrical characterization of ZnO/TiO<sub>2</sub> based dye-sensitized solar cell

## **Thesis Examination**

### **Internal Examiner (Msc)**

1. Muchira Irene Wanjiku, I56/20423/2010, Crystallization kinetics of In<sub>x</sub>Se<sub>y</sub> thin films for phase change memory (PRAM) applications
2. Augustine Ketko, I56/CE/14118/2009, Effect of petroleum products spillage on environment
3. Benard Riro Morumbwa, I56/10991/2006, Fabrication of portable spectrometers to investigate optical properties of thin film
4. Masinde T. Sangura, I56/15645/2005, Multivariate chemo-metric analysis of radionuclide and heavy metal fluxes in shore sediment at port Victoria, Kenya
5. Ogaro Elijah Nyakang'o, I56/CE/10992/2006, Phase shifting diffraction interferometer for absolute calibration of optical flats
6. Mose Rose Gesare, I56/CE/11459/2008, Design and fabrication of a substrate holder controlled using Lab View validated by deposition of Cu<sub>x</sub>N
7. Murori Francis Kamau, I56/CE/14134/2009, Design and fabrication of computer based metal detection system for security applications
8. Shivachi Newton Shuma, I56/CE/14110/2009, Design and fabrication of a microcontroller based carbon monoxide monitoring and mapping system using GPS technology
9. Munguti Lawrence Kioko, I56/CE/10994/2006, Characterization of Sn<sub>x</sub>Se<sub>y</sub>/ZnO:Sn P-N junction for solar cell applications
10. Mosiori Cliff Orori, I56/12236/2009, Electrical and optical characterization of Cd<sub>x</sub>Zn<sub>1-x</sub>S and PbS thin films for photovoltaic applications
11. Mbithi Nelson Matheka, I56/CE/11500/2007, Mechanical properties and thermal degradation of blends of bitumen and cellulose
12. Otieno George Were, I56/CE/10382/2007, Mechanical, diffusion and degradation properties of blends of cellulose and recycled low density polyethylene
13. Kamau Charles Muthui, I56//CE/11177/2007, Nitrogen doping effect on tin-selenium thin films from phase change memory applications

14. Korir Patrick Kiprono, I56/CE/11186/2007, Mechanical, diffusion and degradation behaviour of polypropylene and cellulose blends
15. Moustapha Kassim, I56/CE/11420/2007, Magnetic studies of iron ore mineral deposits in Mbeu area, Meru county
16. Dorcus Nthoki Mulumba, I56/CE/15669/2005, Study and design of a mobile phone-based route prediction optimizer for a security application
17. Elijah Daniel Okelo, I56/CE/11179/2007, Gamma ray spectrometry analysis of the naturally occurring radionuclides in sand samples from sand mines on the shores of lake Victoria in Migori county, Kenya
18. Stanley Kibet Kitur, I56/CE/15635/2005, Design and fabrication of general aperture coupled microstrip antennas with arbitrarily shaped apertures
19. Mwenda Dickson Kinyua, I56/CE/10490/2008, Interferometric analysis of the cellophane sheet for broad band application in phase retardation
20. Nyakundi Makori Evans, I56/CE/11486/2008, Characterization of SnSe-CdO:Sn P-N junction for solar cell applications
21. Vincent Onyancha Abuga, I56/CE/15208/2008, Geophysical investigation of Mbeu iron ore deposit in Meru county using gravity method
22. Mutunga J. Mutungi, I56/CE/22274/2012, Assessment of Natural Radioactivity Concentration Levels in Geological Samples Collected in Selected Areas in Makueni County
23. Njoroge David Kimemia, I56/24956/2013, Fabrication and characterization of a graphite dispersed Titanium Dioxide Solid Solar Cell
24. Margaret Mwaura Muria. Performance of a Double Reflector Solar Box Cooker with Phase Change Material heat storage unit
25. Ombati Dennis, I56/CE/23417/2012, Geophysical investigation in Rongo gold mining area in Migori county using resistivity method
26. Kago James Ndungu, I56/CE/28347/2013, Elastic scattering of electron by Barium atom using distorted wave method
27. Keng'werere Joshua Mose , I56/CE/10899/2008, Design and fabrication of a dual-resistive evaporation system controlled using Lab-View
28. Kamau Samuel Githira, I56/26190/2011, Effects of *aspergillus niger* on Mechanical, Diffusion and Thermal Degradation Properties of Low Density Polyethene
29. Wekunda B. Z. Buya, I56/13090/2005 In<sub>x</sub>Se<sub>y</sub> Alloy Thin Films For Phase Change Random Access Memory (Pram) Applications
30. Kimonyi Shadrack Muthoka, I56/20369/2010, Design of an Automatic Intelligent Room Light Controller with Bidirectional Counters for Energy Efficiency Application
31. Choge Hillary Kirwa, I56/CE/15629/2005, Optical and Electrical Characterization of ZnSe-Cu<sub>x</sub>O<sub>y</sub> Thin Films for Solar Cell Applications.
32. Kamunde Karimi Betty, I56/24516/2012, Assessment of radiation exposure levels associated with sand used for construction in Tharaka region, Tharaka-Nithi county
33. Mwangi Peter Ngugi, I56/24955/2013, A low cost water meter system based on global system for

mobile communication

34. Vincent Onyango Othieno Nunda Agutu, I56/CE/23526/2011, Effect of exchange and absorption potential in the distorted wave calculation of electron impact excitation of auto ionizing state of rubidium
35. Joseph Ayieta Warega, I56/CE/24502/2012, Geothermal prospection of Ol Karia dome areas in Naivasha, Nakuru county using gravity method

### External Examiner

1. Awany Denis, 2012/HD13/685U, Energy Yields of Selected Photovoltaic Modules of Different Technologies in Kampala, Uganda. Msc. Makerere University, Uganda, 2015
2. Baira John, 2009/HD13/15588U, Device Performance Parameter Extraction from I-V Characteristics of Selected Photovoltaic Modules in Ugandan Market, Msc. Makerere University, Uganda, 2013
3. Obbo Moses, 2012/HD13/681U, Development of a Low Cost Large Area Laser Beam Induced Current System. Msc, Makerere University, Uganda, 2015
4. Okello Alex, 2008/HD13/13500U, Performance Evaluation of Poly-Crystalline Silicon Photovoltaic Modules in the Ugandan Market, Msc. Makerere University, Uganda, 2013
5. Lucian John-Ross Bezuidenhout, On characterization of photovoltaic device parameters using light beam induce current measurement, Msc. Nelson Mandela Metropolitan University, South Africa, 2014
6. Nicholas Kwarikunda: On the characterization of solar cells using light beam induced current measurements. PhD, Nelson Mandela Metropolitan University, South Africa, 2015.

### Concepts papers and funding Proposals written

1. **Principal Investigator (Kenya side)** on *Large Area Laser Beam Induced Current characterization of photovoltaic modules*. CSIR NATIONAL LASER CENTRE / DST ALC RESEARCH GRANT, 2011 to present. Renewable annually. 2020/2021 grant was R93,100 KES578,100@R1 = KES6.21
2. Member and Researcher in the departmental material science research group. The Department of Physics and in particular the Materials Science research group was competitively selected as a African Host University (AHU) to Partnership for skills in Applied Sciences, Engineering and Technology (PASET) Regional Scholarship and Innovations Fund (RSIF)
3. **Principal Investigator (Kenya side)** on *Large Area Laser Beam Induced Current characterization of photovoltaic modules*. CSIR NATIONAL LASER CENTRE / DST ALC RESEARCH GRANT, 2011 to present. Renewable annually. 2019/2020 grant was R70,200 KES491,400@R1 = KES7
4. **Principal Investigator (Kenya side)** on *Correlation of opto-electric properties of photovoltaic modules with outdoor performance*. The project on the correlation of opto-electric properties of photovoltaic (PV) modules with outdoor performance, deals with important aspects of PV device characterization. The key objective of the proposed collaboration is to extend the knowledge base of

PV technology. JOINT RESEARCH GRANT UNDER THE SOUTH AFRICAN/KENYA – RESEARCH PARTNERSHIP PROGRAMME BILATERAL AGREEMENT 2011. Project funding not successful

### **Community Service**

1. Board member, Reformed Institute for Theological Training (RITT), Eldoret, Kenya (2019 – present)
2. Member of Reformed Church of East Africa, Tiripkatoi Local Church. Elected to Local church council, position Vice Chairperson, 2011 to present.
3. Member, Kipkuyang Secondary School, Board of Management. 2014 to present
4. Member Tugumoi Secondary School Board of Management, 2013 to 2019

### **LANGUAGES**

Kiswahili, Speak fluently and read/write with proficiency

English, Speak fluently and read/write with high proficiency

Kalenjin: Speak fluently and can read and write

### **MEMBERSHIPS**

African Network for Solar Energy (ANSOLE)

South African Institute of Physics (SAIP)

Kenya Physical Society (KPS)

Africa Laser Centre (ALC)

### **REFERENCES**

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