

# **CURRICULUM VITAE**

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## **Francis Magiri Gaitho**



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### **Contacts**

*Contact Address:* **Masinde Muliro University of Science and Technology, Department of Physics, P. O. Box 190- 50100, Kakamega- KENYA**

*Personal Address:* **P. O. Box 892, Nakuru- KENYA**

*E-Mail:* [fgaitho@mmust.ac.ke](mailto:fgaitho@mmust.ac.ke) or [fgaitho1@gmail.com](mailto:fgaitho1@gmail.com)

*Cell phone:* **+254 722 362 110 or +254 780 362 110**

*Orchid ID:* <https://orcid.org/0000-0002-9427-7275>

*Web of Science Researcher ID:* [AAI-4596-2021](https://orcid.org/0000-0002-9427-7275)

### **Scientific/Research Interests**

- ◆ Renewable Energy
- ◆ Computational Materials Science and Solar Energy Materials

## Education Background

- ◆ **2015-2018:** *University of KwaZulu Natal* Pietermaritzburg, South Africa  
**PhD Physics** (*Computational Physics of Solar Energy Materials*)  
**Title:** “Structural and Dynamic Properties of Polymer Systems at Interfaces”
- ◆ **1995-1998:** *Egerton University* Njoro, Kenya  
**M.Sc. Physics** (*Materials Science*)  
**Title:** “Thermal Conductivity of Diatomite, Wood Ash and their Composite mixtures”
- ◆ **1989 – 1992;** *Egerton University* Njoro, Kenya  
**Bachelor of Education- Science (Physics, Mathematics)** (2<sup>nd</sup> Class Honours-Upper Division)
- ◆ **1987 – 1988;** *Litein high School,* Litein, Kenya  
**Kenya Advanced Certificate Education (KACE)** (3 principles, 1 subsidiary)
- ◆ **1981 – 1984;** *Nakuru Day Secondary School* Nakuru, Kenya  
**Kenya Certificate of Education (KCE)** (Division 2; 24 Points)
- ◆ **1974 - 1980;** *Kenyatta Primary School* Nakuru, Kenya  
**Certificate of Primary Education (CPE)** (36 Points -maximum)

## Professional Experience

- ◆ **February-March 2018** *University of KwaZulu Natal* Pietermaritzburg, South Africa  
**Adjunct Lecturer** -PHYS 110, Semester I
- ◆ **2016-2018** *University of KwaZulu Natal* Pietermaritzburg, South Africa  
**Contingent Laboratory Demonstrator-** PHYS110, PHYS131, PHYS132, PHYS195, PHYS196
- ◆ **October 2019-Present;** *Masinde Muliro University of Science & Technology* Kakamega, Kenya  
**Senior Lecturer-** Postgraduate and Undergraduate Physics Courses
- ◆ **2008-2019;** *Masinde Muliro University of Science & Technology* Kakamega, Kenya  
**Lecturer-** Undergraduate Physics Courses
- ◆ **2013-2014;** *Kibabii University College* Bungoma, Kenya  
**Adjunct Lecturer** – SPH 111, SPH 210, ECC 101, MAT 223
- ◆ **2003- 2008;** *Masinde Muliro University of Science & Technology* Kakamega, Kenya  
**Assistant Lecturer-** Physics
- ◆ **1997- 2003,** *TSC-Njoro Boys' High School,* Njoro, Kenya  
**Teacher-** Physics & Mathematics High School 1 to 4

- ◆ **1993- 1995,** *TSC-Kabimoi High School,* Eldama Ravine, Kenya  
**Teacher-** Physics & Mathematics High School 1 to 4
- ◆ **1992** *Arutani Secondary School,* Nakuru, Kenya  
**Assistant Teacher-** Physics & Mathematics High School 1 to 4
- ◆ **1991** *Moiminariet Sec. School* Kericho, Kenya  
**Teaching Practice**

## Professional Appointments

- ◆ **January 2021-Present;** *Masinde Muliro University of Science & Technology* Kakamega, Kenya  
**University Timetable Coordinator**
- ◆ **October 2019-Present;** *Masinde Muliro University of Science & Technology* Kakamega, Kenya  
**Senior Lecturer-** Physics (Research, Teaching and Examining Physics Students at all Levels)
- ◆ **June 2013- 2015;** *Masinde Muliro University of Science & Technology* Kakamega, Kenya  
**Chairman-** Department of Physics
- ◆ **5<sup>th</sup>-8<sup>th</sup> November 2013;** *Masinde Muliro University of Science & Technology* Kakamega, Kenya  
**Acting Dean-** Faculty of Science
- ◆ **17<sup>th</sup> July- 2<sup>nd</sup> August 2013;** *Masinde Muliro University of Science & Technology* Kakamega, Kenya  
**Acting Dean-** Faculty of Science
- ◆ **February 2012-May 2013;** *Masinde Muliro University of Science & Technology* Kakamega, Kenya  
**Acting Chairman-** Department of Physics
- ◆ **2008- 2020;** *Masinde Muliro University of Science & Technology* Kakamega, Kenya  
**Lecturer-** Physics (Teaching and examining Physics undergraduate & MSc Physics students)
- ◆ **2008- February 2012;** *Masinde Muliro University of Science & Technology* Kakamega, Kenya  
**Quality Assurance Officer-** Department of Physics
- ◆ **2005- February 2012;** *Masinde Muliro University of Science & Technology* Kakamega, Kenya  
**Academic advisor-** Fourth year Physics students
- ◆ **2003- February 2012;** *Masinde Muliro University of Science & Technology* Kakamega, Kenya  
**Timetable Coordinator-** Department of Physics
- ◆ **2003- 2008;** *Masinde Muliro University of Science & Technology* Kakamega, Kenya  
**Assistant Lecturer-** Physics (Teaching and examining undergraduate Physics students)
- ◆ **2003-Sept. 2007;** *Masinde Muliro University of Science & Technology* Kakamega, Kenya  
**Examination Coordinator-** Department of Physical Sciences
- ◆ **2001- 2003;** *Njoro Boys' High School,* Njoro, Kenya  
**Head of Physics**

- ◆ **1998 – 2014;**                      *Kenya National Examinations council*                      Nairobi, Kenya  
**National Physics Examiner- Kenya Certificate of Secondary Education**
  
- ◆ **1998 – 2003;**                      *Njoro Boys' High School,*                      Njoro, Kenya  
**Careers' Master**  
**Assistant Guidance and Counselling Master**
  
- ◆ **1998- 2001;**                      *Njoro Boys' High School,*                      Njoro, Kenya  
**House Master**
  
- ◆ **1997 – 2003;**                      *Njoro Boys' High School,*                      Njoro Kenya  
**Patron- Science Club**  
**Jude/ Examiner- Nakuru District Secondary Schools Science Congress**
  
- ◆ **1993 – 1995;**                      *Kabimoi High School,*                      Eldama Ravine, Kenya  
**Examinations Officer**  
**Patron- Young Christian Students Society**  
**Table Tennis Coach**  
**Girls' Basketball Coach**
  
- ◆ **1990 – 1992**                      *Egerton University*                      Njoro, Kenya  
**Committee Member – Young Christian Students Society**
  
- ◆ **1987 - 1988**                      *Litein High School*                      Kericho, Kenya  
**House Captain**  
**Organising Secretary- Young Christian Students Society (YCS)**  
**Secretary- Science Club**

## Workshops/ Seminars/ Conferences

- ◆ **2020: August 21<sup>st</sup>;**                      *The Biophysical Society & MMUST*                      Virtual Conference  
**Networking Events on Embracing Biophysics in Africa: Challenges and Strengths**
  
- ◆ **2018: July 2<sup>nd</sup>- 6<sup>th</sup>;**                      *University of Mauritius*                      Port Luis, Mauritius  
**International Conference of Pure and Applied Chemistry (ICPAC)**
  
- ◆ **2017: December 3<sup>rd</sup>- 7<sup>th</sup>;**                      *Velmoré Hotel Estate*                      Pretoria , South Africa  
**National conference - Canter for High Performance Computing (CHPC)**
  
- ◆ **2017: October 26<sup>th</sup>;**                      *University of KwaZulu Natal*                      Westville , South Africa  
**UKZN Postgraduate Research Day**
  
- ◆ **2017: February 8<sup>th</sup>;**                      *University of KwaZulu Natal*                      Pietermaritzburg , South Africa  
**Fire Safety Training**

- ◆ **2016:November 2<sup>nd</sup>-4<sup>th</sup>;** *Dedan Kimathi University of Technology* Nyeri, Kenya  
**2<sup>nd</sup> International Conference on Science, Technology, Innovation & Entrepreneurship**
- ◆ **2016:July 6<sup>th</sup>- 8<sup>th</sup> ;** *University of KwaZulu Natal* Pietermaritzburg , South Africa  
**Latex Scientific Editor Workshop**
- ◆ **2016:July 6<sup>th</sup>- 8<sup>th</sup> ;** *University of KwaZulu Natal* Pietermaritzburg , *South Africa*  
**Mastering Masters Programme - Academic Scientific writing, Literature Library electronic database search, Endnote referencing, Information management.**
- ◆ **2015: March, 18<sup>th</sup>- 20<sup>th</sup>;** *Bishop Stam Pastoral Center (MMUST)* Kakamega, Kenya  
**Lead Auditors Training on Implementation of ISO 9001:2008**
- ◆ **2014: June 24<sup>th</sup>;** *Masinde Muliro University of Science and Technology* Kakamega, Kenya  
**Workshop for Curriculum Development, Review & Implementation for Faculty of Science**
- ◆ **2012: July 25– 27;** *Masinde Muliro University of Science and Technology* Kakamega, Kenya  
**Research Proposal Writing Training Workshop –DAAD, NCST, KDSA**
- ◆ **2012: February 22;** *Masinde Muliro University of Science and Technology* Kakamega, Kenya  
**National Council for Science & Technology - “Sensitization workshop on opportunities under ST & I grant ”- NCST**
- ◆ **2012: February 3;** *Masinde Muliro University of Science and Technology* Kakamega, Kenya  
**MMUST - “Seminar on Module Writing” Faculty of Education and Social Sciences (FESS)**
- ◆ **2011: May 10;** *Masinde Muliro University of Science and Technology* Kakamega, Kenya  
**School Practice/School Experience advisors Seminar- MMUST**
- ◆ **2011: January;** *Masinde Muliro University of Science and Technology* Kakamega, Kenya  
**Quality Management Systems - “Implementation of ISO 9001:2008”- Kenya Bureau of Standards**
- ◆ **2010: September 23-24;** *Masinde Muliro University of Science and Technology* Kakamega, Kenya  
**DVC (AA)/Dean of students-“Role of Academic Advisors and Wardens in Mentoring University”- MMUST**
- ◆ **2010: July 8 – 9;** *University of Nairobi* Nairobi, Kenya  
**Conference on Opto-Electronic Devices: Their Potential for Sustainable Development**  
Paper Presented: **“Thermal and Photovoltaic Performance of a Polymer Based High output Hybrid Photovoltaic/Thermal concentrator system”**
- ◆ **2010: May 10 ;** *Masinde Muliro University of Science and Technology* Kakamega, Kenya  
**School Practice/School Experience Advisors Seminar- MMUST**

- ◆ **2010: January 11-22; Masinde Muliro University of Science and Technology Kakamega, Kenya  
Pedagogy and ICT Capacity Building Workshop- MMUST**
- ◆ **2009: October 13 -15; University of Dar es Salaam Dar es Salaam, Tanzania  
1<sup>st</sup> International Conference on Solar Energy Materials**
- ◆ **2006: July- August ; University of Dar es Salaam Dar es Salaam, Tanzania  
Ninth College on Thin Film Technology**
- ◆ **2006: June; Western University College of Science and Technology Kakamega, Kenya  
Quality Management Systems- “Implementation of ISO 9001:2000”- Kenya Bureau of Standards**
- ◆ **2005: May; Western University College of Science & Technology- Kakamega, Kenya  
Earth Observing Systems- NASA**
- ◆ **2005: April; Western University College of Science & Technology- Kakamega, Kenya  
Paradigm Shift in Teacher Preparation (School practice/ attachment)**
- ◆ **2005: August; Western University College of Science & Technology- Kakamega, Kenya  
Association of Third World Scientists (ATWS)**
- ◆ **2004 September; Egerton University Njoro, Kenya  
ICT in Education & Social Development**
- ◆ **2003 January; Psychological Health Service Nairobi, Kenya  
Adolescent Guidance and Counselling**
- ◆ **1998 June; Ministry of Health Nakuru, Kenya  
Gender Sensitisation in Secondary Schools- (PRIMARY HEALTH CARE)**

## Selected Scientific Publications and other Scholarly Contributions

### Journal Articles

1. **Francis M. Gaitho** and Giuseppe Pellicane (2019) “Adsorption of binary polymer mixtures with different topology on a wall”, *Results in Physics*, 12, 975-981 [doi.org/10.1016/j.rinp.2018.12.042](https://doi.org/10.1016/j.rinp.2018.12.042)
2. Pellicane G, Tsige M, **Gaitho F.** (2018). The Importance of Polymer Topology in Surface Absorption. In F. Kongoli, F. Marquis, P. Chen, T. Prikhna, N. Chikhradze (Eds.), *Sustainable Industrial Processing Summit SIPS2018 Volume 6. New and Advanced Materials and Technologies* (pp. 157-158). Montreal, Canada: FLOGEN Star Outreach
3. **Francis Gaitho**, Mesfin Tsige, Genene T. Mola, Giuseppe Pellicane (2018) “Surface Segregation of Cyclic Chains in Binary Melts of Thin Polymer Films: The Influence of Constituent Concentration”, *Polymers*, **10** (3), 324; [doi:10.3390/polym10030324](https://doi.org/10.3390/polym10030324)

4. **Francis Gaitho**, Gene T. Mola, Giuseppe Pellicane (2018) “Computational approach to the study of morphological properties of polymer/fullerene blends in photovoltaics”. *Physical Sciences Reviews*. **3** (2) pp13. doi: [10.1515/psr-2017-0102](https://doi.org/10.1515/psr-2017-0102)
5. M. Megnidio-Tchoukouegno, **F.M. Gaitho**, G.T. Mola, M. Tsige, G. Pellicane (2017) “Unravelling the surface composition of symmetric linear-cyclic polymer blends”. *Fluid Phase Equilibria*, **441**, 33-42. doi.org/[10.1016/j.fluid.2017.02.004](https://doi.org/10.1016/j.fluid.2017.02.004)
6. V. Muramba, M. Mageto, **F. Gaitho**, V. Odari, R. Musembi, S. Mureramanzi, and K. Ayodo (2015) “structural and Optical Characterization of Tin Oxide Co-doped with Aluminium and Sulphur” *Am. J. Mater. Sci.* **5** (2) 23-30. doi: [10.5923/j.materials.20150502.01](https://doi.org/10.5923/j.materials.20150502.01)
7. Miller E. S. M. Mageto, M. Mghendi, and **F. M. Gaitho** (2015) “Signal Processing of LBIC/LBIV System using the Fourier Convolution Technique” *J. Basic. Appl. Sci. Res* 5(12) 53-59. ISSN [2090-4304](https://doi.org/10.21961/2090-4304)
8. Manasse M. Kitui, Mghendi M., **F. M. Gaitho** and C. M. Maghanga (2015) “Optical Properties of TiO<sub>2</sub> Based Multilayer Thin Films: Application to Optical Filters” *Int. J. Thin Film Sci. Tech.* **4**, (1), 17-21, DOI:10.12785/ijtfst/040104. doi.org/[10.12785/ijtfst/040104](https://doi.org/10.12785/ijtfst/040104)
9. B. V.Odari, M. Mageto, R. Musembi, H. Othieno, **F. M. Gaitho**, V. Muramba (2013) “Optical and Electrical Properties of Pd-Doped SnO<sub>2</sub> Thin Films Deposited by Spray Pyrolysis” *Australian Journal of Basic and Applied Sciences*, Vol **7** (2): 89-98. ISSN [1991-8178](https://doi.org/10.21961/1991-8178)
10. B. V.Odari, R. Musembi, M. Mageto, H. Othieno, **F. M. Gaitho**, Mwamburi Mghendi, V. Muramba (2013) “Optoelectronic Properties of F-co-Doped PTO Thin Films Deposited by Spray Pyrolysis” *American Journal of Materials Science*, **3** (4), 91-99. doi: [10.5923/j.materials.20130304.05](https://doi.org/10.5923/j.materials.20130304.05)
11. **Gaitho F. M.**, Nderitu F. G., Muriithi P. M., Ngumbu R. G., Ngari J. K (2013) “Effect of Thermal Conductivity on the Efficiency of Polycrystalline Silicon Solar Cell” *East African Journal of Engineering, Science and Technology*, Vol. **1** (2), 82-87. ISSN [2219-8598](https://doi.org/10.21961/2219-8598)
12. **Gaitho F. M.**, Nderitu F. G., Muriithi P. M., Ngumbu R. G., Ngari J. K. (2009) “Effect of Thermal Conductivity on the Efficiency of Single Crystal Silicon Solar Cell, Coated with an Anti-reflective Thin Film” *Solar Energy- Elsevier*, **83** (8), 1290-1293. doi:10.1016/j.solener.2009.03.003
13. Ngari J. K., Ngumbu R. G., **Gaitho F. M.**, Nderitu F. G., Muriithi P. M., (2007) “Social and Legal Issues That Impede Solar Utilization in Kenya” *Journal of Research and Engineering.*, Vol. **4**. 92-95; ISSN [1597-8001](https://doi.org/10.21961/1597-8001)

#### Conference proceedings

14. Muia M. L., **Gaitho F. M.** (2003) “Thermal Conductivity of Wood Ash/ Diatomite Composites Using the transient hot- Strip Method” **UNESCO & Intl. Atomic Energy Agency- The Abdus Salam International Centre for Theoretical Physics (ICTP)- Trieste, Italy.** IC/IR/ 2003/14.

#### Theses

15. **Gaitho F. M.** (*PhD*, 2019) “Structural and Dynamic Properties of Polymer Systems at Interfaces”

16. **Gaitho F. M.** (MSc, 1998) “Thermal Conductivities of Wood Ash, Diatomite and their Composite Mixtures”

#### University Level Books/Manuals

17. **F. M. Gaitho**, J. Oduogo, E. O. Ojwak- Experimental Techniques in University Physics: *Manual for Level II Undergraduate Physics*- MMUST, (2013)
18. J. Oduogo, **F. M. Gaitho**, E. O. Omondi -Laboratory Manual “Fundamentals of Physics” 1<sup>st</sup> year Physics- MMUST, (2012)
19. **F. M. Gaitho**- Basic Electronics Laboratory Manual for 2<sup>nd</sup> year Physics- MMUST, (2007)
20. **F. M. Gaitho**, E. Omondi- Laboratory Manual -Electrical Circuits MMUST, (2007)
21. **F. M. Gaitho** , J. Oduogo- Renewable Energy & Electronics Laboratory Manual for 3<sup>rd</sup> year Physics- MMUST, (2019)

### Research Project Supervision

- ◆ **Davind Ng’anga Osiyo- PhD Physics** “Effect of sunflower oil as A thermal storage medium on thermal performance of a flat plate solar water heating collector” –*On-going*
- ◆ **Moses Wainaina Rutino- MSc Physics** Impact of Optical Properties on the Performance of a Flat Plate Solar Collector: A Computational Approach”- *On-going*
- ◆ **Gloria Isendi Mulira- PhD Physics** “AB-Initio Study of Hydrated Vanadium and Tungsten Oxide; A Liquid/Solid Interface 2D Material for Electrochemical Energy Storage Application” *On-going*
- ◆ **Wiberforce Anziya Kong’o- MSc Physics Education** “An Investigation of the Scoring Literacy of Secondary School Students in Physics Practical Tests”- *Completed 2016*
- ◆ **Beldina Lipuku- MSc Physics Education** “Video Based Instructions and Students’ Performance in Electromagnetic Induction in Secondary Schools in Kenya” – *Completed 2016*
- ◆ **Manasse Marango Kitui- MSc Physics** “Optical Properties of TiO<sub>2</sub> based Multilayer Thin films”- *Completed 2013*

### Theses Exermination

- ◆ **Ndung’u Ruth Wairimu – MSc Physics** “*Instrumentation, Design and Use in the Determination of Extracellular Electric Potential in Spinach Resulting from Abiotic Changes*” CHUKA UNIVERSITY- February 2021
- ◆ **Mulama Austine Amukaiya- PhD Physics** “*Rheological Properties of Non-Equilibrium Thin Polymer Films via Dewetting for advanced Nanophotonic Systems*” MASENO UNIVERSITY – December 2020
- ◆ **Isoe Wycliffe Maiso-MSc Physics** “Optical Modeling of TCO based FTO/TiO<sub>2</sub> Multilayer Thin Films for Solar Cell Applications” MMUST- October 2020
- ◆ **Isiaho Socliff Ludeshi-MSc Physics** “Structural, electronic and Magnetic Properties of Superconducting Niobium Nitride Polymorphs: An AB-INITIO study” MMUST- October 2020
- ◆ **Valentine Wabwile Muramba-MSc Physics** “Preparation and Characterization of Transport and Conducting Doped Tin Oxide Thin Films” MMUST- October 2013



- ◆ **Elicah Wabululu- MSc Physics** “Quasiperiodic Behavior of a Perturbed Neutron-Proton Pair” MMUST- October 2013
- ◆ **Sarai Antonate Mukhwana- MSc Physics** “Structure and Stability of Binary Mixtures” MMUST- June 2012

## Scholarships and Grants

1. **TWAS Research Grants Programme-** Project Title: “**Metal halide perovskites: A novel material for solar cells**” July 2020- July 2022. USD 28,489.00
2. University of KwaZulu Natal- **National Research Fund (NRF):** B/S no. 4792 (2016-2017)-p.a. @ZAR 60,000 subsistence
3. University of KwaZulu Natal **Knowledge, Interchange and Collaboration (KIC)-Research travel grant** (October- 2016)- ZAR 10,000
4. University of KwaZulu Natal- **PhD Research Scholarship** (2015-2018)- p.a. @ZAR 16,560
5. **North-South-South (No-So-So) Grant** (2011-2014) Programme for staff and student Academic Exchange. Partners; Masinde Muliro University of Science and Technology- **Kenya**, Helsinki Metropolia University of Applied Sciences- **Finland**, Makerere University- **Uganda**, Kisii University College- **Kenya**. Amount awarded for the project. - KShs 11,200,000
6. Government of Kenya- **Undergraduate University funding-** (1989-1992)

## Membership

### Professional

1. Materials Science and Solar Energy Society of Eastern and Southern Africa (**MSSEESA**)-Kenya (2006-Present)
2. Materials Research Society of Kenya (**MRS-K**) (2017-Present)
3. Bio-Physics Society (Kenya Chapter) (2018-Present)
4. Association of Third World Scientists (**ATWS**) (2005-Present)
5. Examiner- Kenya National Examinations Council (**KNEC**) (1997-2010)

### Community

1. BOM- St. Lwanga Catholic Schools, Njoro, Kenya (2010-2020)
2. BOM- St. Peter’s Catholic Schools, Lanet- Nakuru, Kenya (2009-2019)
3. St. Monica’s Small Christian Community (SCC) Chairman (2011-2014)
4. St. Peter’s Catholic Church Development Chairman (2011-2014)