

## DR. ROBINSON NDEGWA

### CURRICULUM VITAE

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- Home Address:** P.O. Box 6737 – 00200 City Square, Nairobi  
Mobile Phone: +254707222559, +254 721 513399
- Qualifications:** PhD in Physics (2020, Nairobi), Second level Masters in Satellite and orbital platforms (2009- Rome); M.Sc. in Physics (**2004** - Nairobi), B.Sc. in Physics (**1997**-Nairobi),
- Academic Positions:** Tutorial Fellow (Sep. 2005 - to date), Department of Physics-University of Nairobi; Part-time Lecturer -Technical University of Kenya (2012-2017)
- Nationality:** **Kenyan**

### CORE COMPETENCES

- **Applied Electronics**
  - Microcontroller and Microprocessors instrumentation
  - Analogue and Digital Electronics Implementation
  - Fabrication of Printed Circuit Boards (PCB).
  - Electronic design and Simulation using Proteus software, EasyEDA and MATLAB
- **Satellite Ground Station Architecture**
  - Flight Dynamic subsystem
  - Telemetry and Tele-command Subsystem
- **Laser Technology**
  - Gas in Scattering Media Absorption Spectroscopy using Tunable Diode lasers.
  - Tunable diode laser Absorption Spectroscopy (TDLAS) for trace gas measurement.
  - Laser Physics

### EDUCATION

- **2017 to 2020** PhD in Physics titled “A hybrid of fuzzy logic and sliding mode techniques for photovoltaic maximum power point tracking systems under partial shading
- **2008 – 2009** Master in Satellite and Orbital Platform Studies in Aerospace Engineering, University of Rome, La Sapienza, Italy

- **2000 – 2003** MSc in Physics (Applied Electronics and Lasers), University of Nairobi, Kenya
- **1993 – 1997** BSc (Hons) in Physics, University of Nairobi, Kenya

## **WORK EXPERIENCE**

### **1. Tutorial Fellow (2005 – to date) – University of Nairobi, Departments of Physics**

#### **Duties:**

- **Teaching**
  - 4<sup>th</sup> Year Applied Electronics and Microprocessors,
  - 4<sup>th</sup> Year Satellite and Mobile Communication Systems,
  - 4<sup>th</sup> Year Fundamental of Space Flight,
  - 4<sup>th</sup> Year Antennae Theory
  - 3<sup>rd</sup> Year Analogue and Digital Communication Systems
- **Demonstration**
  - Undergraduate laboratory in Analogue and Digital Electronics
  - Helium Neon Laser Labs
  - Diode Laser Spectroscopy for Rubidium and Oxygen spectroscopy
  - ND YAG laser for Laser Induced Breakdown Spectroscopy
- **Final year, BSc (Physics), BTech and BSc (Astronomy and Astrophysics), Student Project Supervision**

### **2. Assistant Lecturer Technical University of Kenya (2012-2016)**

#### **Duties:**

- **Teaching**
  - 5<sup>th</sup> Year Satellite and Mobile Communication Systems,
  - 5<sup>th</sup> Year Wireless Communication
  - 5<sup>th</sup> Year Digital Transmission,
  - 4<sup>th</sup> Year Review of microelectronics
  - 4<sup>th</sup> Year Sensors and Micro-electromechanical Systems,
  - 4<sup>th</sup> Year Digital Broadcasting

### **3. Internship at Telespazio SPA Fucino, Italy (May 2009-May 2010)**

#### **Duties:**

- **Satellite Ground Station Architecture Analysis**
  - Flight Dynamic subsystem-Agile satellite
  - Telemetry and Tele-command Subsystem- Agile satellite
- **PalapaD LEOP Analysis**
- **Prisma Satellite Mission Analysis**
  - Orbital parameters determination and analysis using STK software

### **4. Graduate Assistance (2002 – 2005) – University of Nairobi, Physics Department**

#### **Duties:**

- **Teaching**
  - 3<sup>rd</sup> Introductory Electronics
  - Diploma class - Analogue and Digital Electronics

- **Demonstration**
  - Undergraduate laboratory in Analogue and Digital Electronics
  - Helium Neon Laser Labs
  - Diode Laser Spectroscopy for Rubidium and Oxygen Set-up
  - Fiber Optics Fluorosensor using Violet Diode Laser

## **RESEARCH EXPERIENCE**

- Fuzzy logic and sliding mode technique (2020)
- PV solar system modelling and simulation (2019)
- Development of PRISMA satellite Flight Dynamic Subsystem (MSc. Thesis, (Italy, 2009)
- Development of microprocessor-based instruments for laser based instruments (MSc. Thesis, 2003)
- Gas analysis using Tunable diode Laser Absorption Spectroscopy (Lund, 2006)
- Analysis of Gas in Scattering Media Absorption Spectroscopy (GASMAS), (Lund 2004)

## **CONFERENCES AND WORKSHOPS/TRAININGS**

- United Nations/ Italy Workshop on Open Universe Initiative Vienna Austria (20-22 Nov., 2017)
- The 2nd Hands-on Soil Infrared Spectroscopy Training Course Getting the best out of light (12<sup>th</sup> – 17<sup>th</sup> May 2014)
- The African Spectral Imaging Network International Workshop at ICIPE- Nairobi, Kenya (2012)
- Workshop on Advanced Optical Remote Sensing, TIGER Capacity Building Facility II Training Course, at the Regional Center for Mapping of Resources for Development, Nairobi, Kenya. (14<sup>th</sup> – 21<sup>st</sup> October 2010)
- Training on Laser science induction course, JKUAT –Kenya (11-15<sup>th</sup> February 2008)
- International commission for optics topical meeting and LAMNETWROK 8<sup>th</sup> International workshop in Cape Coast, Ghana (19-24, November 2007)
- Training in Atomic and Molecular Spectroscopy at Lund Institute of Science and Technology in Sweden (2006)
- Training in Laser Physics and Multispectral Imaging at Lund Institute of Science and Technology in Sweden (2004)
- Euroconference on 'Ab initio Many-body Theory for Correlated Electron Systems (Co-sponsored activity) ICTP-Trieste (Italy). (25 August - 29 August)
- Third Stig Lundqvist Conference on Advancing Frontiers of Condensed Matter Physics: Fundamental Interactions and Excitations in Confined Systems, ICTP-Trieste (Italy). (11-15 Aug 2003)

## **AWARDS**

- University of Nairobi grant to study Doctor of Philosophy in Physics while working as a Tutorial Fellow (2017).
- Italian Space Agency (ASI) Scholarship “ASI higher education project for young Kenyan researchers” (2008 - 2010) to pursue an 18 months professional master course in Satellites and Orbital Platforms at the University of Rome “La Sapienza”.
- Telespazio Innovation award (2009)
- Kenya / German Academic Exchange Service (DAAD) Scholarship to study for a three year doctoral course at university of Nairobi (2005)
- University of Nairobi grant to study Master in Physics while working as a graduate research assistant (2002).

## **Membership to scientific societies**

- University of Nairobi CBPS Space Sciences Group - From 2000- to date.

## **Publications**

1. Ndegwa, R., Ayieta, E., Simiyu, J., & Odero, N. (2020). A Simplified Method for Parameter Determination of a Photovoltaic Module using Manufacturer's data, Africa Journal of Physical Science, 2020 <http://journals.uonbi.ac.ke/index.php/ajps/article/view/1918>
2. Ndegwa, R., Ayieta, E., Simiyu, J., & Odero, N. (2020). A Simplified Simulation Procedure and Analysis of a Photovoltaic Solar System Using a Single Diode Model. *Journal of Power and Energy Engineering*, 8(09), 65. [10.4236/jpee.2020.89006](https://doi.org/10.4236/jpee.2020.89006)
3. Ndegwa, R., Simiyu, J., Ayieta, E., & Odero, N. (2020). A Fast and Accurate Analytical Method for Parameter Determination of a Photovoltaic System Based on Manufacturer's Data. *Journal of Renewable Energy*, 2020. <https://doi.org/10.1155/2020/7580279>
4. Kiroe A., Kimani J., Nyawade A. and Gathoni R. (2011). Kenya's Capacity Building in Satellite Technology: The Small Satellite Approach With Emphasis on The CubeSat, 4th African Leadership Conference (ALC) on Space Science and Technology for Sustainable Development, September 26th - 28th, 2011, White Sands Beach Hotel, Mombasa, Kenya.
5. Wangai J.K., Gathoni R.N., Mustapha A.O. and Kaduki K.A., Development of a tuneable diode laser absorption spectrometer for NO<sub>2</sub> measurements, 8 The Seventh International Workshop on Physics and Modern Applications of Lasers, Douala, Cameroon, December 2004.

## **REFEREES**

1. Dr. Elijah Ayieta  
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