



CHARLES NDUNG'U NDEGWA

Postdoctoral Researcher | Data Scientist

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ndungundegwa

Nairobi, Kenya

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PROFESSIONAL SKILLS

- Data integration, modeling, and analysis
- Machine learning and deep learning (Python, R)
- Remote sensing project exposure (NDVI, QGIS, supervised land classification tasks)
- Computational physics and AI applications
- Research in AI-driven data engineering
- Scientific writing and publication in peer-reviewed journals
- Strong problem-solving and analytical skills

EXPERIENCE

Postdoctoral Researcher

LISN, LaHDAK Team – CNRS, Paris-Saclay University (CS), France

March 2025 – January 2026 France

- Conducting research on heterogeneous data integration and AI-driven data modeling for high-energy physics experiments.
- Contributing to a data integration and analysis project for Circular Colliders in collaboration with CEA.
- Applying machine learning techniques to analyze collider data, predict relationships, and improve collider performance.
- Developing graph-based and columnar data representations (Neo4j, Parquet) to optimize AI-driven data analysis.
- Publishing research findings in top-tier AI, data science, and physics journals and conferences.
- Collaborating with physicists, AI researchers, and data engineers.

Lecturer – Machine Learning School (EASY-ML 2025)

University of Nairobi, Chiromo Campus

July 2025 Nairobi, Kenya

- Delivered lectures and hands-on tutorials on convolutional neural networks, boosted decision trees, and PyTorch-based workflows for scientific data.
- Facilitated participant-led projects and guided interdisciplinary case studies across physics, chemistry, and engineering.
- Contributed to the development of the school's core curriculum in advanced machine learning techniques and model interpretability.

Assistant Tutor – School of Computational Techniques for Physics Students (SCoTeP-K)

University of Nairobi, Chiromo Campus

June 2024 Nairobi, Kenya

- Supported training in Linux, Python programming, Git versioning, and introductory machine learning.
- Guided BSc and MSc students through hands-on computational labs, with applications in nuclear and particle physics.

ABOUT ME

Postdoctoral researcher with a Ph.D. in Physics and interdisciplinary training in computational spectroscopy, machine learning, and applied data science. My research background centers on environmental exposure assessment through AI-enhanced spectroscopy, and I am currently working on data fusion methodologies at CNRS-Paris-Saclay University. With academic training in remote sensing and GIS, and practical experience in food safety analytics, I am strongly positioned to contribute to evaluating the health impacts of nature-based watershed restoration. I am especially interested in co-developing stakeholder-informed health metrics and economic frameworks that quantify public and livestock health co-benefits of Water Fund projects in East Africa.

EDUCATION

Ph.D. in Physics

University of Nairobi

May 2022 – Dec 2024 Kenya

M.Sc. in Physics

University of Nairobi

Sep 2018 – Aug 2021 Kenya

B.Sc. in Astronomy & Astrophysics

University of Nairobi

Sep 2009 – Aug 2014 Kenya

DATA SCIENCE QUALIFICATIONS

 **Doctoral Training School (Online) (AIMS Research and Innovation Centre, AIMS Rwanda) | Mar 11, 2024 - Apr 5, 2024**

- Foundational Methods in Data Science:
- Machine Learning Essentials I
- Data-Driven Optimization
- Research Methodology
- Presentation Skills
- Gender Equality, Diversity & Inclusion (GEDI) Awareness

 **Data Science: Foundations using R Specialization**

Johns Hopkins University via Coursera

Completed Certificates (25 weeks)

- Worked alongside a multinational faculty to implement a structured, practical computing curriculum for early-career physicists.

Ph.D. Researcher & Part-time Lecturer

University of Nairobi

📅 May 2022 – Dec 2024 📍 Nairobi, Kenya

- Conducted research in **computational and experimental spectroscopy** for **pesticide detection using AI and data analysis**.
- Developed machine learning models for spectroscopy-based rapid detection methods.
- Taught undergraduate courses in **Machine Learning and Computational Physics**.
- Supervised undergraduate research projects integrating **AI and data science**.

Graduate Assistant

University of Nairobi

📅 Sep 2018 – Aug 2021 📍 Nairobi, Kenya

- Assisted in teaching and laboratory demonstrations.
- Evaluated and graded practical assessments.

Volunteer Graduate Assistant

Ministry of Education, G-United Program

📅 July 2016 – June 2017 📍 Meru, Kenya

- Assisted underperforming students in arithmetic and literacy.
- Supported the Digi-School program.
- Led community-based educational initiatives.

Self-employed

Electronics Repair Technician

📅 Sep 2014 – June 2016

- Repaired electronic devices and troubleshoot circuit boards.
- Managed customer service and business operations.

AWARDS & FELLOWSHIPS

Postdoctoral Research Fellowship

LISN, CNRS, Paris-Saclay University

📅 2025 – 2026

Research and Innovation Grant in Computational Modeling and Materials Science

KENET

📅 2022 – 2023

African Spectral Imaging Network Ph.D. Fellowship

AFSIN, Uppsala University

📅 2022 – 2025

Postgraduate Scholarship for M.Sc. Studies

University of Nairobi, Physics Department

📅 2018 – 2021

- The Data Scientist's Toolbox (Grade:100%)
- Reproducible Research (Grade:100%)
- R Programming (Grade:98.16%)
- Exploratory Data Analysis (Grade:96%)
- Getting and Cleaning Data (Grade:97%)
- Reproducible Research (Grade:100%)

STRENGTHS

Quick Learner

Problem Solver

Team Player

Computational Physics

Machine Learning & AI

Data Science & Visualization

Scientific Research

Python, R, NoSQL

PUBLICATIONS

📄 Journal Articles

- Ndung'u, C. N. [Charles N], Kaduki, K. A., Kaniu, M. I., & Kiruri, L. W. (2024). Enhanced detection of pesticide residues using two-dimensional raman correlation spectroscopy and machine learning. *Applied Spectroscopy Practica*, 2(4), 27551857241303466.
- Ndung'u, C., Kaniu, M., Wanjohi, J., Odongo, K., Kiruri, L., & Kaduki, K. (2024). Feasibility for rapid on-site screening of pesticide residues in fresh produce using machine learning-assisted diffuse reflectance spectroscopy. *Food and Humanity*, 2, 100204.
- Odongo, K., Kaniu, M., Ndung'u, C., & Wanjohi, J. (2023). Direct and rapid screening of calcium carbide in ripened bananas using chemometrics-assisted laser raman spectroscopy. *Applied Physics B*, 129(6), 1–9.
- Ndung'u, C., Kaniu, M., & Wanjohi, J. (2022). Optimization of diffuse reflectance spectroscopy measurements for direct and rapid screening of pesticide: A case study of spinach. *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*, 121556. doi:https://doi.org/10.1016/j.saa.2022.121556

REFEREES

Dr. Ian K. Muchai

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Prof. Kenneth A. Kaduki

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