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JEAN RODRIGUE BITSINDA IKUZWE

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EXPERIENCE

UPANZI NETWORK, Kigali, Rwanda   July 2025 — Dec 2025
Research Associate — Data Analysis & Systems Engineering

- **Led** the end-to-end analysis and structuring of large-scale GIS datasets for Kigali's water distribution network, transforming raw utility data into analysis-ready digital-twin assets.
- **Designed and validated** network topology, DMA segmentation, and asset registries, enabling leakage analysis, system monitoring, and pilot deployment planning.
- **Developed** interactive geospatial dashboards and web-based visualizations to support data-driven decision-making for engineers and field operators.
- **Standardized** data schemas, quality checks, and export pipelines (QGIS, GeoJSON, CSV) to ensure reproducibility across hydraulic modeling, analytics, and visualization workflows.
- **Presented** analytical findings and system demos to WASAC leadership, incorporating operational feedback into phased deployment and data-collection strategies.

CARNEGIE MELLON UNIVERSITY AFRICA, Kigali, Rwanda   Sep 2024 — Dec 2024
Graduate Research Assistant

- **Led** a multidisciplinary student team to develop an AI-driven pipeline for 3D prosthetic socket design using smartphone video input and FDM 3D printing, improving accessibility for low-resource settings.
- **Managed** end-to-end model optimization, data preprocessing, experiment design, and pipeline evaluation.
- **Co-authored** a journal paper in the *Journal of Mechanical Design* extended from IDETC-CIE ASME 2024.
- **Refined** reconstruction algorithms to boost accuracy and usability for clinical applications.

CARNEGIE MELLON UNIVERSITY AFRICA, Kigali, Rwanda
Graduate Summer Research Intern   Jun 2024 — Aug 2024

- Optimized computer-vision and AI models for high-fidelity 3D reconstructions of prosthetic limbs.
- Designed and executed data-collection protocols; integrated 3D-printing workflows for functional prototypes.
- Co-authored a conference paper accepted at IDETC-CIE ASME 2024.

Education

- **MSc, Electrical & Computer Engineering (Applied ML)**
  Carnegie Mellon University Africa, Kigali   2023–2025
  - *Key courses*: Machine Learning; Deep Learning; Applied Computer Vision; Data Inference & Applied Machine Learning; Data Analytics; Cloud Computing; Advanced Database Systems; Applied Stochastic Processes; GIS
- **MSc, Condensed Matter Physics**
  ICTP–East African Institute for Fundamental Research, Kigali   2021–2023
  - *Key courses*: Classical Mechanics; Mathematical Methods for Physics; Advanced Electromagnetism; Quantum Mechanics I & II; Statistical Physics; Solid State Physics; Numerical Methods I & II; Many-Body Physics; Advanced Statistical Mechanics; Biological Physics
- **BSc, Physics**
  University of Rwanda, College of Science & Technology, Kigali   2016–2020
  - *Key courses*: Classical Mechanics I & II; Electromagnetism; Quantum Mechanics; Thermodynamics; Optics; Waves & Vibrations; Electricity & Magnetism; Linear Algebra; Mathematical Physics I & II; Numerical Methods; Fluid Mechanics; Environmental Physics; Remote Sensing & GIS

TECHNICAL SKILLS

Programming & Frameworks

- Python, C/C++, MATLAB, SQL
- PyTorch, TensorFlow, Scikit-learn, OpenCV

Data & Tools

- NumPy, Pandas, Matplotlib, MLflow
- Docker, Git/GitHub

Core Concepts

- 3D Computer Vision, Multimodal Learning
- Edge AI & TinyML, Neuroevolution, Quantum Simulation