

LORNA MUGAMBI

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Education

Dedan Kimathi University of Technology, Kenya
PhD Telecommunication Engineering

Sep 2025

Dedan Kimathi University of Technology, Kenya

March 2022 – Aug 2025

MSc. Telecommunication Engineering , specialising in Artificial Intelligence for rheumatic heart diagnosis using echocardiograms (Scholarship by the Centre for Data Science and Artificial Intelligence, DSAIL)

Thesis: Self-supervised multi-task learning with SimCLR and DINOv2: a comparative analysis for rhd-induced valvular pathology detection and classification

Dedan Kimathi University of Technology, Kenya

Sept 2014 – April 2019

BSc.in Electrical and Electronic Engineering

Final Year Project: Design and Comparative Analysis of an SCR Based 500kV HVDC system and the existing 400kV HVAC system from Mombasa to Nairobi

Research Experience

Centre for Data Science and Artificial Intelligence (DSAIL) | Researcher

March 2021 - Present

- **Rheumatic Heart Disease (RHD) Diagnosis:** Developed a self-supervised deep learning model for automated diagnosis of Rheumatic Heart Disease from echocardiograms, achieving 93% accuracy after finetuning and reducing annotation reliance.
- **Wildlife Conservation:** Built camera trap software for Kenyan conservancies, curating a public dataset of 8,000+ annotated images (published in Data in Brief) with 12,000+ downloads.
- **Workshops:** Co-trained 30+ students in AI-for-conservation techniques, including Raspberry Pi-based deployments and YOLO annotation workflows.
- Applied AI techniques to real-world problems by participating in a project focused on efficient image annotation using YOLO, demonstrating expertise in the practical application of AI methodologies.
- **Medical Image Analysis:** Contributed to a publication on the use of unsupervised learning methods in medical image analysis, expanding knowledge in this field, especially where small labelled datasets are a problem.
- **Grant Writing:** Contributed to successful grant proposals totalling \$16,500 for health-related and cloud-computing projects.

Visiting Researcher

University of Leeds & University of Swansea

June - July 2025

- 3 week visit under the Leeds-Africa Hub for Data Science & Artificial Intelligence. Participated in the Postgraduate conference 2025 organised by the School of Mathematics, University of Leeds. Also spoke at seminars for the biology sciences departments at both universities.

Publications

- **L. Mugambi**, C. wa Maina and L. Zühlke, “Self-Supervised Multi-Task Learning for the Detection and Classification of RHD-Induced Valvular Pathology”, Journal of Imaging. Accepted.
- **L. Mugambi**, J. N. Kabi, G. Kiarie, and C. wa Maina, ‘DSAIL-Porini: Annotated camera trap image data of wildlife species from a conservancy in Kenya’, Data in Brief, vol. 46, p. 108863, Feb. 2023, doi: 10.1016/j.dib.2022.108863.
- **L. Mugambi**, G. Kiarie, J. Kabi, and C. Maina, ‘DSAIL-Porini: Annotated camera trap images of wildlife species from a conservancy in Kenya’, vol. 6, Mar. 2022, doi: 10.17632/6mhrhn7rxc.6.
- **L. Mugambi**, L. ZÜHLKE, and C. W. Maina, ‘Towards AI Based Diagnosis of Rheumatic Heart Disease: Data Annotation and View Classification’, in 2022 IST-Africa Conference (IST-Africa), May 2022, pp. 1–8. doi: 10.23919/IST-Africa56635.2022.9845657.
- Y. Njathi, L. Wanjiku, **L. Mugambi**, J. N. Kabi, G. Kiarie, and C. wa Maina, ‘Efficient Camera Trap Image Annotation Using YOLOv5’, in 2023 IEEE AFRICON, Sep. 2023, pp. 1–6. doi: 10.1109/AFRICON55910.2023.10293724.

- G. Kiarie, J. Kabi, **L. Mugambi**, and C. W. Maina, ‘The use of Open-Source Boards for Data Collection and Machine Learning in Remote Deployments’, in 2023 IEEE AFRICON, Sep. 2023, pp. 1–6. doi: 10.1109/AFRICON55910.2023.10293682.
- Y. Njathi, **L. Mugambi**, L. ZÜHLKE, and C. W. Maina, ‘Unsupervised Discovery of Echocardiographic Views for Rheumatic Heart Disease Diagnosis’, in 2023 IST-Africa Conference (IST-Africa), May 2023, pp. 1–10. doi: 10.23919/IST-Africa60249.2023.10187738.
- **L. Mugambi**, G. Kiarie, J. Kabi, C. wa Maina, and S. Mazumdar, ‘The DSAIL-GeJuSTA Data Science Education Workshop: Designing a Data Science Curriculum for the African Continent’, Research Ideas and Outcomes, vol. 10, p. e138833, Oct. 2024, doi: 10.3897/rio.10.e138833.
- A. Gitau, V. Ruto, D. Njoroge, **L. Mugambi**, V. Sitati, and A. Kaburia, Automated ECG Image Classification with InceptionV3. 2024. doi: 10.22489/CinC.2024.498.
- G. Kiarie, **L. Mugambi**, and J. Kabi, ‘Analysis of women representation in STEM in Africa’, 2023, Accessed: Mar. 21, 2025. [Online]. Available: <https://repository.dkut.ac.ke:8080/xmlui/handle/123456789/8422>

Skills

- Languages & Core Tools: Python 3.x, PyTorch, TensorFlow, OpenCV, scikit-learn
- Deep-Learning Techniques: CNNs, ViTs (DINOv2, SimCLR), self-/semi-supervised learning, transfer learning, multi-task learning
- Computer Vision: medical image analysis (echocardiograms), object detection & tracking (YOLOv5/8), camera-trap pipelines, data annotation workflows
- MLOps & Cloud: Weights & Biases, ML flow, Docker, GitHub Actions, AWS, GCP
- Data Engineering: SQL, Pandas, REST APIs, Raspberry Pi & edge deployment
- Visualization & Reporting: Matplotlib, Seaborn, Plotly, Streamlit dashboards, Flask
- Research & Collaboration: LaTeX, Zotero, grant writing (\$16.5k raised), peer review, workshop instruction

Awards

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| • Deep Learning Indaba | Rwanda, 2025 |
| • Data Science Africa summer school | Kenya, 2024 |
| • Google Cloud \$5K credits | |
| • Africa Computer Vision Summer School | Kenya, 2024 |
| • Data Science Africa summer school | Rwanda, 2023 |
| • Data Science Africa summer school | Tanzania, 2022 |
| • Masters Scholarship by the Centre for Data Science and Artificial Intelligence | Kenya, 2022-2025 |
| • Data Science Africa summer school | South Africa, 2021 |

Hackathons

- Kaggle AI Mathematical Olympiad 2025
- Africa Computer Vision Summer School Hackathon 2024
- The George B. Moody PhysioNet Challenge 2024

Professional & Community Engagement

- Data Science Africa 2021-2024: Speaker, organising/hosting, social media management (X), peer review
- Deep Learning Indaba, Deep Learning IndabaX-Kenya, Deep learning IndabaX-Uganda
- Dedan Kimathi University/DSAIL Undergraduate Outreach, Tutorials & Workshop
- IEEE – Keynote speaker, Conferences, Publishing & member

Professional Bodies

- Institute of Electrical and Electronics Engineers (IEEE – Student Member)
- Engineers Board of Kenya - Graduate Engineer