

TANYA AKUMU

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Barcelona, Spain

RESEARCH INTERESTS

Inclusive AI, Medical Imaging, Deep Learning, Trustworthy AI, Computer Vision

EDUCATION

- **Universitat de Barcelona** March 2024 - September 2027 (Expected)
Ph.D., Computer Science Barcelona, Spain
 - Advisor: Karim Lekadir
 - Proposed Thesis: Deep Learning for Obstetric Ultrasound in Low Resource Settings
- **Carnegie Mellon University Africa** August 2019 - Dec 2021
M.Sc., Electrical and Computer Engineering Kigali, Rwanda
 - GPA: 3.9/4.0
- **Jomo Kenyatta University of Agriculture & Technology** Jan 2012 - Nov 2016
B.Sc. Electrical and Electronic Engineering Nairobi, Kenya
 - Degree: Second Class Honors, Upper Division

HONORS AND AWARDS

- **3rd place ACOUSLIC-AI Challenge** 2024
MICCAI
 - Secured 3rd place out of a total of 144 global participants in the ACOUSLIC-AI challenge by developing an innovative framework for automated fetal abdominal circumference measurement on blind sweep ultrasound.
- **Outstanding Technical Award** 2023
IBM Research
 - Recognized for my contributions to the Multidimensional Subset Scanning Applications.
- **Growth Award** 2022
IBM Research
 - Awarded for outstanding growth, demonstrating a keen aptitude for acquiring and implementing new skills in the 'Scaling Research Assets into Watson Studio' project using Spark.
- **Eta Kappa Nu(HKN) Member of the ECE Honor Society at CMU** 2021
Carnegie Mellon University
 - Awarded membership to join Eta Kappa Nu, the Electrical and Computer Engineering (ECE) Honor Society at Carnegie Mellon University. The society inducts the top 1/3rd of masters students in ECE.
- **Mastercard Foundation Scholarship** 2019
Mastercard Foundation
 - Recipient of full Mastercard Foundation scholarship for graduate studies at Carnegie Mellon University.

EXPERIENCE

- **IBM Research - Africa** Oct 2021 - April 2024
AI Research Engineer Nairobi, Kenya
 - Implemented a neural network optimization technique (US Patent Filed, IJCAI 2024): Created efficient method for characterizing deep neural network representations, achieving 30% memory reduction and 4x faster execution.
 - Developed toolkit for analyzing LLM embedding spaces and model alignment, contributing to two papers on hallucination detection and internal state analysis of large language foundation models.
 - Led healthcare AI research with MADIVA hub to develop explainable ML models for predicting hypertension and diabetes in African populations through prospective study in South Africa and Kenya.
- **Plentify , South Africa** June 2020 - September 2021
Software Engineer Remote
 - Constructed and maintained client-facing dashboard, integrated with deployed machine learning models via AWS cloud thus enabling real-time ,remote monitoring of customer devices.
 - Built a back-end application to collect data from new IoT products and automatically integrated them into existing company database.
- **M-Kopa** Oct 2016 - July 2019
Embedded Engineer Nairobi, Kenya
 - Designed embedded hardware for IoT solar home systems for off-grid customers that led to the market release of two company products (M-kopa 6, M-kopa 600)..
 - Performed data analysis of IoT data for remote monitoring and predictive maintenance. The insights from this reduced customer call-backs on faulty devices by 50

FUNDING

• Grants and Competitive Gifts

2024 - Present

- European Research Council under European Union's Horizon Europe research and innovation programme: AIMIX ((Inclusive Artificial Intelligence for Accessible Medical Imaging Across Resource-Limited Settings) - Grant Agreement No.: 101044779). €25,000 p.a.
- Mastercard Foundation: Full Scholarship for graduate studies at Carnegie Mellon University Africa. Tuition Fee + Stipend.

• Conference and Travel Scholarships

- ANAIS Global AI School, Kathmandu, Nepal - \$100 (2024)
- OxML Summer School, Oxford, United Kingdom - \$300 (2024)
- DS-I Africa Consortium, Kigali, Rwanda - All expenses (2023)
- IJCAI D&I program: African Spotlight Posters, Macao, China - \$2500 (2023)
- Scipy2022 Scientific Computing with Python conference, Austin, TX, USA - All expenses (2022)

PATENTS AND PUBLICATIONS

C=CONFERENCE, J=JOURNAL, P=PATENT, W=WORKSHOP

- [J.1] Ignacio Valenzuela Tanya Akumu, Victor M. Campello, Nidhi Leekha Sikolia Wanyonyi, Angela Koech, Marleen Tammerman, Martin Tolsgaard, Elisenda Eixarch, Karim Lekadir (2025). Artificial intelligence models to interpret obstetric ultrasound sweeps. Under Review at *Ultrasound in Obstetrics and Gynecology*.
- [J.2] M. Sofia Sappia, Chris L. de Korte, Bram van Ginneken, Dean Ninalga, Satoshi Kondo, Satoshi Kasai, Kousuke Hirasawa, Tanya Akumu, Carlos Martín-Isla, Karim Lekadir, Victor M. Campello, Jorge Fabila, Anette Beverdam, Jeroen van Dillen, Chase Neff, Keelin Murph (2025). ACOUSLIC-AI challenge report: Fetal abdominal circumference measurement on blind-sweep ultrasound data from low-income countries. Accepted at *Medical Image Analysis*.
- [J.3] Adebayo Oshingbesan, Michelle Kamp, Phelelani Thokozani Mpangase, Kayode Adetunji, Samuel Iddi, Daniel Maina Nderitu, Tanya Akumu, Okechinyere Achilonu, Isaac Kisiangani, Theophilous Mathema, Girmaw Tadesse, F Xavier Gomez-Olive, Chodziwadziwa Whiteson Kabudula, Scott Hazelhurst, Gershim Asiki, Michele Ramsay, Skyler Speakman (2025). Sub-population identification of multimorbidity in sub-Saharan African populations. *Scientific Reports*, 15, 13992.
- [J.4] Skyler Speakman, Girmaw A. Tadesse, Celia Cintas, William Ogallo, Tanya Akumu, Adebayo Oshingbesan (2023). Detecting Systematic Deviations in Data and Models. *IEEE Computer Society, Computer*, 56, 82-92.
- [C.1] Tanya Akumu, Marawan Elbatel, Victor M. Campello, Richard Osuala, Carlos M. Isla, Ignacio Valenzuela, Bishesh Khanal& Karim Lekadir. (2025). Adaptive Frame Selection for Gestational Age Estimation from Blind Sweep Fetal Ultrasound Videos. Under review at the *28th International Conference on Medical Image Computing and Computer Assisted Intervention*, 2025.
- [C.2] John Wamburu, Girmaw A. Tadesse, Celia Cintas, Adebayo Oshingbesan, Tanya Akumu, Skyler Speakman. (2022). Systematic Discovery of Bias in Data. In *proceedings of 2022 IEEE International Conference on Big Data (Big Data)*, Osaka, Japan, 2022.
- [W.1] Tanya Akumu, Carlos M. Isla, Victor M. Campello, Jorge Fabila , Karim Lekadir. (2024). Automatic detection of fetal abdominal circumference from operator-agnostic ultrasound measurements . *ACOUSLIC-AI Challenge, MICCAI*, 2024.
- [W.2] Tanya Akumu, Celia Cintas, Girmaw A. Tadesse, Adebayo Oshingbesan, Skyler Speakman. (2023). TRAD: Task-agnostic Representation of the Activation Space in Deep Neural Networks. *African Spotlight Poster Session, International Joint Conference on Artificial Intelligence*, 2023.
- [W.3] Miriam Raiteke, Celia Cintas, John Wamburu, Tanya Akumu, Skyler Speakman. (2023). Auditing LLMs via Subset Scanning of Internal States. *Socially Responsible Language Modelling Research (SoLaR), NeurIPS*, 2023.
- [P.1] Tanya Akumu, Celia Cintas, Girmaw Tadesse, Skyler Speakman. (2023). Characterizing Activation Spaces in Neural Networks Using Compressed Histograms. Patent No. P202300340US01. Filed: October 2023.

TALKS AND LECTURES

1. Invited Speaker, "Analyzing Ultrasound Data With Hugging Face", code along tutorial, DataCamp, 2025
2. Invited Speaker, "AI-Enabled Ultrasound Analysis for Prenatal Care in Low-Resource Settings", IBM Research Africa, 2025
3. Cohort Trainer, "AI for Healthcare", Digital Health Skills for Africa (DHSA), 2025.
4. Invited Speaker, "Unlocking The Power Of Explainable AI In Healthcare", WiDS Africa Conference, 2024.

5. Panelist, "AI and Equity in Healthcare", WiDS Africa Conference, 2024.
6. Panel moderator, "The Ethical Implications of Data Use", The Data Journey, Nairobi Summit, 2023
7. Panelist, "The Role of Data Science in Climate Change", Women in Data Science Africa, Nairobi 2023.
8. Speaker, "Anomalous Subsets? All You Need Is Scanning", SciPy2022 Conference, Texas, USA, 2022.
9. Speaker, "Anomalous Subsets? All You Need Is Scanning", Google Developer Fest Nairobi, 2022.
10. Speaker "Systematic Deviations in Data and Models", PyConKE Summit 2022.

LEADERSHIP & VOLUNTEER EXPERIENCE

- **Communications Minister, Student Council** 2020 - 2021
Carnegie Mellon University Africa
 - Built and launched the CMU-Africa student blog for students to share their experiences and stories during the pandemic.
 - Managed and improved student body PR through active student social media engagement (Instagram and Facebook).
 - Managed stakeholder engagement between the student body and the administrations through official communication channels.
- **Lead Instructor & mentor, Data Science** 2020
Ripple project, Mastercard Foundation Scholars
 - Developed training modules of data science concepts to post high-school and university students while they were out of school due to the pandemic.
- **Instructor in Computer studies** 2017-2018
KidsCompCamp
 - Trained young adults and elementary school students in digital skills.

TEACHING EXPERIENCE

- **Carnegie Mellon University** 2020 - 2021
 - Graduate Teaching Assistant, Introduction to Deep Learning
 - Graduate Teaching Assistant, Data Inference & Applied Machine Learning
 - Graduate Teaching Assistant, Big Data

PROFESSIONAL SERVICE

- **Reviewer:**
 - Workshop on Fairness of AI in Medical Imaging (FAIMI), MICCAI 2025
 - Workshop on Fairness of AI in Medical Imaging (FAIMI), MICCAI 2024
 - Workshop on Practical ML for Low Resource Settings (PML4LRS), ICLR 2024
 - Workshop on Trustworthy Multi-modal Foundation Models and AI Agents (TiFA), ICML 2024
 - Proceedings for the Annual Scientific Computing with Python Conference, SciPy 2023

STUDENT MENTORING

- **University of Barcelona**
 - Ivan Mikic (masters)
 - Iris Vukonic (masters)
 - Ahmed Hazem (intern)
 - Julia Leyva (intern)
- **Carnegie Mellon University Africa**
 - Khotso Selalia (masters)