

SUMMER 2025



Research Club at CMU-Africa

NEWSLETTER



Carnegie
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Inside this Issue

- Welcome Remark
- Meet the Leadership Team
- The Year in Focus
- Summer Students Spotlight
- Research Opportunities at CMU-Africa

CMU-Africa Research Club

Welcomes
Tartans Class of 2027

to

CMU-Africa



WELCOME REMARKS - RESEARCH CLUB



Dear Class of 2027 Tartans!

The Research Club is excited to welcome you to CMU-Africa.

At CMU-Africa, research is central to our vision of becoming the leading research institution in Africa. As a student, you are a key part of this goal. Throughout your time here, you will have opportunities to participate in faculty-led projects, independent studies, and student-led collaborations that drive innovation and impact. We encourage you to take full advantage of these opportunities.

Building Africa is our goal. Research is our way.

The Research Club is a student-led body dedicated to helping you navigate and maximize the research opportunities available at CMU-Africa. We support students in:

- Connecting with faculty and peers for research collaborations.
- Showcasing the exciting projects happening across CMU-Africa.
- Building a strong culture of student research and publication.

Research can be challenging, but it is also deeply rewarding. It equips you with skills that will serve you not only during your time at CMU-Africa but also in your future endeavors. We invite you to engage with us, participate in our activities, and contribute to shaping the future of research at CMU-Africa.

Have a great semester, and we look forward to seeing you!

— The Research Club Leadership Team

Fill out this [form](#) to become a member of the Research Club

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Meet the Research Club Leadership Team



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The Year in Focus: Fall 2024 & Spring 2025



Meet and Greet with Prof Vernon



Fall 2024 - Meet and Greet



Fall 2024 - Meet and Greet



Fall 2024 - Faculty Panel Session with Ibrahim, Prof. Biyabani, Prof. Assane, Prof. Barros, Prof. Moise (L-R)



Fall 2024 - Faculty Panel Session Q&A



Fall 2024 - Faculty Panel Session

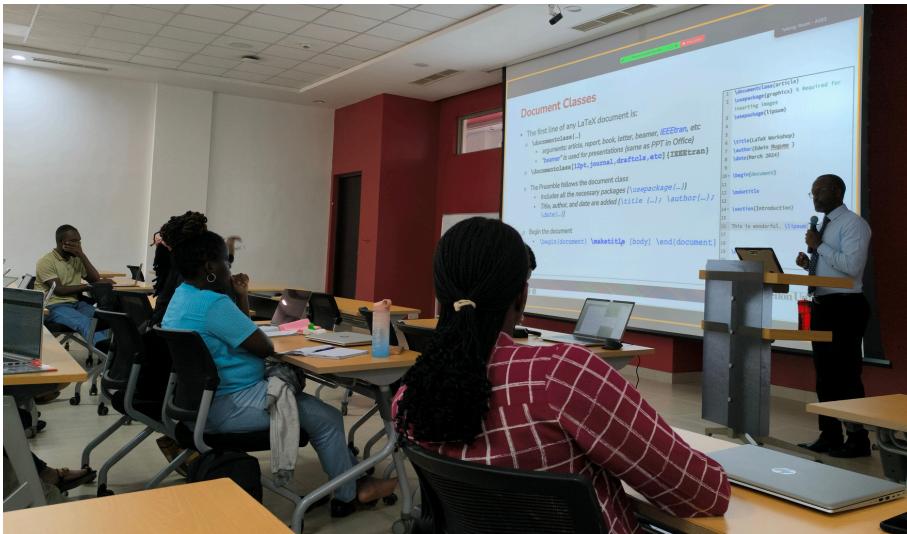


Fall 2024 - Faculty Panel Session



Fall 2024 - Faculty Panel Session, Section of participants

The Year in Focus: Fall 2024 & Spring 2025



Fall 2024 - Latex Tutorial with Prof. Mugume



Fall 2024 - Latex Tutorial



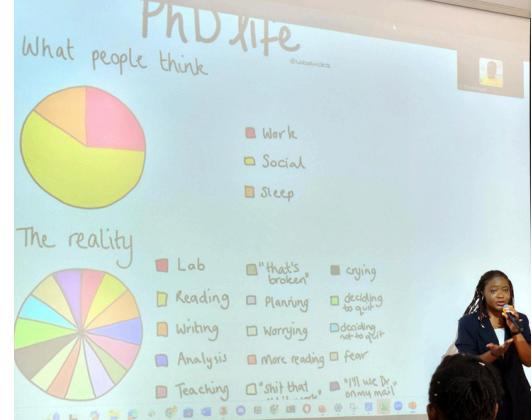
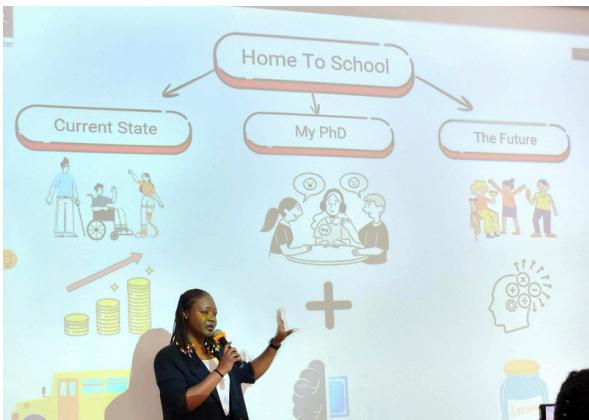
Spring 2025 - Q&A with Prof. Okeyo



Spring 2025 - Q&A with Prof. Okeyo

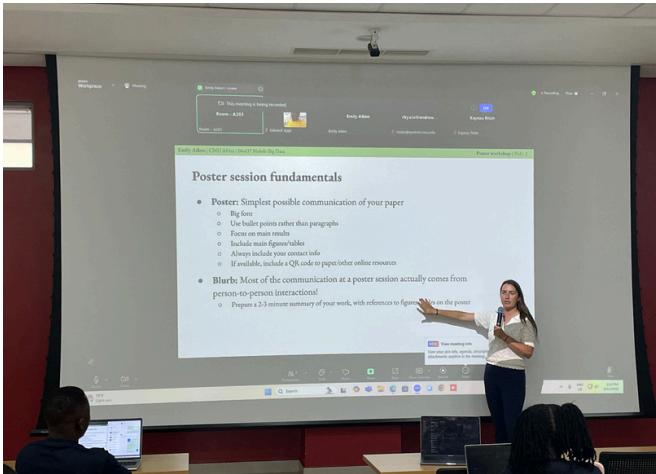


Spring 2025 - Q&A with Prof. Okeyo, Interactive participants



Spring 2025 - Research Chat with Ozioma Paul (CMU-Africa Alumnus)

The Year in Focus: Fall 2024 & Spring 2025



Spring 2025 - Poster Workshop with Prof. Emily Aiken



Spring 2025 - Virtual PhD Application Series with Steven Kolawole (CMU Pittsburgh)



Spring 2025 - Student Research Showcase

The Year in Focus: Fall 2024 & Spring 2025



Spring 2025 - Student Research Showcase



Summer 2025 - Research Chat with Steven Kolawole PhD Candidate, CMU Pittsburgh)

SUMMER INTERNS SPOTLIGHT

At CMU-Africa, students have the opportunity to pursue summer internships at the end of their first year. For students in the Master of Science in Information Technology (MSIT) program, this internship is a requirement. For students in the MSEAI and MSECE programs, it is an exciting chance to gain exposure to industry, engage in research, collaborate within teams, and build valuable skills that are often difficult to develop during the busy academic semester.

The CMU-Africa Career Services team plays a key role by sharing internship opportunities and supporting students throughout the application process. At the same time, students are encouraged to actively seek opportunities worldwide and take full advantage of the summer to broaden their experiences and sharpen their skills.

In the following pages, we highlight a select group of students from the MSEAI, MSIT, and MSECE programs who completed their summer internships. They worked on impactful projects across different sectors and geographies and are excited to share their stories with the CMU-Africa community.

These experiences are crucial stepping stones whether you aspire to join the industry after graduation, pursue a research career or a PhD program. This past summer, CMU-Africa students proudly represented the university across Africa, Europe, Asia and Australia demonstrating the global reach and impact of our community.



CMU-Africa Students Internship Locations - Summer 2025

SUMMER INTERNS SPOTLIGHT

Brandone Fonya, MSEAI'2026



Summer Research Project(s)

MedBLIPNet3D (China)

Proposed a framework for text-prompted segmentation of 3D medical scans, addressing challenges in applying vision-language models to volumetric data. My work focused on training MedBLIPNet3D to segment prostate MRI scans using natural language prompts.

Low-Cost Non-Invasive Tuberculosis Screening (CMU-Makerere CHS Joint Research)

Developing a low-cost, non-invasive TB screening system that combines a mobile app and IoT device. The system leverages multi-modal deep learning on solicited cough sounds and clinical data to support early diagnosis in low-resource settings.

Supervisor(s)

Prof. Edwin Mugume (**CMU-Africa**) and Prof. Kaicheng Yu (**Westlake University**)

How do you feel about your summer experience

My summer spanned three countries and two incredible research teams. I started as a graduate research assistant with CMU, working with the AI team on the Carnegie Mellon-Makerere University CHS Joint Research Program, building solutions for Uganda. Collaborating with engineers and medical doctors across Kigali and Kampala—from debugging to model testing. It was a once-in-a-lifetime experience, guided by Prof. Annie Hartley, whose lab received millions for a similar project in Switzerland.

After a month in Rwanda, I began working remotely with my team before moving to Hangzhou, China—the heart of tech innovation, home to Alibaba and DeepSeek. There, at the Autonomous Intelligence Lab in Gallium Valley Science Park, I collaborated with talented interns from top institutions worldwide, gaining hands-on experience in research and innovation. Exploring Shanghai and other cities added a cultural highlight to the experience.

Overall, my summer was an unforgettable mix of advanced research and adventure!

SUMMER INTERNS SPOTLIGHT



**Baimam Boukar
Jean Jacques
MSIT'2026**

Supervisor(s)

**Miriam Rateike and
Skyler Speakman
(IBM Research)**

Summer Research Project(s)

Anomalous Pattern Detection In LLMs' Activation Spaces (IBM Research, Kenya)

My project focuses on IBM DeepScanner, a method developed to analyse systematic changes in the activation space of neural networks to detect shifts in how data is processed by the model. This is important because certain activations can encode harmful behaviours such as toxicity or hallucinations, and understanding which subsets of activations are responsible for these effects is crucial for improving the trustworthiness and fairness of large language models (LLMs). The methodology involves using the IBM Research cloud environment and various Hugging Face models, including Mistral-3B, Granite-3B-Instruct, LLAMA3-8B-Instruct, and Gemma-7b-it for embeddings extraction. My contributions mostly revolved around architecting scalable and reproducible experimental workflows, supported by a modular codebase and efficient algorithms for running cloud-based large-scale experiments. As early outcome, our proposed design enables running large-scale experiments (Order of hundreds) faster, with a clear reproducibility framework, and allows the team to get insights faster for analysis.

How do you feel about your summer experience

The internship was extremely challenging at first, especially in getting acclimated to the team's workflow, understanding the core methodologies behind DeepScanner, and navigating the existing codebases. Over time, things improved significantly, and the experience became really fulfilling. I had the opportunity to work closely with brilliant scientists and reinforced and gained valuable skills, not just technical ones like exploring LLM activation spaces and architecting reproducible large-scale experiments, but also in writing strong research papers, best practices in research, and delivering technical presentations. Fun fact about my summer experience ? Working of IBM Deepscanner was just part of it, I also engaged in fun activities with other interns and IBMers like ice-skating 😂

SUMMER INTERNS SPOTLIGHT

Julius Wasaja, MSIT'2026



Summer Research Project(s)

Exploring the Correlation Between Africa's startup Funding Network Structures and the Africa Entrepreneurial Ecosystem Index (Edge AI Labs, CMU-Africa)

This research project investigates the critical link between the structure of Africa's startup funding networks and the health of each country's entrepreneurial ecosystem, measured by the Entrepreneurial Ecosystem Index (EEI). To determine whether denser, more interconnected funding graphs are linked with stronger ecosystems, I am building investor-startup bipartite graphs and country-level networks using Python (pandas, NetworkX). By computing network features like centrality and density, I can test these associations directly. Early results from this analysis are promising, indicating that ecosystems with a greater diversity of both startups and investors tend to score higher on the index. Startups and investors within a network tend to score higher on the index.

Supervisor(s)

Prof. Joao Barros (CMU-Africa)

How do you feel about your summer experience

Its mixed feelings, I must say - working in the GenAI Lab has been genuinely exciting, especially with the team's steady support. Some phases like data cleaning were more challenging than I expected, literature review on such a novel approach for analyzing Africa Entrepreneurial ecosystem literally had me searching for papers. The stretch has broadened my perspective and sharpened my skills. Most surprising, I now see myself exploring research—something I never thought I'd be interested in when I joined CMU-Africa.

SUMMER INTERNS SPOTLIGHT

Peace Bakare, MSIT'2026



Summer Research Project(s)

Title: Prognostic Modeling of Hepatocellular Carcinoma (HCC) Surgery Outcomes Using Machine Learning on Tabular Data (EPFL, Switzerland)

During my research internship at EPFL's LiGHT Lab, I worked on implementing machine learning methods to predict surgical outcomes for patients with hepatocellular carcinoma (HCC) using large multi-center clinical datasets. The study tackles important challenges such as ensuring patient privacy and managing variability across institutions, which are common barriers in collaborative healthcare research. By exploring both conventional machine learning and federated learning frameworks, the project seeks to deliver accurate and interpretable prognostic models that maintain data confidentiality. The broader aim is to demonstrate how advanced machine learning techniques can strengthen clinical decision-making and ultimately contribute to improving patient outcomes in HCC treatment.

Supervisor(s)

Prof. Mary-Anne Hartley (LiGHT Lab, EPFL)

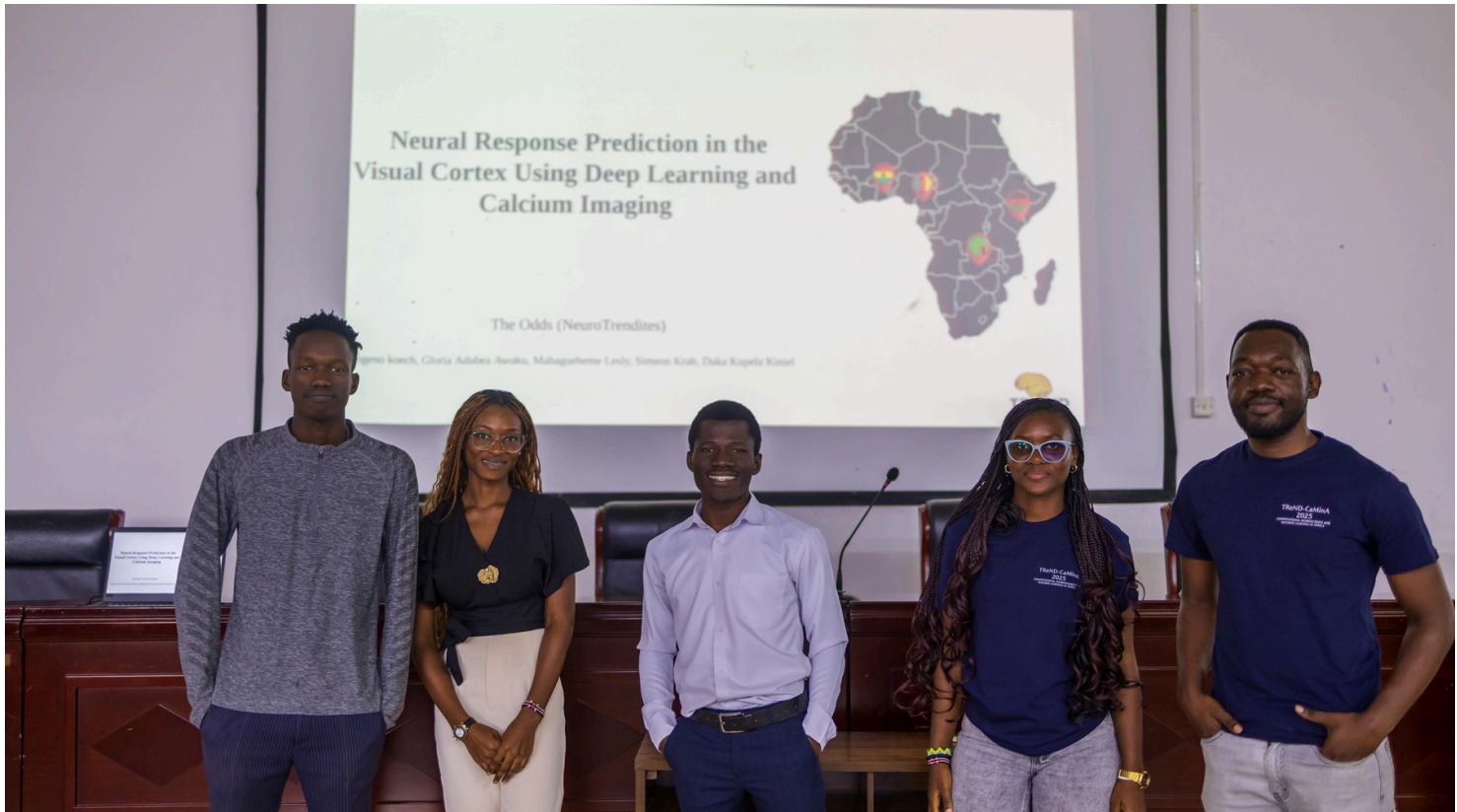
How do you feel about your summer experience

My internship at LiGHT Lab has been an incredibly fulfilling blend of rigorous research and vibrant international community. Intellectually, our bi-weekly "BoPoJoCo" (Book, Podcast, and Journal Club) sessions sharpened my ability to discuss complex AI papers with brilliant peers from around the globe including South Africa, Ghana, France, and the US.

Beyond the state-of-the-art lab, unforgettable memories were made exploring Switzerland's breathtaking landscapes. A standout moment was sharing a home-cooked meal with a friend from South Korea, trying Mandu Bulgogi for the first time. That simple dinner, blending cultural discovery with warm conversation after a day of research, perfectly captured the experience. It was the ideal balance of intellectual growth and personal connection, complemented by adventures like visiting the Olympic Museum and taking a ferry to France.

SUMMER INTERNS SPOTLIGHT

Kipngeno Koech, MSEAI'2026



Summer Research Project(s)

Neural Response Prediction in the Visual Cortex (Trend Camina)

My project focused on a key challenge in computational neuroscience: teaching a computer to predict how neurons in the visual cortex respond to motion. Using a large dataset of calcium imaging—which shows brain cell activity in real time—I trained a deep learning model to learn the complex patterns of these neural responses. The model proved to be highly accurate in its predictions, validating our approach. This work is a significant step towards developing powerful tools that can help scientists decode the mechanics of vision and ultimately aid in studying and treating related brain disorders in the future.

Supervisor(s)

Trend in Africa, University of Zambia - Lusaka Zambia

How do you feel about your summer experience

From a person who is from a software engineering background, understanding the Allen Brain Observatory dataset for brain neural responses was a bit challenging,

Trend in Africa gave us a little bit of biology base to try and help us understand how the brain operates, the difference between a human brain & the mouse's brain. through the entire summer, I felt kind of mechanical really, "tell me what you want me to do and what row and column you want me to change and I will" kind of person without really understanding biologically why we were doing whatever we were doing.

This has encouraged me to do a little bit of extra biology & Brain science digging to better place me in a position i can understand brain data better in the distant future as I want to go full time into Computational Neuroscience

SUMMER INTERNS SPOTLIGHT

Rose Kimu MSIT'2026

Supervisor

Prof. Tim Brown
CMU-Africa



Summer Research Project(s)

Evaluating User Experience of Government and E-Government Services: A technology-neutral ecosystem lens (CMU-Africa)

This research looks at how digital transformation is changing government services in developing countries. It addresses the limits of technology-focused evaluations by introducing a user experience framework that considers access through in-person, phone, online channels, and intermediaries. Using a qualitative case study in Rwanda, the study analyzes how people interact with these services. Findings show the framework helps uncover barriers and solutions often overlooked, making it a useful tool for policymakers to improve accessibility, trust, and efficiency.

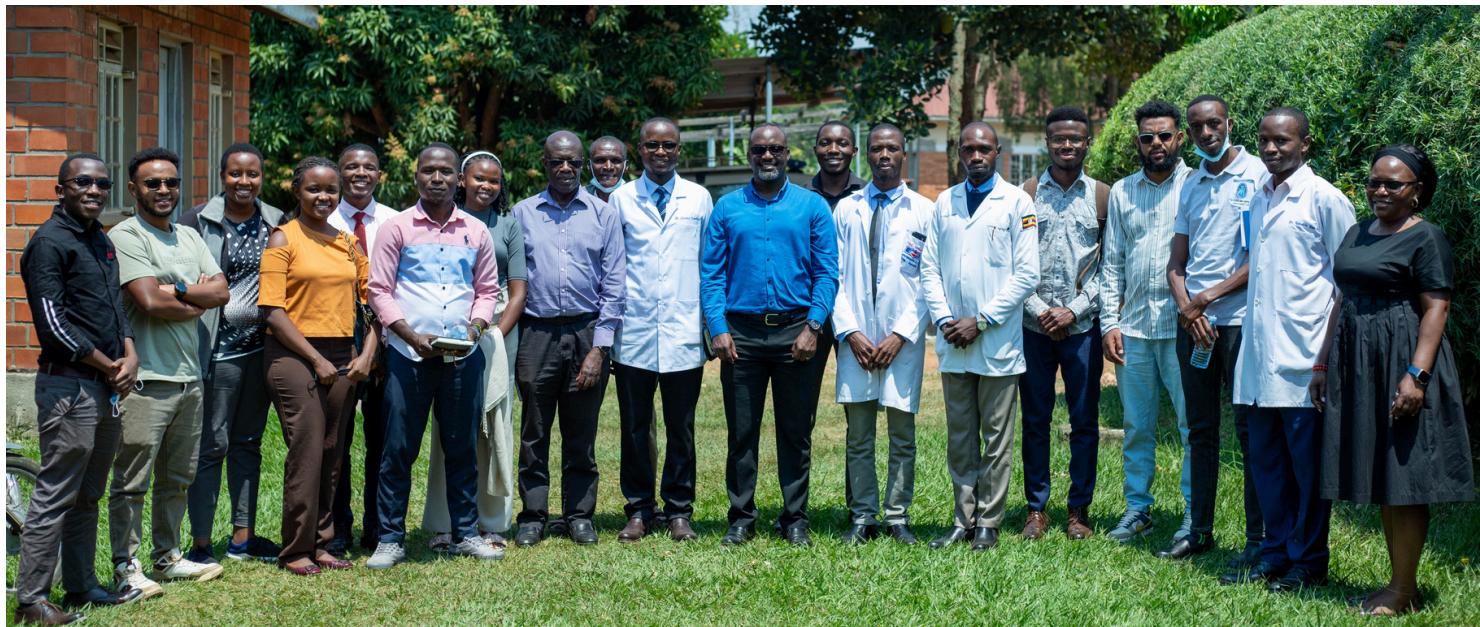
How do you feel about your summer experience

One of my favorite experiences this summer was going to the field with David Nkundineza, a research associate, to collect interviews—although I couldn't speak much Kinyarwanda, the experience pushed me to practice and improve. Being in the users' context made me more empathetic and gave me richer insight when analyzing the data.

I also attended the Cornell, Maryland, Max Planck Pre-doctoral Research School (CMMRS) in Saarbrücken, Germany, a week-long program designed to introduce students to research in computer and information science and to help them explore whether a Ph.D. is the right path. The panels on Ph.D. life, applications, and career paths answered many of my questions, while the poster sessions and lectures gave me a taste of cutting-edge research. I also loved exploring Saarbrücken – the public transport, green spaces, and long summer days made the city so easy and enjoyable to experience.

SUMMER INTERNS SPOTLIGHT

Yabsara Yemanberhan, MSEAI'2026



Summer Research Project(s)

Leveraging Artificial Intelligence for Tuberculosis Detection via Provoked Cough Sounds (CMU-Africa - Makerere University)

This research focuses on developing an offline-capable tuberculosis (TB) screening system using artificial intelligence to analyze provoked cough audio recordings. The goal is to provide an accessible, low-cost screening tool for both medical professionals and civilians, especially in low-resource settings where laboratory testing is limited. Our approach combines a mobile application with a standalone handheld IoT device, enabling TB screening without requiring internet connectivity. We are experimenting with multiple deep learning architectures, including variants of convolutional neural networks (CNNs) and audio transformer-based models for feature extraction and classification. Early experiments have achieved a classification accuracy of 73%, demonstrating strong potential for AI-driven cough analysis in TB detection. The expected outcome is a reliable, portable screening solution that can improve early TB detection rates and support global public health efforts.

Supervisor(s)

Prof. Edwin Mugume (CMU-Africa)

How do you feel about your summer experience

Working on this project has been an exciting and fulfilling experience, though at times challenging as we navigate the complexities of both AI technology and medical requirements. Collaborating closely with medical students and team members from Makerere University has been invaluable, giving me direct insight into clinical concepts and real-world healthcare challenges. One memorable moment was when we traveled to Nkozi, Uganda, and saw firsthand the community and environment where our TB screening solution would be deployed, it really brought home the impact of our work. A fun fact from the summer was discovering how much a cough sound can reveal about someone's health, and realizing the power of AI to interpret these subtle signals in places with limited medical infrastructure.

SUMMER INTERNS SPOTLIGHT

Eddy Kayiganwa, MSIT'2026



Summer Research Project(s)

Building Scalable Cloud-Based Applications: The EuropFoods Platform (Tianlu Digital Services, Spain)

My internship project focused on the development of EuropFoods, a large-scale mobile and web application that connects vendors, clients, sales teams, and shops on a unified digital platform. The project addresses the challenge of fragmented communication and inefficient sales tracking in the food distribution sector, where real-time coordination between stakeholders is crucial. To achieve this, I applied full-stack development (React Native, Next.js, NestJS) alongside cloud deployment pipelines built with Docker and Kubernetes on AWS, ensuring scalability and reliability. Early outcomes include the successful deployment of a real-time chat feature that enables instant communication among users, and the implementation of a CI/CD pipeline that streamlines deployment and database synchronization. These results highlight the potential of cloud-based, scalable solutions to improve efficiency and collaboration in industry-scale applications.

Supervisor(s)

Abel Bordonado Lillo (Tianlu Digital Services, Spain)

How do you feel about your summer experience

This internship has been both exciting and challenging, as it pushed me to work on complex, real-world systems at scale. I learned how to design deployment pipelines with Docker and Kubernetes on AWS while also sharpening my teamwork and problem-solving skills. A memorable moment was when I successfully deployed the real-time chat feature, seeing vendors and clients communicate instantly through the app. And outside of work, I even got the chance to go sailing in the Mediterranean Sea, which made this summer not only technically fulfilling but also unforgettable.

SUMMER INTERNS SPOTLIGHT

Serign Modou Khan

MSIT'2026

Supervisor

Victor Eyo Andrew
Chanja Datti Ltd, Nigeria



Summer Research Project(s)

Wapfi - Digital financial services platform developed by Chanja Datti Limited to support underserved communities in Africa's recycling value chain (Chanja Datti Ltd, Nigeria - Remote Internship)

The platform I worked on is a digital financial services platform that is meant to improve financial inclusivity by giving loans to waste collectors who may otherwise have to get it from banks at huge interest rates. Additionally, the business model allows loanees to pay with recyclables as an alternative to cash thus expanding their repayment options. During the development, I used technologies such as React, TailwindCSS to build the user interfaces. I also incorporated best user experience practices to ensure ease of use for users. Finally, I held a presentation where I went tested the application before company reps, CMU reps and other developers who worked on the project.

How do you feel about your summer experience

The experience was valuable. I am glad to have contributed to a project that promotes financial inclusivity and environmental protection. Through this internship, I learned about the importance of communication and coordination among team members. It also gave me the opportunity to work in a remote setting and with people of different technical backgrounds which made me see how collaboration can lead to success.

SUMMER INTERNS SPOTLIGHT

Motaroki Samson , MSIT'2026



Summer Research Project(s)

Predictive Animal Wellbeing with LoRaWAN Eartags (Afya ya Mnyama Digital, Tanzania)

This research explores the use of LoRaWAN-enabled eartag sensors to monitor and predict the well-being of livestock in real-time. By leveraging low power, long range wireless communication, the system enables continuous tracking of vital indicators such as movement, temperature and location even in remote areas. The project addresses the challenge of early detection of health issues in animals, especially livestock, which is critical for improving welfare, reducing losses and enhancing farm productivity. The methodology involves deploying LoRaWAN sensors, collecting time-series data and applying machine learning models to identify patterns and predict potential health risks. Preliminary results suggest promising correlations between sensor data and early signs of illness and other physiological conditions. The expected outcome is a scalable, cost-effective solution for proactive animal health management in agriculture.

Supervisor(s)

Dickson Massawe (Afya ya Mnyama Digital, Tanzania)

How do you feel about your summer experience

Working on this project was both exciting and deeply fulfilling. It became very apparent how powerful IoT and data analytics can be in transforming traditional livestock management, especially in rural settings. One memorable moment was seeing the first batch of sensor data come in (after successful wrestling a goat). It was felt like the animals were finally 'speaking' through the tech. This experience taught me the value of patience, adaptability and the importance of designing tech that works in the real world.

SUMMER INTERNS SPOTLIGHT



**Oswaldo Camille
Grimaud
MSIT'2026**

Supervisor

**Romalice Ishimwe
Ministry of Infrastructure
Rwanda**

Summer Research Project(s)

National Building ID Registry for Rwanda (Ministry of Infrastructure - Rwanda)

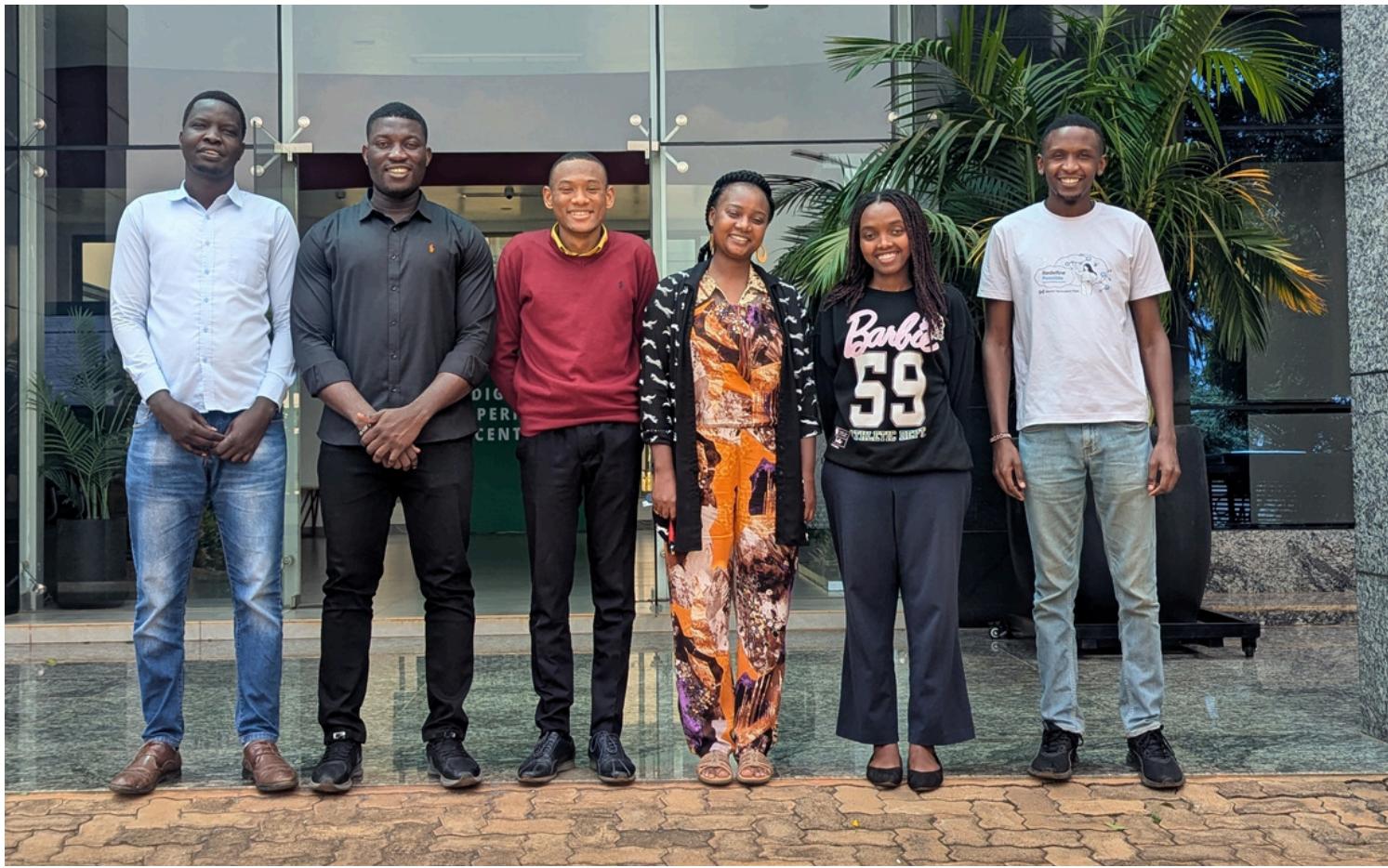
Rwanda has a national unique land ID (UPIs) system, but there is no equivalent system to uniquely identify buildings. This gap creates challenges in tracking whether permitted constructions were actually built and makes it difficult to uniquely reference a building or house. To address this, we designed a solution that assigns a unique building ID (UBUID) to every structure, starting with Kigali, using geospatial building footprints provided by the Rwanda Space Agency (RSA). We then linked these buildings to their corresponding UPIs and building permits. To make the system usable, we developed an interactive platform where users can search and locate buildings by their UBUID or explore all buildings on a given plot using its UPI. This work provides a foundation for a national building registry, establishing a base upon which future urban development initiatives and public utility services can be built.

How do you feel about your summer experience

Working with a national organization was an exciting and fulfilling experience. What stood out to me at the Ministry of Infrastructure was how collaboration flowed smoothly; requests were addressed quickly, which challenged the common stereotype of government institutions being slowed down by bureaucracy. Contributing to a project of national scale, knowing it would directly impact the lives of many Rwandans, was both inspiring and an honor. I also attended the Cornell, Maryland, Max Planck Pre-doctoral Research School (CMMRS) in Saarbrücken, Germany, a week-long program designed to introduce students to research in computer and information science and to help them explore whether a Ph.D. is the right path. The panels on Ph.D. life, applications, and career paths answered many of my questions, while the poster sessions and lectures gave me a taste of cutting-edge research. I also loved exploring Saarbrücken – the public transport, green spaces, and long summer days made the city so easy and enjoyable to experience.

SUMMER INTERNS SPOTLIGHT

Nchofon Tagha Ghogomu, MSIT'2026



Summer Research Project(s)

Cardiologist and Gradients: Nuance in arrhythmia classifications (AI and Healthcare Research Laboratory)

I developed ArrhyX-ECG-Net, a hybrid residual-CNN + BiLSTM architecture for multi-class classification of six clinically relevant atrial rhythm categories using 5-second single-lead ECG segments from a large publicly available PhysioNet database. Using this model, I compared the salient ECG regions emphasized by the model and by cardiologists, showing how alignments may refine and improve clinical diagnostic cues.

Supervisor(s)

Prof. Carine Mukamakuza (CMU-Africa)

How do you feel about your summer experience

It was fulfilling. I think a research internship gets the weight you give it. If you want more out of it, you give it more weight. Interestingly, my goal was to use a shorter length of signal to make 15 classifications. Unfortunately, the dataset I used did not yield the expected accuracy. In looking for a larger data set with short signals, I learned techniques in signal processing that were useful for my second iteration which made my model perform even better. My most memorable moments are the periods I had insightful conversations with my principal investigator and colleagues, sharing knowledge.

SUMMER INTERNS SPOTLIGHT

Moïse Iradukunda Ingabire, MSIT'2026



Summer Research Project(s)

KRO-powered Smart Resources Provisioning for Kubernetes-native Infrastructure (Irembo Ltd)

The project improves how we manage and store Infrastructure Custom Resource Definitions (CRDs). With our shift toward a more scalable and automated infrastructure provisioning approach, this project introduces a built-in centralized CRD repository and automated CRD generation within the application logic. It also streamlines deployment workflows. This enables controlled access to reusable CRDs across internal teams, enhances agility (reducing time to market), and provides a smoother experience for defining and deploying resources.

Supervisor(s)

Landry Chedjou (Irembo Ltd)

How do you feel about your summer experience

It's nothing short of an amazing and exciting experience because before the internship, I wasn't aware that I could perform at an industry level. But through this experience, I was able to deliver at the same pace as experienced professionals, not just relying on academic knowledge, but applying it effectively in real projects. I am sincerely grateful to CMU Africa and its vibrant alumni community. Their support was instrumental, especially the alumni at Irembo who helped onboard me, guided me, and ensured I thrived throughout the internship period. I consider it a privilege to have formed lasting connections with brilliant industry minds who are making our country proud and shaping its digital future.

SUMMER INTERNS SPOTLIGHT



**Cynthia
Iradukunda**

MSIT'2026

Supervisor

**External
Supervisor
Senior Software Developer
Formbird**

Summer Research Project(s)

Formbird microservices (Formbird - Australia (Remote)) & SafeSpeak mental health

During my internship, I helped modernize Formbird's architecture by transitioning its monolithic structure from Express.js to Rust, enabling a microservices approach that improved security and performance. I also enhanced the frontend by replacing Angular Material with Tailwind CSS, resulting in more flexible and efficient component styling. Beyond my internship, I co-founded SafeSpeak, an AI-powered and culturally sensitive platform aimed at helping young Africans address and prevent mental health challenges. Over the summer, our team conducted market research that guided the selection of core features for our MVP.

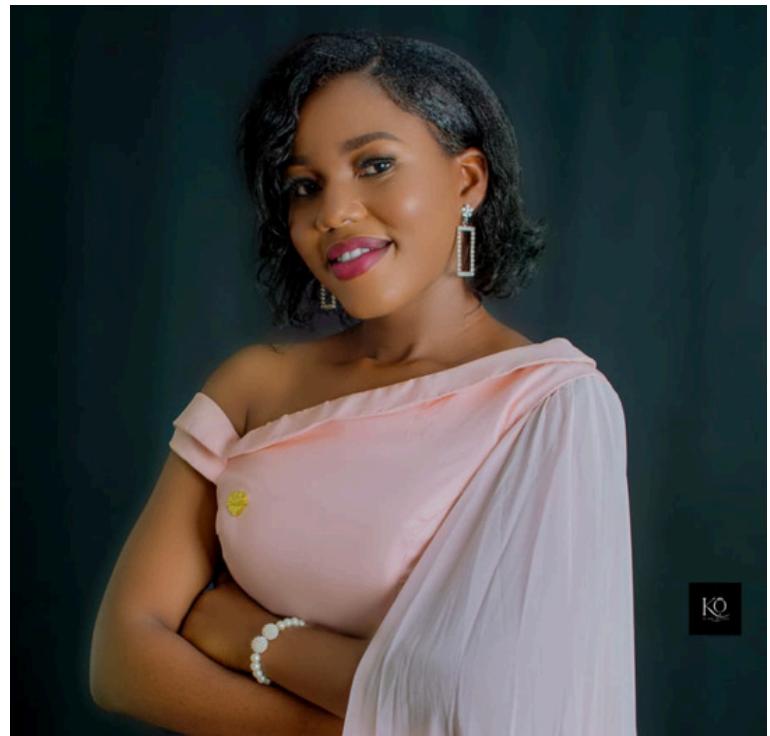
How do you feel about your summer experience

This summer was both exciting and fulfilling as I explored the power of technology in different contexts. Using AI, I was able to quickly learn Rust, which made it easier to transition Formbird's system into a more secure and high-performing microservices architecture. Another moment that stood out was interviewing people about mental health challenges, where I saw firsthand the stigma around the topic in Africa and the urgent need for solutions. A fun fact is that these conversations directly shaped the features we prioritized for our MVP at SafeSpeak.

SUMMER INTERNS SPOTLIGHT



Floride Tuyisenge(MS ECE'AD'26)



Ntung Landon(MSIT'26)

Summer Research Project(s)

Fairness-Aware Face Presentation Attack Detection: An African-Centric Study (CMU-Africa)

Our research focuses on developing a fairness-aware Presentation Attack Detection (PAD) system for facial recognition, with a special emphasis on African users. While PAD systems protect biometric authentication from spoofing attempts such as photos, videos, or masks, existing models often underperform for underrepresented groups, especially people of African descent, due to dataset imbalance and technical biases. We are using the CASIA-SURF CeFA dataset, applying Local Binary Patterns (LBP) for feature extraction, and training a classifier to detect spoofing attempts. We are also conducting a demographic fairness evaluation to measure and address performance disparities across ethnic groups. Early results are promising, we expect our lightweight, interpretable model to outperform baseline methods in achieving better demographic parity while remaining deployable in low-resource environments.

Supervisor(s)

Prof Jema David Ndibwile (CMU-Africa)

How do you feel about your summer experience

This project has been both exciting and deeply meaningful. It's challenging to balance technical performance with fairness, but that's exactly what makes the work impactful. We've learned not only advanced biometric security techniques but also how to embed ethical AI principles into practical solutions. One standout moment was realizing that even a simple, traditional method like LBP, when thoughtfully applied can make a significant difference in fairness outcomes.

Fun fact: While running experiments, our models sometimes classified my colleague's face as a spoof, reminding us how tricky real-world deployment can be!

SUMMER INTERNS SPOTLIGHT

**Delyon Ronnie
Obote
MSEAI'2026**

Supervisor

**Geoffrey
Omoding
Patapia Limited. Uganda**



Summer Research Project(s)

Artificial Intelligence Development Program (Patapia Limited. Uganda - Remote)

Patapia Limited supports refugees in Uganda through loans and business training and was seeking to expand its services with a 24/7 multilingual customer support system covering Kiswahili, Kinyarwanda, English, and Luganda.

As part of a two-person team, I co-developed a WhatsApp-integrated chatbot trained on Patapia's internal documentation and external resources. The solution was designed to handle both voice and text queries, with plans for future deployment as a Smart IVR system. My role involved designing, training, and testing the model, while also working closely with the client to adapt the system to real-world use.

During testing, we identified key challenges in speech recognition and NLP for African languages, such as accent variability and limited text-to-speech naturalness. I contributed by refining the models through retraining and documenting these gaps, which provided Patapia with a practical tool as well as strategic insights into the opportunities and limitations of AI-driven multilingual support in East Africa.

How do you feel about your summer experience

It has been a fulfilling experience. Patapia's mission and goal aligned with my personal ambition to use technology to contribute meaningfully to initiatives driving financial inclusion and economic empowerment in East Africa.

The value created for Patapia has further shown that African companies are ready and willing to adopt and incorporate AI powered solutions into their processes when the returns on their investment are clearly defined and realised as promised. This adoption has the potential to serve as a growth accelerator due to low-cost service provision at scale

RESEARCH OPPORTUNITIES AT CMU-AFRICA

At CMU-Africa, every student engages in research through assignments, course projects, reports, and more. In essence, we are all researchers. Here are some resources and opportunities to help you get started and excel in research:

1. Research Methods in Engineering Course: Your journey begins with this foundational course, offered in both Fall and Spring semesters.
2. Join Research Groups: Explore opportunities to volunteer or intern with various research groups during the summer. These experiences provide hands-on exposure to cutting-edge projects.
3. Research Track for MSIT Students: IT students can opt for a dedicated research track designed for students interested in pursuing a research career or a Ph.D. after their program.
4. Independent Study or Engineering Research Project: Students can also undertake independent study or research project which offers a way to engage in research while earning course units. Reach out to the academic advisor for guidance on this option.
5. The Department of Electrical and Computer Engineering CMU-Pittsburgh also has open research opportunities for students. More information [here](#).
6. CMU Africa, Libraries Research Guide [here](#).
7. Learn more about CMU Africa research [here](#).

For more opportunities, reach out to the Research Club officials.

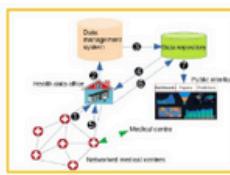


Available

Digital Foundations for Sustainable Transportation

WE WILL GAUGE THE APPLICABILITY OF VARIOUS INTELLIGENT TRANSPORT / E-MOBILITY SYSTEMS IN DIFFERENT SOCIO-ECONOMIC CONTEXTS.

[PROJECT DETAILS →](#)



Available

Digital Malaria Control for the Developing World

THE PROJECT EMPLOYS MACHINE-LEARNING CLASSIFICATION METHODS ON MICROSCOPIC IMAGES OF BLOOD SMEARS TO DETECT MALARIA PARASITES AND MIXED INFECTIONS.

[PROJECT DETAILS →](#)



Available

Enhanced CVD Discovery in Medically Underserved Communities via AI-assisted Stethoscopy

THIS RESEARCH AIMS TO ENHANCE THE DIAGNOSTIC CAPABILITIES OF ELECTRONIC STETHOSCOPES.

[PROJECT DETAILS →](#)



Available

Enhancing Parents' Reporting and Prediction of Adverse Effects following Maternal and Child Immunization in Rwanda through Mobile Application

THIS PROJECT WILL STRENGTHEN VACCINE SAFETY MONITORING AND IMPROVE PUBLIC HEALTH OUTCOMES IN RWANDA.

[PROJECT DETAILS →](#)



Available

Evading AI-based Radar Detection

MACHINE LEARNING METHODS HAVE BEEN USED TO DETECT OBJECTS BEHIND WALLS. CAN WE DEVELOP A METHOD THAT WOULD EVADE AI DETECTION?

[PROJECT DETAILS →](#)



Available

Leveraging Large Language Models for Enhancing Public Healthcare

WHEN IS IT USEFUL TO USE LLMS TO ADDRESS CRITICAL HEALTHCARE CHALLENGES IN UNDERSERVED COMMUNITIES?

[PROJECT DETAILS →](#)

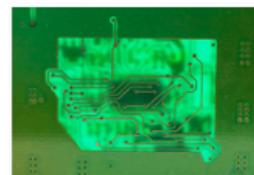


Available

LLMs for Maternal Health Question-Answering and Complications Detection

THE HIGH RATES OF MATERNAL MORTALITY IN AFRICA CAN BE ADDRESSED BY IMPROVING MATERNAL KNOWLEDGE ON OBSTETRIC DANGER SIGNS.

[PROJECT DETAILS →](#)



Available

ML-accelerated Prediction of Thermoelectric Semiconductors from Locally Sourced Wolframite

THIS PROJECT WILL MAXIMIZE THE THERMOELECTRIC EFFICIENCY OF WOLFRAMITE MATERIALS WO_3 USING ML-ACCELERATED ATOMISTIC SIMULATIONS

[PROJECT DETAILS →](#)

Have you followed us on our social Media?

The research club has opened our official pages where you will get information about research, opportunities and very insightful contents. Kindly follow us on our [LinkedIn page](#) by clicking on the icon below and engage our posts.



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Higher Education · 3 followers · 2-10 employees

Feedback for Research Club

Do you have feedback for us?

- As a student researcher, do you want to share your research?
- Do you have any opportunities you want to showcase on this newsletter?
- Ask a Professor - Do you have a question for faculty you want us to feature on the next newsletter?
- Do you have an Alumni, doing amazing works, you want us to feature?
- Any other suggestions

Scan this QR code or fill the form [here](#)

Your feedback is highly appreciated



Enjoy the Fall semester!

Thank you for reading

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