

BRIAN K. BOSHO

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SUMMARY

I am a Research Associate at Carnegie Mellon University Africa, holding a Master's degree in Engineering Artificial Intelligence. My work focuses on developing data-efficient AI systems tailored for real-world, low-resource environments. Currently, I am exploring applications of vision foundation models and generative models, building on my experience in training graph neural networks within federated settings, applying 3D computer vision techniques to biomedical imaging, and integrating multimodal AI in robotics. I am dedicated to addressing high-impact challenges and excel at translating theoretical concepts into reproducible and deployable systems. I am actively seeking a PhD or research scientist position to further my commitment to this field.

EDUCATION

Carnegie Mellon University Africa (CMU-Africa)

May 2025

M.S. in Engineering Artificial Intelligence

GPA: 3.97/4.0

Selected coursework: Data Inference & Applied ML; Mathematical Foundations of ML; Computer Vision; Deep Learning; Natural Language Processing.

Jomo Kenyatta University of Agriculture and Technology (JKUAT)

November 2018

Dual B.Sc. in Electrical & Electronics Engineering; Electronics & Computer Engineering

RESEARCH EXPERIENCE

Generative AI & Foundation Models for Urban Scene Understanding

June 2025 – Present
Research Associate Carnegie Mellon University Africa

- Lead research on the semantic understanding of complex urban traffic scenes, leveraging **vision foundation models (VFMs)** for robust visual data mining in data-scarce contexts.
- Develop data curation pipelines using **diffusion models** for dataset augmentation and visual grounding, enhancing the performance of VFMs in low-resource settings.

FedProp: Communication-Efficient Federated GNNs

Jan 2025 – May 2025

Graduate Research Assistant

Carnegie Mellon University Africa

- Proposed and developed a novel, model-agnostic GNN framework that solves the missing neighbor problem in federated learning by locally reconstructing features via iterative propagation.
- Achieved **99.6% of centralized model performance** on the Cora dataset with **zero additional inter-client communication**, a key advantage for privacy and bandwidth-constrained settings.
- Formulated the feature reconstruction as a Dirichlet energy minimization problem with theoretical convergence guarantees. (*Preprint, Code, More Details*)

RoboCHAT: LLM-Powered Human-Robot Interaction

Jan 2025 – May 2025

Capstone Project

Carnegie Mellon University Africa

- Architected a two-layer system to bridge the "automation gap" in service robotics, enabling a PR2 robot to perform dynamic, multi-step tasks via natural language.
- Integrated a FAISS-based RAG pipeline for contextual awareness, achieving **89% command and 85% parameter resolution accuracy** across 172 test cases. (*Demo, More Details*)

Automated Cryo-ET Particle Picking Pipeline

August 2024 – Dec 2024

Research Intern

Xulab, Carnegie Mellon University

- I developed an end-to-end automated pipeline for Cryo-ET particle picking using public datasets from the **EMPIAR** database, addressing critical challenges of low SNR.
- Orchestrated a deep learning workflow integrating state-of-the-art tools like **ccpem-denoiser (3D U-Net)** and **DeepETPicker** to automate prediction and streamline data conversion for high-throughput discovery. (*Code, More Details*)

PROFESSIONAL EXPERIENCE

Graduate Teaching Assistant

Sept 2024 – May 2025

Carnegie Mellon University Africa

Designed and led recitations for *Mathematical Foundations of ML* and *Applied Computer Vision*, developing supplementary materials to enhance student learning.

Jasiri Fellow

Jan 2023 – June 2023

Jasiri4Africa

Selected for an intensive fellowship on market-creating innovation, lean startup methodology, and design thinking; conducted market research with over 100 potential users to validate a new venture.

Project Manager & Director

Nov 2018 – Dec 2022

Romello Technologies Ltd

Led the end-to-end delivery of 10+ optical fiber projects, combining business development, project management, and technical leadership to connect over 1,000 homes and multiple cell tower sites.

AWARDS & ACHIEVEMENTS

- **Valedictorian**, Carnegie Mellon University Africa — Graduated top of the M.S. Engineering AI class of 2025.
- **Local Chair**, African Computer Vision Summer School (ACVSS) 2025.
- **Smart Africa Scholarship Award** — Prestigious merit scholarship fostering digital transformation and leadership in Africa, with a focus on AI and technology innovation.
- **Jasiri Entrepreneurship Fellowship** — Selective fellowship supporting individuals creating high-impact ventures in Africa through entrepreneurial training and mentorship.

SKILLS & INTERESTS

Programming Languages

Python, C/C++, MATLAB, HTML

Machine Learning Tools

PyTorch, TensorFlow, scikit-learn

Other Tools

Docker, Git, Linux, LaTeX

Hobbies

Hiking and cycling