

# PRINCE MIREKU

Researcher @ ML Collective | Intern at NDSU  
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## RESEARCH INTEREST

Multimodal learning (eg. vision-language models), model reliability, robustness, and interpretability for critical application domains like healthcare.

## EDUCATION

### University for Development Studies

2019 - 2023

B.Sc. Computer Science

**CGPA:** 4.54/ 5.0 (First Class) | **Rank:** 1/127

## RESEARCH EXPERIENCE

### North Dakota State University - SMART Lab

Jul. 2024 - present

Research Intern | Advised by Dr. Armstrong Aboah

Remote, USA.

- Implementing an object tracking and geo-localization architecture in PyTorch, fusing a feature pyramid network with ResNet50 and exploring its advantages and limitations.

### ML Collective

Mar. 2024 - present

Independent Researcher

Remote, USA

- Leading a team in building the first-ever diverse multimodal multilingual African dataset.
- Leading a focus group concentrating on Self Supervised Learning for small datasets in healthcare.

### C.K. Tedam University of Technology and Applied Sciences

Nov. 2023 - Jul. 2024

Research Assistant | Advised by Dr. Mohammed Daabo

Navrongo, Ghana.

- Conducted literature review on generative AI in multimodal medical diagnosis.

## PUBLICATIONS & ONGOING RESEARCH

(\*) denotes equal contribution

### Preprints

1. [Prince Mireku\\*](#), Jackline Mireku\*, Bayitaa Strato Angsoteng and Mohammed Ibrahim Daabo. **From Limited Contexts to Rich Data: Elevating Twi NLP through Diverse and Verified Datasets.**  
*Under Review at BAI Workshop, co-located with NeurIPS 2024* [\[Extended abstract\]](#)

### Non-Peer Reviewed Publications

1. [Prince Mireku\\*](#) and Mohammed Ibrahim Daabo. **Fault-Tolerant Techniques in Residue Number System for Reliable Arithmetic Operations**  
2023 [\[Report\]](#)
2. [Prince Mireku\\*](#) and Edward Opare Yeboa. **Comparative Analysis of Visual Basic and QBasic: A Comprehensive Study**  
2023 [\[Report\]](#)

## SPOTLIGHT PROJECTS

### AfriMMD

Led initiative that leveraged state-of-the-art machine translators to build a multilingual African multimodal dataset, verified with semantic similarity scores ranging from 0.53 to 0.98. [\[Huggingface\]](#)

### PalmMed

Developed an app using SVC as model architecture, few-shot learning, and prompt engineering to adapt an LLM for heart disease prediction and report generation. [\[GitHub\]](#) [\[Demo ↗\]](#)

### AscoLab

Fine-tuned an encoder-decoder model architecture for table structure recognition and integrated it into an automated handwritten pumping test data extractor software. [\[Demo ↗\]](#)

*"Earned commendation from the Ghana Water and Sanitation Agency, Koforidua, after an initial review"*

## WORK EXPERIENCE

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### Full-Stack Engineer

ReallyGreatTech

2023 - present

Accra, Ghana.

- Collaborated with Machine Learning Developers and LLM Engineers to design and implement seamless end-to-end applications for medical contexts.
- Developed responsive web interfaces utilizing React and Tailwind CSS, ensuring the precise implementation of high-quality design specifications across various projects.

### Co-Founder/Solutions Architect

VimTech Smart Solutions

2023 - 2024

Navrongo, Ghana

- Mentor a team of AI enthusiasts by organizing weekly meet-ups and occasional workshops.
- Integrated regression analysis algorithms via Python's scikit-learn into a client's financial service platform, achieving a 93% accuracy rate in predictive tasks.

### Software Developer Intern

Falcon Systems

Oct. 2022 - Dec. 2022

Koforidua, Ghana

- Conducted systematic maintenance and debugging of existing software applications, enhancing system stability and operational functionality.
- Optimized and restructured existing application codebase, achieving significant reductions in load times and enhancements in computational efficiency and performance metrics.

### Project Manager

FencyWeb

2020 - 2021

Remote, India

- Orchestrated the entire project lifecycle, ensuring seamless integration of planning, and execution.
- Facilitated bi-weekly team meetings to recognize achievements, cultivate a collaborative atmosphere, and promote ongoing enhancements in project outcomes.

### Web Developer

Founder: DevFreak

2020 - 2022

- Designed and shared free web development kits Online.
- Gave lessons on web design and development to over 270 subscribers on YouTube.

## PRESENTATIONS

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### ML Collective's Research Jam

Presented our work on multilingual multimodal datasets in the African Context at the 22nd MLC research jam.

## HONORS AND AWARDS

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- **Cohere for AI Aya Expedition** - Won most promising project award with my team on the multimodal Aya project, which achieves LaVa-standard performance, enhanced with multilingual capabilities.
- **Honorable Mention** (4th Place)  
Learnt a new stack, developed and submitted a mobile app all within a month to the 2022/2023 New Mexico annual app contest and won 4th place out of 10 teams.
- **Dean's Award**  
Achieved the highest CGPA and graduated first-class from the computer science department.
- **GetFund Scholarship**  
Awarded full tuition scholarship based on academic merit - 19.5% national offers in 2023/2024

## TECHNICAL SKILLS

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**Languages:** Python, Java, Typescript, JavaScript

**Libraries:** PyTorch, NumPy, Pandas, Matplotlib, BeautifulSoup

**Dev Experience:** Flask, Django, React, SQL, FastAPI, Git

**Documentation:** L<sup>A</sup>T<sub>E</sub>X

## ACADEMIC SERVICES

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<b>Paper Reviewer</b> , Machine Learning for Health (ML4H) Symposium	2024
<b>Paper Reviewer</b> , Women in Machine Learning Workshop, co-located with NeurIPS	2024
<b>Paper Reviewer</b> , LatinX in AI Research Workshop, co-located with NeurIPS	2024
<b>Applications Reviewer</b> , Deep Learning Indaba Conference (DLI)	2024

## AFFILIATIONS

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- ML Collective
- Black in AI (BAI)
- Black in AI - ELAI Scholars
- Masakhane