

STEVEN KOLAWOLE

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RESEARCH INTEREST

Exploring *inference efficiency* problems in machine learning from systems, algorithms, and data perspectives.

EDUCATION

Ph.D., Carnegie Mellon University, Pittsburgh 2023 - 2028
Language Technologies Institute, School of Computer Science
Advisor: Professor Virginia Smith

BSc., Federal University of Agriculture Abeokuta, Nigeria 2017 - 2023
Department of Computer Science

RESEARCH EXPERIENCE

Carnegie Mellon University Pittsburgh, PA, USA
Graduate Student Researcher Aug 2023 - Present
Research focus: Efficient ML.

ML Collective remote
Independent Researcher, primarily mentored by Dr. Rosanne Liu & Dr. Jason Yosinski July 2021 - Present
Research focus: Sign language understanding, resource-constrained NLP, federated learning, & efficient ML.

German Research Centre for Artificial Intelligence (DFKI) remote
Undergraduate Research Assistant with Nils Rethmeier Fall 2021
Investigated the performance accuracy and efficiency of resource-efficient pre-trained models (CLESS) against large, self-supervised models when fine-tuned on fine-grained tasks.

PUBLICATIONS

- [7] **Steven Kolawole***, Keshav Santhanam*, Virginia Smith, and Pratiksha Thaker*. "Extracting Parallelism from Large Language Model Queries." *AFM, NeurIPS* (2024).
- [6] **Steven Kolawole***, Don Dennis*, Ameet Talwalkar, and Virginia Smith. "Agreement-Based Cascading for Efficient Inference." *in review* (2024).
- [5] Lucio Dery, **Steven Kolawole**, Jean-François Kagy, Virginia Smith, Graham Neubig, and Ameet Talwalkar. "Everybody Prune Now: Structured Pruning of LLMs with only Forward Passes." *in review* (2024).
- [4] Busayo Awobade*, Mardiyah Oduwale*, and **Steven Kolawole***. "What Happens When Small Is Made Smaller? Exploring the Impact of Compression on Small-Data Language Models." *AfricaNLP, ICLR* (2024).
- [3] Colin Leong..., **Steven Kolawole** et al. "Adapting to the Low-Resource Double-Bind: Investigating Low-Compute Methods on Low-Resource African Languages." *AfricaNLP, ICLR* (2023).
- [2] Nahid Alam*, **Steven Kolawole***, Simardeep Sethi*, Nishant Bansali, and Karina Nguyen. "Vision Transformers for Mobile Applications: A Short Survey." *arXiv preprint arXiv:2305.19365* (2023).
- [1] **Steven Kolawole**, Opeyemi Osakuade, Nayan Saxena, and Babatunde Kazeem Olorisade. "Sign-to-Speech Model for Sign Language Understanding: A Case Study of Nigerian Sign Language." *IJCAI* (2022).

* co-first authorship

WORK EXPERIENCE

Founding Machine Learning Engineer 2022
ASAlytics (now Nazari)

- awarded \$115k grant in funding from the Algorand Foundation to build the ASAlytics platform;

- handled the backend engineering of ASALytics, a dynamic opinion mining application to retrieve analytics for digital assets on the Algorand blockchain, through real-time scraping from social media platforms.

Data Science Intern

SeqHub Analytics LLC

2021

New Haven, CT

- Fine-tuned mT5 for machine translation on low-resource Nigerian ethnical languages;
- Worked on new capabilities as microservices for the company's flagship conversational AI agent modeled as a teaching assistant - including a teacher-student report's edit prediction functionality using Levenshtein Distance;
- Built a dockerized dashboard app that automates the analytics part of the firm's Emotional Analytics workflow boosting development speed by 45%.

Data Scientist (Contract)

ScityLana NG

2020 - 2021

Lagos, Nigeria

- Under NDA. Worked on projects ranging from propensity modeling to end-to-end Machine Learning applications built from start to finish single-handedly.

Machine Learning Intern

Rural Farmers Hub

2020

Abuja, Nigeria

- Annotated farm boundaries via satellite imageries;
- Built a model using Forest algorithms for soil nutrient-sensing for NPK to predict the best crops to grow on certain soils with up to 87% accuracy.

Software Engineering Intern

HNG Internship

2019

remote

- Built DB models & API endpoints for authentication, reviews, & file storage (in Amazon S3) for app usage;
- Implemented a Trainer SDK to correct exercise postures using Geometric algorithms and OpenPose pretrained model.

SELECTED HONORS, AWARDS & RECOGNITION

AI Champion, Nigeria Computer Society Won the first place position at NCS' AI Summit with my project on sign-to-speech, solving a genuine societal problem with an original and reproducible solution.

2nd Best Poster Award, Data Science Nigeria's AI Bootcamp 2021 Won a poster award for my research project, "Driving an inclusive society: Sign-to-Speech modeling for Sign Language Understanding."

Winner, DeepQuest AI Challenge 2021 Built an end-to-end working prototype that uses Object Detection to detect sign language meanings in videos and generate an equivalent voice of words communicated by the signs.

Scholar, MTN Foundation Science & Technology Scholarship Scheme 2020, 2021 Recognizes and rewards the academic excellence of high-performing, low-income full-time students studying in public tertiary institutions in Nigeria. *Selection rate: 1.8%*

1st Runner-up, Mr. Algorithm Award, Data Science Nigeria AI Bootcamp 2020 Recognizing "the most outstanding male starlet in Nigeria's AI community who not only strives to be the best in Artificial Intelligence but also invests in others through knowledge sharing."

Fellow, The Young Professionals Bootcamp 2020 (YPB) is an in-residence program for high-potential 20-25-year-olds to learn world-class practical training, inspire innovation, drive success in the marketplace, and ultimately lead to the transformation of the Nigerian economy. *Selection rate: 3.6%*

Finalist, "Can You Hack the Future" Ideathon 2020 Built a collaborative-based Recommender System that predicts the nearest locations in need of transport for bike-hailing companies' riders in Lagos. *Rank: 5 / 40 teams.*

Gold Medal Winner, NaijaHacks '19 One of the two AgroAI team members that built a mobile application that helps farmers detect plant diseases using Computer Vision. *Rank: top 12 / 336 teams at the final Expo day.*

SELECTED TALKS

Black in AI's ELAI, CMU Africa's Research Club '24-'25 repeated guest speaker invites on discussing graduate school and applications.

IndabaX Nigeria '23, OSCAFEST '23 anchored workshops titled "*HuggingFace and You: A hands-on, open-source journey into your ML Development*".

Cohere For AI Independent Research Panel on how I have been able to thrive as an independent researcher and secure collaborations successfully.

ML Efficiency Workshop, Deep Learning Indaba '22 on my project, "*Minimizing Communication Costs in Decentralized Federated Learning using Mutable Torrents*."

EuroPython Dublin '22, Berlin Buzzwords '22 talks on Colin Raffel's idea of "*Open Science: Building Models like we build Open-source Software*."

IJCAI Conference '22 & NeurIPS '21's ML4D Workshop oral presentations of my accepted paper "*Sign-to-Speech Model for Sign Language Understanding: A Case Study of Nigerian Sign Language*."

Lanfrica Talk Series, Deep Learning Indaba '22, SciPy Conference '22, Build Stuff '22, PyConDE & PyData Berlin '22, Blackathon '22, Python Web Conference '22, Nigeria Computer Society's AI Summit '22, Masakhane Speaker Series '21, PyData Global '21 several talks from different angles/perspectives on my award-winning project, "*Sign Language Understanding in sub-Saharan Africa*."

MLCollective's Open Collab Research Jam #3, #4 & #5 Presented progress on my research in sign language understanding for low-resourced African sign languages.

PyCon APAC '21, EuroPython '21, Python Web Conference '21, Conf42 Python '21, PyData Global '20, PyCon Africa '20 several talks from different perspectives on building data apps with Streamlit.

SELECTED COMMUNITY SERVICES

Organizer, MLC-Nigeria Mentoring URM research enthusiasts to develop research skills outside of formal education by facilitating events around P2P study & reading sessions, collaborative projects, and academic writing – while providing resources and guidance to support members' research initiatives within ML Collective. (2023 - present)

Mentor, STEM for Development Actively coaching URM grad school aspirants to achieve clarity in their research interests and optimize their application packages for graduate degree programs in the Western world. (2023 - present)

Community Lead, Google Developer Students Club, FUNAAB Organized technical & soft-skills training impacting over 3000 students to bridge the gap between learning and becoming industry-grade. Personally taught more than 600 students on various topics across machine learning, data science, and technical skills needed to function in an industrial setting. (2021 - 2022)

Data Science Mentor, She Code Africa Mentorship Program Prepared an immersive, intermediate-to-professional curriculum for female mentees across West Africa, providing mentorship to help them advance in the data science sphere. (2020 - 2021)

Campus Lead, Artificial Intelligence Plus, FUNAAB Transformed AI+ FUNAAB from a nascent club to one of the top 3 student AI communities in Nigeria—due to which FUNAAB was the African school with the highest number of undergraduate researchers (9) at the 2022 Deep Learning Indaba and the highest (23) at the 2023 edition. (2019 - 2021)

Deputy City Lead - Abeokuta, Data Science Nigeria On my watch, AI+ Abeokuta won the "AI City of the Year" award at Data Science Nigeria's AI Bootcamp 2020—I was nominated for the Mr. Algorithm award for my efforts in knowledge sharing. (2020)