

# STEVEN KOLAWOLE

Pittsburgh, PA, USA

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## RESEARCH INTEREST

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

## EDUCATION

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**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

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**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

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- [7] **Steven Kolawole\***, Keshav Santhanam\*, Pratiksha Thaker\*, and Virginia Smith. "Extracting Parallelism from Large Language Model Queries." *AFM, NeurIPS* (2024).
- [6] **Steven Kolawole\***, Don Dennis\*, Ameet Talwalkar, and Virginia Smith. "Revisiting Cascaded Ensembles 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

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**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

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**AI Champion, Nigeria Computer Society's AI Summit 2022** Won the first place position in the AI Challenge 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

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**IndabaX Nigeria 2023, OSCAFEST 2023** Anchored workshops titled "*HuggingFace and You: A hands-on, open-source journey into your ML Development*".

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

**ML Efficiency Workshop, Deep Learning Indaba 2022** Gave a talk on my project, "*Minimizing Communication Costs in Decentralized Federated Learning using Mutable Torrents*."

**EuroPython Dublin '22, Berlin Buzzwords '22** Gave talks on "*Open Science: Building Models like we build Open-source Software*."

**IJCAI Conference 2022 & NeurIPS 2021's ML4D Workshop** Delivered 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 2022, SciPy Conference 2022, Build Stuff 2022, PyConDE & PyData Berlin 2022, Blackathon 2022, Python Web Conference 2022, Nigeria Computer Society's AI Summit 2022, Masakhane Speaker Series 2021, PyData Global 2021** Gave 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 2021, EuroPython 2021, Python Web Conference 2021, Conf42 Python 2021, PyData Global 2020, PyCon Africa 2020** Delivered several talks on: "*Streamlit: The Fastest Way to build Data Apps*."

## SELECTED COMMUNITY SERVICES

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**Organizer, MLC-Nigeria** Mentoring URM research enthusiasts to grow self-confidence in their fundamental research skills outside of formal education, by facilitating P2P study & reading sessions and project collaborations 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 Western Africa and mentored them, with 90% of my mentees now working professionally across 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 students AI communities in Nigeria - due to which FUNAAB was the African school with the highest number of undergrad researchers participants (9) at the 2022 Deep Learning Indaba. (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)