

Education

- 2019 – 2021 MSc, **Machine Intelligence**, African Institute for Mathematical Sciences (*Top 5*).
2018 – 2019 MSc, **Mathematics**, University of Khartoum (*Distinction*).
2012 – 2017 BSc (Hons), **Mathematics and Computer Sciences**, University of Khartoum (*First Class*).

Professional Experiences

- Feb. 2024 – Present **Senior AI Engineer** at **Technology Innovation Institute**, Abu Dhabi, UAE.
Innovate AI solutions via research and development.
- Aug. 2023 – Feb 2024 **ML Research Engineer** at **Kera Health Platform**, Remote.
We building an AI-powered applications for healthcare running with LLMs.
- Aug. 2021 – Feb. 2023 **AI Resident** at **Meta**, London, UK.
I was working as full-time employee in the Modern Recommendation System (MRS) team to build a graph-based recommendation system for better user experience at Meta platforms (Facebook, Instagram, etc). My research focus was on building scalable, high-performance graph-based novel algorithm.
- Nov. 2020 – Jul. 2021 **AI Research Associate** at **LIVIA - École de Technologie Supérieure ÉTS**, Montreal, Canada.
I joined LIVIA research group as a AI research associate to collaborate on large research project at the intersection of graph machine learning and software engineering.
- Jun. 2020 – Dec. 2020 **AI Research Intern** at **Mila-Quebec AI Institute**, Montreal, Canada.
It was paid internship. I was working in research area comprise Meta-Learning and Graph Representation Learning (GNNs) to tackle the drug discovery challenges. I supervised by Prof. Samira E. Kahou and Prof. Doina Precup.
- May 2019 – Aug. 2019 **Software Developer** at **Financial and Banking System Co. Ltd**, Khartoum, Sudan.
I worked in the development and deployment core bank system “Meezan”, as service for many banks in Sudan. It was 3 months training position.

Academic Positions

- Jan. 2019 – present **Lecturer at Pure Mathematics Department, University of Khartoum**, Khartoum, Sudan.
- Nov. 2017 – Dec. 2018 **Teaching Assistant at Pure Mathematics Department, University of Khartoum**, Khartoum, Sudan.

Researches & Projects

- AI/ML**
- 2022 – 2023 **Pretraining Hypergraphs Neural Networks**
At Meta, I worked on developing a novel pretraining framework that leveraging the hypergraph structure to generate informative node embeddings, and use these embeddings for different downstream tasks and usecases. *This work has led to a publication and now is under review.*
- 2020 – 2021 **From Legacy System to Microservices**
At LIVIA, I was working on a research to develop machine learning based architecture to migrate the monolithic legacy system to microservices. The framework use several ML models such as GNNs. This work accepted at *Journal of Software: Evolution and Process*.
- 2020 **Meta-Learning for Graph Representation with Application to Drug Discovery**
At Mila, I was working to develop a machine learning model to foretell the link connections in sparse graphs using graph representation methods with meta-learning paradigm.
- 2020 **Automatic Speech Recognition for Arabic Language.**
It was a mini-project aim to generate an ASR model for the Arabic language, using our own recorded 2-hours labeled dataset and pre-train using CPC self-supervision and fine-tune using CTC.
- 2020 **DNA Sequence Classification**
Using kernel methods to predicting whether a DNA sequence region is binding site to a specific transcription factor. The project was a Kaggle’s challenge.
- 2020 **Cassava Disease Classification**
In this project, we used deep learning algorithms besides building a data pipeline to classify Cassava plant images, categorized in four different diseases (CBB, CBSD, CGM, CMD) and one healthy class. This project was a Kaggle’s challenge.
- 2019 **Audio-Classifer**

Reproduced the paper “VERY DEEP CONVOLUTIONAL NEURAL NETWORKS FOR RAW WAVEFORMS, Wei Dai et al.” by building a deep Convolutional Neural Networks (CNN) for five different architectures M3, M5, M11, M18, and M34-res on UrbanSound dataset using Pytorch.

Cryptography

2018 – 2019 **Zero-Knowledge Proofs**

By made a research on Zero-Knowledge Proofs techniques I implemented the Prime Factorization scheme by using Java Security framework as a proof of concept.

2017 – 2018 **Secure Mailing System Using Signcryption**

As gradauation team-project, we built an email client that applies a Signcryption scheme to provide confidentiality and authentication. The scheme security is on a par with encryption and digital signature schemes of comparable parameters but at a lower cost using Java.

Journal Publications

2022 From Legacy to Microservices: a Type-based Approach for Microservices Identification using ML and Semantic Analysis, I. Trabelsi, M. Abdellatif, **A. Abubaker**, N. Moha, S. Mosser, S. Ebrahimi-Kahou, and Y. Guéhéneuc.

[Paper] *Accepted at Journal of Software: Evolution and Process.*

Preprints

2023 Self-Supervised Pretraining for Heterogeneous Hypergraph Neural Networks, *Abdalgader Abubaker et al.*

2020 A Comparative Study of Graph Representations for Few-Shot Link Prediction, *Abdalgader Abubaker et al.*

Engineering Skills

Programming Languages/Skills Python, Linux/Unix shell scripting, Algorithms analysis, design and optimization.

ML Frameworks PyTorch, PyG, Scikit-Learn, NumPy, Pandas, Matplotlib.

Databases Graph Database (Cypher Neo4j), SQL, MySQL/PostgreSQL, NoSQL, Docker.

Infrastructure GCP, AWS (SageMaker), Parallel Computing and Distributed Training.

MLOps Designing ML systems, Data engineering, Model deployment.

OS Linux, Mac and Windows.

Others CI/CD, Git, LaTeX, Java (security), Matlab, HTML/CSS.

Awards and Scholarships

2019 Google and Facebook Full Scholarship for AMMI Program (MSc).

2018 Sudan’s Ministry of Higher Education (MSc) Scholarship.

2017 IEEE-Sudan Best Project Award (1st place) - title:”Secure Mailing System Using Signcryption”.

2015 Exchange Program: Beifang University of Nationalities, Ninxia, China. (given to the top 5 students)

Conferences & Summer Schools

Dec. 2022 Learning on Graph (LoG) Meetup @ University of Cambridge, Cambridge, UK.

Sep. 2020 Montreal AI Symposium, Montreal, Canada - (Virtual).

Aug. 2020 Machine Learning Summer Schools-MLSS— Indonesia - (Virtual).

Jun. 2020 Machine Learning Summer Schools-MLSS — Tübingen, Germany - (Virtual).

May 2020 Computer Vision and Pattern Recognition (CVPR)- Volunteer (Virtual).

Mar. 2019 CIMPA: Hyperplane Arrangements, Recent Advances and Open Problems - Hanoi, Vietnam.

Memberships & Academic Services

- Reviewer for *Journal of Software: Evolution and Process*
- Member of Black in AI Community.
- Member of Sudanese Machine Learning Community (SMLC).

Languages

English, Arabic, and French (beginner).