Melchizedek G Mashiku

PERSONAL INFORMATION

email	melchy.mashiku@gmail.com
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PRESENT APPOINTMENT

01/2023–present — **AI Institute in Dynamic Systems, Seattle,WA**

Research Scientist/Engineer

Performing research in applied mathematics, the engineering sciences, machine learning and data science with supervision by Professors J. Nathan Kutz and Steven L. Brunton at University of Washington. Specifically, under supervision, machine learning methods will be developed towards characterizing complex dynamical systems and their control.

11/2021–present — **CDC, Atlanta,GA**

Back-end Software Engineer

Cherokee Nation Assurance Contractor to Center for Disease Control and Prevention, Polio and Picornavirus Laboratory Branch: Building Micro-services Infrastructure, Cloud Native Super-computing and DevOps

09/2021–present — **Independent Contractor**

Research Engineer

Augmenting service readiness models with accessibility-informed catchment models. Parallel cloud compute and GPU model acceleration architect. Supervised by Dr. Ewan Cameron

PREVIOUS APPOINTMENTS

05/21–11/2021 — **Georgia State University, Atlanta,GA**

Predoctoral Fellow

During this fellowship, explored literature and researched applications of category theory for interpretable geometric deep learning on dynamical systems using graph auto-encoders.

10/19–12/19 — **University of Oxford, Malaria Atlas Project**

Machine Learning Intern

I worked as a machine learning engineering intern in geospatial epidemiology with the Malaria Atlas Project at the University of Oxford. Conducted Spatial temporal epidemiology methodology survey to create a geometric deep learning algorithm to predict the risk of malaria in low-endemicity context using machine learning on complex network, this multi-year project is leading to one publication and Open Source Software library. AWS Machine Learning Research Award for A Bayesian Reinforcement Learning Algorithm to Predict the Risk of Malaria in Low-endemicity Context, supervised under Dr. Andre Python and Dr. Katherine E. Battle

9/18–10/19 — **Georgia State University**

Research Engineer

Built and published case study work for architecting and engineering a solution for predicting calcium binding sites with a graph theory approach implemented on AWS serverless pipeline for Calciomics.

1/19–5/19 — **Aptos, INC**

Co-operative Software Development

Created an in-house react-electron diagnostic and analysis tool for order

management system (OMS) used by business and quality analysts. Fixed credit card and penny rounding transactions in main commercial OMS site.

6/16–8/18 National Aeronautics and Space Administration, Greenbelt, MD

NASA Summer Software Engineering Intern

Designed user interface and experience for displaying Space Network (SN) assets and services on SN Now. Developed custom angular components and created animated Scalable vector graphics (SVG) for front-end. Developed back-end of "SAGE-EGS Remote Status Display Demonstration" for STPSat-6 Antennas and Ground Equipment (SAGE) - Enterprise Ground Services (EGS). Incorporated, generating standard messages, reading and parsing data in real time and web socket, and publishing results on a message bus. Presented project to management of Space Communication and Navigation (SCaN).

EDUCATION AND TRAINING

edX (2022) UBCx

Professional Training

Silicon Photonics Design, Fabrication and Data Analysis · Ongoing
Learned how to effectively design silicon photonics chip, photonics fabrication, experimentation, and data analysis. Used this course to build programmable photonic systems, conducting research for Deep learning with coherent nanophotonic circuits based optical neural networks (ONN). Fabrication was performed by the University of Washington Nanofabrication Facility and Applied Nanotools Inc. Measurements performed at The University of British Columbia.

2016–2018 Georgia State University

BS

Computer Science · Stopout
Projects included National Science Foundation Center for Neurotechnology, Science Gateways Community Institute and HackEmory Hackathon Winner. Research Programmer in the Advanced Research Computing Technology & Innovation Core for Dr. Jenny Yang's Lab at Center for Diagnostics and Therapeutics. Supervised by Dr. Suranga Edirisinghe

2012-2016 Cedar Shoals High-School, Mathematics & Regional Science Fair

Governor's Honor Program '52

Science Major · Mind and Brain Seminar
For final project at GHP we used *Brain Computer Interface* analysis to study effects of exercise on *concentration*.

OTHER PROFESSIONAL ACTIVITES

Founder, Technical Director

3/20–Present QMatrix.ai
QMatrix is a Focused Advanced Research Project focused on Open Science for Human Intelligence Augmentation hardware and OSS built on interpretable AI research, Experimental Mathematics, Information Physics and Data-Driven Science and Engineering; continuing work from JAMES.ai. Supported by 1517 Fund Micro-grant.

PEER-REVIEWED CONFERENCE PROCEEDINGS

2019

Mashiku, M., & Edirisinghe, N. (2019, July). *Serverless Science Gateway Development for Ca2+ binding site prediction on Amazon Web Services: Case Study*. In Proceedings of the Practice and Experience in Advanced Research Computing on Rise of the Machines (learning) (p. 56). ACM. [pdf]

GRANTS AWARDED

2020 · 1517 Fund Micro-Grant. Project Qmatrix. $1000

INVITED TALKS

2019 *Malaria Diffusion Embedding with Dynamic Network Analysis (DNA)*

COMPUTATIONAL SKILLS AND SOFTWARE

Statistical methods Geo-spatial statistics, probabilistic machine learning, deep learning, deep reinforcement learning, Bayesian inference.

Languages Python (expert level), Haskell, C++ and TypeScript

Other Experience in Python Library development, PyTorch, TensorFlow, Pyro, Git, Docker, K8s, Terraform, micro-services, unit testing, continuous integration, shell/ssh and HPC/Cloud-native super-computing.

REFEREES

Dr Andre Python
Center for Data Science
Zhejiang University

Hangzhou
China

Email: python.andre@gmail.com

20th February, 2023