Mercy Amankwah

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Summary

Demonstrated advanced proficiency in leveraging mathematical and statistical modeling skills to develop cutting-edge algorithms in MATLAB and Python, showcased through the creation of 3 software packages tailored for quantum image processing and biomedical research, driving forward impactful advancements in data analysis and model innovation.

Work Experience

Case Western Reserve University Cleveland, Ohio
INSTRUCTOR AND GRADUATE RESEARCH ASSISTANT *August 2019 – Present*

- Taught as instructor of record and mentored a class of 30 students for fall and spring semesters.
- Managed multiple research projects in Inverse problems and Uncertainty quantification using Bayesian techniques resulting in 2 publications and MATLAB software for analyzing muscle recruitment patterns.

IONQ College Park, Maryland
QUANTUM APPLICATIONS SCIENTIST INTERN *June 2023 - August 2023*

- Implemented a customized hybrid-classical quantum neural network model in python and presented the final results of the project as a talk to IONQ scientists.

NERSC, Lawrence Berkeley National Laboratory Berkeley, California
QUANTUM ALGORITHMS INTERN *June 2022 - August 2022*

- Contributed to an open-source software, QCRANK and a Nature Scientific Report publication.
- Collaborated with an inter-disciplinary team to on a research project focused on quantum data encoding producing a framework tested on trapped-ion and transmon Quantum Processing Unit

Lawrence Berkeley National Laboratory Berkeley, California
RESEARCH INTERN *June 2021 - August 2021*

- Created a novel framework for loading image data for quantum algorithms resulting in the development of open-source software, QPIXL and published results in a Scientific Reports article.

- Effectively communicated deliverables to cross-functional research team in weekly slide presentations, the final project results in a poster presentation and talks at conferences and seminars.

Skills

Programming: MATLAB, Python, C

Open-Source projects: QPIXL- Representations for quantum images. QCRANK – Quantum data encoding.

Education

Case Western Reserve University (CWRU) Cleveland, Ohio
PHD IN APPLIED MATHEMATICS *August 2019 - May 2024*

Montana State University Bozeman, Montana
M. Sc. IN MATHEMATICS August 2018 - *May 2019*

NIMS, Kwame Nkrumah University of Science and Technology Kumasi, Ghana
MPHIL IN SCIENTIFIC COMPUTING AND INDUSTRIAL MODELING *September 2016 - July 2018*

Kwame Nkrumah University of Science and Technology Kumasi, Ghana
B. Sc. IN MATHEMATICS *September 2012 - May 2016*

Publications and Theses

2024 **Bayesian analysis of muscle recruitment patterns in Locomotion, Mercy Amankwah**. Ph.D. thesis.

2024 **Quantum-parallel vectorized data encodings and computations on trapped-ion and transmon QPUs**, Jan Balewski, **Mercy G Amankwah**, Roel Van Beeumen, E Wes Bethel, Talita Perciano, Daan Camps. Nature Scientific Reports, DOI: 10.1038/s41598-024-53720-x

2024 **Exploring muscle recruitment by Bayesian methods during motion**, **Mercy Amankwah**, Alex Bersani, Daniela Calvetti, Giorgio Davico, Erkki Somersalo, Marco Viceconti. BioRXiv, DOI: 10.1101/2024.02.06.579136

2023 **Quantum computing and visualization: A disruptive technological change ahead**, E Wes Bethel, **Mercy G Amankwah**, Jan Balewski, Roel Van Beeumen, Daan Camps, Daniel Huang, Talita Perciano. IEEE Computer Graphics and Applications, DOI: 10.1109/MCG.2023.3316932 .

2022 **Quantum pixel representations and compression for N-dimensional images**, **Mercy G Amankwah**, Daan Camps, E Wes Bethel, Roel Van Beeumen, Talita Perciano. Nature Scientific Reports, DOI: doi.org/10.1038/s41598-022-11024-y

2018 **Comparative analysis of image deblurring methods on a test image, Mercy Amankwah.** M. Phil thesis.

2016 **Modeling and simulation of in-crib drying of ear maize: A case study of Sunyani-West district, Mercy Amankwah.** Undergraduate thesis.

Leadership/Service

Case Western Reserve University

VICE PRESIDENT, GRADUATE COUNCIL OF ARTS AND SCIENCES *August 2022-May 2023*

- Efficiently organized professional development week (PDW) and successfully brought 17 alumni from diverse career backgrounds to campus for career seminars, panels and networking.
- Implemented a sustainable mentor-protege program, connecting 14 students with alumni professionals.
- Raised $5358.00 in 1 month by establishing connections with different school offices, effectively managing resources and maximizing funding for PDW.

FOUNDING PRESIDENT, SIAM STUDENT CHAPTER *January 2022-May 2023*

- Spearheaded the establishment of the SIAM Student Chapter, fostering a community of mathematics enthusiasts and promoting collaboration and knowledge sharing.

STATISTICS PROFESSOR SEARCH COMMITTEE MEMBER *August 2022 - December 2022*

- Reviewed 20 applications for 2 Statistics Assistant professor position for the Department of Mathematics, Applied Mathematics and Statistics.
- Interviewed Shortlisted candidates for the Statistics Assistant professor position.