Awwab Azam

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EXPERIENCE

Undergraduate Research Assistant   Oct 2024 - present

Yu Group, Department of Physics, University of Florida, Gainesville, FL

– Research Interests: Computational Condensed-Matter Physics
– Advisor: Dr. Jiabin Yu
– Designed, implemented and trained neural networks (NNs) with various architectures (including self-attention) to accelerate the calculation of reduced density matrices for quantum many-body systems (arXiv preprint).
– Currently working on applying our method to more complex and realistic systems, as well as developing new and improved NN architectures for the same purpose.

Chief of Education   April 2025 - present

IEEE Signal Processing Society, University of Florida

– Developed the content for a two-part workshop series on machine learning for physics and engineering, focusing on training NNs using the PyTorch library and implementing transformer models from scratch.
– Taught the workshop series twice (in summer and fall) in collaboration with the Society of Physics Students. Lessons included both live coding and theoretical explanations.
– Planning to develop more advanced educational content for future semesters.

Peer Instructor (Teaching Assistant)   Aug 2025 - Dec 2025

Department of Electrical & Computer Engineering, University of Florida

– Peer Instructor for EEL 3701C (Digital Logic and Computer Systems) for the Fall 2025 semester.
– Responsibilities include leading lab sections, evaluating hardware/software demos, holding office hours, grading (labs/homework/quizzes/exams), and answering students' questions.

EDUCATION

2023-2027   BS (Computer Engineering) at **UF**   (GPA: 3.88/4.0)
– Selected Courses: EEL 4744C (Microprocessor Applications 1), EEL 3701C (Digital Logic and Computer Systems), COP 3530 (Data Structures and Algorithms), CDA 3101 (Computer Organization)

2023-2027   BA (Mathematics) at **UF**   (GPA: 3.88/4.0)
– **Minor in Physics**
– Selected Courses: MAA 4211 (Real Analysis), PHY 3101 (Modern Physics), MAS 4301 (Abstract Algebra 1), MAS 4105 (Linear Algebra), PHZ 3113 (Theoretical Physics), MAP 2302 (Honors Elementary Differential Equations), PHY 2060/2061 (Enriched Physics 1/2 with Calculus)

Honors and Awards:

– UF Center for Condensed Matter Sciences (CCMS) Undergraduate Fellowship (2025-2026)
– AI Scholars Program (2025-2026)
– Dean's List (2025)
– 3rd place winner, GatorHack AI Hackathon (sponsored by NVIDIA and Verizon) (2023)

Publications, Posters, and Presentations

Publications

- **A. A. Azam**, L. Zhao, and J. Yu, "Machine-Learning Accelerated Calculations of Reduced Density Matrices" (2025), [arXiv:2511.07367 [cond-mat.str-el]](#). *In preparation for journal submission.*

Posters and Presentations

- **A. A. Azam**, L. Zhao, and J. Yu, "Reduced Density Matrices through Machine Learning", The Pennsylvania State University Condensed Matter Theory Group Meeting (online), 05 Dec. 2025. *Talk delivered by L. Zhao; co-prepared presentation and participated in Q&A.*
- **A. A. Azam**, L. Zhao, and J. Yu, "Machine-Learning Accelerated Calculations of Reduced Density Matrices", Quantum Geometry and Moiré Materials Workshop (sponsored by the Institute for Fundamental Theory) Poster Session, University of Florida, 10 Nov. 2025.
- **A. A. Azam**, L. Zhao, Y. Ge, and J. Yu, "Machine Learning Acceleration for Hartree-Fock Calculations", UF Undergraduate Fall Research Symposium, 16 Oct. 2025.
- **A. A. Azam**, "Introduction to PyTorch", Workshop taught for the IEEE Signal Processing Society at UF (in collaboration with the Society of Physics Students) twice, on 15 May and 04 Sept. 2025.
- **A. A. Azam**, "Self-Attention and Transformer Models from Scratch", Workshop taught for the IEEE Signal Processing Society at UF (in collaboration with the Society of Physics Students) twice, on 12 June and 20 Nov. 2025.

Skills

Programming Languages	Python, C/C++, Java/Kotlin
Machine Learning	PyTorch for training NN models, Hyperparameter Optimization with RayTune and Optuna
Software	Scientific Programming using NumPy/SciPy, plotting and data visualization with Matplotlib, Bash scripting, Linux command line, high-performance computing (SLURM, HiPerGator 4.0/AI HPC cluster at UF), Git/GitHub, LaTeX
Hardware	ARM/AVR Assembly, Microcontrollers (embedded C, UART/SPI), Basic FPGA programming with VHDL