

Aqib Mahfuz

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I'm a software engineer with strong foundations in theoretical and applicative AI/ML in addition to plenty of web development experience. I've acquired a variety of skills over 6+ years from working in several fast-paced environments, both in industry and research settings. I find equal joy in teaching as I do in learning about new concepts and the latest technologies. I'm eager to be a part of the next wave of cutting-edge innovation.

EDUCATION

University of Oxford

Oct. 2023 – Sep. 2024

Master of Science in Advanced Computer Science

Oxford, England

- **GPA:** 4.00/4.00 (Distinction)
- **Projects:**
 - * PSyDUCK: Perfectly-secure Steganography via Diffusion models Using Construction Keys ([code](#))
 - * Readout Optimization for Multigraph Neural Network Classifiers ([report](#)) ([code](#))
 - * Variational Continual Learning with Laplacian Approximation Families ([report](#)) ([code](#))
 - * Improving Temporal Graph Networks via Learnable Aggregation ([report](#)) ([code](#))
 - * Enhanced Classical Quantum Circuit Simulation via Partial Stabilizer Decomposition ([report](#)) ([code](#))
 - * Diagrammatic Quantum Solution for Linear Systems ([report](#))
- **Relevant Coursework:** Geometric Deep Learning, Graph Representation Learning, Uncertainty in Deep Learning, Probability in Computing, Quantum Software, Quantum Information, Categories, Proofs and Processes

Duke University

Aug. 2019 – May 2023

Bachelor of Science in Computer Science and Mathematics (Double Major)

Durham, North Carolina

- **GPA:** 3.98/4.00 (in majors)
- **Teaching:**
 - * *Graduate Computer Vision* (Spring 2023)
 - * Design and Analysis of Algorithms (Spring 2022, Fall 2021) + Discrete Mathematics (Spring 2021)
 - * Laboratory Calculus (Spring 2023, Spring 2022, Fall 2021, Spring 2021)
- **Relevant Coursework:** Computer Vision, High Dimensional Data Analysis, Artificial Intelligence, Design and Analysis of Algorithms, Computer Architecture, Data Structures and Algorithms, Database Systems

TECHNICAL SKILLS

(Italics indicate extensive experience)

Languages: *Python, TypeScript, Ruby*, Java, Haskell

Frameworks: *PyTorch, Diffusers, Pandas, React*

EXPERIENCE

Torr Vision Group

Feb. 2024 – Present

Student Researcher

Oxford, United Kingdom

- [Designing novel steganographic schemes with generative AI](#) under supervision of esteemed Professor Philip Torr (i.e. hiding secret messages in AI-generated images/videos to evade detection)

Epic Systems

Jun. 2023 – Sep. 2023

Full-Stack Developer — Rainbow

Verona, Wisconsin

- Streamlined training website designed for both end-users and employees of world's largest healthcare software firm
- Spearheaded team-wide transition to modern version control system (Git), resulting in 50%+ productivity boost

Meta (FAIR Labs)

May 2022 – Aug. 2022

Software Engineering Intern — Droidlet

Menlo Park, California

- Collaborated on Droidlet, a modular framework for rapid multi-modal agent deployment, culminating in [a real-time interaction tool that facilitated visual annotation for ML pipelines](#)
- Contributions can be found in the open-sourced codebase [here](#)

Facebook Financial

May 2021 – Aug. 2021

Software Engineering Intern — Payments Risk Engineering

Remote

- Designed new fraud detection immunity framework, [reducing weekly losses by \\$1+ million](#) across millions of users

PROJECTS

PSyDUCK | *Python, PyTorch*

- The first perfectly-secure steganographic scheme to employ latent image and video diffusion models
- Able to encode hundreds of bytes at 99% accuracy with mathematical guarantees to be undetectable w/out keys

R-FR-GNN | *Python, PyTorch*

- Devised new class of GNNs that infer up to 3x faster than before by cutting out certain costly readout operations
- Demonstrated both empirically and theoretically that these models perform classification tasks as well if not better than (due to not overfitting) state-of-the-art R²-GNNs

Laplacian Variational Continual Learning | *Python, PyTorch*

- Identified fundamental flaw in the underlying assumptions of the seminal “Variational Continual Learning” paper
- Devised superior approximation (Laplacian variation as opposed to Gaussian) without sacrificing any efficiency
- Reduced error rates by up to 2.5x, mitigating catastrophic forgetting by earlier continual learning models

Food Devil | *TypeScript, React, Node.js, MongoDB, Python*

- Led team behind crowd-sourced review website for Duke Dining locations w/ campus-wide feed + nutrition tracking

Pokémon Reborn | *Ruby*

- Community developer for popular fan-made game, responsible for infrastructure improvements and bug reports

AWARDS

Academic Competitions

- Mu Alpha Theta
 - * Calculus - State, 1st place (team), 8th place (individual), 2018-19
 - * Statistics - State, 1st place (team), 3rd place (individual), 2017
 - * Pre-Calculus – National, 6th place (team), 16th place (individual), 2016
- Florida Math League, 1st place (individual), 2015-19
- Palm Beach County Math Tournament, 1st place (individual), 1st place (overall), 2015

Other Recognitions

- National Merit Finalist, 2018
- National AP Scholar, 2018
- National Honor Society, 2017-19