# Helen Propson

hpropson@mit.edu | https://helenpropson.github.io

## EDUCATION

**Massachusetts Institute of Technology**, Cambridge, MA
*Master of Engineering, Computer Science | GPA: 5.0/5.0* *Sept.2023 – May 2024*
*Bachelor of Science, Computer Science and Engineering | GPA: 5.0/5.0* *Sept.2020 – May 2024*

Courses: Grad Cryptography & Cryptanalysis, Quantum Cryptography (audit), Grad Inference & Information, Grad ML, Grad Computer Systems Security, Quantum Physics, Software Performance Eng., Microcomputer Project Laboratory

## EXPERIENCE

**Stripe |** *Software Engineer (Balances Team, Payments - Money Movement & Storage)* *Aug. 2024 – Present*

- Contributed to the development and optimization of Stripe's core financial APIs, enabling secure, efficient, and scalable money movement for billions of dollars in global transactions across multiple currencies and payment methods

**MIT CSAIL – Theory of Computation Group** | *Researcher Assistant* *Aug. 2022 – Aug. 2024*

- First author ICML 2025 Submission (in preparation): Developed and implemented a non-interactive protocol to run and fine-tune transformer models on encrypted data utilizing post-quantum secure Fully Homomorphic Encryption
- Master's Thesis: Enhanced efficiency of Verifiable Oblivious Pseudorandom Function protocol secure against quantum adversaries by optimizing the zero-knowledge proof of knowledge
- SuperUROP Project: Designed a Distributed Oblivious Pseudorandom Function protocol based on lattice-based cryptography

**Amazon** | *Data Engineer Intern* *May 2023 – Aug. 2023*

- Designed and implemented a serverless data quality evaluation tool to analyze and monitor validation metrics of data sets, ensuring the accuracy of data-driven business decisions
- Developed data verification strategies and quality checks that proactively detect data anomalies across multiple company-wide data tables; utilized AWS Lambda, S3, Glue, CloudWatch, IAM, DynamoDB, SNS, EventBridge, and Step Functions

**MIT RLE – Engineering Quantum Systems Group** | *Undergraduate Researcher* *Oct. 2021 – Sept. 2022*

- Developed a pipeline to find an optimal pulse for single-qubit gates
- Designed a transmon-qubit-based device involving two qubits and a flux-tunable coupler using pyEPR and Qiskit Metal circuit-design software

**Microsoft |** *Software Engineering Intern* *January 2022*

- Collaborated with 4 teammates to make a web app that automates the evaluation of 3,200+ software projects
- Wrote GraphQL APIs to call services that query SQL Server databases and serve information to 70,000 users

**Icahn School of Medicine – Ma'ayan Lab |** *Research Intern* *Jun. 2021 – Aug.2021*

- Benchmarked methods for predicting the cell type of scRNA-seq data using ML clustering algorithms
- Designed and implemented a data creation pipeline to mine external databases and build gene set libraries of 13,000+ genes to increase the accuracy of scRNA-seq data analysis

**MarePesca LLC |** *Machine Learning Intern* *January 2021*

- Researched the application of deep learning models for the segmentation and analysis of images of biological aquatic systems to improve aquaculture efficiency

## SKILLS

Python, C, C++, Java, JS, Typescript, HTML, CSS, C#, PyTorch, SQL, Flask, NumPy, Pandas, Matplotlib, SciPy, NodeJS, Git, Unity

## TEACHING & OUTREACH

**Computation Structures (6.1910)** | *Graduate Teaching Assistant* *Sept. 2023 – Jan. 2024*

- Led twice-weekly recitations, held 8 weekly office hours, guiding students in labs and teaching the design of digital systems and computer architecture

**MIT Momentum Leader** *Aug. 2022, 2023*

- Mentored first-generation, low-income students and exposed them to fundamentals of AI
- Guided the students through two-week-long, project-based program including the construction of neural nets

**MITxHarvard Women in AI Club** *Sept. 2020 – Sep. 2021*

- Worked on committee to make AI more accessible, hosted female speakers and provided educational resources

**Computer Systems Engineering (6.1800)** | *Learning Assistant and Grader* *Feb. 2023 – May 2023*

**Intro to Computational Thinking and Data Science (6.0001/2)** | *Learning Assistant* *Feb. 2022 – May 2022*

## HONORS & AWARDS

MIT EECS Philips Undergraduate Research & Innovation Scholar, NCWIT Aspirations in Computing Award, National Merit Finalist & Scholarship Recipient, Dean's List University of Minnesota Twin Cities, National AP Scholar, Minnesota Gold Bi-Lingual Seal