

Adrian Harkness

New York, NY 10014 • (646) 269-8093 • arh142@case.edu • [LinkedIn](#)

Education

Case Western Reserve University

BA, Physics, Dual minors in Mathematics and Economics, GPA: 3.63/4.00

Cleveland, OH

Expected Graduation May 2023

Honors & Awards: E. & B. Smith Endowment Fund Scholar 2021-2022, Dean's High Honors 2020-2021, Dean's Honors 2021-2022, University Athletic Association All-Academic Honors 2020-2022, NCAA D3 Academic All Ohio 2022

Select Coursework: Differential Equations, Linear Algebra, Convexity & Optimization, Graduate Numerical Analysis, Graduate Cryptology, Intermediate Microeconomics, Behavioral Economics, Computational Economics, Options and Other Derivatives, Computational Physics, Mathematical Physics, Electrodynamics, Quantum Mechanics 2, [Quantum Computing](#)

Eleanor Roosevelt High School – AP Scholar with Honors, SAT: 1510/1600

New York, NY, June 2019

Research

Quantum Key Distribution

NSF REU – Professor Walter Krawec, Professor Bing Wang

University of Connecticut

June 2022 – August 2022

- Analyzed QKD key rates in partially corrupted networks, proved security beyond 11% noise tolerance of fully corrupted BB84 by applying entropic uncertainty relations. Modeled network in **Python** and **Mathematica** with a range of topologies.
- Extended summer collaboration into year-long research project as Bachelor's thesis with publication in progress.

Optical Metamaterials

Research Assistant – Professor Giuseppe Strangi

[Nanoplasm Lab](#), Case Western Reserve University

February 2021 – May 2022

- Simulated Fano-resonant optical coatings in **Python** with Drude-Lorentz model, Transfer-Matrix method.
- Fabricated thin-film metamaterials with **thermal/electron-beam evaporation** and **sputtering** deposition techniques.
- Characterized fabricated metamaterials through **profilometry** and **ellipsometry**.
- Tuned and applied **convolutional neural networks** towards the inverse design of metamaterial structures.

Quantum Cryptocurrency

Research Intern – Dr. Po-Heng Lee, Kuan-Cheng Chen

QWorld, Imperial College London (Remote)

July 2022 – August 2022

- Applied results from a quantum solution to the Byzantine Generals problem toward developing a secure and energy efficient quantum cryptocurrency.

Projects & Certifications

IBM Accelerate – Hardware Developer Track

June 2022 – August 2022

- Developed [industry-relevant skills](#) under IBM professionals with a technical focus on **computer hardware** and a foundational focus on **business acumen**. Delivered paper and presentation on superconducting qubit hardware.

Quantum Coalition Hack – IBM Challenge

April 2022

- Won 1 of 2 [honorable mentions](#) by co-developing a [Quantum Snakes and Ladders](#) game with **Qiskit**.
- Discovered quantum advantage by utilizing superposition and Grover's amplitude amplification.

IBM Qiskit Global Summer School on Quantum Machine Learning

July 2021 – August 2021

- Earned IBM's [Certificate of Quantum Excellence](#) by completing all lectures and Q&A, passing all graded lab assignments.

Leadership & Activities

Case Quantum Computing Club – Founder and President

June 2022 – Present

- Leading a QC community of 100+ people. Officially university recognized and funded.
- Ran a 2-week [Qiskit Fall Fest '22](#) workshop series and hackathon. Lectured on quantum circuits and algorithms.
- Organized a seminar series and a student-led journal club for literature review.

CWRU Varsity Soccer

August 2019 – November 2022

- 20+ hours weekly. Organized team as 2-year elected member of the **Leadership Council**: 1 of 2 Class of 2023 representatives that actively strengthen team culture, address areas for improvement, and evaluate opportunities to lead by example.

ThinkImpact Social Entrepreneurship Fellowship

September 2022 – Present

- Weekly training in value proposition and innovation. Prototyping toroidal wind turbines for noise reduction in urban areas.

Skills & Interests

Technical: Python (NumPy, SciPy, Pandas, Matplotlib, TensorFlow, Keras, Qiskit), MATLAB, Mathematica, LaTeX

Laboratory: Nanofabrication and Characterization, Microfluidics, Gloveboxes, Oscilloscopes, Digital Multimeters, 3D Printing

Languages: Fluent English, Fluent Mandarin Chinese, Intermediate Spanish

Interests: Quantum Information, Deep Learning, Optimization, Quantitative Finance, Soccer, Biking, Violin