

Education

The American University in Cairo,

Jan 2021 - Dec 2024

Double Major: B.S. in Computer Science, B.S. in Mathematics

High Distinction (GPA: 3.84/4.00)

Awards: International Physics Olympiad Finalist '19 | Egypt Physics Olympiad Gold Medalist '19

ACM ACPC Finalist '22 | ACM ECPC Bronze Medalist '22 | ACM ECPC Finalist '21

Research Experience

Undergraduate Researcher, The CERN Quantum Technology Initiative

Jun 2024 - Aug 2024

European Organization for Nuclear Research (CERN)

Geneva, Switzerland

Supervisor: Dr. Michele Grossi (CERN), Dr. Gian Giacomo Guerreschi (Intel Labs)

- Researched **Quantum Simulations** and Intel Quantum Simulator in collaboration with Intel Labs.
- Benchmarked the difference between multi-qubit rotations and single to double-qubit rotations.

Undergraduate Researcher, The Security and Cryptography Laboratory (LASEC)

Jun 2023 - Aug 2023

École polytechnique fédérale de Lausanne (EPFL)

Lausanne, Switzerland

Supervisor: Dr. Ritam Bhaumik

- Researched **Compressed Quantum Permutation Oracles** with Dr. Ritam Baumik.
- Read research papers, worked on proofs, and assessed the security of cryptographic schemes.

Undergraduate Researcher

Dec 2022 - May 2024

The American University in Cairo

Cairo, Egypt

Supervisor: Dr. Nourhan Sakr

- Optimized an algorithm organizing the elevators' queues with stability proof of the modified algorithm.
- Created a combinatorial optimization algorithm for a modified version of the **Graph Balancing** problem.
- Implemented the algorithms with **C++** and **Python** with different techniques for code optimization.

Professional Experience

Teacher Assistant

Sep 2024 - Present

The Coding School

Remote

- Leading weekly quantum computing labs for 30+ students in the year-long **Qubit by Qubit** course.
- Utilizing **Python & Cirq** to guide students in building and analyzing quantum circuits and algorithms.

Software Engineer Intern

Feb 2024 - May 2024

Siemens EDA

Cairo, Egypt

- Designed **React** and **Tailwind**-based tools, leveraging C++ and **socket** communication.
- Developed **C++** backend services, enabling real-time data handling and application support.

Software Engineer Intern

Mar 2022 - Nov 2023

Dell Technologies

Cairo, Egypt

- Implemented different features on internal company-wide tools using **React**, **TypeScript**, and **GoLang**.
- Developed and enhanced custom data visualization charts in **React** with the library VisX built on D3.
- Built and deployed serverless cloud functions using **OpenShift**, **Knative**, and some bash Automation.

Teacher Assistant and Peer Tutor

Feb 2022 - Dec 2023

The American University in Cairo

Cairo, Egypt

- Assisted as a TA for the Data Structures course, providing support and guidance to students.
- Helped students with their assignments and guided them in building their projects using **C++**.
- Worked as a peer tutor for computer science courses, conducting 150+ hours of sessions to aid students.

- Transferred the website code to **React** and built filter and search functionalities for different resources.
- Built the backend API of the application using **Node.js** and **Express** to manage authentication.
- Gathered quantum computing resources and built roadmaps for different quantum computing fields.

Relevant Projects

Connectify

Oct 2023 - Dec 2023

- Developed a **Next.js/React** app for social music sharing, featuring private groups and **MUI** styling.
- Integrated **Supabase** for backend and enabled personalized recommendations with **Spotify API**.

RISC-V RV32IM Assembly Processor

Mar 2023 - May 2023

- Developed RISC-V RV32I Assembly processor in **Verilog** with single-cycle and pipelined designs.
- Incorporated the Multiplication extension and a single-ported memory for data and instructions.

EI-Modeer Linux Process Manager

Feb 2023 - May 2023

- Built a CLI process manager using **Rust** to help monitor and manage processes in the CLI.
- Collaborated with the sysinfo crate's codebase to enhance its functionality and add additional features.

Digital Clock/Alarm System

Nov 2022 - Dec 2022

- Developed **Verilog**-based Digital Clock/Alarm System on Basys 3 **FPGA** with adjustable clock.
- Implemented alarm functionality with a buzzer synchronized with the clock using Vivado software.

Tom and Jerry Maze Game

Nov 2021 - Dec 2021

- Built a game using **C++** and QT Creator where a player tries to avoid getting caught by Tom in a maze.
- Implemented Dijkstra's single-source shortest path algorithm to enable Tom to "catch" the player.

Extracurricular Activities

Google Developer Student Club AUC (GDSC AUC) - Vice President

Aug 2022 - May 2024

- Led and conducted an intro-level Quantum Computing training course for university students.
- Organized Qiskit Fall Fest, Egypt's first quantum computing event, with IBM support and 800+ attendees.
- Organized Teqfest'24, a mega-event with 800+ attendees with talks in business, research and tech.
- Led organizing 3-day Google Solution Challenge hackathon with 50+ participating teams at AUC Tahrir.
- Organized various university learning tracks: ML, cybersecurity, data science, and web development.

Technical Skills

Programming Languages: Experienced in C/C++, Java, Python, JavaScript, and Rust. Familiar with Go.

Frameworks: Experienced in Node.js, React, MySQL, MongoDB. Familiar with Vue.js.

Other Technologies: VHDL/Verilog, Github, Bash, Docker, Kubernetes, Openshift, Qiskit, Cirq, and Latex.

Miscellaneous

- Won Third Place at the AI Hackathon by Beltone about Gold Price Predictions using Time Series forecasting.
- Won Best Demo Award at WebFest Hackathon 2024 for the Quantum Random Number Generator Challenge.
- Completed the **IBM Quantum Challenge** (2023) about Dynamic Circuits using the 127-Qubit Quantum System.
- Awarded the **Generation Google Scholarship**: for women in computer science (2023).
- Attended a 2-week course on **Quantum Simulations** organized by **IBM** (Qiskit Global Summer School 2022).
- Completed a 6-month program on **Quantum Computing Hardware** organized by **Womanium**.
- With a hackathon on Quantum Natural Language Processing With **Lambeq** led by **Quantinuum** (2022).
- Attended a 3-day intensive conference about Quantum Computing organized by **QWorld** on June 1-3, 2022
- Completed **QSilver Workshop** on Quantum Computing & Programming (2022).
- Completed a year-long course on **Quantum Computing** organized by **The Coding School & IBM** (2020).
- Won the Gold Medal Nationally at the **Mediterranean Youth Mathematical Championship** (2020).