Gavin **McCabe**

Caltech Student · Researcher · Tutor · Freelance Developer

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"If something's important enough, you should try even if the probable outcome is failure."

Summary

I'm a researcher and software engineer pushing the boundaries of human understanding to advance the frontier of physics and computer science. I have experience in quantum information science, nanofabrication, professional software engineering, and team management that can be applied to a variety of projects and disciplines.

Work Experience

Current Department of Defense Secret Security Clearance — *Sept. 1, 2021*

MG Venture, LLC. — *Yorktown, Virginia*

Chief Technology Officer — *Aug. 2020 - Present*

- iOS and web development team lead
- Acted as project manager responsible for delegating tasks, conducting code reviews, and providing feedback to developers and other partners
- Managed contracted companies and communicated with overseas partners.
- Oversaw beta testing of the Hangr iOS application to 15 various testing locations around the country

Gnosko Associates, Inc. — *Williamsburg, Virginia*

Consultant — *Sep. 2021 - Present*

- Provided subject matter expertise and training support to the U.S. government and private industry training programs, requiring demonstrated proficiency, while operating in both classroom and field training environments
- Required to maintain strict adherence to corporate and customer robust and exacting standards of performance while managing and delivering complex, time-sensitive training exercises that simulate real-world situations

Caltech Division of Computing and Mathematical Sciences — *Pasadena, California*

Teaching Assistant — *Sep. 2020 - Present*

- CS 001 - Introduction to Computer Programming
- CS 004 - Fundamentals of Computer Programming
- CS 132 - Web Development
- SA 016 - Cooking Basics
- Assisted students through both in-person and virtual office hours and graded assignments
- Helped students grasp the fundamentals of computer science in CS 001 through the introduction of Python
- Introduced students to functional programming in OCaml in CS 004, teaching basic functional paradigms
- Helped create assignments and code submission and review tools for a new course on Web Development (now labeled CS 132) teaching the basics of JavaScript, Express, Node.js, HTML, and CSS

Amazon Web Services Center for Quantum Computing — *Pasadena, California*

Software Development Engineering Intern - Quantum — *Jun. 2022 - Sep. 2022*

- Worked with the control stack team
- Assisted in creating software to support the mission of creating a usable quantum computer at AWS
- Attended various seminars, trainings, etc. to support my learning in quantum computing and software engineering in a professional environment

Caltech Division of Computing and Mathematical Sciences — *Pasadena, California*

Head Teaching Assistant, Introduction to Computer Programming (CS 001) — *Sep. 2021 - Jan. 2022*

- Assisted professors with onboarding new teaching assistants
- Graded assignments using various tools (including `codepost.io`, custom testing scripts, and style checkers) and provided detailed feedback to students
- Handle administrative tasks such as grading in-lecture coding assignments, assigning graders to specific assignments, and assisting professors during lecture

Research

Effect of Aluminium Fluoride Surface Layer on Waveguide Resonator Dielectric Loss
Pasadena, California

Caltech Minnich Group — *Feb. 2022*

- Developed new cleanroom techniques to minimize dielectric loss in waveguide resonators, leading to a longer coherence time of qubits
- Simulated the replacement of various oxides on the surface of resonators with aluminum fluoride to reduce dielectric loss in the resonators

Simulation of the Effect of Geometry on Transmon Qubit Dielectric Loss
Pasadena, California

Caltech Painter Group — *Oct. 2021*

- Collaborated with postdoctoral researchers to research the affect of dielectric loss on the cohesion time of transmon qubits
- Used COMSOL to simulate various qubit geometries and the affect of various sources of dielectric loss

Numerical Monte Carlo Simulation of Cryogenic Buffer Gas Beams
Pasadena, California

Caltech Hutzler Lab — *Jun. 2021*

- Mark Reinecke Summer Undergraduate Research Fellow
- Created Julia-based simulations to simulate the affect of cell properties on cryogenic buffer gas beams
- Developed open-sourced wrapper for existing Python simulations in Julia which allow for a runtime that is 1000x the previous runtime.

Machine Learning Based Morphological Classification of Type-Ia Supernova Host Galaxies
Pasadena, California

Caltech and The Observatories at The Carnegie Institution for Science — *Jun. 2020*

- Shirley and Carl Larson Summer Undergraduate Research Fellow
- Used CyMorph parametrization of type-Ia supernova host galaxies to develop automated classification pipeline
- Developed machine learning algorithms and neural networks for the Carnegie Supernova Project

Education

Caltech
Pasadena, California

B.S. in Physics — *Oct. 2019 - Jun. 2023*

The Governor's School for Science and Technology
Hampton, Virginia

Engineering Strand — *Sep. 2017 - Jun. 2019*

York High School
Yorktown, Virginia

Honors Graduate — *Sep. 2015 - Jun. 2019*

The College of William & Mary
Williamsburg, Virginia

Course Audits — *May 2015 - Jun. 2017*

Audited math courses pre-calculus through ordinary differential equations

Honors & Awards

2022	**Mark Reinecke Quantum Summer Undergraduate Research Fellow,** Caltech	*Pasadena, California*
2020	**Shirley and Carl Larson Undergraduate Research Fellow,** Caltech	*Pasadena, California*
2019	**Alden & Genevieve Roach Scholarship,** Caltech	*Pasadena, California*
2018, 2019	**Intel Excellence in Computer Science Award,** Tidewater Science and Engineering Fair	*Norfolk, Virginia*
2018	**Second Place,** I/ITSEC Future Leader's Pavilion	*Orlando, Florida*
2018	**Second Award of Excellence,** Tidewater Science and Engineering Fair	*Norfolk, Virginia*
2018	**Rensselaer Medal Award,** Rensselaer Polytechnic Institute	*Troy, New York*
2016	**Third Place,** Virginia State Science and Engineering Fair Engineering Category	*Lexington, Virginia*
2015	**Member,** Mensa Honor Society	*Yorktown, Virginia*

Skills

Programming	Python, C++, C, Swift, Objective-C, Java, MATLAB, Mathematica, OCaml, Julia
Laboratory	Semiconductor etching, photolithography, metal deposition, SEM, AFM, microfluidics
Web Development	HTML, CSS, JavaScript, jQuery, mySQL, SQLite, Bootstrap, Ruby
Data Analysis	Numpy, Scipy, Matplotlib, Pandas, Astropy, Microsoft Excel, Scikit-Learn, Tensorflow
Writing	TEX, Microsoft Word, Apple Pages, scientific writing
Flying	Private Pilot Certificate