Arman Babakhani

armanbab@usc.edu | Github | YouTube | Linkedin

Objective: I am interested in applying machine learning and innovative algorithms to engineering and problems in physics.

EDUCATION

UNIVERSITY OF CALIFORNIA, SANTA BARBARA
MASTERS OF SCIENCE: PHYSICAL CHEMISTRY, GPA: 3.84
September 2019 - Present | Goleta, CA
Master's Thesis on topological phases: inspirehep.net/2031259

UNIVERSITY OF CALIFORNIA, BERKELEY
BACHELOR OF SCIENCE: ENGINEERING PHYSICS
September 2015 - December 2017 | Berkeley, CA

PASADENA CITY COLLEGE
December 2014 - May 2015 | Pasadena, CA

RESEARCH AND PUBLICATIONS

TOPOLOGICAL QUANTUM COMPUTING |MAIN AUTHOR
Feb 2020 - Sep 2021
In a collaboration with Microsoft, I worked on developing mathematical theory of anyons, a sub-branch of topological quantum computing. In this project I developed a mathematical theory to describe the mathematical structure of an anyonic system using the topological data provided by quantum measurements. (Work in preparation and will be published soon)

QUANTUM ERROR CORRECTION | PROGRAMMAR AND CO-AUTHOR
March 2018 - July 2019
In a collaboration with the Whaley group lead by Prof. Birgitta Whaley, I worked on simulating a quantum feedback mechanism for quantum annealing. I, along with another collaborator, coded python scripts testing the efficacy of our proposed feedback protocol to detect and correct errors affecting the quantum memory during quantum annealing. In this work, we show that significant improvement on the fidelity of the quantum memory can be achieved by detecting errors from weak measurement signals.
Publication: PhysicalReviewsA.103.042406

MICROSCOPY USING DEEP LEARNING | PROGRAMMAR AND CO-AUTHOR
May 2017 - Jan 2018
I programmed plugins to control illumination patterns on a microscope and to use the images as training data for a neural network used by the microscope to learn autofocusing. By collecting the data, I helped train a fully connected neural network to do autofocusing in a practical time.
Publication: Optica.2019

TEACHING

PRIVATE TUTORING |UNDERGRADUATE AND HIGH SCHOOL
Link to Tutoring Profile

- **More than 100 hours:** Quantum Mechanics • Electromagnetism • Linear Algebra • Advanced Calculus

- **More than 1000 hours:** AP Calculus • AP Physics • AP Chemistry

GRADUATE TEACHING ASSISTANT |GENERAL UNDERGRADUATE CHEMISTRY
Sep 2019 - Aug 2021
I have taught all general chemistry lab series at UC Santa Barbara

SKILLS

PROGRAMMING
Proficient:
Python • C/C++ • Matlab • Mathematica
LaTeX
Familiar:
TensorFlow • MySQL
BUILD TOOLS
Git • Github Actions
DESIGN PROGRAMS
Adobe Illustrator • Photoshop • AutoCad

AWARDS

2017 Berkeley Fletcher Laboratory Stipend
2016 George and Mary Poulos Scholarship
2016 Berkeley Surf (Rose Hills Foundation)
2015 William S. and Mary Jane Detwiler scholarship
2015 J. Jen and NLC Chang mathematics scholarship

CONFERENCES

Presentation Cancelled - APS 2020: Continuous error-correction for quantum memory in time-dependent Hamiltonians
Attended - APS 2019: Error-correction with Quantum Annealing

COURSEWORK

Graduate Level
Quantum Field Theory • conceptual Condensed Matter • Advanced statistics and Renormalization Groups • Electromagnetism • Classical and Quantum Mechanics
Undergraduate Level
Signals and Systems • Real and Complex analysis • Algorithms and interactable problems • Introduction to C++ • Matlab for scientists and Engineers