

Arman Babakhani

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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 interactive problems • Introduction to C++ • Matlab for scientists and Engineers