Zackary Jorquera

Ph.D. Student at UCSC

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I am currently enrolled at the University of Colorado Boulder in the school of engineering, pursuing a major in computer science and a double minor in applied mathematics and pure mathematics. I am experienced in many fields of computer science, such as theory and low-level programming, from classes and out-of-class projects. I am also experienced in research and teaching from my time at CU.

Work Experience

05-2019
08-2019

Software Engineer Intern

Boulder Imaging Inc.

I used openPOWERLINK to work with the Powerlink protocol. I also worked with OpenCV to implement image analysis tools. And I work with TensorFlow to identify eagles in a wind farm. The ladder of which included research on how to best train the EfficientNet convolutional neural network for our use cases.

Education

08-2018
05-2022

Bachelor of Science in Computer Science (In Progress)

University of Colorado at Boulder

GPA: 3.893/4.000 Cumulative
Thesis Title: "Quantum Approximate Optimization Algorithm with Local Max-Cut (In Progress)"
Course Work: Quantum Computing, Practical Algorithmic Complexity, Discrete Mathematics, Abstract Algebra, Fourier Series / PDEs, Discrete Structures, Operating Systems, Quantum Physics, Probability/Stats, Linear Algebra, Writing Class on Science, Network Systems, Computer Vision, Machine Learning, Theory of Computation, Coding & Cryptography, etc.
Minors: Double minors in Applied Mathematics and Pure Mathematics.
Awards: Deans List (all semesters)

Teaching And Research

08-2019
05-2021

Course Assistant

University of Colorado at Boulder

I have been a course assistant for a class called computer system and a linear algebra class at CU Boulder for a total of four semesters. This experience furthered my teaching and communication skills tremendously.

05-2021
08-2021

Software Research Assistant

Prof. Jed Brown

Worked to make rust-lang bindings for a PDE solving library called PETSc. This consisted of systems-level FFI Rust code. Much of which was done individually. However, future work was done after I left the project.

08-2020
Current

Quantum Computing Thesis

Prof. Alex Kolla

I have been working in a group researching quantum supremacy with the Quantum Approximate Optimization Algorithm (QAOA). We were looking at if a quantum computer can find locally optimal solutions to the NP-hard optimization problem, max cut, better than classical computers.

Projects And Extracurricular

Matrix Method PCA Final Project

In a group of four, we used principal component analysis to identify handwritten numbers from the MNIST dataset with a test error rate of 13.34%, do lossy compression on the handwritten numbers, and identify different audios from an audio dataset.

The complexity of solving an NxNxN Rubik's Cube

I wrote a paper on the complexity of solving an NxNxN Rubik's cube both optimally and approximately. This included showing that the optimal case in NP-Hard and conjecturing that the approximate case was APX-Complete.

Fourier Series/PDE Final Project

In a group of three, we explored different ways to model the propagation of voltage in a neuron using the cable equation. My work focused on the traveling wave solution between the bistable, active and inactive states. This allowed us to convert to an ODE and solve analytically.

Hackathons

Won 3rd place out of 21 in the 2019 Lucid Programming Competition.
Won the Rapid API category in Hack CU V 2019.
Won 3rd place overall twice in Hack CU VI and 007

Vido (For Hack CU VI)

It's video but shorter. It takes a 20 (ish) minute video and produces a 2-minute, summarized version using a variation on the knapsack problem. We won 3rd place overall in Hack CU VI.

Legal-Ease (For Hack CU 007)

Summarizes and simplifies legal documents into a short and more easily readable documents using machine learning and other techniques. We won 3rd place overall in Hack CU 007.

section.io Article Writer

https://www.section.io/engineering-education/authors/zack-jorquera/
I wrote five articles on a variety of topics, such as low-level programming, parallel programming, and computer vision algorithms.

2021 Putnam

I took the 2021 Putnam and scored a 4, which tied for third place overall at CU Boulder.

For Fun

Whitewater Kayaking

I got into whitewater kayaking during college. Since then, I have done Colorado classics such as Gore Canyon and Bailey Canyon. Both are class 5 stretches of water.

Skiing

I've skied my whole life in ski resorts throughout Colorado. During college, I also started backcountry skiing. Last season I did a Colorado front range classic, Dragontail Couloir.