

# HARLEY PATTON

(310)-683-8818 ◊ hpatton@berkeley.edu ◊ hpatton@lbl.gov  
harleypatton.com ◊ linkedin.com/in/harley-patton

## EDUCATION

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### University of California, Berkeley

*Intended B.A. Computer Science, B.A. Applied Mathematics*

Berkeley, CA

*August 2015 - Present*

- GPA: 3.95
- Relevant Coursework: Structure and Interpretation of Computer Programs, Data Structures, Machine Architecture, Machine Learning, Efficient Algorithms and Intractable Problems, Designing Information Devices and Systems, Discrete Mathematics and Probability Theory, Linear Algebra and Differential Equations, Multivariable Calculus
- Intended Fall 2017 Coursework: Special Topics in Deep Learning (graduate), Introduction to Database Systems, Probability and Random Processes
- Member of Upsilon Pi Epsilon, Nu Chapter (Computer Science Honor Society)
- Brother at Sigma Phi Epsilon, Cal Alpha Chapter

## EXPERIENCE

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### Rigetti Computing

*Software Engineer Intern*

Berkeley, CA

*May 2017 - August 2017*

- Worked to develop a Python library (pyquil.readthedocs.io) that allows users to construct Quil (Quantum Instruction Language) programs and run them on an in-house Quantum Processing Unit over the cloud.
- Wrote and deployed an interactive website (demo.rigetti.com) to demonstrate the ability of quantum algorithms to approximate solutions to NP-complete problems.
- Implemented the Metropolis-Hastings algorithm, using a Markov chain Monte Carlo to find the ground state of an arbitrary multi-qubit system.

### Lawrence Berkeley National Laboratory

*Research Apprentice*

Berkeley, CA

*August 2016 - Present*

- Works for the European Organization for Nuclear Research (CERN) through Lawrence Berkeley National Lab. Part of the LBNL Atlas Analysis Team, working with data brought in from the ATLAS experiment at the Large Hadron Collider at CERN.
- Writes data analysis modules in C++ for ROOT (an object-oriented framework for large scale data analysis) in order to resolve issues of detector performance, efficiency, and alignment.
- Currently writing a neural network to classify different particle types, using measurements of the stopping power exerted on different layers of the ATLAS pixel detectors as features.
- Previously designed and implemented a regression model that takes in existing data from the Large Hadron Collider alongside data simulated using Pythia 8 (particle simulator) in order to accurately predict the quark/gluon composition of particle jets resulting from proton-proton collisions.

### UC Berkeley EECS Department

*Student Instructor*

Berkeley, CA

*August 2016 - May 2017*

- Taught a discussion section for Computer Science 70 (Discrete Mathematics and Probability Theory). Met twice per week with a group of thirty lower division students and lectured on the course material. Also held office hours, held homework parties, graded exams, and helped maintain the course website (eecs70.org).
- Previously an Academic Intern for Computer Science 61A (Structure and Interpretation of Computer Programs). Led the lab component of the course each week and held weekly office hours.

## PROJECTS

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**Enigma:** Computer simulation of the German M4 Enigma Machine used to encrypt messages during World War II. Recreates the full Enigma system used by the German Navy, consisting of eight moving rotors, two fixed rotors, and two reflectors. Implements a progressive substitution cipher, allowing for 614,175,744 unique possible encryptions of any text string.

**BearMaps:** Backend of mapping program rendering Berkeley campus and surrounding area, using data pulled from OpenStreetMap. Finds routes using A\*.

**Editor:** Fully functional text editor, akin to Notepad or MS Word. Handles file I/O, intelligent word-wrapping (avoids cutting lines mid-word), and keyboard shortcuts.