

# Kunal Marwaha

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Last updated September 18, 2020

## EDUCATION

**Independent Study** (July - August 2020) ([Barak's Introduction to TCS book](#))

**Whaley Group Journal Club** (May - July 2020) ([notes](#))

**Independent Study** (March - May 2020) ([Childs' quantum algorithms notes](#))

**Simons Institute Workshop Attendee** (Jan & Feb 2020) ([Boot Camp](#) & [Quantum Algorithms](#))

**University of California - Berkeley** (June 2018 - Dec 2019)

Unofficial Auditor: [abstract algebra](#), [astrophysical fluids](#), [quantum materials](#), [QFT primer](#)

**University of California - Berkeley** (Aug 2012 - May 2016) (**GPA: 3.73**)

Bachelors of Science in Engineering Physics

Bachelors of Science in Electrical Engineering & Computer Science

**Math:** Probability Theory, Linear Algebra, Real & Complex Analysis, Vector Calculus

**Physics:** Quantum Information, Continuum Mechanics, Statistical Mechanics, QM, E&M

**Electrical Engineering:** Microelectronic Devices, Circuits, Signal Theory, Feedback Control

**Computer Science:** SICP, Data Structures, Architecture, Algorithms, Data Science

## GOALS

I want to design and bound algorithms for physical problems on post-NISQ quantum computers.

I am especially interested in graph theory and new techniques for Hamiltonian simulation.

I am conducting independent research in 2020 and applying to Ph.D programs this fall.

I worked in software from 2016-2019.

## RELEVANT EXPERIENCE

**Independent Research** | Berkeley, CA | June 2020 - Present

Extended analysis of local MAXCUT algorithm and comparison to  $p=1$ ,  $p=2$  QAOA

*with Bea Nash and Boaz Barak (Harvard):* Generalized local classical algorithms on MAXCUT

**Research Assistant** | *Birgitta Whaley (UC Berkeley)* | Berkeley, CA | Jan-Aug 2015, Jan-May 2016

Independent project: bilinear control theory applied to nonlinear spectroscopy ([paper](#))

Independent project: compressive sensing applied to quantum information ([paper](#))

## SEMINAR TALKS AT UC BERKELEY

**Kunal Marwaha**, "Examining a Classical Competitor to QAOA on MAXCUT"

*Whaley Research Group*

September 2, 2020 ([slides](#))

**Kunal Marwaha**, "Applications of Bilinear Control Theory in Nonlinear Spectroscopy"

*Numerical Methods in Radiation Transport: Final Project*

May 10, 2016 ([slides](#), [paper](#))

*Whaley Research Group*

May 27, 2015 *updated* May 18, 2016

**Kunal Marwaha**, “Quantum Applications of an Efficient Solution to Compressive Phase Retrieval”  
*Society of Physics Students Undergraduate Talk* February 17, 2015 ([slides](#), [paper](#))  
*Whaley Research Group* January 28, 2015

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## WORK EXPERIENCE

**Volunteer Researcher** | *Phil Marcus (UC Berkeley)* | Berkeley, CA | May-Oct 2019  
 Formulated and defined a fluids research problem in wind turbine blade design  
 Ran supercomputer simulations, reproduced prior results, tested a novel [neural net layer](#)

**Volunteer Researcher** | *John Tomsick (Space Sciences Laboratory)* | Berkeley, CA | Summer 2019  
 Moved flight data collection of [balloon-based gamma-ray spectrometer](#) into database system  
 Built real-time, online data visualizer for monitoring balloon health while in flight

**Senior Software Engineer** | *Pandora Media* | Oakland, CA | Feb 2018 - Dec 2019  
 Built software tools to import, deduplicate, and measure new music delivered to Pandora

**Forward Deployed Engineer** | *Palantir Technologies* | Washington, DC | Aug 2016 - Jan 2018  
 Built data entry and data analysis tools for several US government agencies

**Teaching Assistant** | *UC Berkeley EECS* | Berkeley, CA | Summer 2015  
 Taught a [popular, daily class](#) for “Discrete Mathematics and Probability Theory” (CS70)  
 Wrote discussion worksheets, homework problems, and additional logic problems

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## ENGINEERING SKILLS

**Simulations:** Jupyter notebooks, SolidWorks/AutoCAD, Multisim/HSPICE, Slurm/HPC  
**Programming:** JavaScript/React/TypeScript, Python/Django, Java/Spring, SQL, Scheme, LabView  
**Electrical Lab:** Oscilloscope, Multimeter, Function Generator, Parameter Analyzer  
**Building:** Power tools (saws, drills), Soldering (SMT & PTH), 3D Printing  
**Business:** Grant writing, Engineering project management, Non-profit 501(c)(3) Incorporation

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## AFFILIATIONS

<b>Instructor</b> , <a href="#">Software Carpentry</a> (non-profit to teach research computing skills)	2015 - present
<b>President</b> , Society of Engineering Sciences (departmental club)	2014 & 2016
<b>Carillonist</b> , UC Berkeley Carillon (bell tower musical instrument)	2012 - 2019
<b>Eagle Scout</b> , Boy Scouts of America	2011

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## REFERENCES

References available upon request.