Anthony Polloreno

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Work Experience

September 2018 - Present | Software Engineer at **Rigetti Quantum Computing**

Physicist and software engineer. Working on control software to bring-up, characterize, and calibrate quantum computers. Primary responsibilities include maintaining and developing the software suite for experimental work through implementing new routines (e.g. Gate Set Tomography) and new APIs for easily accessing and using calibrated pulses and pulse sequences.

June 2016 - September 2018 | Junior Quantum Engineer at **Rigetti Quantum Computing**

Worked on several teams including theory and applications, full stack quantum engineering, and software engineering. Implemented control software for device characterization and bring-up. Built functionality in Rigetti's quantum compiler, specifically developing ways to represent and manipulate Clifford circuits for use in benchmarking. Wrote customer facing code to access the quantum computer (pyQuil and Grove), including implementing standard algorithms (e.g. Grover's Algorithm). Work primarily done in Python and Common Lisp.

June-Aug 2014 | Undergraduate Student Instructor for CS70 at **U.C. Berkeley**

Worked as an undergraduate student instructor under James Cook for the summer offering of a course in discrete mathematics and probability in the Computer Science department. Taught a discussion section of 10 students twice a week, held office hours, wrote homework and exam problems, and ran review sessions.

Jan-May 2014 | Reader for CS61A at **U.C. Berkeley**

Graded homework, tests, and projects and held office hours for the introductory Computer Science course, taught by Paul Hilfinger.

Research Experience

September 2018 - October 2018 | Visiting Researcher at **UT Austin**

Random Quantum Circuits

Researching properties of random quantum circuits with Scott Aaronson. In particular, trying to prove that the probabilities for measuring different computational basis vectors following a random circuit are Porter-Thomas distributed.

June 2015 - Jan 2016 | Student Intern at **Sandia National Laboratories**

Quantum Computation, Control and Error Correction

Did research with Kevin Young on using quantum optimal control to average away coherent noise using gradient-based methods (GRAPE) and optimization. Currently working to publish results.

July 2013 - July 2015 | Student Assistant at **Lawrence Berkeley National Laboratory**

Beamline Optics, Reflection Zone Plates

Worked with Dmitriy Voronov to develop elliptical grating patterns called reflection zone plates which allow for more efficient beamline signal transmission in the Advanced Light Source. Used Python to generate patterns for the gratings as .cif files for use by electron beam and laser lithograpy machines.

Jan-May 2013 | Undergraduate Research Apprenticeship at **U.C. Berkeley**

Animal Flight Laboratory, Hummingbird Flight

Worked with graduate student Marc Badger to investigate how hummingbirds navigate natural vegetation. Learned about avian flight as well as animal handling, and was introduced to basic experimentation techniques, Arduino usage, and Mathematica.

Education

Aug 2012 - May 2016 | B.A., **Computer Science**, **Physics**, and **Pure Mathematics**

University of California, Berkeley GPA: 3.762

Languages and Frameworks

Languages: Python, Common Lisp, SQL, LaTeX, [Quil⟩

Frameworks: MPI, Docker, Postgres, AWS, Atlassian

Relevant Coursework

Mathematics	Real/Complex Analysis (104/185) Linear Algebra (110) Set Theory (135)	Topology (202A) Abstract Algebra (113/250A) Functional Analysis (202B)
Physics	Electricity and Magnetism (110A) Classical Mechanics (105) Thermodynamics and Statistical Physics (112)	Quantum Mechanics (137A/137B/221A) Advanced Laboratory (111A/111B)
Computer Science	Algorithms (170) Combinatorics and Discrete Probability (174) Machine Learning (189)	Computability and Complexity (172) Quantum Computing (191C/294)

(1xx: upper division, 2xx: graduate)

Talks/Posters

1. Anthony Polloreno, Nicholas Rubin, Robert Smith, and William Zeng. Random quantum circuits with varying topologies and gate sets. APS March Meeting, 2017
2. Anthony Polloreno, Nicholas Rubin, Robert Smith, and William Zeng. Random quantum circuits with varying topologies and gate sets. Southwest Quantum Information and Technology (SQuInT), 2017

Publications

1. M. Reagor, C. B. Osborn, N. Tezak, A. Staley, G. Prawiroatmodjo, M. Scheer, N. Alidoust, E. A. Sete, N. Didier, M. P. da Silva, E. Acala, J. Angeles, A. Bestwick, M. Block, B. Bloom, A. Bradley, C. Bui, S. Caldwell, L. Capelluto, R. Chilcott, J. Cordova, G. Crossman, M. Curtis, S. Deshpande, T. El Bouayadi, D. Girshovich, S. Hong, A. Hudson, P. Karalekas, K. Kuang, M. Lenihan, R. Manenti, T. Manning, J. Marshall, Y. Mohan, W. O'Brien, J. Otterbach, A. Papageorge, J. P. Paquette, M. Pelstring, A. Polloreno, V. Rawat, C. A. Ryan, R. Renzas, N. Rubin, D. Russell, M. Rust, D. Scarabelli, M. Selvanayagam, R. Sinclair, R. Smith, M. Suska, T. W. To, M. Vahidpour, N. Vodrahalli, T. Whyland, K. Yadav, W. Zeng, and C. T. Rigetti. Demonstration of universal parametric entangling gates on a multi-qubit lattice, 2017
2. S. Caldwell, N. Didier, C. A. Ryan, E. A. Sete, A. Hudson, P. Karalekas, R. Manenti, M. Reagor, M. P. da Silva, R. Sinclair, E. Acala, N. Alidoust, J. Angeles, A. Bestwick, M. Block, B. Bloom, A. Bradley, C. Bui, L. Capelluto, R. Chilcott, J. Cordova, G. Crossman, M. Curtis, S. Deshpande, T. El Bouayadi, D. Girshovich, S. Hong, K. Kuang, M. Lenihan, T. Manning, J. Marshall, Y. Mohan, W. O'Brien, C. Osborn, J. Otterbach, A. Papageorge, J. P. Paquette, M. Pelstring, A. Polloreno, G. Prawiroatmodjo, V. Rawat, R. Renzas, N. Rubin, D. Russell, M. Rust, D. Scarabelli, M. Scheer, M. Selvanayagam, R. Smith, A. Staley, M. Suska, N. Tezak, T. W. To, M. Vahidpour, N. Vodrahalli, T. Whyland, K. Yadav, W. Zeng, and C. Rigetti. Parametrically-activated entangling gates using transmon qubits, 2017
3. C. M. Wilson, J. S. Otterbach, N. Tezak, R. S. Smith, A. Polloreno, G. E. Crooks, and M. P. da Silva. Quantum kitchen sinks: An algorithm for machine learning on near-term quantum computers, 2019. Update with Experimental Results In Progress
4. A. Polloreno and K. Young. Robust decorrelation of errors in quantum gates by random gate synthesis, 2019. Under Review by Sandia National Laboratories
5. S. Hong, A. T. Papageorge, P. Sivarajah, G. Crossman, N. Didier, A. Polloreno, E. Sete, M. P. da Silva, and Blake R. Johnson. Demonstration of a high-fidelity parametrically-activated entangling gate on a multi-qubit architecture, 2019. Currently in Progress