

Anthony Polloreno

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RESEARCH EXPERIENCE

September 2018 - October 2018	Visiting Researcher at UT Austin <i>Random Quantum Circuits</i> 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 <i>Quantum Computation, Control and Error Correction</i> 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 <i>Beamline Optics, Reflection Zone Plates</i> 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 lithography machines.
Jan-May 2013	Undergraduate Research Apprenticeship at U.C. Berkeley <i>Animal Flight Laboratory, Hummingbird Flight</i> 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.

WORK EXPERIENCE

June 2016- August 2019	Quantum Engineer at Rigetti Quantum Computing Calibrating and characterizing near-term superconducting quantum computers (≤ 32 qubits). Developing and testing more efficient routines for device bring-up, simulation work done to validate routines done in Julia. Maintained and developed the software suite for experimental work, including APIs for easily accessing and using calibrated pulses and pulse sequences. Developed instrument drivers for vector network analyzers, and spectrum analyzers, implemented C++ drivers for matched filtering of RF signals, and was a primary developer and reviewer of the control software to run experiments and implement quantum programs, in Python. Built functionality in Rigetti's quantum compiler, speeding up measurements in the simulator and implementing group theoretic routines for benchmarking and simulating quantum circuits, in Lisp. Wrote customer facing code to access the quantum computer (pyQuil and Grove), including implementing standard algorithms (e.g. Grover's Algorithm).
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TEACHING EXPERIENCE

August 2019 - Present	Teaching Assistant for Physics 1110 and 1115 at C.U. Boulder Taught three sections of introductory general physics. Taught tutorial sections introducing students to ideas in kinematics and dynamics and graded homework. Course taught by Daniel Bolton, Cindy Regal, and Shijie Zhong.
August 2019 - Present	Grader for Physics 4410 at C.U. Boulder Graded homework and quizzes for upper division, second-semester quantum mechanics with Andreas Becker.
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.

EDUCATION

Aug 2019 - Present	Ph.D. Candidate, Physics University of Colorado, Boulder
Aug 2012 - May 2016	B.A., Computer Science, Physics, and Pure Mathematics University of California, Berkeley

GPA: 3.762

AWARDS AND SCHOLARSHIPS

Dec 2014	Pomerantz Physics Scholarship
Aug 2012	U.C. Berkeley Regents' and Chancellor's Scholarship

LANGUAGES AND FRAMEWORKS

Languages: Python, Julia, Common Lisp, SQL, \LaTeX , [Quil]

Frameworks & Tools: MPI, Docker, Postgres, AWS, Atlassian

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
3. Anthony Polloreno. Robust decorrelation of errors in quantum gates by random gate synthesis. *Bulletin of the American Physical Society*, 2019

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. Sabrina S. Hong, Alexander T. Papageorge, Prasahnt Sivarajah, Genya Crossman, Nicolas Dider, Anthony M. Polloreno, Eyob A. Sete, Stefan W. Turkowski, Marcus P. da Silva, and Blake R. Johnson. Demonstration of a parametrically-activated entangling gate protected from flux noise, 2019
 4. 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
 5. A. Polloreno and K. Young. Robust decorrelation of errors in quantum gates by random gate synthesis, 2019. Under Review by Sandia National Laboratories