

CHINMAY NIRKHE

PERSONAL DATA

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EDUCATION

University of California, Berkeley (GPA: 3.9/4.0)
2017 -

Ph.D. Candidate in Computer Science

Advisor: Umesh Vazirani

Research Interests: Quantum Computing, Complexity Theory

California Institute of Technology (GPA: 3.9/4.0)
2013 - 2017

B.S. Mathematics

B.S. Computer Science

PUBLICATIONS

All publications have alphabetical authorship and signify equal contribution by all authors.

Circuit lower bounds for low-energy states of quantum code Hamiltonians

Anurag Anshu and Chinmay Nirkhe. 2021.

Presented at [24th Annual Conference on Quantum Information Processing \(QIP 2021\) Munich, Germany](#)¹. Publically available pre-print: [arXiv : 2011.02044](#).

Good approximate quantum LDPC codes from spacetime circuit Hamiltonians

Thomas Bohdanowicz, Elizabeth Crosson, Chinmay Nirkhe, and Henry Yuen. 2019.

In the proceedings of [51st ACM Symposium on the Theory of Computation \(STOC 2019\) Phoenix, Ariz., USA](#). Presented at [5th International Conference on Quantum Error Correction \(QEC 2019\) London, UK](#). (Invited Talk) Presented at [22nd Annual Conference on Quantum Information Processing \(QIP 2019\) Boulder, Colo., USA](#). Publically available pre-print: [arXiv : 1811.00277](#).

On the complexity and verification of quantum random circuit sampling

Adam Bouland, Bill Fefferman, Chinmay Nirkhe, and Umesh Vazirani. 2018.

Published in [Nature Physics 2018](#). Abstract appearing in and presented at [2020 ACM Conference on Innovations in Theoretical Computer Science \(ITCS 2019\) San Diego, Calif., USA](#). Presented at [22nd Annual Conference on Quantum Information Processing \(QIP 2019\) Boulder, Colo., USA](#). Publically available pre-print: [arXiv : 1803.04402](#). News article published by UC Berkeley News.

Approximate low-weight check codes and circuit lower bounds for noisy ground states

Chinmay Nirkhe, Umesh Vazirani, and Henry Yuen. 2018.

In the proceedings of [45th International Colloquium on Automata, Languages, and Programming \(ICALP 2018\) Prague, Czech Republic](#). Presented at [13th Conference on the Theory of](#)

¹Online due to COVID-19 Pandemic.

Quantum Computation, Communication, and Cryptography (TQC 2018) Sydney, Australia.
Publically available pre-print: [arXiv : 1802.07419](https://arxiv.org/abs/1802.07419).

TALKS & PRESENTATIONS

Circuit lower bounds for low-energy states of quantum code Hamiltonians

Simons Institute for the Theory of Computing, Quantum Wave in Computing Reunion Workshop, July 2021. Stanford Patrick Hayden's Group Quantum Seminar, July 2021. Caltech Thomas Vidick's Group Quantum Seminar, March 2021. Quantum Information Processing (QIP), February, 2021. University of Texas, Austin and MIT Joint Quantum Seminar, December 2020. Quantum Code Design and Architectures (The European Network) Seminar, November 2020.

Good approximate QLDPC codes from spacetime Hamiltonians

Symposium on the Theory of Computing, June 2019. Institute for Quantum Computation, University of Waterloo Seminar, April 2019. UC Berkeley Theory Lunch, February 2019. Berkeley Quantum Information & Computation Center Seminar, December 2018.

On the complexity and verification of Random Circuit Sampling

Indian Symposium on Quantum Information and Technology, Pune, India, December 2019. University of Toronto Computer Science / Quantum Information Seminar, March 2019. IIT Kanpur Computer Science Seminar, December 2018. Simons Institute Industry Day Lightning Talks, May 2018. UC Berkeley Visit Days, March 2018.

Approximate low-weight check codes and circuit lower bounds for noisy ground states

Theory of Quantum Computing, July 2018. Stanford Institute for Theoretical Physics Seminar, May 2018. Caltech IQIM, February 2018.

Quantum pseudo-telepathy games

Caltech undergraduate math club, November 2016.

EMPLOYMENT AND RESEARCH POSITIONS

IBM. Yorktown Heights, NY. PhD Quantum Research Intern. May - December 2021.

Jane Street Capital. New York City, NY. Software Engineer Intern. Summer 2016.

Caltech Research for Course Credit, Professor Thomas Vidick. Summer and Fall 2016. Theoretical computer science research on pseudo-telepathy quantum games and certifiable randomness generation.

Twitter, Inc. San Francisco, CA. Software Engineer Intern. Summer 2015.

Caltech Summer Undergraduate Research Fellowship, Professor Thomas Apostol. Summer 2014. Mathematics research on the geometry of brachistochrone and tautochrones in radially dependent force fields.

University of Washington, Professor Jacob O. Wobbrock. Fall 2012. Human computer interaction research on novel text entry systems using *Microsoft Kinect* for midair freehand gestural input. Unpublished publication: C. Nirkhe, J. Wobbrock; *The Bubble Keyboard: A Midair Freehand Gestural Text Entry Method*.

AWARDS

National Science Foundation Graduate Research Fellowship Honourable Mention 2017

Microsoft Teaching in Computational Mathematical Sciences (CMS) Prize 2017

Associated Students of the California Institute of Technology (ASCIT) Teaching Award 2017

National Merit Semifinalist 2012

TEACHING POSITIONS

The Mathematics of Quantum Computation

Teaching Assistant; Hebrew University of Jerusalem: The 4th Winter School in Computer Science and Engineering Fall 2019.

CS 294-6: Quantum Computation

Teaching Assistant; University of California, Berkeley Fall 2019.

Trends in Theory: Quantum Computation

Teaching Assistant; University of California, San Diego Spring 2018.

CS 170: Efficient Algorithms and Intractable Problems

Teaching Assistant; University of California, Berkeley Spring 2018.

CS 38: Introduction to Algorithms

Head Teaching Assistant; California Institute of Technology Spring 2016, Spring 2017.

CS 139: Advanced Algorithms

Teaching Assistant; California Institute of Technology Winter 2017.

CS 156a: Learning Systems

Teaching Assistant; California Institute of Technology Fall 2016.

CS 21: Decidability and Tractability

Teaching Assistant; California Institute of Technology Winter 2016.

MENTORSHIP

James Chen

Summer & Fall 2020, UC Berkeley undergraduate, now quantitative trading at Jane Street Capital.

Natalie Parham

Summer & Fall 2020, UC Berkeley undergraduate, now a Masters student at University of Waterloo.

Sahil Patel

Summer & Fall 2020, UC Berkeley undergraduate.

SERVICE

(Anonymous) reviewer for

- (Conferences) CCC 2018, RANDOM 2018, TCC 2018, TQC 2018, CCC 2019, QCRYPT 2019, QIP 2019 (2), QIP 2020 (4), STOC 2020 (2), FOCS 2020, SODA 2021, ITCS 2021, STOC 2021 (3) and TQC 2021.
- (Journals) Quantum (1).

REFERENCES

Professor Umesh Vazirani, University of California, Berkeley. vazirani@cs.berkeley.edu.

Professor Thomas Vidick, California Institute of Technology. vidick@cms.caltech.edu.

Assistant Professor Henry Yuen, Columbia University. hsy2116@columbia.edu.

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