

Henry Yuen

Assistant Professor of Computer Science and Mathematics (*joint appointment*)

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Areas of specialization

Quantum computing, cryptography, complexity theory.

Appointments held

- 2018- Assistant Professor, University of Toronto
Departments of Computer Science and Mathematics (*joint appointment*)
- 2016-2018 Postdoctoral Associate in Computer Science, University of California, Berkeley

Education

- 2011-2016 Ph.D. in Computer Science, MIT
Thesis supervisor: Dana Moshkovitz
Thesis title: *Games, Protocols, and Quantum Entanglement*
- 2006-2010 B.A. in Mathematics, University of Southern California

Publications

Preprints

- 2018 Quantum proof systems for iterated exponential time, and beyond.
Joseph Fitzsimons, Zhengfeng Ji, Thomas Vidick, Henry Yuen.
Submitted.

Conference proceedings

- 2018 Approximate low-weight check codes and circuit lower bounds for noisy ground states.
Chinmay Nirkhe, Umesh Vazirani, Henry Yuen.
In proceedings of *International Colloquium on Automata, Languages, and Programming (ICALP)*

2018.

Presented at *Theory of Quantum Computing (TQC) 2018*.

Noise-tolerant testing of high entanglement of formation

Rotem Arnon-Friedman, Henry Yuen.

In proceedings of *International Colloquium on Automata, Languages, and Programming (ICALP) 2018*.

2017

New security notions and feasibility results for authentication of quantum data

Sumegha Garg, Henry Yuen, and Mark Zhandry.

In proceedings of *Annual International Cryptology Conference (CRYPTO) 2017*, pp. 342–371. Presented at *QCrypt 2016*.

Anchoring games for parallel repetition

Mohammad Bavarian, Thomas Vidick, and Henry Yuen.

In proceedings of *Symposium on Theory of Computing (STOC) 2017*, pp. 303–316. Presented as a plenary talk at *Quantum Information Processing (QIP) 2016*.

Multiplayer parallel repetition for expander games

Irit Dinur, Prahladh Harsha, Rakesh Venkat, and Henry Yuen.

In proceedings of *Innovations in Theoretical Computer Science (ITCS) 2017*, pp. 37:1–37:16. Presented as Invited Talk at ITCS 2017.

Parallel repetition via fortification: analytic view and the quantum case

Mohammad Bavarian, Thomas Vidick, and Henry Yuen.

In proceedings of *Innovations in Theoretical Computer Science (ITCS) 2017*, pp. 22:1–22:33. Presented at *Theory of Quantum Computing (TQC) 2016*.

2016

A parallel repetition theorem for all entangled games

Henry Yuen.

In proceedings of *International Colloquium on Automata, Languages, and Programming (ICALP) 2016*, pp. 77:1–77:13.

Presented at *Quantum Information Processing (QIP) 2017*.

A No-Go Theorem for Derandomized Parallel Repetition: Beyond Feige-Kilian

Dana Moshkovitz, Govind Ramnarayan, and Henry Yuen

In proceedings of *APPROX-RANDOM 2016*, pp. 43:3–42:29.

On the sum-of-squares degree of symmetric quadratic functions

Troy Lee, Anupam Prakash, Ronald de Wolf, and Henry Yuen.

In proceedings of *Computational Complexity Conference (CCC) 2016*, pp. 17:1–17:31.

2015

Parallel repetition for entangled k -player games via fast quantum search

Kai-min Chung, Xiaodi Wu and Henry Yuen.

In proceedings of *Computational Complexity Conference (CCC) 2015*, pp. 512–536

- 2014 Infinite Randomness Expansion and Amplification with a Constant Number of Devices
Matthew Coudron and Henry Yuen.
In proceedings of *Symposium on Theory of Computing (STOC) 2014*, pp. 427–436.
Presented at *Quantum Information Processing (QIP) 2014*
- 2013 Robust Randomness Amplifiers: Upper and Lower Bounds
Matthew Coudron, Thomas Vidick, and Henry Yuen.
In proceedings of *APPROX-RANDOM 2013*, pp. 468–483.
- 2012 Continuous Time Channels with Interference
Ioana Ivan, Michael Mitzenmacher, Justin Thaler, and Henry Yuen.
In proceedings of *International Symposium on Information Theory (ISIT) 2012*, pp. 860–864

Journal articles

- 2016 Rescuing Complementarity With Little Drama.
Ning Bao, Adam Bouland, Aidan Chatwin-Davies, Jason Pollack, and Henry Yuen.
In *Journal of High Energy Physics (JHEP)*, 2016:26.
- 2014 A quantum lower bound for distinguishing random functions from random permutations.
Henry Yuen.
In *Quantum Information and Computation*, 14(9-10), 2014.
- 2010 DNA Sequencing via Data Mining and Quantum Mechanics.
Henry Yuen, Fuyuki Shimojo, Kevin Zhang, Aiichiro Nakano, Kenichi Nomura, Priya Vashishta.
In *International Journal of Computational Science*, Vol. 4, No. 4, 2010.

Talks

- 2018 *Noise-tolerant testing of high entanglement of formation*
International Colloquium on Automata, Languages, and Programming (ICALP) 2018
(Prague, Czech Republic).
Approximate low-weight check codes and circuit lower bounds for noisy ground states.
International Colloquium on Automata, Languages, and Programming (ICALP) 2018
(Prague, Czech Republic).
Approximate low-weight check codes and circuit lower bounds for noisy ground states.
Workshop on Quantum Algorithms and Complexity Theory (Center for Quantum Technologies, Singapore).
- 2017 *Noise-tolerant testing of high-dimensional entanglement.*

- Invited speaker to Asian Quantum Information Science (AQIS) 2017 conference (Singapore)
- Centre for Quantum Information and Control (CQIQC) seminar (Toronto, Canada)
- 2017 *Parallel repetition for entangled games.*
- Innovations in Theoretical Computer Science (ITCS) 2017 conference (Berkeley, CA)
- Symposium on Theory of Computing (STOC) 2017 conference (Montreal, Canada)
- 2016 *Quantum parallel repetition with polynomial decay.*
- Joint Center for Quantum Information and Computer Science (College Park, Maryland)
- ICALP conference (Rome, Italy)
- Quantum Information Processing (QIP) 2017 conference (Seattle, WA)
- 2016 *Anchoring games for parallel repetition.*
- Caltech IQIM seminar (Pasadena, CA)
- Quantum Information Processing (QIP) 2016 conference (Banff, Canada)
- Hebrew University Quantum seminar (Jerusalem, Israel)
- Weizmann Institute of Science (Rehovot, Israel)
- NYU Theory Seminar (New York, NY)
- 2015 *Parallel repetition for entangled free games.*
- MIT Algorithms and Complexity Seminar (Cambridge, MA)
- Simons Institute Workshop on Information Theory in Complexity and Combinatorics (Berkeley, CA)
- CWI Seminar (Amsterdam, Netherlands)
- Computational Complexity Conference 2015 (Portland, OR)
- Caltech IQIM Group Meeting (Pasadena, CA).
- 2015 *Infinite randomness expansion.*
- Princeton CS Theory Group Meeting (Princeton, NJ)
- Foundations of Randomness Workshop (Stellenbosch Institute of Advanced Study, Stellenbosch, South Africa)
- 2014 *Infinite randomness expansion.*
- Simons Institute Quantum Gathering seminar, Simons Institute Quantum Games Workshop (Berkeley, CA)
- Symposium on the Theory of Computing (STOC) 2014 conference (New York, NY)
- CWI Seminar (Amsterdam, Netherlands)
- MIT Quantum Computing Group Meeting (Cambridge, MA).

Teaching

- Fall 2018 CSC2451/MAT1751 Quantum Computing: Foundations to Frontier (Graduate course)
- 2015 Graduate Instructor in Advanced Complexity Theory, MIT.

Service

Program committees

Innovations in Theoretical Computer Science (ITCS) 2017

Computational Complexity Conference (CCC) 2018

Theory of Quantum Computing (TQC) 2018

Conference reviewing

STACS, QIP, STOC, SICOMP, TQC, SODA, Theory of Computing Journal, and the Foundations and Trends in Theoretical Computer Science.

References

Dana Moshkovitz (Ph.D. advisor), UT Austin, danama@cs.utexas.edu

Scott Aaronson, UT Austin, aaronson@cs.utexas.edu

Thomas Vidick, CalTech, vidick@cms.caltech.edu

Ronald de Wolf, Centrum Wiskunde & Informatica (CWI), Ronald.de.Wolf@cwi.nl

Umesh Vazirani (Postdoc supervisor), UC Berkeley, vazirani@cs.berkeley.edu