

Ewin Tang

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CURRENT POSITION	University of California, Berkeley Miller Postdoctoral Fellow, hosted by Umesh Vazirani	<i>2023 – Present</i>
RESEARCH INTERESTS	quantum computing; learning theory; entanglement in quantum systems; numerical linear algebra	
EDUCATION	University of Washington <i>PhD</i> in Computer Science Thesis: Quantum machine learning without any quantum Advisor: James Lee	<i>2018 – 2023</i>
	University of Texas at Austin <i>Bachelor of Science</i> in Computer Science <i>Bachelor of Science</i> in Pure Mathematics Thesis: A quantum-inspired classical algorithm for recommendation systems Advisor: Scott Aaronson	<i>2014 – 2018</i>
RECOGNITION	QIP 2025 plenary talk For “High-temperature Gibbs states are unentangled and efficiently preparable” [BLMTb]	<i>2025</i>
	QIP 2024 plenary talk For “Learning quantum Hamiltonians at any temperature in polynomial time” [BLMTc]	<i>2024</i>
	Miller Postdoctoral Fellowship Awarded by the Miller Institute for Basic Research in Science	<i>2023</i>
	QIP 2020 plenary talk and best student paper For “Quantum-inspired algorithms for recommendation systems, principal component analysis, and supervised clustering” [Tan; Tan21]	<i>2020</i>
	NSF Graduate Research Fellowship	<i>2019</i>
	Forbes 30 Under 30	<i>2019</i>
	Dean’s Honored Graduate Research and academic distinction given to the top 1% of graduating students of UT College of Natural Sciences	<i>2018</i>
	Best Undergraduate Thesis For “A quantum-inspired classical algorithm for recommendation systems”, selected from all undergraduate computer science honors students	<i>2018</i>
SERVICE	Co-organizer, “Mathematical Challenges of Quantum Algorithms for Open Quantum Systems” Simons Institute	<i>October 2024</i>
	FOCS program committee	<i>2024</i>
	QIP program committee	<i>2022</i>
	QIP program committee	<i>2020</i>
TEACHING	Lecturer, “Quantum and quantum-inspired linear algebra” PCMI Graduate Summer School	<i>July 2023</i>

PUBLICATIONS

- Ainesh Bakshi, Allen Liu, Ankur Moitra, and Ewin Tang. “Structure learning of Hamiltonians from real-time evolution”. In: *FOCS 2024*. To be presented at QIP 2025.
- Ainesh Bakshi, Allen Liu, Ankur Moitra, and Ewin Tang. “High-temperature Gibbs states are unentangled and efficiently preparable”. In: *FOCS 2024*. To be presented in **plenary talk** at QIP 2025.
- Ainesh Bakshi, Allen Liu, Ankur Moitra, and Ewin Tang. “Learning quantum Hamiltonians at any temperature in polynomial time”. In: *STOC 2024*. Presented in **plenary talk** at QIP 2024, awarded best student paper; invited to **SICOMP special issue**.
- Ewin Tang and Kevin Tian. “A CS guide to the quantum singular value transformation”. In: *SOSA 2024*.
- Ainesh Bakshi and Ewin Tang. “A classical singular value transformation for quantum machine learning”. In: *SODA 2024*.
- Jeongwan Haah, Robin Kothari, Ryan O’Donnell, and Ewin Tang. “Query-optimal estimation of unitary channels in diamond distance”. In: *FOCS 2023*. Presented at QIP 2024.
- Ewin Tang. “Dequantizing algorithms to understand quantum advantage in machine learning”. In: *Nature Reviews Physics* (2022). [Review article].
- Jeongwan Haah, Robin Kothari, and Ewin Tang. “Learning quantum Hamiltonians from high-temperature Gibbs states and real-time evolutions”. In: *Nature Physics* (2024). Presented at QIP 2022 and FOCS 2022.
- András Gilyén, Zhao Song, and Ewin Tang. “An improved quantum-inspired algorithm for linear regression”. In: *Quantum* (2022).
- Nai-Hui Chia, András Gilyén, Tongyang Li, Han-Hsuan Lin, Ewin Tang, and Chunhao Wang. “Sampling-based sublinear low-rank matrix arithmetic framework for dequantizing quantum machine learning”. In: *Journal of the ACM* (2022). Appeared in STOC 2020, presented at QIP 2020.
- András Gilyén, Seth Lloyd, and Ewin Tang. “Quantum-inspired low-rank stochastic regression with logarithmic dependence on the dimension”. In: *ISAAC 2020*.
- Ewin Tang. “Quantum principal component analysis only achieves an exponential speedup because of its state preparation assumptions”. In: *Physical Review Letters* (2021). Presented at QIP 2020 (joint with 1807.04271).
- Ewin Tang. “A quantum-inspired classical algorithm for recommendation systems”. In: *STOC 2019*. Presented in **plenary talk** at QIP 2020 (joint with 1811.00414), awarded **best student paper**.
- Sunita Chepuri, Neeraja Kulkarni, Joe Suk, and Ewin Tang. “Factorizations of k -nonnegative matrices”. In: *Journal of Combinatorics* (2022).

PREPRINTS

- Angelos Pelecanos, Xinyu Tan, Ewin Tang, and John Wright. *Beating full state tomography for unentangled spectrum estimation*. In submission. 2024.
- Ainesh Bakshi, John Bostanci, William Kretschmer, Zeph Landau, Jerry Li, Allen Liu, Ryan O’Donnell, and Ewin Tang. *Learning the closest product state*. To be presented at QIP 2025. 2024.
- João F. Doriguello, Alessandro Luongo, and Ewin Tang. *Do you know what q -means?* 2023.

INVITED TALKS

- “Structure learning of Hamiltonians from real-time evolution” [BLMTa]
Workshop on correlations of quantum many-body systems *December 2024*
- “A perspective on Gibbs sampling”
Simons Institute Quantum Industry Day *November 2024*
- “How to learn a Hamiltonian”
FOCS 2024 Recent Advances in Quantum Learning workshop *October 2024*
- “High-temperature Gibbs states are unentangled and efficiently preparable” [BLMTb]
Stanford Thermalization and Quantum Information workshop *October 2024*
- “Learning the closest product state” [Bak+24].
UC Berkeley quantum pod talk. *October 2024*
- “Learning quantum Hamiltonians at any temperature in polynomial time” [BLMTc].
- Simons Institute one-day Hamiltonian learning workshop *February 2024*
 - UC Berkeley quantum seminar *December 2023*
 - MIT Theory Reading Group *November 2023*
 - Harvard Special Quantum Information seminar *November 2023*
- “An improved classical singular value transformation for quantum machine learning” [BT].
- Berkeley theory lunch *October 2023*
 - Google Quantum CS Theory seminar *May 2023*
- “Two results on estimation of unitary channels”
MIT QI seminar *January 2023*
- “Query-optimal estimation of unitary channels in diamond distance” [HKOT].
- Cornell Junior Theorists’ Workshop *May 2023*
 - MIT Algorithms and Complexity Seminar *April 2023*
 - Chicago Junior Theorists Workshop *January 2023*
 - Sandia Labs QPL seminar *December 2022*
 - CMU theory group seminar *December 2022*
 - Southwest Quantum Information and Technology Workshop *October 2022*
 - Quantum Innovators in Computer Science and Mathematics *October 2022*
 - Perimeter Institute QI seminar *October 2022*
- “Optimal learning of quantum Hamiltonians from high-temperature Gibbs states” [HKT24].
- MIT A+C seminar *March 2022*
 - Simons Institute Quantum Wave in Computing Reunion *July 2021*
- Talks surveying quantum-inspired classical linear algebra algorithms:
- ColdQuanta seminar *March 2023*
 - Perimeter Institute colloquium *October 2021*
 - University of Illinois IQIST seminar series *April 2021*
 - Simons Institute Quantum Colloquium *March 2021*
 - Simons Quantum Algorithms workshop *February 2020*
 - Simons Quantum Wave in Computing boot camp *January 2020*
 - Santa Fe Institute workshop *July 2019*
 - TQC (plenary talk) *June 2019*
 - TCS+ *May 2019*
 - CIFAR Quantum Information Systems Meeting *May 2019*
 - Microsoft Research QuArC seminar *November 2018*
- “A quantum-inspired classical algorithm for recommendation systems” [Tan]
- Microsoft Research AI seminar *December 2018*
 - UW Theory Seminar *October 2018*
 - Quantum Cluster, Simons Institute (informal) *June 2018*