Laura Cui

Pasadena, CA 91125
lcui (at) caltech.edu

Education

Ph.D. Physics, *California Institute of Technology* SEPT 2023 - PRESENT
- Advised by John Preskill and Fernando Brandão

S.B. Physics and Mathematics, *Massachusetts Institute of Technology* SEPT 2019 - JUNE 2023
- GPA: 4.9/5.0, Thesis: "Probing Local Many-Body Dynamics with Random Quantum Circuits"

Selected Awards & Honors

Sigma Pi Sigma Inductee 2023
Invited for outstanding scholarship in physics at MIT

NSF Graduate Research Fellowship Program Honorable Mention 2023
Received one of 825 honorable mentions

MIT Goldwater Scholarship Nomination 2022
Selected as one of two nominees from the MIT School of Science

Regeneron Science Talent Search Scholar 2019
Awarded for work on near-threshold doubly heavy tetraquark states

Selected Publications & Preprints

* *denotes equal contribution*

[3] **Laura Cui,** Thomas Schuster, Liang Mao, Hsin-Yuan Huang, Fernando Brandão, *Random unitaries from Hamiltonian dynamics.* arXiv:2510.08434 [quant-ph] (2025).

[2] Liang Mao, **Laura Cui,** Thomas Schuster, Hsin-Yuan Huang, *Energy-conserving random unitaries.* arXiv: 2510.08448 [quant-ph] (2025).

[1] **Laura Cui,*** Thomas Schuster,* Fernando Brandão, Hsin-Yuan Huang, *Unitary designs in nearly optimal depth.* arXiv:2507.06216 [quant-ph] (2025).

Research Talks & Seminars

Unitary designs in nearly optimal depth
Waterloo IQC Quantum Innovators Workshop, *Invited talk* OCT 2025

Designs and random dynamics in very low depth
Stanford Institute for Theoretical Physics, *QIQC Seminar* MAY 2025
NUS Center for Quantum Technologies, *Seminar talk* APR 2025

Random quantum circuits as a model for the classification of topological phases
MIT Center for Theoretical Physics, *QIP Seminar* JUNE 2023

Invited Schools & Workshops

Workshop II on Random Quantum Circuits (Upcoming) — AUG 2026
Institute for Theoretical Physics, University of Cologne, Cologne, Germany

Workshop on Random Quantum Circuits — NOV 2024
QuSoft and Centrum Wiskunde & Informatica, Amsterdam, Netherlands

---

Additional Schools & Workshops

Cal-Bay Quantum School — JUNE 2024
Munich Center for Quantum Science and Technology, Garching, Germany

---

Teaching Experience

California Institute of Technology

Teaching Assistant, *Ph/CS 219a: Quantum Computation* — FALL 2025
Teaching Assistant, *Ph 129b: Analytic Techniques in Mathematical Methods of Physics* — WINTER 2025
Teaching Assistant, *Ph 12: Waves, Quantum Physics, and Statistical Mechanics* — WINTER 2024 - FALL 2024

Massachusetts Institute of Technology

Undergraduate Teaching Assistant, *6.1200: Mathematics for Computer Science* — SPRING 2023
Lecturer and Head Grader, *18.S097: Proof-Writing Workshop* — WINTER 2021
Undergraduate Teaching Assistant, *8.02: Electricity and Magnetism* — FALL 2020

Other

Course mentor, *MIT Physics Mentorship Program* — FALL 2021 - SPRING 2023
Residential Counselor, *MathROOTS @ MIT* — JUNE 2022 - JULY 2022
Teaching Assistant, *Art of Problem Solving Academy Gaithersburg* — NOV 2017 - JULY 2020

Additional Publications & Manuscripts

[2] Rubi Gonzalez, **Laura Cui,** *A conversation with Angie Drobnic Holan on misinformation, fact-checking, and the modern media landscape.* MIT Science Policy Review **6,** 153-158 (2025).

[1] **Laura Cui,** *Local information scrambling in random quantum circuits.* Based on work supervised by John Preskill, Alexander Dalzell, and Hsin-Yuan (Robert) Huang. Presented in Caltech Summer Undergraduate Research Fellowship Symposium (2021).

Additional Technical Experience

Interuniversity Institute for Marine Sciences, *Research Assistant* — JUNE 2023 - AUG 2023
Supervised by Derya Akkaynak

MIT Center for Theoretical Physics, *Research Assistant* — JAN 2022 - JAN 2024
Supervised by Aram Harrow, Daniel Ranard

Caltech Institute for Quantum Information and Matter, *Research Assistant* — JUNE 2021 - AUG 2021
Supervised by John Preskill, Alexander Dalzell, Hsin-Yuan (Robert) Huang

MIT Research Laboratory of Electronics, *Research Assistant* — JUNE 2020 - AUG 2020
Supervised by Dirk Englund, Carlos Errando Herranz

J.P. Morgan Chase & Co., *Quantitative Research Intern* — JAN 2020
Rates Data Analytics Team

University of Maryland Joint Quantum Institute, *Research Assistant* — JUNE 2019 - AUG 2019
Supervised by Jacob M. Taylor, Daniel Carney

University of Maryland Center for Fundamental Physics, *Visitor* JUNE 2018 - AUG 2018
Supervised by Thomas D. Cohen

blair3sat, *Co-founder, Optical Mission Lead* SEPT 2017 - JUNE 2019
With Ryan Tse, Patrick Kim, Sujay Swain, Benjamin Cohen, and Gautom Das

Naval Research Laboratory, *Science and Engineering Apprenticeship Program* JUNE 2017 - AUG 2017
Space Science Division

Professional Activities

I have served as a subreviewer for the Quantum Information Processing (QIP) and Theory of Quantum Computation, Communication and Cryptography (TQC) conferences.

Outreach & Community Service

Caltech CUWiP 2028, Organizing Committee PRESENT
Caltech FUTURE of Physics, Co-chair SUMMER 2025
Caltech Gender Minorities and Women in PMA, Treasurer FALL 2024 - PRESENT
Caltech PMA Graduate Student Advisory Board, Member FALL 2023 - PRESENT
MIT Physics Values Committee, Undergraduate Representative FALL 2021 - SPRING 2023
MIT Undergraduate Society for Women in Mathematics, President SUMMER 2022 - SPRING 2023
MIT Undergraduate Womxn in Physics, Executive Board Member SUMMER 2021 - SPRING 2023
MIT Society of Physics Students, Executive Board Member SUMMER 2021 - SPRING 2023
MIT Educational Studies Program, Executive Board Member FALL 2019 - FALL 2022
HMMT Education, Speaker SPRING 2021 - FALL 2021