

Charles Yuan

MIT CSAIL

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EDUCATION

Massachusetts Institute of Technology, Cambridge, MA.

Ph.D. in Computer Science

September 2020–May 2025

S.M. in Computer Science

May 2022

Working with Prof. Michael Carbin on programming systems for quantum computation.

Carnegie Mellon University, Pittsburgh, PA.

B.S. in Computer Science

May 2019

Worked with Prof. Jan Hoffmann on probabilistic programming and Bayesian inference.

PUBLICATIONS

The T-Complexity Costs of Error Correction for Control Flow in Quantum Computation.

PLDI 2024

Charles Yuan, Michael Carbin.

Quantum Control Machine: The Limits of Control Flow in Quantum Programming.

OOPSLA 2024

Charles Yuan, Agnes Villanyi, Michael Carbin.

Codesign of Error-Correcting Codes and Modular Chiplelets in the Presence of Defects.

ASPLOS 2024

Sophia Lin, Joshua Vizslai, Kaitlin Smith, Gokul Ravi, **Charles Yuan**, Frederic Chong, Benjamin Brown.

Tower: Data Structures in Quantum Superposition.

OOPSLA 2022

Charles Yuan, Michael Carbin. *Distinguished Artifact Award.*

Semi-Symbolic Inference for Efficient Streaming Probabilistic Programming.

OOPSLA 2022

Eric Atkinson, **Charles Yuan**, Guillaume Baudart, Louis Mandel, Michael Carbin.

Twist: Sound Reasoning for Purity and Entanglement in Quantum Programs.

POPL 2022

Charles Yuan, Chris McNally, Michael Carbin.

Statically Bounded-Memory Delayed Sampling for Probabilistic Streams.

OOPSLA 2021

Eric Atkinson, Guillaume Baudart, Louis Mandel, **Charles Yuan**, Michael Carbin.

PREPRINTS AND WORKSHOPS

Analyzing Quantum Programs Using the Power of Interaction.

PLanQC at ICFP 2022

Agnes Villanyi, **Charles Yuan**, Chris McNally.

Probabilistic Inference for Quantum Programs.

I2Q at ISCA 2021

Charles Yuan, Yipeng Huang, Michael Carbin.

BLT: Exact Bayesian Inference with Distribution Transformers.

Technical Report, 2019

Charles Yuan, Jan Hoffmann. *Allen Newell Award for Best Undergraduate Thesis.*

TEACHING EXPERIENCE

Massachusetts Institute of Technology, Cambridge, MA.

6.1120: Dynamic Computer Language Engineering Fall 2023–Spring 2024

Carnegie Mellon University, Pittsburgh, PA.

15-312: Principles of Programming Languages Spring 2018–Spring 2019

98-317: Hype for Types Spring 2018–Spring 2019

15-210: Parallel and Sequential Data Structures and Algorithms Spring 2017–Fall 2018

15-122: Principles of Imperative Computation Spring 2016–Fall 2017

INDUSTRY EXPERIENCE

Google, Los Angeles, CA.

Research Intern, Quantum AI May–August 2024

Hudson River Trading, New York, NY.

Core Developer, Trading Infrastructure August 2019–August 2020

Two Sigma Investments, New York, NY.

Software Engineering Intern, Halite AI Challenge May–August 2018

Airbnb, San Francisco, CA.

Software Engineering Intern, Guest Growth May–August 2017

Google, Kirkland, WA.

Software Engineering Intern, Cloud Platform May–August 2016

TALKS AND SEMINARS

Stanford University Stanford, CA, May 2024

Raytheon BBN Technologies Cambridge, MA, May 2024

Northeastern University Boston, MA, May 2024

University of California, San Diego San Diego, CA, May 2024

Columbia University New York, NY, April 2024

University of Chicago Chicago, IL, April 2024

University of Illinois Urbana-Champaign Urbana, IL, April 2024

Carnegie Mellon University (seminar and guest lecture) Pittsburgh, PA, October 2023

EPFL / Swiss Federal Institute of Technology Lausanne, Switzerland, October 2023

ETH Zurich / Swiss Federal Institute of Technology Zurich, Switzerland, October 2023

Imperial College London London, United Kingdom, October 2023

Renssalaer Polytechnic Institute Troy, NY, October 2023

TTI/Vanguard Rebooting Computing Conference Montreal, Canada, June 2023

Jane Street Capital New York, NY, April 2023

National Research Institute of Poland / NASK Warsaw, Poland (virtual), March 2023

Tsinghua University Beijing, China (virtual), October 2022

PLanQC 2022 (invited speaker)	Ljubljana, Slovenia, September 2022
MIT CSAIL Alliances	Cambridge, MA, May 2022
University of Chicago	Chicago, IL (virtual), May 2022
Zapata Computing	Boston, MA (virtual), May 2022
IBM Quantum	Yorktown Heights, NY (virtual), March 2022
Implications of Quantum at SXSU	Austin, TX, March 2022
Stanford University	Stanford, CA (virtual), January 2022

EXTERNAL SERVICE

SIGPLAN-M Student Mentor	2023–Present
<i>Quantum</i> Journal Reviewer	2024
ACM <i>TOPLAS</i> Journal Reviewer	2024
OOPSLA 2024 Artifact Evaluation Committee Member	2024
ICFP 2023 Artifact Evaluation Committee Member	2023
PLDI 2023 External Reviewer	2023
PLDI 2023 Artifact Evaluation Committee Member	2023
POPL 2023 Artifact Evaluation Committee Member	2022
PLMW at OOPSLA 2022 Student Mentor	2022

INSTITUTIONAL SERVICE

EECS Resources for Easing Friction and Stress Member	2022–Present
EECS Faculty Search Student Advisory Group Member	2023
School of Engineering Dean’s Graduate Student Advisory Group Member	2022–2023
MIT Graduate Application Assistance Program Mentor	2021–2023
Quantum Software Reading Group and PL Reading Group Coordinator	2021–2022
CSAIL Ahead Committee Member	2020–2021

HONORS AND AWARDS

RPI Rising Star in Quantum Computing	2024
CQE-LPS Doc Bedard Fellowship	2023
Jane Street Graduate Research Fellowship Honorable Mention	2023
OOPSLA 2022 Distinguished Artifact Award	2022
NSF GRFP Honorable Mention	2020
Allen Newell Award for Undergraduate Research Excellence (Best Undergraduate Thesis)	2019

PRESS

<u>“A blueprint for making quantum computers easier to program”</u> – MIT News	April 2024
<u>“Meet Twist: MIT’s Quantum Programming Language”</u> – IEEE Spectrum	February 2022
<u>“A new language for quantum computing”</u> – MIT News	January 2022