Quantum Information Science and Technology @Yale
Paving the way for the second quantum revolution

Why do we want it?

Is it even possible?

How can we build it?

Quantum error correction & fault-tolerance

Quantum Information & Technology

Computation & Simulations

Communication & Networks

Sensing

Superconducting circuits

Optomechanics

Multidisciplinary effort: Applied Physics, Physics, Computer Science, Electrical Engineering, Mathematics

All comes together at...

https://quantuminstitute.yale.edu/
Pioneers in QIS

Superconducting circuits, “circuit quantum electrodynamics”

First electronic quantum processor built in Yale in 2009 (the “transmon”)

Developed “quantum bus” architecture for coupling superconducting qubits

First quantum algorithms with integrated circuits

Key theoretical and experimental contributions in the field of bosonic/continuous-variable quantum error correction

First demonstration of “break-even” in quantum error correction

Kerr-cat qubit with inherent robustness: Theoretically proposed in 2017, experimentally realized in 2020

Unique strength: Strong collaboration between theorists and experimentalists across disciplines

Rob Schoelkopf  Michel Devoret

Steve Girvin  Leonid Glazman  Dan Prober

Joined the faculty in 2020
Leadership in QIS

Leading partner in the Co-design Center for Quantum Advantage (C²QA)

Partner in NSF Quantum Leap Challenge Institute for Robust Quantum Simulations

Partner in NSF Center for Quantum Networks

And many others....
Training

Courses (https://courses.yale.edu/)

Physics and Applied Physics
- Quantum Information and Computation
- Quantum Optics
- Noise, Dissipation, Amplification, and Information
- Mesoscopic Physics
- Techniques of Microwave Measurement and RF Design

Computer Science
- Quantum Computing Systems

Chemistry
- Machine Learning and Quantum Computing in Chemistry and Material

Notable Alumni: Jay Gambetta (IBM, VP, Chief Theorist), Jerry Chow (IBM, Director, Quantum Hardware Systems Development), Chad Rigetti (CEO, Rigetti), Dave Schuster (Chicago), Andreas Wallraff (ETH Zurich), Irfan Siddiqi (UC Berkeley), Alexandre Blais (U Sherbrooke), Jens Koch (Northwestern)…

Colloquiums, Seminars, Distinguished Lecture Series
https://quantuminstitute.yale.edu/

Monday Lunch Seminars

Latest quantum faculty in CS!

Yongshan Ding
Student Led Organizations and Events

Women in Quantum Information group

The Yale Undergraduate Quantum Computing Group

Quantum Ethics Workshop
Those Who Work Hard, Play Hard

Join Us!