

## Princeton Center for Theoretical Science

The Princeton Center for Theoretical Science is dedicated to exploring the frontiers of theory in the natural sciences. Its purpose is to promote interaction among theorists and seed new directions in research, especially in areas cutting across traditional disciplinary boundaries.

The Center is home to a corps of Center Postdoctoral Fellows, chosen from nominations made by senior theoretical scientists around the world. A group of senior Faculty Fellows, chosen from science and engineering departments across the campus, are responsible for guiding the Center. Center activities include focused topical programs chosen from proposals by Princeton faculty across the natural sciences. The Center is located on the fourth floor of Jadwin Hall, in the heart of the campus “science neighborhood”. The Center hopes to become the focus for innovation and cross-fertilization in theoretical natural science at Princeton.

### Faculty Fellows

Igor Klebanov, Director  
Ned Wingreen, Associate Director  
Andrei Bernevig  
Duncan Haldane  
Andrej Košmrlj  
Frans Pretorius  
Silviu Pufu  
Eliot Quataert  
Shinsei Ryu  
Anatoly Spitkovsky

### Center Postdoctoral Fellows

Jan Albert 2024-2027	Sebastian Mizera 2024-2027
Ashley Bransgrove 2023-2026	Anirudh Prabhu 2022-2025
Miguel Goncalves 2024-2027	Rhine Samajdar 2022-2025
Mina Himwich 2023-2026	Colin Scheibner 2023-2026
David Hosking 2022-2025	Olivier Simon 2023-2026
Jonah Kudler-Flam 2022-2025	Benjamin Sorkin 2024-2027
Yves Kwan 2022-2025	Pok Man Tam 2023-2026



# Theoretical and experimental advances in quantum error correction

February 5-7, 2025  
Room 407, Jadwin Hall

### Organizers

Dima Abanin  
Sarang Gopalakrishnan  
Rhine Samajdar  
Jeff Thompson

To find out more about PCTS see: <https://pcts.princeton.edu>

## Theoretical and experimental advances in quantum error correction

### Wednesday, February 5, 2025

8:30-9:10 Check in, Light Breakfast  
9:10-9:15 Welcome and Introduction

9:15-10:15am **Liang Jiang**  
Co-Designed Quantum Error Correction.

10:15-11:00am Coffee break

11:00-12pm **Ciaran Ryan-Anderson**  
High-fidelity teleportation of a logical qubit using transversal gates and lattice surgery

12-1:00 Lunch at PCTS

1pm-2pm **Daniel Gottesman**  
Fault Tolerance with Dynamical Codes

2pm-3pm **Alex Kubica**  
Quantum memories and self-correction

3pm-4pm Coffee/Discussion time

4pm-5pm Structured discussion session

5:00-7:00 pm Reception at PCTS

### Thursday, February 6, 2025

8:30-9:15am Light Breakfast  
9:15-10:15am **Michael Gullans**  
Efficient Compilation and Noise Learning for Fault-Tolerant Quantum Algorithms

10:15-11:00am Coffee break

11:00-12pm **Harry Zhou**  
Experimental Demonstration of Logical Magic State Distillation

## Theoretical and experimental advances in quantum error correction

### Thursday, February 6, 2025 (cont.)

12:00-1:00pm Lunch at PCTS

1:00-2:00pm **Hayata Yamasaki**  
New Frontiers of Low-Overhead Fault-Tolerant Quantum Computation

2:00-3:00pm **Adam Kaufman**  
Developing the omg architecture using  $^{171}\text{Yb}$  for applications in quantum error correction

3:00-4:00pm Discussion time

4:00-5:00pm Physics Colloquium, Jadwin Hall A-10  
**Misha Lukin**  
New frontier of quantum computing

### Friday, February 7, 2025

9:00-9:30am Light Breakfast at PCTS  
9:30-10:30am **Genyue Liu**  
Error-corrected qubits via erasure conversion in a neutral atom array

10:30-11:00am Coffee break

11:00-12:00pm **Andy Lucas**  
Quantum statistical mechanics with low-density parity-check codes

12:00pm Conclusion/Lunch at PCTS