

## Mathematical and Computational Challenges in Quantum Computing Tutorials

### Tuesday September 12, 2023

- 8:00–8:55 *Check-in/Breakfast (hosted by IPAM)*
- 8:55–9:00 *Welcome & Opening Remarks*
- 9:00–10:15 **Dong An** (University of Maryland)  
*Introduction to quantum linear algebra, part 1*
- 10:15–10:45 *Break*
- 10:45–12:00 **Yu Tong** (University of California, Berkeley (UC Berkeley))  
*The Heisenberg limit and early fault-tolerant quantum algorithms, part 1*
- 12:00–12:30 *Core Orientation with IPAM Staff*
- 12:30–2:00 *Lunch (on your own)*
- 2:00–3:15 **Di Fang** (Duke University)  
*Quantum algorithms for dynamics simulation: Hamiltonian simulation and general differential equations, part 1*
- 3:15–3:45 *Break*
- 3:45–5:00 **Nicolas Delfosse** (Microsoft Research)  
*Introduction to quantum error correction, part 1*

### Wednesday September 13, 2023

- 8:00–9:00 *Check-in/Breakfast (hosted by IPAM)*
- 9:00–10:15 **Dong An** (University of Maryland)  
*Introduction to quantum linear algebra, part 2*
- 10:15–10:45 *Break*
- 10:45–12:00 **Yu Tong** (University of California, Berkeley (UC Berkeley))  
*The Heisenberg limit and early fault-tolerant quantum algorithms, part 2*
- 12:00–2:00 *Lunch (on your own)*
- 2:00–3:15 **Di Fang** (Duke University)  
*Quantum algorithms for dynamics simulation: Hamiltonian simulation and general differential equations, part 2*
- 3:15–3:45 *Break*
- 3:45–5:00 **Nicolas Delfosse** (Microsoft Research)  
*Introduction to quantum error correction, part 2*



## Thursday September 14, 2023

- 8:00–9:00 *Check-in/Breakfast (hosted by IPAM)*
- 9:00–10:15 **Nicolas Delfosse** (Microsoft Research)  
*Introduction to quantum error correction, part 3*
- 10:15–10:45 *Break*
- 10:45–12:00 **Dong An** (University of Maryland)  
*Introduction to quantum linear algebra, part 3*
- 12:00–2:00 *Lunch (on your own)*
- 2:00–3:15 **Pedram Roushan** (Google)  
*Quantum simulation with noisy intermediate-scale quantum processors, part 1*
- 3:15–3:45 *Break*
- 3:45–5:00 **Pedram Roushan** (Google)  
*Quantum simulation with noisy intermediate-scale quantum processors, part 2*

## Friday September 15, 2023

- 8:00–9:00 *Check-in/Breakfast (hosted by IPAM)*
- 9:00–10:15 **Hsin-Yuan (Robert) Huang** (California Institute of Technology)  
*Introduction to quantum learning, part 1*
- 10:15–10:45 *Break*
- 10:45–12:00 **Hsin-Yuan (Robert) Huang** (California Institute of Technology)  
*Introduction to quantum learning, part 2*

