C²QA
Co-design Center for Quantum Advantage

Welcome!

C²QA: Co-design for Quantum Advantage
QIS303 Quantum Error Mitigation Program 2024

Program Commences

Monday, August 12, 2024 at 11 a.m. ET.

Brookhaven National Laboratory

C²QA
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QIS 303: Quantum Error Mitigation Program

Aug 12 – 15, 2024

DAY 1: Monday
Aug 12, 2024

TIME (ET)	LECTURE & TOPIC	LECTURER
11 – 12 p.m.	**Quantum Computing (Part 1)**	**Nathan Wiebe**
12:15 – 1:15 p.m.	**Quantum Error Mitigation (Part 1)** High-level overview of several quantum error mitigation techniques, basic concepts, and readout error mitigation.	**Ewout van den Berg**
1:15 – 2 p.m.	**Break**	
2 – 3 p.m.	Office Hour: Quantum Computing (Part 1)	Nathan Wiebe
3:15 – 4:15 p.m.	Office Hour: Quantum Error Mitigation (Part 1)	Ewout van den Berg

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DAY 2: Tuesday
Aug 13, 2024

TIME (ET)	LECTURE & TOPIC	LECTURER
11 – 12 p.m.	**Quantum Computing (Part 2)**	**Nathan Wiebe**
12:15 – 1:15 p.m.	**Characterizing Noisy Quantum Circuits** Introduction to quantum tomography and randomized benchmarking. Discussion of the resource costs associated, and touch upon probabilistic error cancellation at the end.	**Yanzhu Chen**
1:15 – 2 p.m.	**Break**	
2 – 3 p.m.	**Quantum Error Mitigation (Part 2)** Noise learning and probabilistic error cancellation	**Ewout van den Berg**
3:15 – 4:15 p.m.	**Office Hour: Quantum Computing & Error Mitigation**	**Yanzhu Chen**

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DAY 3: Wednesday
Aug 14, 2024

TIME (ET)	LECTURE & TOPIC	LECTURER
12:15 – 1:15 p.m.	**Quantum Error Mitigation (Part 3)** Zero-noise extrapolation and coherent Pauli checks.	**Ewout van den Berg**
1:15 – 2 p.m.	**Break**	
2 – 3 p.m.	**Quantum Computing**	**Javier Robledo Moreno**
3:15 – 4:15 p.m.	Office Hour: Quantum Computing	Javier Robledo Moreno

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DAY 4: Thursday
Aug 15, 2024

TIME (ET)	LECTURE & TOPIC	LECTURER
12:15 – 1:15 p.m.	**Separate Quantification and Mitigation of State Preparation Errors and Readout Errors** Introduction in state preparation errors and readout errors and the hardness to separate them. Discussion of a method to separately quantify them via ancilla qubits, along with an efficient way to mitigate both.	Hongye Yu
1:15 – 2 p.m.	Break	
2 – 3 p.m.	**Quantum Simulation of Jets in Massive Schwinger Model** Introduction to simulating lattice gauge theories on a quantum computer, exemplified by studying a model of jet fragmentation in (1+1)-dimensional quantum electrodynamics, known as the Schwinger model.	David Frenklakh
3:15 – 4:15 p.m.	Roundtable	All

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