Andrew Yates

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Education

HARVARD UNIVERSITY
PhD in Quantum Science & Engineering - Theoretical Physics
Incoming student

CORNELL UNIVERSITY
Bachelor of Arts in Physics
Expected graduation: May 2022

- Selected coursework: Quantum Information Processing, Blackholes & Quantum Information Theory (Grad), Relativistic Quantum Field Theory I (Grad), Solid State Physics, Applied Functional Analysis (Grad).

Research Experience

CALTECH INSTITUTE FOR QUANTUM INFORMATION AND MATTER
Advisor: John Preskill
April 2021 – present

- Supported by the Caltech Summer Undergraduate Research Fellowship.
- Gave a talk at the MURI Annual Meeting 2021: Quantum Codes, Tensor Networks, and Quantum Spacetime.
- Studied the effects of noise on ‘quantum gravity in the lab’ experiments. Developing a quantum error correction strategy that restores the teleported state to its noiseless form.

CORNELL UNIVERSITY
Advisors: Paul Ginsparg and Peter McMahon
August 2020 – March 2021

- Implemented a quantum algorithm to prepare thermofield double states of the Sachdev–Ye–Kitaev (SYK) model.

Advisor: Peter McMahon
October 2019 – present

- Created and simulated a circuit-model quantum reservoir ML algorithm.

June – October 2019

- Simulated quantum circuits which are ‘Markovian’ and ‘locally rapidly mixing’. Created methods to diagnose and catalogue circuits with these properties. Found tensor network descriptions of the same phenomena.

January 2020 – present

- Mentors undergrads in Peter McMahon’s group who are working on quantum machine learning projects.

Service and Leadership

- Mentors an undergraduate sub-team within Peter McMahon’s lab. Creates and supervises the projects, hosts journal clubs, and provides tutoring for new student researchers.
- Mentors prospective students of physics and computer science, helping them find research opportunities and choose courses.

Skills

- Quantum computation, quantum information theory, and random matrix theory (i.e., unitary t-designs, Weingarten Calculus).
- Quantum simulation, quantum chaos theory, classical/quantum machine learning & linear algebra algorithms.
- Software packages: Cirq, Qiskit, Qutip, Pennylane, Tensorflow (Quantum), OpenFermion.

Industry Experience

CORNELL DESIGN & TECH INITIATIVE

January - May 2019

- Software developer for DTI, an engineering project team.

XIFIN, INC.

June - August 2017

- Software developer intern at a company which automates healthcare financial processing.