

Yifeng (Rocky) Zhu

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EDUCATION

Oct 2022 — Jun 2023	MASc, St John's College, University of Cambridge <ul style="list-style-type: none">Applied mathematics	Cambridge
Oct 2018 — Jun 2022	MSci, Imperial College London <ul style="list-style-type: none">Physics with theoretical physics, first-class honoursFinal year modules: quantum information, quantum optics, quantum field theory, general relativity and unification - the standard modelFinal year project: Improved positivity bounds for scalar field theories	London
Sep 2016 — Jun 2018	A-Levels, The Leys School A* A* A* A in mathematics, further mathematics, physics and chemistry	Cambridge

PUBLICATIONS

Apr 2022	Iterative quantum optimization with an adaptive problem Hamiltonian for the shortest vector problem <ul style="list-style-type: none">Listed as the first authorPublished on Physical Review A (DOI: 10.1103/PhysRevA.106.022435)	
Dec 2022	On the (Non)Hadamard Property of the SJ State in a 1+1D Causal Diamond <ul style="list-style-type: none">Listed as the first authorarXiv identifier: 2212.10592Under review by Classical and Quantum Gravity - IOPscience	

RESEARCH EXPERIENCES

Jun 2022 — Present	Causal set theory & Sorkin-Johnston(SJ) state <ul style="list-style-type: none">Summer research project. Supervisor: Dr. Yasaman YazdiAnalytically studied the non-Hadamard property of the SJ state of a causal set in 1+1 dimensionsInvestigated how the Hadamard condition affects entanglement entropyPaper under review	London
Aug 2021 — May 2022	Improved positivity bounds for scalar field theories <ul style="list-style-type: none">Final year project. Supervisor: Prof. Andrew TolleyCalculated the scattering amplitude of ϕ^3 theory to one-loop order and validated its strict positivityInvestigated the constraining power of improved positivity bounds on a non-renormalizable theoryReceived an overall mark of 87% (top 4 of the cohort)	London
Jun 2021 — Apr 2022	Quantum approximation optimization algorithm (QAOA) <ul style="list-style-type: none">Summer research project. Supervisor: Prof. Florian MintertIntroduced an algorithm to solve the shortest vector problem using QAOAPaper published by Physical Review A	London
Jun 2021 — Sep 2021	Quantum generative adversarial networks (QuGAN) <ul style="list-style-type: none">Summer research project. Supervisor: Dr. Antoine JacquierGenerated fake distributions that mimic the real input using QuGANAttempted to improve the algorithm by analyzing its performance in generating log-normal distributions	London
Oct 2020 — Jan 2021	Variational quantum eigensolver (VQE) <ul style="list-style-type: none">Third year project. Supervisor: Prof. Myungshik KimProposed a solution to reduce the circuit depth required for qubit-ADAPT-VQE to find the ground state of a problem Hamiltonian by more than half	London

- Received an overall mark of 78%

Jun 2019 — Sep 2019

Numerical methods for fast "spin-up" of circulation calculation

Oxford

- Summer research project. Supervisor: Prof. Samar Khatiwala
- Introduced an algorithm to precondition inputs by applying Jacobian matrices without explicit calculation
- The algorithm was intended to speed up any periodic circulation calculation that obeys the advection-diffusion equation

WORK EXPERIENCES

Jun 2021 — May 2022

Research analyst, Carle & Co Ltd.

London

- Researched in the stem cell therapy industry with a top-down approach
- Constructed a causal map of the industry with logical assumptions
- Analyzed large datasets on clinical trials to interpret useful insights
- Modeled the industry using an industrial software with the aim of predicting market growth
- Worked part time during term time

Jun 2020 — Aug 2020

Exam reviewer, Reachable Education Ltd.

Shanghai

- Evaluated question qualities in Physics and Mathematics Marathon
- Adjusted question difficulties to suit high school students

ACADEMIC AWARDS

2017 — 2018

Top Gold in Senior Maths Challenge

2018

National Top 100 in British Physics Olympiad

2018

National Top 43 in British Astronomy & Astrophysics Olympiad

2018

Winner of the Leys School Lam Mathematics Prize

- Best overall performance in mathematics

2018

1st Place in the Leys School Peter Watson Prize for Science and Engineering

- Designed an automated streetlight system in the idea of reducing energy wastage

2017

Commendation in the University of Cambridge Peterhouse College Kelvin Essay Prize

- Essay topic: What are NMR ring currents and why they are useful

2017

1st place (non-native speaker) in the Kroto Prize for Innovative Use of Technology in Science Learning

- Video topic: Bonding and anti-bonding orbitals

CONFERENCES ATTENDED

Sep 2022

Relativistic Quantum Information North (RQI-N)

Aug 2022

Fundamental Aspects of Gravity

Jul 2022

Lattice Coding & Crypto Meeting

Jun 2022 — Present

Causal Set Seminar

EXTRACURRICULAR ACTIVITIES

Oct 2022 — Present

Active member of the Cambridge University Mathematical Society

Oct 2022 — Present

Active member of the Cambridge University Physics Society

Oct 2021 — Present

Active member of the Imperial Quantum Technology Society