

Lawrence Wu

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Education

University of Cambridge MSc Physics

Oct.2022–Jun.2023

- Thesis: Combinatorial Optimisation of the Ising model with Graph Neural Networks
- Quantum Field Theory, Advanced Statistical Physics

University of Cambridge BA(Hons) Physics

Oct.2019–Jun.2022

- Scored over 90% in 2/4 final year core modules (General Relativity, Electrodynamics)
- Computing Project: Simulation of the Ising Model of Ferromagnetism
- Literature Review: Development of Quantum Computing Hardware

Relevant Modules: Statistical Physics, Advanced Quantum Mechanics, Particle Physics, Linear Algebra, PDE, Complex Analysis, Group Theory, Rep Theory, Differential Geometry

West London Free School (UK) Sixth Form

Oct.2017–Jun.2019

- A-Levels (All A*s): Physics, Maths, Further Maths, Chemistry.

Taipei Municipal Jianguo High School (Taiwan) High School

Sept.2016–Oct.2017

- Ranked 1st in entrance exam for the governmental Gifted Class of Mathematics and Science.

Awards

- United Steel Companies Scholarship, St John's College, University of Cambridge (2020, 2022)
- Top Gold, British Physics Olympiad (2019)

Research Experience/Projects

Combinatorial Optimisation of the Ising model using GNNs

Oct.2022–May.2023

Supervisor: Prof. Pietro Lio, Department of Computer Science, University of Cambridge.

- Developed a Graph Neural Network (GNN) for solving Ising energy optimisation (QUBO) problems through Polarised Attention Graph Diffusion

Preferred Directions in the Cosmic Microwave Background (CMB)

Aug.2021–present

Supervisor: Prof. Jiun-Huei Protty Wu, Department of Physics, National Taiwan University.

- Independently developed the codebase, which analyses data with over 50 million pixels each
- Applied new strategies to investigate possible preferred axes or directions in the observed full-sky CMB maps.

Efficient Wordle Solver using the Word Correlation Graph

Feb. 2022

Independent research on an interesting problem

- A rapid brute force solver in python based on the complete directed correlation graph between all 6000 5-letter words
- The directed graph was simplified into a simpler graph by applying a non-trivial symmetry between the edges
- Concluded the best strategy of starting with "Aloes" with an expected guess count of 3.2 guesses

Simulation of the Ising Model

Oct.2021–Apr.2022

Undergraduate Computational Project.

- Implemented and Investigated the Ising Model using Monte-Carlo optimisation algorithms.

Simulation of the domestic and international spreading of COVID-19

Mar.–Jun.2020

Independent research on Models building.

- Simulated the spreading by modelling individuals as repulsive particles.
- Investigated how the spreading rate varies with the strictness of quarantining, travel restriction and social distancing
- Determined how the rate of spreading varies with the vaccination rate.

Connect Four AI

Jun.–Aug.2018

Independent research on Machine Learning.

- A Connect4 agent based on Monte Carlo Tree Search (MCTS).

Work Experience

Optiver Incoming Quantitative Trader

From Sep.2024

University Surf Society Trip Secretary

Jun.2022–Jun.2023

- Planned and organised two 50-people surf trips to Morocco and the Canary Islands with budgets of over \$20k

Physics Olympiad Tutor Tutoring

Jun.2022–Jun.2023

- Tutoring for the preparation of IPhO, BPhO and other advanced physics competition

Programming/Computers

Python (Numpy, Pandas, PyTorch), C++, \LaTeX , Linux

Hobbies

Surfing, Skateboarding, Speed Cubing, DJing(House), Maths