

Lawrence Wu

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Education

University of Cambridge *MSc Physics* Oct.2022–Jun.2023

University of Cambridge *BA(Hons) Natural Sciences, 1st class* Oct.2019–Jun.2022

- 1st year: First-Class (Physics, Chemistry, Materials, and Maths).
- 2nd year: Upper Second-class (Physics and Maths).
- 3rd year: First-Class (Physics).

Literature review: Superconducting Quantum Computing Hardware
Computational Project: Simulating the Ising model of Ferromagnetism.

Related courses: Advanced Quantum Mechanics, General Relativity, Optics and Electrodynamics, Thermodynamics and Statistical Physics, Particle and Nuclear Physics, Quantum Condensed Matter. PDE, ODE, Linear Algebra, Complex Analysis, Group Theory, Tensor Calculus.

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)
- Top Gold, British Physics Olympiad (2019)
- Distinction, British Mathematics Olympiad (2018 & 2019)
- Golds, UK Senior Math Challenge (2017 & 2018)

Publication

Investigation of Cosmic Preferred Directions in the Cosmic Microwave Background Using New Strategies, Lawrence Wu & Jiun-Huei Proty Wu (in preparation).

Research Experience/Projects

Preferred Directions in the Cosmic Microwave Background (CMB) Aug.2021–present

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

- Applied new strategies to investigate possible preferred axes or directions in the observed full-sky CMB maps.
- Performed spherical harmonic transforms for full-sky maps of million pixels.
- Independently developed all the codes.
- Independently optimised the core codes employing GPU.

Literature Review

Oct.2021–Apr.2022

Supervisor: Prof Mike Payne, Department of Physics, University of Cambridge.

- Looked into emerging technologies of Quantum Computer Hardware and their current difficulties.

Simulation of the Ising Model

Oct.2021–Apr.2022

Computational Project.

- Investigated the Ising Model using the Metropolis Algorithm.
- Quantified how the total magnetisation fluctuates in time when the system is in equilibrium.
- Determined how Magnetisation varies with Temperature.
- Found the heat capacity of the system as a function of temperature.

Simulation of the domestic and international spreading of COVID-19

Mar.–Jun.2020

Independent research.

- Simulated the spreading by modeling 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.

- An unbeatable AI that plays Connect4 by Monte Carlo Tree Search (MCTS).
- Investigated the difference between different Selection Algorithms in MCTS.
- The AI lost 0/100000 games against a random playing agent.

Work Experience

M2 Digital Asset Management *Summer Intern*

Jun.–Jul.2021

Project: Research and Development of Bitcoin Pricing Models.

- Estimated the average mining cost per coin from historical mining difficulty and ASIC chip efficiency datas.
- Developed codes to estimate the probability distribution of future BTC prices by using the Black-Scholes model on current option prices.

Programming/Computers

Python, C++, L^AT_EX, Linux

Hobbies

Surfing, Skateboarding, Speed Cubing, Electronic Music