Lawrence Wu

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Education

University of Cambridge *Natural Sciences, BA (Hons)*   *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 coursework: Advanced Quantum Mechanics, General Relativity, Optics and Electrodynamics, Thermaldynamics 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: Physics A*, Maths A*, Further Maths A*, Chemistry A* (all highest grades).

Taipei Municipal Jianguo High School (Taiwan)   *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

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.

Computer Skills

Python, C++, Linux, GPU computation, LaTeX