

Kyle Wong

Recent Master's graduate from Sidney Sussex College, University of Cambridge

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A highly motivated recent Master's graduate from the University of Cambridge with a strong background in astrophysics, mathematics, and computational science. Experienced in cosmological research, gravitational wave data analysis, and radio astronomy. Seeking a challenging research or data science role to further develop expertise in scientific computing, data analysis, and software programming.

EDUCATION

Sidney Sussex College, University of Cambridge, Cambridge, England, United Kingdom 2024 — 2025

MASt/Part III in Astrophysics

Graduated with Good Honours equivalent

Victoria College, University of Toronto, Toronto, Ontario, Canada 2020 — 2024

Honours Bachelor of Science (HBSc) in Physics & Mathematics

Graduated with High Distinction

German Swiss International School, Hong Kong SAR, China 2010 — 2020

International Baccalaureate (IB) Diploma in 6 subjects

International Advanced Subsidiary (AS) level in 1 subject

International General Certificate of Secondary Education (IGCSE) in 12 subjects

RESEARCH EXPERIENCE

Master of Advanced Study Research Project Cambridge, England, United Kingdom

Postgraduate Student

October 2024 — September 2025

Supervised by Prof. Anastasia Fialkov at the Institute of Astronomy, University of Cambridge

- Research topic: implementation and statistical testing of variable initial conditions (cosmologies) in 21cmSPACE code package for simulating the distribution of hydrogen gas clouds in the early universe, making possible efficient forecasting of future radio astronomy experiments, most notably for the Square Kilometre Array (SKA)
- Skills: simulation, high performance computing, data visualization, cosmology, Python, MATLAB

Canadian Institute for Theoretical Astrophysics

Summer Undergraduate Research Fellowship

Toronto, Ontario, Canada

Undergraduate Researcher

May 2023 — December 2023

Supervised by Dr. Philippe Landry at the Canadian Institute for Theoretical Astrophysics

- Research topic: probing neutron star tidal deformability from gravitational wave signals using Markov chain Monte Carlo (MCMC) parameter estimation in many dimensions, and incorporating new models for neutron star equation of state correlations in the analysis pipeline of Laser Interferometer Gravitational-Wave Observatory (LIGO) Scientific Collaboration gravitational wave data
- Skills: simulation, MCMC, Bayesian inference, high performance computing, Python

McGill Space Institute Summer Undergraduate Research Award

Montreal, Quebec, Canada

Undergraduate Researcher

May 2022 — April 2023

Supervised by Prof. Adrian Liu at the Trottier Space Institute (formerly McGill Space Institute) of McGill University

- Research topic: incorporating statistical priors into the power spectrum data estimator used in the data pipeline, for analysis of radio astronomy data from the Hydrogen Epoch of Reionization Array (HERA) collaboration's cosmic dawn experiment, using the Python programming language
- Skills: simulation, Fourier transform, radio astronomy, radio frequency interference, Python

HONOURS, AWARDS AND SCHOLARSHIPS

- Dean's List Scholar in the Faculty of Arts & Science 2022, 2023, 2024
- Canadian Institute for Theoretical Astrophysics
Summer Undergraduate Research Fellowship (CITA SURF) 9,500 CAD, 2023
- Birkenshaw Family Scholarship II 1,000 CAD, 2023
- McGill Space Institute (now Trottier Space Institute)
Summer Undergraduate Research Award (MSI SURA) 7,000 CAD, 2022
- David and Louise Fraser Scholarship 2,500 CAD, 2022
- University of Toronto Scholar 1,500 CAD, 2022
- Birkenshaw Family Scholarship 1,000 CAD, 2022

SKILLS

- **Programming:** Proficient in Python for scientific computing and data analysis, with additional experience in MATLAB and Java.
- **Data Analysis:** multi-dimensional data visualization, fast Fourier transform, numerical methods (differentiation, integration, root finding, ODE/PDE solutions), Monte Carlo methods, and symbolic computing.
- **Software & Libraries:** Bilby (gravitational wave parameter estimation), 21cmSPACE, CAMB, recfast++ (cosmological simulation).
- **Machine Learning (ML):** Solid understanding of fundamental machine learning techniques, including the MCMC method and Convolutional Neural Network (CNN) architectures.
- **AI Tools:** Google Gemini, Gemini CLI, and ChatGPT for academic and scientific research and coding.

PRESENTATIONS

- Interim progress presentation, at the Cambridge Cosmic Dawn Group 2024
- *Estimating Neutron Star Tidal Deformability*, at the CITA Undergraduate Research Showcase 2023
- PHY478 Physics Project final presentation 2023
- Two presentations given at the CITA Compact Objects Group, as part of PHY478 Physics Project 2023

FEATURED CODE REPOSITORIES

sound_simulation (https://github.com/kyleyhw/sound_simulation)

- A numerical simulation of physical waves in N-dimensions, implemented in Python. The simulation allows for the creation of physical boundaries and obstacles, and models their interaction with the waves. Future work aims to use this simulation to generate training data for machine learning models.
- Skills: Python, NumPy, Matplotlib, numerical modeling, physics simulation.

digit_recognizer (https://github.com/kyleyhw/digit_recognition)

- A project to build a convolutional neural network (CNN) from scratch in Python for handwritten digit recognition. This was undertaken to develop a fundamental understanding of machine learning principles without relying on high-level libraries like PyTorch or TensorFlow.
- Skills: Python, NumPy, fundamental machine learning, neural networks and architecture, computer vision, Tkinter.

digit_recognizer_pytorch (https://github.com/kyleyhw/digit_recognition_pytorch)

- Developed a CNN using PyTorch for real-time MNIST digit recognition, featuring an interactive GUI with advanced preprocessing, comprehensive documentation, robust testing, and checkpointing, to deepen understanding of ML principles and software engineering best practices.
- Skills: Python, PyTorch, NumPy, machine learning, neural networks, computer vision, Tkinter.

driver_assignment (https://github.com/kyleyhw/driver_assignment)

- An application of constraint programming to the vehicle routing problem, assigning passengers to drivers by minimizing a Haversine distance-based cost function. Developed to provide a scalable framework for real-world logistical challenges like ride-sharing coordination.

- Skills: Python, optimization, algorithms, problem-solving, data visualization.

SELECTED COURSES

- Gravitational Waves & Numerical Relativity (Cambridge, 2025)
- Astrostatistics (Cambridge, 2025)
- Cosmology (Cambridge, 2024)
- General Relativity (Cambridge, 2024)
- General Relativity (Toronto, 2024)
- Relativity Theory II (Toronto, 2024)
- Relativity Theory I (Toronto, 2023)
- Physics Project (Toronto, 2023)
- Computational Physics (Toronto, 2023)
- Computational Astrophysics (Toronto, 2023)
- Advanced Classical Mechanics (Toronto, 2023)
- Geometry of Curves and Surfaces (Toronto, 2023)
- Partial Differential Equations (Toronto, 2023)

RESEARCH INTERESTS

- Computational data analysis
- Simulation programming
- Fundamental machine learning, artificial intelligence
- Astrophysics (including gravitation, cosmology, black holes & compact objects, dark matter, dark energy)

RELEVANT EXPERIENCE

- **Teaching:** Private Tutor for physics & mathematics (IGCSE, A-levels, IB syllabi). 2020 – 2022, 2024 – 2025
- **Professional Development:** Intensive astrophysics bootcamp at the University of Pennsylvania. 2022
- **Volunteering:**
 - Involved in public astronomical observing nights at the Institute of Astronomy.
 - Involved in Beaver Scouts outreach visits at the Institute of Astronomy.
 - Volunteered for RiseWise HK, serving as an assistant soccer coach for children with special educational needs.
 - Travelled to Chiang Mai, Thailand to physically contribute to the construction of a school.
 - Undertook training and assisted with a public astronomical observing night at McGill University.

LANGUAGES

- English (fluent, language of education)
- Cantonese (fluent, mother tongue)
- Mandarin (formally learned 10 years)
- German (formally learned 10 years)

RECENT MEMBERSHIPS

- Sidney Sussex College Football Team, Premier Division
- Cambridge University Mountaineering Club
- Cambridge University Table Tennis Club
- Cambridge University Hong Kong Postgraduate Student Association
- Cambridge University Chinese Society

PERSONAL INTERESTS

- Rock climbing (both outdoors and indoors, with awards won at amateur, inter-high school and inter-university competitions. Also led a rock climbing extra-curricular activity during high school, including captaining the competition team)
- Soccer (7+ years league participation)
- Scuba diving (PADI open water certified)
- Travelling