Kyle Wong

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EDUCATION

Sidney Sussex College, University of Cambridge, Cambridge, England, United Kingdom 2024 — present
Master of Advanced Study (MASt) in Astrophysics
Expected time of completion: June 2025

Victoria College, University of Toronto, Toronto, Ontario, Canada 2020 — 2024
Honours Bachelor of Science (HBSc)
Programs: Physics Specialist (ASSPE1944), Mathematics Major (ASMAJ1165)
Graduated with High Distinction

German Swiss International School, Hong Kong SAR, China 2010 — 2020
International Baccalaureate (IB) in 6 subjects
International Advanced Subsidiary (AS) level in 1 subject
International General Certificate of Secondary Education (IGCSE) in 12 subjects

RESEARCH EXPERIENCE

Master's of Advanced Study Research Project Cambridge, England, United Kingdom
Postgraduate Student October 2024 — present
Supervised by Prof. Anastasia Fialkov at the Institute of Astronomy, University of Cambridge

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

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) machine learning parameter estimation, 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
- Relevant skills: simulation, MCMC, Bayesian inference, high performance computing

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
- Relevant skills: simulation, Fourier transform, radio astronomy, radio frequency interference

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
- Received offer for University of Toronto
  Natalia Krasnopolskaia Memorial Summer Undergraduate Research Fellowship
  (declined due to commitment with MSI SURA) — 2022

SKILLS

- Scientific object oriented programming with Python, MATLAB, and Java, placing emphasis on design and coding practices
- Multi-dimensional data visualization
- Data analysis techniques including fast Fourier transform and numerical methods such as differentiation, integration, root finding, solutions to ordinary/partial differential equations, Monte-Carlo methods
- Symbolic computing
- Extensive use of the Bilby parameter estimation library (authored by the LIGO Scientific Collaboration)
- Extensive use of the 21cmSPACE (authored by the Cosmic Dawn Group at the Institute of Astronomy) cosmological simulation package
- Extensive use of the CAMB and recfast++ astrophysical simulation packages

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

SELECTED COURSES

At the University of Cambridge:

- Gravitational Waves and Numerical Relativity — Planned (Easter 2025)
- Canonical Gravity Hamiltonian Approach to General Relativity — Planned (Lent 2025)
- Astrostatistics — Planned (Lent 2025)
- Cosmology — In progress (Michaelmas 2024)
- General Relativity — In progress (Michaelmas 2024)

At the University of Toronto:

- General Relativity (APM426) — A (Winter 2024)
- Relativity Theory II (PHY484) — A (Winter 2024)
- Relativity Theory I (PHY483) — A+ (Fall 2023)
- Physics Project (a continuation of CITA SURF) (PHY478) — A+ (Fall 2023)
- Computational Physics (PHY407) — A+ (Fall 2023)
- Computational Astrophysics (CTA200H) — Audited (Summer 2023)
- Advanced Classical Mechanics (PHY354) — A+ (Winter 2023)
- Geometry of Curves and Surfaces (MAT363) — A+ (Winter 2023)

RESEARCH INTERESTS

- Computational data analysis
- Simulation programming
- Machine learning, artificial intelligence
- Gravitation
- Cosmology
- Black holes, compact objects
- Dark matter, dark energy

RELEVANT EXPERIENCE

- Attended 1-week HERA collaboration astrophysics bootcamp, hosted at the University of Pennsylvania 2022
- Tutored physics & mathematics for IGCSE, A-levels, and IB syllabi 2020 — 2022, 2024 — present

LANGUAGES

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

CITIZENSHIPS

- United States of America (US)
- Hong Kong SAR (HK)

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

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)
- Traveling