Henry Yip

MSc Physics student, ETH Zürich

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Research interests

Tropical cyclones, numerical weather prediction, climate modelling, and machine learning for atmospheric science.

Education

MSc Physics, ETH Zürich — Sep 2025 – Feb 2027 (expected)

Courses include Dynamics of the Large-Scale Atmosphere; Cloud Dynamics: Hurricanes; Computational Statistical Physics; Computational Astrophysics; AI in the Sciences and Engineering.

BSc Mathematical Physics, University of Edinburgh — 2021 – 2025

First Class Honours. Pre-Honours Certificates of Merit (years 1 and 2); Career Development Scholarship (year 3).

Research experience

Summer intern, Hong Kong Observatory — Jun – Sep 2026

Developed a model-agnostic machine-learning post-processor for tropical cyclone intensity and central-pressure forecasts from global AI weather models. First-author manuscript submitted.

Semester project, Atmospheric Physics group, ETH Zürich — Feb – Jul 2026

The resolution dependence of environmental tropical cyclone metrics: how the spatial resolution and time averaging of ERA5 reanalysis affect estimates of potential intensity, with a focus on coastal regions and extremes. Supervised by Prof. Ulrike Lohmann and Dr Bernhard Enz.

Final project, Computational Statistical Physics, ETH Zürich — Spring 2026

Monte Carlo study of the 3D classical Heisenberg model with Metropolis and Wolff cluster updates on lattices up to 256^3 spins: the critical temperature and five critical exponents, all within 1σ of the literature values. Awarded full marks.

Summer student researcher, School of Mathematics, University of Edinburgh — Jun – Sep 2025

Synchronisation of small scales in two-dimensional Kolmogorov-forced turbulence, simulated with JAX-CFD and checked against the literature; now extending the theory to include Coriolis effects on the beta-plane. Supervised by Dr Jacob Page, with assistance from Dr Dmitriy Zhigunov.

Summer student researcher, School of Physics and Astronomy, University of Edinburgh — Jun – Sep 2024

The gravitational three-body problem: symplectic integrators for known periodic orbits and Euler's problem of two fixed centres, and a study of the existence proof of the figure-eight orbit and of Sundman's series. Supervised by Prof. Jenni Smillie; funded by a Career Development Scholarship. Led to publication 2 below.

Research team leader, Edinburgh Scientific Researchers Association — Sep 2023 – Mar 2024

Led a group project modelling liquid slosh with coupled pendulums and a wave equation, presented at the association's annual conference.

Research analyst, HYPED — Sep 2022 – May 2023

Researched liquid ring pumps as part of a group study of vacuum pumps for hyperloop systems; the group concluded that they are unsuitable because of their poor performance.

Publications

1. H. Yip et al., *A Model-Agnostic Post-Processor for Tropical Cyclone Intensity and Central Pressure in Machine-Learning Weather Forecasts*. Submitted (2026).
2. H. Yip and J. M. Smillie, *An Analysis of the Restricted Euler Problem Using Symplectic Integrators*. Edinburgh Student Journal of Science **1**(3) (2025). doi:10.2218/esjs.10064.

Computing

Python (NumPy, SciPy, Numba, JAX), JAX-CFD, ERA5 reanalysis data, high-performance computing on ETH's Euler cluster, LaTeX.