

## Hong Kong Observatory Summer Placement Programme 2025

Project Code	Project Title	Job description	Subject and year of study required	Specific knowledge / skills required / remarks
A1	Set up a flight simulator for aviation meteorological services roadshow exhibit	Set up a flight simulator and supporting platform to give participants firsthand experience of landing/taking off at Hong Kong International Airport under simulated weather conditions of historical events. The intern will also be involved in creating promotional materials, including video clips, to demonstrate the use of the flight simulator. The outcomes will be utilized in roadshows and other settings to enhance awareness of our services within the aviation industry and the general public.	Computer Science, Engineering, or related disciplines  Completion of 2 <sup>nd</sup> year of preferred.	- Knowledge and experience in programming (e.g. Python) are required.  - Familiarity with flight simulator would be an advantage.
A6a	Evaluate the performances of forecast models for aviation hazardous weather	Numerical weather prediction models and machine learning models have been useful for forecasting aviation hazardous weather, e.g. significant convection, airframe icing, turbulence. This project will study and evaluate models developed for forecasting aviation hazardous weather. Model verification will provide valuable guidance for aviation forecasters.	Mathematics, Statistics, Physics, Earth System Science, Computer Science or related disciplines.  Completion of 2 <sup>nd</sup> year of study.	- Genuine interest in meteorology.  - Knowledge and experience in Python/R programming language and statistical analysis would be an advantage.

A6b	Develop, analyse and evaluate turbulence intensity using aviation flight data	<p>Develop turbulence intensity estimation (in Eddy Dissipation Rate) using available aviation flight data (e.g. Automatic Dependent Surveillance –Broadcast (ADS-B), Mode S). The project will focus on developing an algorithm, performing statistical analysis on the vast amount of flight data and evaluating the performance of the algorithm against other available turbulence observations. The project will involve data analytics with vast amount of rapidly updating data.</p>	<p>Physics, Earth System Science, Mathematics, Data Science, Computer Science, Aviation Engineering or related disciplines.</p> <p>Completion of 2<sup>nd</sup> year of study.</p>	<p>- Genuine interest in aviation and meteorology.</p> <p>- Knowledge and experience in Python programming and performing statistical analysis would be an advantage.</p>
D1	Analyse the intensity of tropical cyclones near Hong Kong from 1884 to 1939	<p>During 1884-1939, reports on some destructive tropical cyclones (TCs) were documented in the HKO's "Meteorological Results".</p> <p>The project aims to estimate the intensity of these historical TCs by utilising observations documented in those corresponding reports, along with empirical models.</p> <p>The intern will gain hands-on experience in data analysis and TC research. The results may provide insights into the climatology of strong TCs affecting Hong Kong over the past century.</p>	<p>Earth System Science, Physics or Mathematics.</p> <p>Completion of 2<sup>nd</sup> year of study.</p>	<p>- Knowledge in meteorology</p>

D4	Produce educational and promotional videos for the Hong Kong Observatory (HKO)	The intern will assist in the production of educational and/or promotional videos for HKO, including screenwriting, filming and post-production. The videos may be broadcast on local TV channels (as part of “Cool Met Stuff” series), and/or uploaded to HKO social media platforms including YouTube, Facebook and Instagram.	Film and television, creative media, multimedia technology, animation or other related disciplines with an emphasis in digital video production.  Completion of 2 <sup>nd</sup> or 3 <sup>rd</sup> year of study.	Strong knowledge in <b>(A)</b> digital video production and editing software (e.g. Adobe Premiere), <b>OR</b> <b>(B)</b> animation production and software (e.g. Adobe Illustrator, After Effects).  <u>Strong skills in both (A) and (B) above will be an advantage.</u>  <u>Applicant must submit a portfolio of previous work.</u>  Please specify your role involved in each of the videos submitted.
F12	Apply Artificial Intelligence (AI) and Machine Learning (ML) in high-impact weather analysis and forecasting	The Hong Kong Observatory has been producing real-time analyses of the 3-dimensional atmospheric state containing detailed spatial distributions of dozens of weather parameters. This project will use AI and ML techniques to identify the key ingredients for the development of high-impact weather, such as rainstorms. The findings could support the development of objective short-term forecast of high-impact weather events.	Computer Science and Engineering, Artificial Intelligence, Data Science, Statistics, Physics, Mathematics, Earth System Science or related disciplines.  Completion of 2 <sup>nd</sup> year of study.	- Knowledge and experience in Python and ML frameworks required.  - Interest in meteorology, AI and ML.

F3a	Develop automatic regional forecast of thunderstorm using Ensemble Prediction System (EPS) data product	<p>The intern will:</p> <p>(i) study method on using EPS to automatic regional thunderstorm forecast probability;</p> <p>(ii) develop model post-processing technique on calibrating the automatic thunderstorm forecast using observations such as lightning location, radar and upper-air observations; and</p> <p>(iii) conduct case studies and verification of the automatic thunderstorm forecast.</p>	<p>Meteorology, Earth System Science, Physics, Mathematics, Statistics, Computer Science or related disciplines.</p> <p>Completion of the 2<sup>nd</sup> year of study.</p>	<p>- Knowledge in programming using Python libraries for data science</p> <p>- Genuine interest in meteorology or numerical weather prediction is preferred</p>
F3b	Enhance severe weather nowcast algorithm for high-impact significant convective weather phenomena using Artificial Intelligence (AI)	<p>The intern will:</p> <p>(i) study and enhance detection of severe weather object on radar image;</p> <p>(ii) develop AI / machine learning (AI/ML) algorithm to predict location and intensity of severe weather object for the next 1-2 hours; and</p> <p>(iii) conduct case studies and verification of the AI/ML method using severe weather cases and real-time data.</p>	<p>Meteorology, Earth System Science, Physics, Computer Science and Engineering, Artificial Intelligence, Mathematics, Statistics or related disciplines.</p> <p>Completion of 2<sup>nd</sup> year of study.</p>	<p>- Knowledge in data processing, applications of Python libraries for data science and AI/ML</p> <p>- Genuine interest in meteorology and application of weather radar data</p>

F3c	Develop automatic weather forecasts for hill top locations	<p>The intern will:</p> <p>(i) study and develop automatic forecast of weather elements (e.g. temperature and wind) for hill top locations based on calibrating forecasts from numerical weather prediction models;</p> <p>(ii) incorporate terrain effect and apply real-time observation data from automatic weather stations to enhance the model forecast for hill top sites; and</p> <p>(iii) conduct verification against observations in selected cases and different seasons.</p>	<p>Meteorology, Earth System Science, Physics, Mathematics, Statistics, Computer Science or related disciplines.</p> <p>Completion of 2<sup>nd</sup> year of study.</p>	<p>- Knowledge in programming using Python libraries for data science</p> <p>- Genuine interest in meteorology or numerical weather prediction is preferred</p>
F4	Conduct evaluation of thermal stress indices forecasts from numerical weather prediction models	<p>The intern will verify forecasts of various thermal stress indices (e.g. wind chill temperature, heat index) by global numerical weather prediction models and study potential applications of such forecasts in assessing the heat/cold stress conditions in Hong Kong.</p>	<p>Meteorology, Physics, Earth System Science, Mathematics or related disciplines.</p> <p>Completion of 2<sup>nd</sup> year of study.</p>	<p>- Knowledge in meteorology.</p> <p>- Knowledge and computing skills including Linux.</p> <p>- Experience in using Python/R programming language and statistical analysis would be an advantage.</p>

R4	Conduct optimisation of FLEXible PARTicle (FLEXPART) dispersion model to support simulation of radiological and atmospheric dispersion events	<p>The Hong Kong Observatory has been utilising FELXPART to simulate the dispersion of radioactive material and atmospheric events to facilitate nuclear emergencies and environmental assessments. This project aims to optimise the model and its applications.</p> <p>The intern will:</p> <ul style="list-style-type: none"> <li>(i) configure FLEXPART model;</li> <li>(ii) study the characteristics of different schemes;</li> <li>(iii) benchmark different outputs; and</li> <li>(iv) try out applications on High Performance Computing (HPC) system.</li> </ul>	<p>Physics, Earth System Science, Nuclear Science, Computer Science, or related disciplines.</p> <p>Completion of 2<sup>nd</sup> year of study.</p>	<ul style="list-style-type: none"> <li>- Knowledge in computing skills and data analysis, including Linux and python programming are preferred.</li> <li>- Knowledge of parallel computing and Fortran, and interest in dispersion modeling would be an advantage.</li> </ul>
R5	Establish a distilled language model from state-of-the-art Large Language Model to support weather forecasting operation.	The intern will build a distilled model such as open-sourced Qwen2.5 72B from DeepSeek-V3 on weather bulletins to support HKO operations.	<p>Computer Science or related disciplines.</p> <p>Completion of 2<sup>nd</sup> year of study.</p>	<ul style="list-style-type: none"> <li>- Genuine interest in Large Language Model. Passionate, and can work under pressure and independently.</li> <li>- Knowledge in distilled model and Python.</li> </ul>