Hong Kong Observatory Summer Placement Programme 2023

Project Ref.	Project Title	Job description	Subject and year of study required	Specific knowledge / skills required / remarks
F13	A study of population-based impact of weather events	To estimate how many people were affected by different weather events (e.g. rainstorm/very hot weather/cold weather) by investigating the relationship between population distribution and distribution of rain gauges/automatic weather stations.	Physics, Earth System Science, Mathematics, Statistics, Computer Science or related disciplines. Completion of 1st year of study.	- Genuine interest in meteorology. - Knowledge in data analysis and GIS preferred.
F2	Development of HKO's voicebot based on Fine-tuned Natural Language Processing (NLP) Models	Assist in developing the HKO voicebot, including backend programming and testing. Explore ways to adopt different NLP models for functions to improve accuracy.	Computer Science, Software Engineering or related disciplines. Completion of 2nd year of study.	- Experiences in coding using languages such as Python, Java, etc. - Knowledge in NLP/machine learning preferred.
F3a	Enhancements of the Automatic Regional Weather Forecast (ARWF) system	To develop machine learning model for new weather elements such as the Hong Kong Heat Index and chance of thunderstorm in ARWF web portal (https://maps.weather.gov.hk/ocf/). To apply geoinformation on local terrain and urban environment for improving gridded weather forecasts in ARWF.	Meteorology, Physics, Earth System Science, Mathematics, Statistics, Computer Science or related disciplines. Completion of 2nd year of study.	- Genuine interest in meteorology or urban climate. - Knowledge in programming (e.g. Python, R). - Experience in machine learning, data analysis and numerical weather model data preferred.

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F3b	Enhancement of reflectivity-rainfall rate calibration algorithm using machine learning	To enhance radar reflectivity-rainfall rate (Z-R) calibration for generating quantitative precipitation estimates using machine learning (ML) methods with various sources of weather data. To conduct case studies, backtesting and statistical analysis for verifying the enhanced algorithm, and fine-tuning of ML methods for further improvement.	Meteorology, Physics, Earth System Science, Mathematics, Statistics, Computer Science or related disciplines. Completion of 2nd year of study.	- Genuine interest in meteorology. - Knowledge in data processing, machine learning and skills in using statistical analysis libraries written in Python preferred
A5	A study on wake vortex detection by short range LIDAR	Study wake vortex characteristics in different weather conditions, adopt different scanning configurations of short range LIDAR for detection.	Physics, Earth System Science, Mathematics, Computer Sciences or related disciplines Completion of 2nd year of study	- Genuine interest in meteorology and equipment. - Knowledge in data processing and programming skills (e.g. python) preferred.
A6a	Evaluation of the performances of machine learning models for aviation hazardous weather forecasts	Machine learning models have been shown valuable in forecasting aviation hazardous weather, e.g. airframe icing, turbulence. This project will study and evaluate machine learning models developed for forecasting aviation hazardous weather, and also try to provide some guidance for aviation forecasters.	Mathematics, Statistics, Physics, Earth System Science, Computer Science or related disciplines. Completion of 2nd year of study.	- Genuine interest in meteorology. - Experience in using Python/R programming language and statistical analysis would be an advantage.

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A6b	A study on expanding satellite-derived cloud top heights from regional to global coverage for aviation applications	Study and derive algorithms to produce a global cloud top height field based on globally stitched satellite imageries and Numerical Weather Prediction models. The student would be able to work with high performance computing, perform computational optimization and develop operational products.	Physics, Earth System Science, Computer Science, Computer Engineering or related disciplines. Completion of 2nd year of study.	- Genuine interest in aviation and satellite meteorology. - Experience using C++, Python programming and the use of GPU in programming would be an advantage.
D1	Development of a web-based visualization tool for displaying the local wind speeds during historical tropical cyclone events	To develop a web-based visualization tool to replace the closed-source java-based software tool for displaying time series of wind speeds recorded at various weather stations in Hong Kong during the passages of historical tropical cyclones with similar tracks for weather forecaster's reference.	Physics, Earth System Science, Computer Science, Mathematics or related disciplines. Completion of 1st year of study.	- Basic knowledge in meteorology. - Fair knowledge in JavaScript and/or Python programming. - Experience in web development is a plus.

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D2	Development of an ebook on earthquake and tsunami	Process and present public education materials on earthquake and tsunami related knowledge in the form of an ebook for access on the Observatory's website and mobile platforms.	Creative Media, Digital Communication, Computer Science or related disciplines. Completion of 1st year of study.	- Good knowledge in JavaScript, HTML5, CSS. - Interest in infographic and webpage design. - Skills in graphic design and motion graphics software Adobe Illustrator or Photoshop would be an advantage. **Submission of a portfolio showing previous design work is preferred.**
D4 [two students]	Production of educational and promotional videos for the Observatory	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 2nd or 3rd year of study.	Strong knowledge in **(A)** digital video production and editing software (e.g. Adobe Premiere), **OR** **(B)** animation production and software (e.g. Adobe Illustrator, After Effects). Strong skills in both **(A)** and **(B)** above will be an advantage. **Applicant must submit a portfolio of previous work.** Please specify your role involved in each of the videos submitted.

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R2	Gamification for promoting weather or radiation related knowledge	Design and develop online interactive games to promote weather or radiation related knowledge to the public.	Game Design and Animation, Computer Science, Software Engineering or related disciplines. Completion of 2nd year of study.	- Good knowledge in JavaScript, HTML5, CSS. - Skills in game framework (e.g. Unity, Phaser, etc.) and graphic design software Adobe Illustrator or Photoshop would be an advantage.
R5	A pilot study on the implementation of semantic search engine on weather related articles in HKO archive.	Explore how to fine tune sentence transformer models on the weather articles published by HKO to develop a semantic search engine.	Physics, Earth System Science, Mathematics, Statistics, Computer Science or related disciplines. Completion of 2nd year of study.	- Genuine interest in NLP/AI modelling. - Knowledge in programming skills such as Python.