Hong Kong Observatory Summer Placement Programme 2021

Project Ref.	Project Title	Job description	Subject and year of study required	Specific knowledge / skills required / remarks
F12a	Development of numerical operators for numerical weather prediction model with unstructured mesh	Many numerical weather prediction (NWP) models conveniently employ Cartesian grids, on which calculus operators may be intuitively implemented using array operations. The candidate will develop efficient numerical operators suitable for processing new generation NWP model data based on unstructured meshes, where the ordering of grid cells do not necessarily reflect their relative positions.	Strong background in Physics, Mathematics, or Earth System Science. Completion of 2nd or 3rd year of study.	Computing programming skills beneficial. Interest in weather modelling a plus.
F12b	Visualisation of new generation atmospheric prediction model	The availability of a new generation of variable resolution atmospheric prediction models utilising unstructured meshes presents new challenges and opportunities in the visualisation of computer weather simulations. The candidate will develop visualisation tools and related products using outputs from a new generation global weather prediction model.	Strong background in physics, mathematics, computer science, or Earth System Science. Completion of 2nd or 3rd year of study.	Knowledge of Linux beneficial. Interest in weather modelling a plus.
F3a	Rainstorm probability nowcast using analog method	Enhance rainstorm probability nowcast using spatial rainfall distribution and intensity in the past heavy rain events. Verify performance of the probability model so developed against the current operational nowcast guidance. Further explore the extension of the range of rainstorm probability nowcast to two hours or beyond.	Physics, Earth System Science, Mathematics, Statistics, Computer Science or related disciplines. Completion of 2nd year of study.	Genuine interest in Meteorology. Knowledge in data analysis and programming skill on Java and bash are preferred.

F3b	Short-term rainfall forecast by machine-learning method using rain-gauges and remote sensing observations	Analyse spatial and intensity characteristics of rainfall from rain-gauge and remote sensing observations using computer vision or other machine learning method. Develop algorithm and study predictability of short-term rainfall forecast using machine-learning method.	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 are preferred.
F3c	A study on forecasting extreme cold/hot weather by machine-learning method	Study the correlations of various meteorological elements from automatic weather stations in Hong Kong and Guangdong during extreme cold/hot events using machine-learning method. Explore the use of above machine-learning model in predicting the probability and severity of extreme cold/hot events.	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 are preferred.
A4	Study of satellite derived tropospheric folding turbulence products	Compare and study the characteristics of the existing products on detecting turbulence caused by tropopause folding. Explore development of tropospheric folding turbulence products using specific algorithm.	Physics, Earth System Science, Computer Science or related disciplines. Completion of 2nd year of study.	Genuine interest in meteorology. Skills on python and Linux shell script programming are preferred.
A6	A study on enhancing aviation forecasts on icing hazards using numerical weather prediction model and observational data	Develop guidance on using the numerical weather prediction model based icing forecast products based on verification and data analysis with observational data (e.g. pilot reports, QAR, etc.).	Physics, Earth System Science, Mathematics, Statistics, Computer Science or related disciplines. Completion of 2nd year of study.	Genuine interest in Meteorology. Knowledge in data management preferred. Experience in using Python programming language and image analysis would be an advantage.

D1	Development of new tropical cyclone webpages	Redesign and develop new internet tropical cyclone webpages for public information access. The student is expected to create visually appealing webpages that feature user-friendly design and easy navigation for a wide range of information and statistics on tropical cyclones.	Graphic design, visual communication or related disciplines. Completion of 2nd year of study.	Knowledge and experience in front end web development; Hands-on experience in web programming languages such as HTML, CSS and JavaScript and graphic design tools. Keen interest in Meteorology, especially tropical cyclones.
D1D3	Analysis of sub-daily precipitation extremes in Hong Kong	The intensity and frequency of extreme rainfall events are believed to increase in a warming world. Hong Kong Observatory possesses hourly rainfall records at its Headquarters and other places over Hong Kong. In this study, the frequency and intensity of sub-daily precipitation extreme events will be investigated. The distribution of the sub-daily rainfall will be studied to see if there are any changes over the years. Regional differences of the trends of sub-daily precipitation extreme events will also be analysed.	Physics, Earth System Science, Mathematics, Statistics or related disciplines. Completion of 2nd year of study.	Genuine interest in Meteorology and climate change. Knowledge in data management and skills in the use of statistical analysis tools (e.g. R programming software) preferred.
D2	Development of Geographic Information System based inundation maps for Hong Kong	Develop an interactive GIS-based webpage / tool to show the flood extent and depths in Hong Kong using Digital Elevation Model (DEM) data and the outputs generated from the storm surge model.	Computing Science, Geography, Engineering, Earth System Science. Completion of 2nd year of study	Strong academic background. Sound knowledge in GIS and webpage development. Experience in computer programming (e.g. QGIS, ArcGIS, Python and Javascript) under UNIX/Linux/Windows environment.

D4	Production of educational and promotional videos for the Hong Kong Observatory	Assist in the production of educational and/or promotional videos for the Hong Kong Observatory (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 and Facebook.	Film and Television, Creative Media, Multimedia Technology, 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. Outdoor work may be required. **Submission of a portfolio of previous work is required.** Please specify the role involved in each of the video submitted.
R2a	Infographic design of hazardous weather phenomena and natural disasters	Design and develop graphics for illustrating the causes and characteristics of hazardous weather phenomena including thunderstorm, storms, tornadoes/waterspouts, rainstorm, hail, windshear and turbulence by making reference to the educational materials on the Hong Kong Observatory's website and other reputable sources. The student may need to collaborate with other student or staff in the Observatory in this project.	Creative Media, Visual Arts or related disciplines. Completion of 1st year of study.	Good knowledge and skills in graphic design software (e.g. Adobe Illustrator or Photoshop). Interest in infographic design. Knowledge in motion graphics would be an advantage. **Submission of a portfolio showing previous design work is required.**

R2b	Infographic design of precautionary measures of weather warnings and natural disasters	Design and develop graphics for illustrating the precautionary measures associated with each type of weather warnings and natural disasters by making reference to the materials on the Hong Kong Observatory's website. The student may need to collaborate with other student or staff in the Observatory in this project.	Creative Media, Visual Arts or related disciplines. Completion of 1st year of study.	Good knowledge and skills in graphic design software (e.g. Adobe Illustrator or Photoshop). Interest in infographic design. Knowledge in motion graphics would be an advantage. **Submission of a portfolio showing previous design work is required.**
R2c	Motion graphics and video production for radiation ebook and education activities	Refine or redesign the graphics in the illustrations of the radiation e-book containing radiation basics, nuclear emergency preparedness and response. Produce short videos containing motion graphics of cartoon characters to introduce radiation concepts and education activities. The navigation and webpage layout of the draft responsive webpage will also be refined to suit for desktop and mobile versions. The student may need to collaborate with other student or staff in the Observatory in this project.	Creative Media, Visual Arts, Digital Communication or related disciplines. Completion of 1st year of study.	Good knowledge and skills in graphic design software (e.g. Adobe Illustrator, Photoshop, After Effects). Interest in infographic design. Knowledge in motion graphics and animation production. **Submission of a portfolio showing previous design work is required.**

R2d	Revamp of "Science in the Public Service" webpage and navigation of "Cloud Appreciation by Dr Tin" ebook	Revamp the "Science in the Public Service" webpage (www.science.gov.hk) and cloud ebook (https://kids.weather.gov.hk/en/ebook_shelf.html) with mobile friendly design. The design must meet at least WCAG 2.0AA accessibility conformance level, and better to be WCAG 2.1AA level. Redesign and rewrite the online games of cloud ebook using JavaScript.	Digital Communication, Computer Science or related disciplines. Completion of 1st year of study.	Good knowledge in JavaScript, HTML5, CSS. Skills in graphic design software Adobe Illustrator or Photoshop would be an advantage.
R3	Semi-automation of site exposure assessment for automatic weather station	Develop semi-automated and standardised methods for conducting site exposure assessment for the Hong Kong Observatory's automatic weather stations. Further document the methods and practices for knowledge transfer in meteorological observation.	Earth System Science, Physics or related disciplines. Completion of 2nd year of study.	Genuine interest in meteorology. Skills in the use of image editing tools (e.g. Adobe Photoshop, and GIMP) preferred. Outdoor work is required.
R4a	A study to redesign the Hong Kong Observatory's Intranet webpage for Radiation Monitoring and Assessment	Redesign the Observatory's Intranet webpage to facilitate access of relevant information/knowledge in relation to emergency preparedness, radiation monitoring and assessment.	Computer Science, Physics, Meteorology or related disciplines. Completion of 2nd year of undergraduate study preferred.	Be positive and co-operative. Good knowledge of JavaScript, HTML5, CSS. Good experience in webpage design.
R4b	A study on utilizing near ground meteorological observations for nuclear accident consequence assessment	Study on making use of available meteorological information in deriving the stability class of the atmosphere for use in consequence assessment and establish a web-based platform for the display and the analysis of the corresponding meteorological data.	Computer Science, Physics, Meteorology or related disciplines. Completion of 2nd year of undergraduate study preferred.	Be positive and co-operative. Knowledge in data management and analysis. Experience in webpage design.

R4c	A study to design curating activities for the radiation exhibition hall of the Hong Kong Observatory	Design and demonstrate thematic onsite and online curating activities for sharing radiation related knowledge with members of the public.	Visual Arts, Creative Media, Arts and Cultural Management or related disciplines. Completion of 2st year of undergraduate study preferred.	Be innovative and co-operative. Knowledge and/or experience in curating ideas and concepts with the aid of digital and artistic angles.