**Earth Sciences Summer Student Program**

**Reliability of Satellite Rainfall Retrieval Against Surface Rainfall Observation under Weather Extremes**
以地面降雨觀測資料分析驗證在極端天氣狀態下衛星降雨反演的特性與可靠度

Supervisor:
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**Project description:**

Hurricane and Typhoon are the major contributors to the annual damage and economic lost due to natural disaster around the world. How the characteristics of these high-impact weather extremes change in a warming climate have attracted considerable interests from research community. One key uncertainty regarding to the previous studies is that the intensity of tropical cyclone and accompanying extreme rainfall are often underestimated. With high-resolution global atmospheric general circulation model reached 20-30 km resolution, we found that these high-resolution model can start to reasonably capture the typical wind-pressure relationship found in the observed tropical cyclone. Nevertheless, the composite of rainfall associated with tropical cyclone in the model are several times higher than the corresponding typhoon rainfall estimate from satellite observation (e.g. TRMM). To explain such discrepancy, the possible underestimate from satellite rainfall retrieval for extremes associated tropical cyclone was supported from surface observation during typhoon landing period. The motivation of study is to work on a more throughout examination of the satellite rainfall estimate with surface observation along all the tropical cyclone tracks.

For high temporal and spatial resolution near global rainfall analysis, different satellite observations had been used to retrieve and construct the precipitation distribution from the combination of active and passive sensors. Normally surface rainfall observation was used to calibrate the rainfall retrieval scheme. However, they are typically optimized for all rainfall conditions from light shower to heavy downpour. Such strategy in developing retrieval algorithm will loose the dynamical range of observational signal in the heavy rainfall tail end associated with tropical cyclone. The project will try to colocate the available satellite and surface rainfall observation along the tropical cyclone best tracks data archive and systematically evaluate the characteristics of satellite rainfall estimate during different stages of tropical cyclone life cycle.

**Preferred background of student candidates:**

• Senior or Junior students with good English skills are both welcome.
• Strong knowledge/experience in computers (linux system) is essential.
• Good programming skills would be a plus.