

## Environmental Research, Technology Demonstration and Conference Project

<b>ECF Project:</b>	ECF 2022-29
<b>Project Title:</b>	Environment and Conservation Fund - A Novel Real-Time Thermal Management solution Using Lightweight CFD and Reinforcement Learning for Hong Kong's Next-Generation Data Center
<b>Principal Investigator:</b>	Professor Wen Chih-yung, Department of Aeronautical and Aviation Engineering, The Hong Kong Polytechnic University
<b>Total Approved Grant:</b>	\$500,000
<b>Duration:</b>	1/10/2023 to 30/9/2025
<b>Project Status/Remarks:</b>	On-going
<b>Project Scope:</b>	<p>The 5G era has increased the requirement for digital information transmission. Data centres can handle massive volumes. The data centre requires a lot of energy to process data quickly. Hong Kong's location as a global financial hub makes it ideal for data centres. Hong Kong's land and labour prices make input and operational costs unreasonably costly. Hong Kong's data centres face this problem, which is driving the creation of more efficient data centres of the next generation to minimise energy usage. The cooling system consumes more than 40% of a data centre's total energy to keep IT equipment running smoothly. The cooling system utilises the room's average temperature as a control aim, and the cooling units' capacity much surpasses what IT equipment needs. The proposed project would construct an AI-based real-time data centre cooling system. It's reliable and efficient. This project blends computational fluid dynamics (CFD) with reinforcement learning (RL) to tackle tough and complicated technical issues. RL bridges CFD and real-time applications. RL makes CFD lightweight and real-world implementable, inheriting its advantages while avoiding its shortcomings. A next-generation cooling system plan will be integrated and standardised.</p>
<b>Summary of the Findings/ Outcomes:</b>	To be available upon completion of the project