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HKUST | CCRS | WSDI DMS

NEWSLETTER

BREAKING: HKUST Unveils Otto Poon Center for Climate Resilience and Sustainability

Pioneering Interdisciplinary Innovation to Combat Global Climate Challenges

The Hong Kong University of Science and Technology (HKUST) inaugurated the **Otto Poon Center for Climate Resilience and Sustainability (CCRS)** on July 2, 2025, a transformative initiative designed to accelerate research, innovation and policy solutions in climate resilience and sustainable development. Established through the generous support of **Ir Dr. Otto POON**, Founder of the Otto Poon Charitable Foundation, the Center unites HKUST's world-class expertise in climate science, advanced modeling systems, artificial intelligence (AI), renewable energy and sustainable policy to deliver scalable and actionable strategies for governments, industries, and communities worldwide.

The inauguration brought together leading scientists from renowned institutions across Europe, the United States, Korea, and Mainland China alongside government and academic leaders. Officiating guests included HKSAR Secretary for Environment and Ecology **Mr. TSE Chin-Wan**, **Ir Dr. Otto POON**, HKUST President **Prof. Nancy IP**, Provost **Prof. GUO Yike**, Vice President for Research and Development **Prof. Tim CHENG**, and CCRS Director **Prof. LU Mengqian**.

Bridging Research and Real-World Impact

The HKUST Otto Poon Center for Climate Resilience and Sustainability (CCRS) held its inauguration ceremony and the opening session of the Climate, Weather and Water Forum. The ceremony was attended by Mr. TSE Chin-Wan, Secretary for Environment and Ecology (5th from left), Dr. Otto POON (5th from right), Prof. Nancy IP, President of HKUST (4th from left), Prof. GUO Yike, Provost (4th from right), Prof. Tim CHENG, Vice-President for Research and Development (3rd from left), Prof. LU Mengqian, Director of CCRS (3rd from right), along with representatives from partner institutions including Dr. LIANG Ping from Shanghai Meteorological Bureau (1st from left), Dr. LEE Tsz-Cheung from Hong Kong Observatory (2nd from left), Prof. YANG Jing from Beijing Normal University (2nd from right), and Prof. BAO Qing from Institute of Atmospheric Physics, Chinese Academy of Sciences (1st from right).

The CCRS is dedicated to advancing interdisciplinary collaboration and delivering technology-driven solutions to strengthen societal resilience against climate threats. At its core, the Center bridges cutting-edge scientific research with policy and industry needs, empowering communities worldwide to both adapt to and climate impacts and mitigate future risks.

Initial Focus Areas:

- **Climate Prediction & Services:** Developing Hong Kong's first Global Climate Model – a fully coupled system for unified forecasting – to enhance sector-specific climate adaptation.
- **Marine Resources & Biodiversity:** Predicting coastal ecosystems through data-driven conservation strategies.
- **Renewable Energy Innovation:** Accelerating the transition to net-zero with next-generation energy technologies.
- **Sustainable Development Policy & Finance:** Bridging research and governance to enable equitable climate action.

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UN Resident Coordinator in China Mr. Siddharth Chatterjee Visits HKUST to Explore Climate and Sustainability Research

HKUST welcomed Mr. Siddharth Chatterjee, UN Resident Coordinator in China, to explore the University's latest advances in climate change and sustainability research.

After the visit, all attendees took a group photo. Prof. Nancy IP (5th from the left), President of HKUST, presented a HKUST souvenir to Mr. Siddharth Chatterjee (6th from the left), UN Resident Coordinator in China.

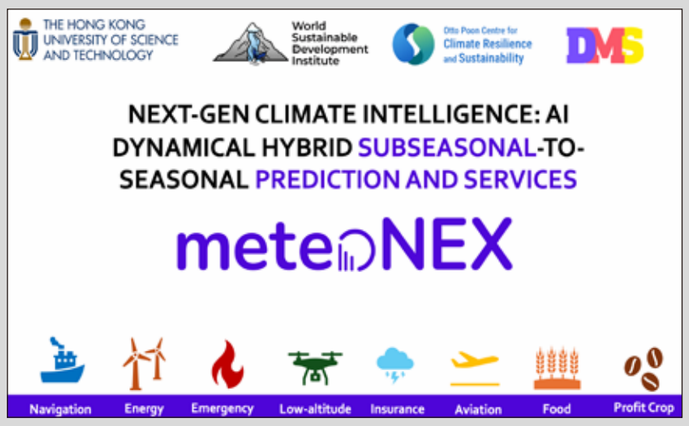
UN Resident Coordinator in China, **Mr. Siddharth Chatterjee**, accompanied by **HKUST Council Member Ms. Poman LO**, visited the Hong Kong University of Science and Technology (HKUST) to gain deeper insights into the University's research efforts in **climate change, environmental science, and sustainability**. The visit aimed to enhance understanding of HKUST's research work in climate change and sustainability.

During the visit, **Professor Lu** introduced the **SEPRESS program** (Seamless Prediction and Services for Sustainable Natural and Built Environments), a global initiative hosted by the **World Sustainable Development Institute** at HKUST dedicated to advancing climate resilience solutions. The program was recently **endorsed by UNESCO** under its **International Decade of Sciences for Sustainable Development (IDSSD)**, marking HKUST's growing influence in global sustainable development.

Professor Lu also highlighted HKUST's research advances in **weather-to-climate prediction services** for key sectors such as **low-altitude economy, marine navigation, agriculture, disaster risk reduction, renewable energy harvesting**, and more. These research efforts demonstrate not only significant academic value but also substantial practical application potential.

She noted that **Otto Poon Center for Climate Resilience and Sustainability** has brought together over **30 faculty members**, many of whom are rising stars in their respective fields, contributing to a vibrant and growing research community focused on sustainability. By integrating multidisciplinary expertise, the Center will propose a series of forward-looking interdisciplinary research initiatives to contribute scientific research strength to addressing climate change and advancing sustainable development.

Next-Gen Climate Intelligence - meteoNEX Makes Official Debut at CSITF, Shanghai



meteoNEX—Seamless Weather-to-Climate Prediction Service—is the first Research-to-Operation (R2O) technology transfer product under the **SEPRESS Programme** (Seamless Prediction and Services for Sustainable Natural and Built Environments), co-hosted by the **World Sustainable Development Institute (WSDI)** and **Otto Poon Center for Climate Resilience and Sustainability (CCRS)**.

Recognized by **UNESCO** as part of the **International Decade of Sciences for Sustainable Development (2024–2033)**, SEPRESS aims to turn science into real-world impact. Supported by WSDI and CCRS, and in collaboration with the **Digital Weather Services and Innovation Lab(DMS)** at HKUST Shanghai Center, meteoNEX will focus on delivering decision-making forecasting services for weather- and climate-sensitive sectors, enhancing their ability to respond to climate change.

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HKUST Researchers Discover A Possible Abiotic Pathway To Synthesize Rare Sugars

The electrochemical synthesis of organic compounds from CO_2 can potentially alleviate climate change by hampering atmospheric CO_2 accumulation. This study, led by first author **Dr. Ernest Delmo** from the research group of **CCRS member Prof. SHAO Minhua**, focused on analysing the glycolaldehyde pathway of the electrochemical CO_2 reduction reaction (CO_2RR) on polycrystalline copper. The exact role of glycolaldehyde in the overall C_2 pathway of CO_2RR is identified. Furthermore, it was discovered that by operating in high local pH-conditions in an unbuffered electrolyte, glycolaldehyde coupling to rare C_4 sugars, such as threose and erythrose, can be realized with significant conversions in an electrochemical cell under ambient conditions.


Dr. Ernest Delmo

Stablizing Metallic Materials For Affordable Energy Storage

To ensure continuous wind power delivery to the electric grid during periods of low or no wind, long-duration energy storage systems are essential. Conventional lithium-ion batteries face cost and safety constraints. One promising alternative involves reengineering battery architecture using commodity metals (in foil or powder form) as electrodes and pairing them with aqueous electrolytes. These systems offer high ionic and electronic conductivities and thermal stability, enabling intrinsically safer, lower-cost, and longer-duration energy storage. Yet, a critical technical challenge remains: metal electrodes are prone to degradation and corrosion reactions in aqueous environments, which result in self-discharge and compromised energy efficiency.


A scaled-up model for visualizing nanoporous metal, a microstructure designed with high stability in a battery.

To overcome the challenge, **CCRS member Prof. CHEN Qing** and his team are investigating the degradation mechanisms of metal-based batteries using novel characterization tools and theoretical frameworks. Their work has led to the development of optimized electrode microstructures and tailored electrolyte chemistries that suppress corrosion and promote structural stability—advancing these systems toward application-specific performance targets.

Prof. ZHOU Yuanyuan's Latest Breakthrough Showcased at HKUST Unicorn Day

Prof. LU Mengqian and Prof. ZHOU Yuanyuan

HKUST Unicorn Day, held on June 13, is the university's flagship innovation and entrepreneurship event. It brings together entrepreneurs, investors, and researchers to promote research translation and cross-sector collaboration.

Prof. LU Mengqian and **Prof. ZHOU Yuanyuan from Otto Poon Center for Climate Resilience and Sustainability (CCRS)** participated in this year's event. CCRS is dedicated to addressing global climate challenges through scientific research. Both the Center and the Unicorn Day platform emphasize the importance of real-world impact and interdisciplinary collaboration in science and technology.

At the event, Prof. Zhou showcased his team's latest breakthrough in perovskite solar module technology. By investigating the nanoscale properties of perovskite solar cells (PSCs), his team has improved both efficiency and durability, significantly reducing costs and expanding application potential. The innovation marks a critical step forward in renewable energy development and strengthens the bridge between academic research and industry.

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Optimizing Emission Permits: New Research Reveals Balance Between Environmental Protection and Economic Growth

Prof. FU Xingyu
UNSW Sydney

Prof. CHEN Yingju
HKUST

Prof. Guillermo Gallego
CUHKSZ

Prof. GAO Pin
CUHKSZ

Prof. LU Mengqian
HKUST

A team of researchers from **UNSW Sydney**, **HKUST**, and **CUHKSZ** — with expertise in both Operations Management and Environmental Science — conducted an interdisciplinary study on the optimal design of emission permits policy, a key form of environmental public policy that is widely adopted globally. Recently published in the premier business journal *Manufacturing & Service Operations Management* [UTD24, FT50], the research illustrates how operations can harmonize environmental protection with economic development.

The study reveals that extreme emission permits policies—fully flexible (e.g., allowing unrestricted inter-temporal banking and borrowing of emission permits) and fully nonflexible (e.g., prohibiting any inter-temporal transfers of permits)—are generally welfare-suboptimal. Restricting firms' temporal flexibility in compliance fulfillment can be beneficial for the society, particularly when pollution damage is severe or production costs are highly volatile. This finding reflects the trade-off between the positive industrial impact and the negative environmental consequence of temporal flexibility in compliance fulfillment. We further show that partially flexible emission permits — such as transfer cap/discount mechanisms and permits-tax hybrid policy — can achieve a superior balance between industrial efficiency and environmental protection. Additionally, we find that temporal flexibility in compliance may reduce overall industry profit by intensifying market competition, and allocating additional permits can widen profit gaps among firms.

CCRS and Shanghai Meteorological Bureau Hold Online Meeting to Explore Collaboration on Climate Finance and Climate Risk

CCRS members Prof. LU Mengqian and **Prof. LOU Dong**, together with **Prof. Guillermo Gallego**—an internationally renowned scholar from The Chinese University of Hong Kong, Shenzhen (CUHK-Shenzhen), and widely recognized as one of the pioneers of modern dynamic pricing—participated in an online meeting with the **Shanghai Meteorological Bureau**.

Online meeting between CCRS and Shanghai Meteorological Bureau on financial meteorological services and collaboration opportunities.

During the meeting, the Shanghai Meteorological Bureau presented its latest initiatives in financial meteorology, with particular emphasis on efforts in insurance, banking, and weather derivatives.

The discussion also focused on the development of financial meteorology and climate change research in Hong Kong. Prof. Lu introduced the mission and objectives of CCRS, underscoring the importance of strengthening collaboration between Hong Kong and Shanghai. She emphasized the significant challenges climate change poses across industries, and the need for developing financial indices to better measure and manage associated risks.

Representatives from Shanghai expressed strong interest in learning from Hong Kong's financial expertise. Both sides agreed to explore collaborative opportunities in climate finance and advance further joint research in this important area.