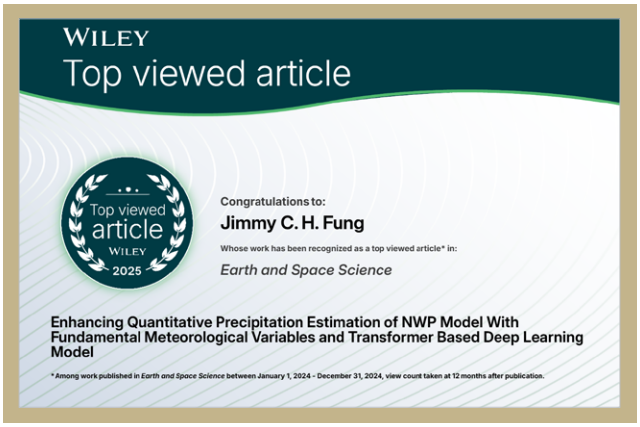
THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY
HKUST JOCKEY CLUB INSTITUTE FOR ADVANCED STUDY
INSTITUTE FOR ADVANCED STUDY ATMOSPHERIC RESEARCH CENTER

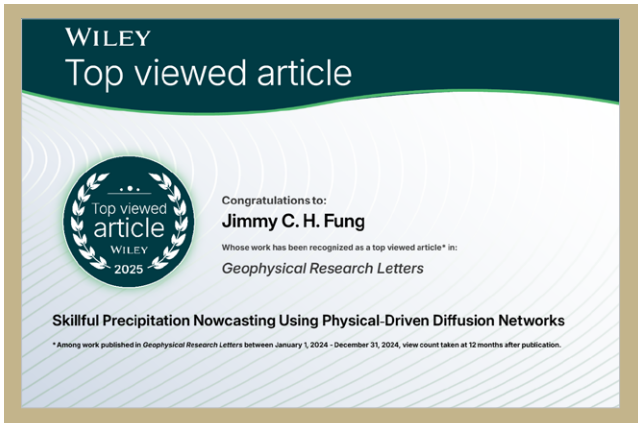
JUNE 2026

NEWSLETTER

Research Spotlight

Helping Weather Models See Rain More Clearly
Two HKUST rainfall prediction papers rank among AGU journals' top 10% most-viewed papers in 2024





Rain is easy to feel, but notoriously difficult to predict.

Anyone who has watched a sunny afternoon turn suddenly into a Black Rainstorm warning knows the problem well. Rainfall can be intensely local, fast-moving, and shaped by a mix of atmospheric conditions, terrain, urban form, and sea-land interactions. For scientists, this makes rainfall prediction one of the toughest challenges in weather science.

Two HKUST-authored papers have now struck a chord with the global research community. Both published by journals of the American Geophysical Union, the papers ranked within the top 10% most-viewed papers published by their respective journals in 2024.

The first, published in *Earth and Space Science*, is *Enhancing Quantitative Precipitation Estimation of NWP Model With Fundamental Meteorological Variables and Transformer Based Deep Learning Model*. Co-authored by Haolin Liu, Jimmy Fung, Alexis Lau, and Zhenning Li, the paper shows how Transformer-based deep learning can help numerical weather prediction models make better use of the meteorological variables they already produce.

The second, published in *Geophysical Research Letters*, is *Skillful Precipitation Nowcasting Using Physical-Driven Diffusion Networks*. Co-authored by Rui Wang, Jimmy Fung, and Alexis Lau, the paper introduces a Physical-Driven Diffusion Network that combines radar and numerical weather prediction data to improve short-term rainfall nowcasting.

Together, the two papers tell an important story. AI is not replacing physics-based weather science. It is helping strengthen it. The Earth and Space Science paper focuses on improving precipitation estimation from model-generated meteorological variables. The Geophysical Research Letters paper focuses on nowcasting – the urgent, short-range prediction of rainfall over the next few hours. One helps weather models read the atmosphere more effectively; the other helps sharpen warnings when rain is already forming.

For Hong Kong and tropical regions, the relevance is obvious. Extreme rainfall is no longer a distant risk. It is part of the city's lived experience. Better rainfall estimation and nowcasting can support earlier warnings, more informed emergency response, improved drainage and slope-risk planning, and ultimately better protection for people, infrastructure, and communities.

The strong readership of both papers reflects growing international interest in exactly this frontier: how physics-based modelling, radar observations, numerical weather prediction, and AI can work together to improve rainfall prediction in a changing climate.

As climate risks become sharper, the task is not only to predict the weather more accurately. It is to turn better prediction into better preparedness.

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AI Meets Weather: HKUST Helps Launch Beijing Key Laboratory for Meteorological Artificial Intelligence

New collaboration strengthens urban forecasting, early warning, and climate resilience across Hong Kong, Beijing, and the wider region

On 17 April 2026, HKUST became one of the co-establishing partners of the Beijing Key Laboratory for Meteorological Artificial Intelligence, a new platform dedicated to advancing AI-driven weather science for climate adaptation and public safety. The laboratory is led by the Beijing Urban Meteorological Engineering Technology Research Center / Institute of Urban Meteorology, China Meteorological Administration, with co-founding partners including HKUST, Zhongguancun Academy, and Zhongguancun Institute of Artificial Intelligence.

Second from right:
Prof Kai Hon Alexis LAU,
Head of the Division of Environment & Sustainability, HKUST

Third from left:
Prof Jimmy Chi Hung FUNG,
Associate Provost (Teaching & Learning), HKUST

Second from left:
Prof Fei CHEN,
Associate Head of the Division of Environment & Sustainability, HKUST

The laboratory focuses on some of the most urgent questions facing cities today: how to improve meteorological observation, forecast extreme weather events, strengthen early warning, support climate adaptation, and develop intelligent urban weather services. Its ambition is to build a full-chain innovation system from "monitoring – forecasting – services – industry", turning scientific progress into practical applications.

HKUST has a significant role in this collaboration. Prof. Alexis Lau has been appointed Deputy Director of the laboratory. Prof. Jimmy Fung has been appointed to the Scientific Advisory Committee. Prof. Fei Chen also shared insights on urban weather forecasting at the launch seminar.

The timing is important. Extreme weather events are becoming more frequent and more difficult to manage. Forecasting and early warning systems are under growing pressure to improve accuracy, lead time, coverage, and decision relevance.

This is where AI can make a difference. By combining atmospheric science, data science, and real-world urban applications, meteorological AI can help scientists extract more value from observations, models, and complex urban data. It can also help cities move from general weather information to more targeted, decision-useful warnings.

The new laboratory also creates strong synergies with Hong Kong's role as a WMO Urban-PREDICT Demonstration City. As Prof. Fei Chen noted at the launch, Hong Kong provides a unique real-world environment for advancing next-generation urban weather forecasting, while Beijing offers another major urban testbed for scalable AI-enabled forecasting systems.

In other words, this is not just a new laboratory. It is part of a larger shift in climate and weather science: from forecasting the atmosphere in broad strokes to understanding urban weather in much finer detail, and from scientific prediction to public safety, resilience, and preparedness.

From "Weather-Dependent" to Weather-Smart Energy
HKUST and Goldwind form strategic partnership on "AI Meteorology + New Energy"

Wind power has long been described as "depending on the sky." But with better meteorological AI, the wind is becoming less unpredictable and more useful for the energy transition.

On 20 April 2026, HKUST and Goldwind Science & Technology (one of China's major renewable energy companies and a leading global wind-turbine manufacturer) formed a strategic partnership to advance the integration of AI meteorology and new energy. The collaboration will focus on key technical frontiers including numerical weather prediction, extreme weather early warning, and AI meteorological large models.

The significance goes beyond forecasting. For renewable energy, better weather intelligence can help turn variable wind resources into assets that are more predictable, manageable, and even tradable. This matters for windfarm operation, power prediction, grid stability, maintenance planning, and investment decisions. Goldwind describes the shift as transforming once "unpredictable" wind resources into "predictable and tradable" high-quality assets.

For HKUST, the partnership shows how AI-enabled weather science can move from research papers and laboratory platforms into real-world decarbonisation. It connects climate science, artificial intelligence, renewable energy, and industry application, exactly the kind of cross-disciplinary pathway needed to support a smarter and cleaner energy system.

In short: better weather science does not only help cities prepare for storms. It can also help renewable energy systems perform better.

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Award Spotlight

Tracking Stronger Typhoons in a Warming World

Prof. Shi Xiaoming receives the inaugural ESCAP/WMO Typhoon Committee Research Award for Young Scientists

Typhoons are familiar to Hong Kong. But the science is becoming clearer: in a warming climate, the risks associated with tropical cyclones are changing and intensifying. Professor Shi Xiaoming has received the inaugural ESCAP/WMO Typhoon Committee Research Award for Young Scientists, recognising his distinguished contributions to typhoon-related research. He was selected as one of only two recipients of the new award and is the first scholar from Hong Kong to receive this accolade. The award was presented at the 58th Session of the ESCAP/WMO Typhoon Committee in the Republic of Korea on 10 March 2026.

The award honours Professor Shi's research paper, *Escalating Tropical Cyclone Precipitation Extremes and Landslide Hazards in South China under Global Warming*, published in npj Climate and Atmospheric Science. The study combines AI with classic numerical weather prediction techniques to assess future tropical cyclone risks.

In plain language, the research asks a question that matters deeply for Hong Kong and South China: as the climate warms, how might typhoon rainfall change, and what does that mean for landslide hazards?

This is not just a scientific question. It is a planning, safety, and resilience question. More intense typhoon rainfall can strain drainage systems, destabilise slopes, disrupt transport, and place communities at greater risk. Understanding these changes is essential for preparedness.

The ESCAP/WMO Typhoon Committee plays a major regional role in reducing the impacts of tropical cyclones across the Asia-Pacific.

(L-R) Dr. Nathaniel Servando, Administrator, Department of Science and Technology of the Philippines - PAGASA and 57th Chairperson of the Typhoon Committee, Prof Xiaoming Shi, Dr. Yihong Duan, the Secretary of the Typhoon Committee.

Its members work together on weather forecasting, flood management, and disaster risk reduction. The creation of this new Young Scientist award reflects the growing importance of research that can directly support regional resilience.

Professor Shi's recognition is therefore more than an individual honour. It highlights HKUST's growing contribution to the science of extreme weather, from typhoon rainfall and landslide risk to AI-enabled climate modelling and decision-relevant forecasting.

As typhoon risks evolve, better science gives cities a stronger foundation for action, helping turn climate projections into preparedness, and preparedness into protection.

From Space to Climate Action: HKUST's Greenhouse Gas Detector Reaches Tiangong

Prof. Su Hui leads MUSICO, Hong Kong's first scientific payload on the national space station

Climate change is a global problem, but emissions often begin at very specific places: a power plant, a landfill, an industrial site, a port, or a dense urban area.

Seeing those emissions clearly is one of the next big frontiers of climate science. An HKUST-led research team has reached a major milestone with the successful arrival of MUSICO (Multi-Spectral Imaging Carbon Observatory) at China's Tiangong Space Station aboard the Tianzhou-10 cargo spacecraft. Led by Professor Su Hui, the project marks Hong Kong's first scientific payload deployed on the national space station.

MUSICO is designed to detect point-source emissions of CO_2 and methane, two of the most important GHGs driving climate change. What makes it special is its combination of precision and compactness. The instrument weighs less than 80 kg and carries various optical sensors.

In plain language, MUSICO gives scientists a sharper eye in the sky.

(L-R): David Liu (CEO of Stellerus Technology), Xiaofeng Zhao (Lingnan University), Jize Zhang (CIVL), Chengxing Zhai (EMIA), Hui Su (CIVL, ENVR and OCES), Nancy Ip (President), Tim Cheng (VPRD), Limin Zhang (CIVL), Xiaoming Shi (ENVR), Xiaojuan Ma (CSE), Jian Liang (CLP Power Hong Kong)

By analysing how sunlight changes as it passes through the atmosphere and reflects from Earth's surface, MUSICO can identify gas-specific absorption features and estimate greenhouse gas concentrations. This allows researchers to locate individual emission sources and monitor facilities such as power plants and landfills more effectively. The achievement is both scientific and strategic. It shows how Hong Kong researchers can contribute to national space missions while supporting climate action, emissions monitoring, and better environmental governance. The project also connects aerospace engineering, remote sensing, environmental science, AI, and policy, exactly the kind of interdisciplinary work needed for the climate transition.

For HKUST, MUSICO is more than a payload. It is a signal of what climate science is becoming: more precise, more technology-enabled, and more directly connected to decision-making.
As governments, companies, and cities face increasing pressure to measure and reduce emissions, tools like MUSICO can help turn climate commitments into verifiable evidence. From space, HKUST is helping make invisible gases visible and giving society better data for a lower carbon future.

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Climate Science Recognition: From Regional Climate Change to Urban Weather Resilience

Prof. Eun-Soon Im receives the Climate Science Award from the Korean Meteorological Society

Climate change is global, but its impacts are always felt somewhere specific. That is why regional climate science matters.

Prof. Eun-Soon Im, Associate Professor of HKUST's Division of Environment and Sustainability and the Department of Civil and Environmental Engineering, has received the Climate Science Award from the Korean Meteorological Society. The award recognises her significant contributions to climate science through interdisciplinary research and scholarly work, especially in using climate data to understand how human activities affect regional climate change.

Established in 2020, the KMS Climate Science Award recognises outstanding academic commitment and leadership in advancing climate science. Prof. Im is one of only six recipients of the award since its inception. Prof. Im's work speaks directly to one of the central challenges of climate science today: how to translate global climate change into regional information that is useful for decision-makers. While global models tell us the planet is warming, societies need to understand what that means locally for rainfall, heat stress, water resources, infrastructure, food systems, and disaster preparedness.

In plain language, regional climate science helps bring the climate future closer to home. For dense and exposed regions in much of Asia, this kind of work is essential. It helps bridge the gap between climate projections and practical planning, giving governments, communities, and industries better evidence for adaptation.

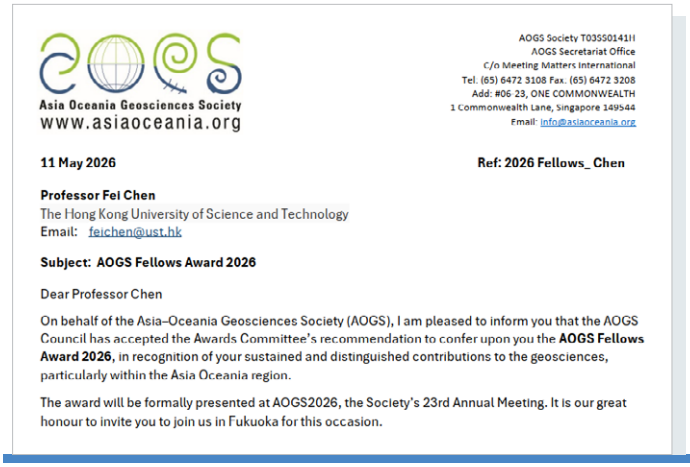
The recognition by the Korean Meteorological Society highlights not only Prof. Im's scientific contribution, but also HKUST's growing strength in climate research that connects data, models, human activity, and regional risk.

Geoscience Leadership: Prof. Fei Chen Named AOGS Fellow 2026

Asia-Oceania Geosciences Society recognises sustained and distinguished contributions to geosciences

Cities do not simply experience weather. They shape it. That idea has become increasingly important as scientists work to understand how dense urban areas interact with rainfall, heat, wind, air quality, and extreme weather. It is also central to the work of Prof. Fei Chen, whose research has helped advance urban weather and climate modelling in complex environments.

Prof. Chen has been selected for the Asia-Oceania Geosciences Society Fellows Award 2026, in recognition of his "sustained and distinguished contributions to the geosciences, particularly within the Asia-Oceania region." The award will be formally presented at AOGS2026, the Society's 23rd Annual Meeting, in Fukuoka, Japan, during the Axford Lectures, Opening, AGM & Award Presentations session on 3 August 2026.



Asia Oceania Geosciences Society
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11 May 2026 **Ref: 2026 Fellows_ Chen**

Professor Fei Chen
The Hong Kong University of Science and Technology
Email: feichen@ust.hk

Subject: AOGS Fellows Award 2026

Dear Professor Chen

On behalf of the Asia-Oceania Geosciences Society (AOGS), I am pleased to inform you that the AOGS Council has accepted the Awards Committee's recommendation to confer upon you the **AOGS Fellows Award 2026**, in recognition of your sustained and distinguished contributions to the geosciences, particularly within the Asia Oceania region.

The award will be formally presented at AOGS2026, the Society's 23rd Annual Meeting. It is our great honour to invite you to join us in Fukuoka for this occasion.

The AOGS Fellows Award is a major recognition from one of the region's leading geoscience societies. For HKUST, it is also a timely honour. Prof. Chen's work sits at the heart of several themes that have become increasingly urgent for cities: high-resolution weather prediction, urban climate processes, land–atmosphere interactions, and the translation of modelling science into resilience planning.

At HKUST, Prof. Chen serves as Associate Head and Professor in the Division of Environment and Sustainability and Director of the IAS Atmospheric Research Center. He also co-chairs WMO Urban-PREDICT, a flagship project of the World Weather Research Programme, where Hong Kong has been selected as a Global Demonstration City.

Prof. Chen's AOGS Fellows Award celebrates a scientific career that has helped bring urban processes into the centre of weather and climate modelling. It also highlights HKUST's role in building the next generation of climate science for the Asia-Oceania region, where urbanisation, coastal exposure, and extreme weather increasingly converge.