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CORPORATE NEWS

Bringing sustainable supercomputing to the tropics

NSCC's tropical data centre, which houses Singapore's newest next generation national supercomputer, is once again recognised for its innovation and sustainability.



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Supercomputing in data centres (DC) requires two things: power and temperature management. This means that the majority of the world's most capable supercomputing DCs are located in colder climates with lower humidity in order to operate safely and with lower costs.

NSCC took this challenge on and established a new purpose-built DC at NUS' Innovation 4.0 (i4) building that is Southeast Asia's first tropical DC designed specially to support supercomputing in the tropics. The DC houses Singapore's newest next-generation national supercomputer, the ASPIRE 2A, which is a green, warm water-cooled system. This achievement has earned them the Data Centre Award at the 2023 Singapore Business Review Technology Excellence Awards.

The awards programme recognises the breakthroughs and innovations of Singapore companies in producing high-quality or world-first products and services, and NSCC has distinguished themselves by designing a DC that incorporates sustainability and promotes the development of more energy and cooling-efficient supercomputing DCs.

While most DCs are cooled to around 20°C to 25°C, with lowered humidity levels hovering around 50% to 60%, the main compute room in NSCC's DC, which houses the ASPIRE 2A, does not rely on a conventional computer room air handler (CRAH) or computer room air conditioning (CRAC) for cooling. In other words, the unique compute room is aircon-less, which saves on power consumption, therefore enabling the ASPIRE 2A to operate at temperatures between 33.5 to 39.5°C. Another unique design feature of the DC is a Hot Hall ambient temperature Water-Dry Cooler system for the computer which uses warm water cooling (at a temperature of around 40°C so as to reduce additional power required for water cooling) and an external ambient atmosphere in the cooling of the DC.

NSCC also leveraged made-in-Singapore technology such as KoolLogix's Cool Hall rear-door heat exchangers (RDHXs) that utilise a unique Thermosiphon gas system as well as an IOT sensor array and digital monitoring of the DC operations.

All these power-saving measures put in place have enabled the DC to achieve a target PUE (power usage effectiveness) of below 1.18. This is one of the lowest recorded PUEs for any Singapore-based DCs and is estimated to decrease NSCC's carbon footprint by up to 40%. The new DC has also been awarded a Singapore Building and Construction Authority (BCA) Green Mark Platinum Award (2021).

NSCC's tropical DC at NUS' i4 no longer serves as just a proof-of-concept. The deployment of the equipment and methods used in the DC, such as liquid-to-chip cooling, cold plates, natural air cooling, and waterless DC not only demonstrates how the use of technology, innovation and out-of-the-box thinking can be used in developing more sustainable DCs, it also showcases what DC providers and enterprises can undertake to meet IMDA/BCA requirements and better contribute to the country's sustainability efforts. The NSCC DC could serve as a model to lead the way in the development of next-generation DCs in Singapore.

This award adds to the accolades of the DC, which had previously been conferred Singapore's **Building & Construction Authority (BCA) Platinum Green Mark Award for Data Centres** as well as the **W.Media Southeast Asia 2022 award for Energy Efficient Innovation**.

Congratulations to the NSCC DC team and our close partners from the National University of Singapore (NUS) for this achievement!

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Recognition for accelerating healthcare research in Singapore using supercomputers

NSCC and SingHealth recognised at the Singapore Recognition of Excellence 2023.



NSCC Singapore and SingHealth have been conferred a Recognition of Excellence Award for its National Supercomputer for Healthcare (Cardiovascular) for the innovative and disruptive use of technology in the healthcare sector through the optimisation of healthcare processes, delivering patient-centric services and pushing new boundaries.

Co-developed by NSCC, SingHealth and NVIDIA, the supercomputer, that is placed at SingHealth's Singapore General Hospital (SGH) Campus to support medical research and innovation efforts for the cluster and healthcare researchers from across Singapore, is expected to take the AI used by clinicians to make sense of diseases and scale it. Where standard computers might take days to train the AI using a set of patient data, the supercomputer could do it in hours.

OpenGov Asia's Recognition of Excellence Awards recognises public and private sector agencies and organisations that have achieved excellence in using ICT to serve citizens and customers and who work behind the scenes to make offerings and services smarter, more agile, more efficient and more transparent.

Congratulations to both the NSCC and SingHealth team for this achievement!

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6th Annual APAC HPC-AI Student Competition launched

Hosted by the HPC-AI Advisory Council, NSCC and National Computational Infrastructure (NCI) Australia, the latest regional APAC student competition aims to tackle the pressing problems of climate change.

Spanning six intensive months, the annual competition hosts graduate, advanced degree and undergraduate students from across the APAC region to develop their skillsets and challenge their understanding of high performance computing (HPC) and AI technologies as well as showcase their mastery of the two disciplines in a spirited international competition.



22 selected teams from 17 APAC universities will participate, including Singapore's Nanyang Technological University, Australian National University, Chinese University of Hong Kong, Fudan University, Kasetsart University, Lanzhou University, Nanjing University, National Cheng Kung University, National Tsing Hua University, Peking University, Shahjalal University of Science and Technology, Southern University of Science and Technology, Sun Yet-Sen University, Telkom University, Thammasat University, Universiti Putra Malaysia and University of Peradeniya.

This year's competition includes tasks and challenges focusing on the global climate anomalies simulation model, The Model for Prediction Across Scales (MPAS) and the open-source Large Language Model – BLOOM. To support the competition, NSCC will be providing participants access to its newest supercomputer, the ASPIRE 2A, NVIDIA A100 GPU and Slingshot network, and NCI will provide their Gadi supercomputer system, which is based on NVIDIA A100 GPU and NVIDIA Quantum InfiniBand network.

The winning teams will be announced in November 2023 followed by an official award ceremony to celebrate all the competitors at the annual [SupercomputingAsia 2024](#) conference, which will be held in Sydney, Australia, from 19 – 22 February 2024.

For more information on the competition please visit <https://www.hpcadvisorycouncil.com/events/2023/APAC-AI-HPC/>.

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Pulling the curtains on climate change

From predicting torrential rains to modeling urban climates, supercomputing provides us the necessary tools to navigate the climate crisis.

Asian countries today are at the mercy of extreme weather events spurred by climate change. Typhoon Hagibis in 2019, for example, is the largest to hit Japan since records began, and monsoon rains submerged thousands of homes in Malaysia at the start of 2022.

From Pakistan to the Philippines, climate change has altered the conditions in which all weather occurs: the oceans and air are warmer, the atmosphere is more vaporous and sea levels are higher. These result in stronger storms and typhoons, as well as more death and destruction in floods and landslides. A recent study found that climate change made Typhoon Hagibis' extreme rainfall 67 percent more likely, and is responsible for US\$4 billion worth of the damage left behind.



As world leaders set goals for mitigating climate change, scientists are helping them prepare for the disasters it will cause. In developing countries, accurate early-warning systems are proving key to improving evacuation systems and limiting casualties. The Global Commission on Adaptation estimates that every dollar spent on such systems could prevent up to twenty dollars in losses annually—underscoring the tangible benefits of coordinated early action.

At RIKEN, Japan's largest research institution, weather and climate scientists are making rain predictions for the Tokyo metropolitan area using Fugaku, previously the world's fastest supercomputer. The key to their technique is big data assimilation: harnessing computational prowess to synchronize data between large-scale computer simulations and observational data.

“For the first time, we have developed a highly accurate and precise model that is capable of predicting weather conditions of up to 30 minutes into the future, updated every 30 seconds, with a resolution of 500 meters,” said Dr Takemasa Miyoshi, who leads the Data Assimilation Research Team at the RIKEN Centre for Computational Science, in an interview with Supercomputing Asia.

Head over to <https://www.asianscientist.com/2023/02/print/pulling-the-curtains-on-climate-change/> to read the full article published in the January 2023 issue of NSCC's Supercomputing Asia Magazine to find out how high performance computing (HPC) is empowering researchers in countries like Japan and Singapore to find ways to navigate the climate crisis in the decades to come.

This article was first published in the print version of [Supercomputing Asia](#), January 2023.

B THE LAST BYTE...

<SHARED CONTENT>

Shared articles and news from the HPC world.

HPC roundup: Frontier retains first place as world's fastest supercomputer on Top500 list

Top ten remains the same, despite upgrades.

The US remains the only country to officially operate an exascale-class supercomputer. The 1.194 exaflops Frontier system, located at the Department of Energy's Oak Ridge National Laboratory in Tennessee remains the No. 1 system on the Top500 list, the latest version of which was published this week. RIKEN's Fugaku system in Japan, CSC's Lumi in Finland, CINECA's Leonardo in Italy, and the DOE's Summit system round out a top five unchanged from November 2022 – though some have seen upgrades. Read more at Data Centre Dynamics [here](#).



Credit: Data Centre Dynamics

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Japan's Fugaku supercomputer to help develop homegrown generative AI

Free Japanese-focused platform targeted for release in fiscal 2024.

Japanese researchers will use the homegrown Fugaku supercomputer to develop ChatGPT-style generative artificial intelligence under plans announced on Monday. The Tokyo Institute of Technology and Tohoku University have teamed up with Fugaku developers Riken research institute and Fujitsu on the new project. They will develop a large language model (LLM) for generative AI that centers on the Japanese language. Read more at Nikkei Asia [here](#).



Credit: Tomoki Mera

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Australia sets out A\$1bn national quantum strategy

Australia has launched its first national quantum strategy with the aim of becoming a global player in quantum technologies by the end of the decade.

Released by the Department of Industry, Science and Resources, the A\$1bn initiative aims to boost Australia's economy, protect the country's national security and prevent a brain drain of top people heading abroad. The strategy has five central "themes" to boost quantum technologies, including investing in research, securing access to infrastructure, and growing a skilled workforce. It also focuses on three main categories of quantum technology, namely computing, communication and sensing. Read more at Physics World [here](#).



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Powering Innovation
Supercomputing in Asia

National Supercomputing Centre (NSCC) Singapore

1 Fusionopolis Way, Connexis South, #17-01 Singapore 138632