

NEWSBYTES

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CORPORATE NEWS

NSCC Singapore at ISC24 Hamburg

NSCC Singapore reaped valuable insights at ISC24, one of the premier international supercomputing conferences. Engagements with potential partners and various High Performance Computing (HPC) centre partners was useful in garnering intelligence on the latest technological advancements and national HPC strategies from across the world.

ISC24, which was held from 12 May to 16 May 2024, brought together HPC professionals from academia, leading HPC companies and technology developers, and HPC centres and organisations to exchange updates on the latest advancements in HPC technologies as well as share knowledge future and current HPC trends.

NSCC Singapore was present on the exhibition floor with a booth showcasing its HPC capabilities and collaborations, which gained traction from both exhibition vendors and visitors. Through various conversations at the booth, connections were established for potential future collaborations.



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Additionally, NSCC Singapore organised various meetings with HPC centres to exchange information on system updates, national HPC strategy and upcoming plans.



NSCC meeting with international partners and collaborators at its exhibition booth during the conference days of ISC24.

14th Alliance of Supercomputing (ASC) Meeting



Representatives from HPC centres across the globe attending the regular ASC Meeting in Hamburg, Germany.

The quarterly ASC meeting, held alongside the ISC24 conference, brought together representatives from 9 HPC centres, including those from Australia, Finland, Ireland, Luxembourg, Poland, Singapore, South Korea, Taiwan, and the USA. The international network fosters a collaborative and dynamic platform focused on mutual support, talent development and the exchange of best practices across borders. During the meeting, representatives explored opportunities for collaboration in HPC resource sharing and common research themes. A significant outcome was the consensus to establish a specific interest groups (SIGs) in topics of common interest like HPC-Quantum, talent development and AI.

The ASC is a network of like-minded national HPC centres and professionals seeking to build a collaborative, dynamic platform that focuses on mutual support and cooperation, talent development and sharing of best practices across borders.

HPC in Asia-Pacific – Region Update: Singapore

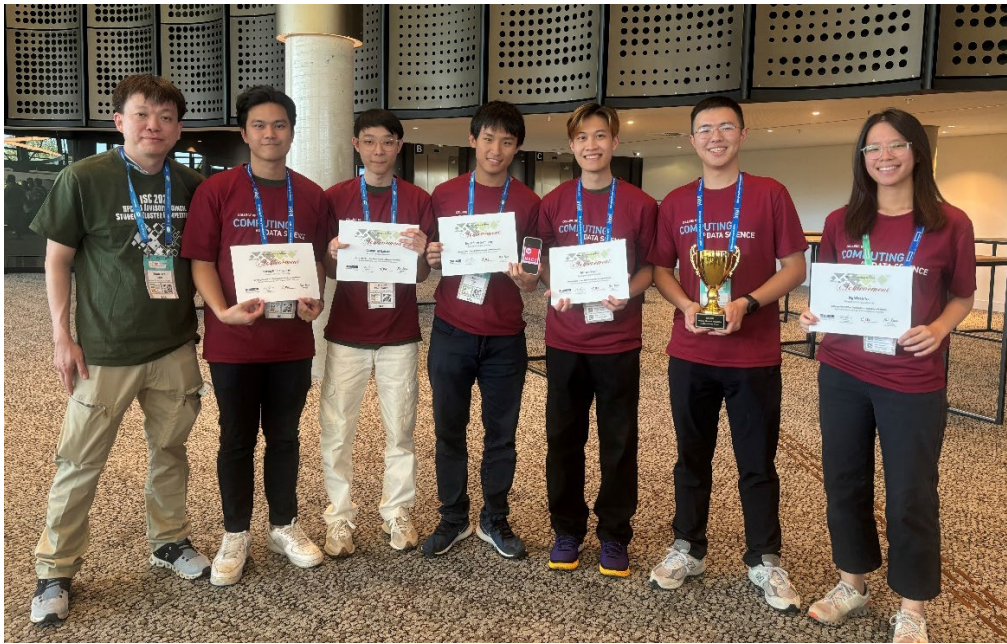


Mr Chung sharing updates on NSCC Singapore’s HPC system.

Mr Chung Shin Yee, Senior Assistant Director at NSCC, gave a country update about NSCC including system updates and upcoming national strategies plans during an invited talk at the track session on ‘HPC in Asia-Pacific’. In his presentation, he outlined the journey of supercomputing in Singapore and gave insights on the current supercomputing landscape. He also highlighted upcoming developments and steps NSCC is taking to better support the work of local researchers. Multiple impactful projects, initiatives, and capabilities of NSCC’s ASPIRE 2A infrastructure were shared, underscoring the crucial role of NSCC for the research community in Singapore.

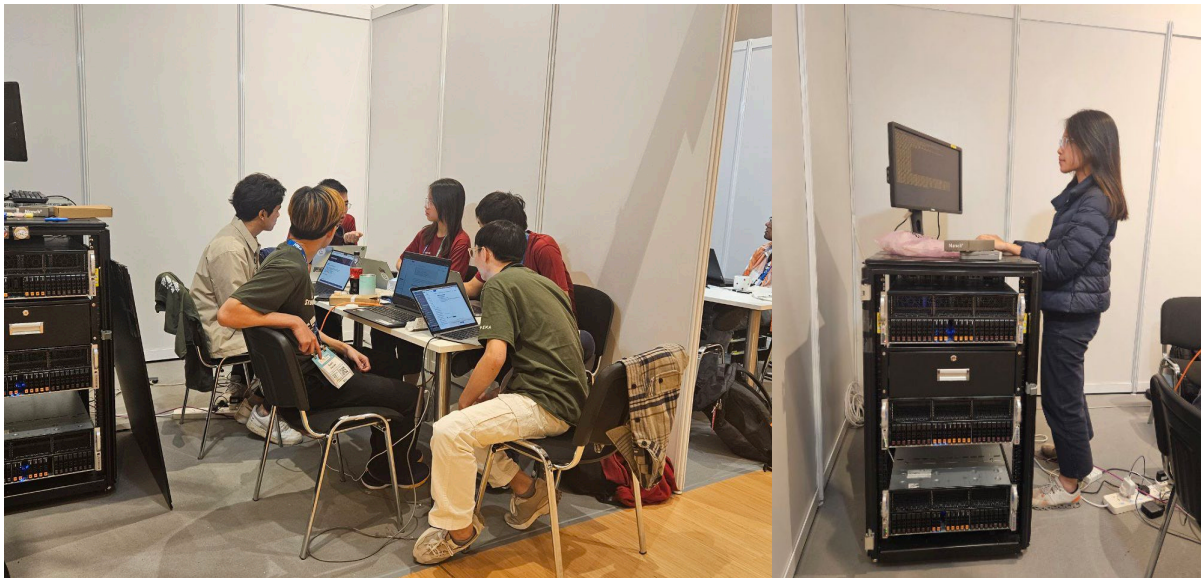
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Nanyang Technological University (NTU)'s Team Supernova Wins 3rd Place for ISC Student Cluster Competition 2024 (Online)



Team Supernova was awarded third for their performance in the online application task.

As part of the mission to develop Singapore HPC talent, the NTU HPC student cluster competition was in action at ISC24 against other top student teams from around the world. The annual competition actively trains the university student teams by introducing them to the industry, HPC systems, machine learning applications, and more. The 2024 competition welcomed 19 virtual and 8 in-person teams.



Team Supernova actively engaged in completing various tasks assigned to them during the competition.

Supported by NSCC Singapore, students from the NTU participated in-person at the competition, which spanned three days of the conference. The students were required to secure and assemble their own HPC systems before being presented with multiple HPC-related challenges and problems to solve. Competing with teams from institutes of higher learning around the world, the NTU student team achieved 3rd place in the online category.

"Solving complex HPC problems with large-scale high-performance supercomputers was both challenging and uniquely enriching. This competition not only sharpened our technical skills but also fuelled our passion for computational science and its capacity to address real-world challenges." said Zhang Danxu, Team Supernova's team leader.

Under the Remote Competition category, the first place was won by Sun Yat-Sen University in China and the second place was won by Tsinghua University in China.

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NSCC Singapore Welcomes New Deputy Chief Executive Officer, Dr Terence Hung

NSCC Singapore welcomes Dr Terence Hung as its new Deputy CEO.

With a distinguished career in the area of technology and innovation, Terence brings a wealth of experience and expertise from both research and industry that will be invaluable in advancing NSCC Singapore's mission of driving excellence in supercomputing and digital transformation.

Terence joins NSCC Singapore from Rolls-Royce, where he served as the Chief of Future Intelligence Technologies in Central Technology. He led a dynamic team in the development of cutting-edge Artificial Intelligence capabilities, revolutionising engineering processes and enhancing the quality of services and products. Terence also drove the corporate lab AI research activities at NTU as a programme co-director.



With a career spanning 30 years, Terence has varied experience in research and development, technology management, and the execution of pioneering programmes. He served on advisory panels for industry leaders like HP and Microsoft, government bodies, national technology roadmaps and academic programmes. Terence has been a member of NSCC Singapore's Steering Committee since 2019 where he provided expert counsel and advise on NSCC Singapore's numerous initiatives and direction.

We warmly welcome Dr Terence Hung to the NSCC Singapore family and look forward to the remarkable contributions he will undoubtedly make.

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Improving Singapore's Food Security

Researchers from the National University of Singapore are creating indoor-adapted crops to increase Singapore's food production, with the help of NSCC Singapore's HPC resources.



Food security is a major concern in Singapore with only 14% of leafy vegetables produced locally while the rest are imported from overseas. With reliance on imported food, Singapore can be adversely affected when there are disruptions to overseas food supplies.

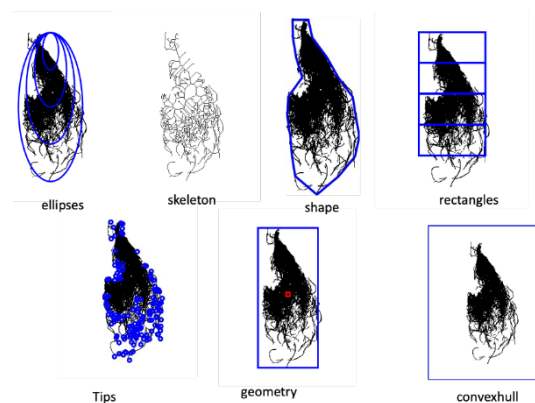
Considering Singapore's limited land availability, high-tech indoor farming could be a viable solution to boost local vegetable production. However, indoor farming is a relatively new industry in Singapore and many current crop cultivars chosen for conventional outdoor soil-based farming may not be well suited for indoor environments.

To address these concerns, researchers from NUS aim to develop improved cultivars of leafy vegetables suitable for indoor farming through genomic research.

The Research

In support of Singapore's initiative to increase food production to meet its '30 by 30' goal of achieving 30% of the nutritional needs of the population by 2030, the team plans to leverage their knowledge of genetics and breeding to develop vegetable cultivars with improved agronomic traits desirable for indoor farming. Some of the vegetable crops that the team are currently studying include arugula, kale, bok choy and cai xin.

The research aims to study cultivar development and create indoor-adapted desirable traits for local farmers, as well as working towards seed innovation technologies and large-scale production.



The Technology

Phenotyping and whole-genome sequencing: Conducted to study the genetic and morphological diversity of the worldwide collection of kale and other leaf crop varieties, sourced from various gene banks and commercial seed companies. Harnessing the association information between the genotype and phenotype of the plants allows the researchers to select potential parental candidates for crossing and breeding to enhance the performance of the current kale varieties.

Identifying crop genetic components: The researchers also performed assays on the anti-oxidation, anti-microbial and anti-cancer properties of kale and arugula plants. In addition, the plants were screened for their metabolite contents using a liquid-chromatography mass spectrophotometer (LC-MS).

HPC resources: This project was allocated 3,000 CPU hours on NSCC Singapore's supercomputing resources.

The Impact

By characterising the genetic diversity of the vegetable crops, the team was able to understand the trait adaptability of the plants under indoor farming conditions. The results can then be used to develop genomic prediction models to select high-yielding varieties with value-added or other desirable traits of the plants as well as to develop a targeted approach in cultivar development in order to achieve speed breeding.

For indoor farmers, these crops maximise their productivity and resource-use efficiency, which may in turn improve food security and facilitate the sustainable growth of the urban farming industry in Singapore.

“The recent COVID-19 pandemic and conflict between Russia and Ukraine have escalated food prices, exacerbating the food insecurity problem. We are confronted with a pressing need to secure our own food, as the importation of food may become a limitation in the near future. With the help of NSCC Singapore's HPC resources, we are able to embark on this project on plant and crop breeding.”

Ting Xiang Neik (Tina)
Research Fellow (PhD)
National University of Singapore
Agritech Centre



To find out more about how NSCC Singapore's HPC resources can help you, please contact e-news@nsc.sg.

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Supercharge your HPC Skills with a Certificate of Competency (CoC) by NSCC Singapore and ITE College West

Jointly run by the NSCC Singapore and ITE College West, this SkillsFuture Certificate of Competency course equips participants with the basic knowledge of HPC.

Participants will be co-trained by ITE lecturers and NSCC Singapore specialists on how to access HPC remotely from a virtual platform to experience working on thousands of computing nodes to perform complex program tasks at high speed, which in turn will accelerate the building of deep learning AI applications.



In this course, participants will acquire skills and knowledge on:

- Basic building blocks of a supercomputer
- Understanding PBS Scheduler
- Environment setup and file transfer
- Resource allocation and Job Submission
- Use case and accessing of HPC
- Hands-on AI project using HPC

Training accounts with computing resources will be provided by NSCC Singapore. Upon completion of the course, participants will be awarded a certificate of competency in Introduction to HPC as well as a certificate of participation by NSCC Singapore.

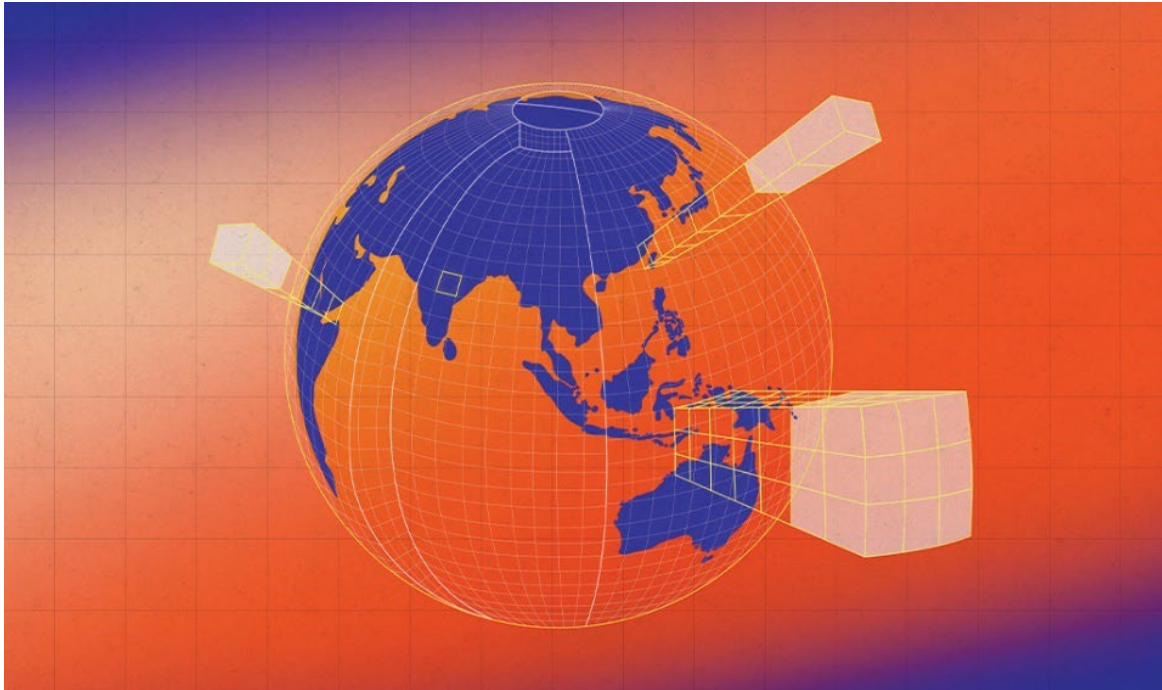
The next intake for the course is on **19 June 2024**. Fees for this course can be paid using SkillsFuture credits.

Click [here](#) for more information.

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The Key to Climate Models

As more countries embrace climate modelling, researchers turn to AI to improve the accuracy and efficiency of their models.



The unpredictable nature of the weather has long captured the imagination and fear of our ancestors, immortalized in the legends of gods. From the Grecian Zeus and the Mesoamerican Quetzalcoatl to the Shinto Raijin and Fujin, various deifications have manifested across cultures as humans struggled to impose a sense of order and control to the fickle moods of the winds and clouds.

Modern-day forecasting lifts some of the mysticism around weather with its ability to predict local meteorological conditions, albeit to varying accuracy levels and time horizons. For example, the Meteorological Service Singapore provides fairly accurate projections locally up to a fortnight in advance, while global weather centre, AccuWeather, publishes estimates up to three months in advance. The advent of more accurate and extended predictions can help people and governments plan ahead, as well as mitigate property damage and loss of life.

Moreover, the irreversible environmental footprint that human activity has on the planet has led to an increasing global push to understand how the climate changes over much longer timescales. In fact, according to the United Nations Intergovernmental Panel on Climate Change's Sixth Assessment Report, compound weather events—which are combinations of destructive events—will become more frequent as global warming accelerates. The same report highlights that even typical weather events, like maximum daily rainfall and daily temperature extremes, have significantly intensified over the years.

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Shared articles and news from the HPC world.

Tech Giants are Starting to Treat South-East Asia Like the Next Big Thing

Long considered a tech hinterland, South-east Asia is fast emerging as a centre of gravity for the industry.

The chief executives of Apple, Microsoft and Nvidia are among the industry chieftains who have swung through the region in past months, committing billions of dollars in investment and holding forth with heads of state from Indonesia to Malaysia. After decades of playing second fiddle to China and Japan, the region is drawing more tech investments than ever. For data centres alone, the world's biggest companies are set to splurge up to US\$60 billion over the next few years.



Credit: The Straits Times

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Release of "Fugaku-LLM" - A Large Language Model Trained on the Supercomputer "Fugaku"

A team of researchers in Japan released Fugaku-LLM, a large language model with enhanced Japanese language capability, using the RIKEN supercomputer Fugaku.

To train large language models on Fugaku, the researchers developed distributed training methods, including porting the deep learning framework Megatron-DeepSpeed to Fugaku in order to optimize the performance of Transformers on Fugaku. They accelerated the dense matrix multiplication library for Transformers, and optimized communication performance for Fugaku by combining three types of parallelization techniques and accelerated the collective communication library on the Tofu interconnect D.



Credit: AsiaOne

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AI: Council Reaches Political Agreement on the Use of Supercomputing for AI Development

The Council has reached a political agreement on a regulation to expand the objectives of the European High Performing Computer Joint Undertaking (EuroHPC), aimed at boosting Europe's leadership in artificial intelligence (AI).

The regulation adds an additional objective for the Joint Undertaking: to develop and operate AI Factories in support of an artificial intelligence ecosystem in the Union. AI Factories will be entities that provide AI super-computing service infrastructure. The regulation will also make the Union's supercomputing capacity further available to innovative AI European startups to train their models.



Credit: EuroHPC/LUMI

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