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SupercomputingAsia 2024 (SCA24) Conference @ Sydney – A first for SCA!

Themed "Exascale readiness in AI, HPC, and Quantum", SCA24 took place in Sydney, Australia, from 19 to 22 February 2024, and concluded on a high note. The successful SCA24 featured 172 speakers and panelists sharing their knowledge and expertise with more than 1,200 attendees from 27 countries and 263 organizations.

Co-organised by supercomputing centres from Australia, Japan, Singapore, and Thailand, the SCA24 conference concluded after four days of insightful conference sessions and exhibitions on the latest HPC technology innovations and developments. National Supercomputing Centre (NSCC) Singapore was represented at SCA24 in Sydney with a booth showcasing its HPC capabilities and collaborations. NSCC was also at hand to coordinate the SCA signature event, the HPC Leaders Forum, one of the regular tracks of the conference. Interested to have your research published in NSCC's NewsBytes?

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HPC Centre Leaders Forum



Professor Satoshi Matsuoka (left), Associate Professor Tan Tin Wee (middle), and Mr Mark Stickells (right) presenting on the latest development of the respective HPC centres during HPC Leaders Forum.



HPC leaders from various global HPC centres at 2024 HPC Centre Leaders Forum.

Looking forward to SCA25 in Singapore

The 2024 edition of the HPC Centre Leaders Forum brought together global HPC Centre leaders from Australia, Finland, Japan, Poland, Singapore, Taiwan, Thailand, and the United States to discuss the latest updates from the respective centres and their regions. The leaders also expounded on the challenges faced and opportunities for collaboration, which leveraged HPC centre partners to foster the growth and cooperation. The track held on 20 February 2024 featured a four-hour session, which was Chaired in part by Professor Chennupati Jagadish, the President of the Australian Academy of Science, and Mr Eugene Low, Deputy Director at NSCC Singapore.

Industry Track Session: "Supercomputing in Singapore"



A/Prof Tan sharing his insights on Singapore's supercomputing resources during the Industry track

Associate Professor Tan Tin Wee, Chief Executive of NSCC, was featured as a speaker at the Industry Track session of SCA24. During his talk, he shared more about opportunities and challenges of providing computing power in a tropical country like Singapore. On showcase was NSCC's HPC infrastructure such as the ASPIRE 2A, capabilities and support for the Singapore research community. His sharing also covered the trends for supercomputing and research in Singapore.

13th Alliance of Supercomputing (ASC) Meeting



Representatives from the 10 HPC centres attending the ASC Meeting in Sydney, Australia.

The quarterly ASC meeting was held on the sidelines of the SCA24 conference, with representatives from 10 HPC centres, including Australia, Finland, Ireland, Japan, Poland, Singapore, South Korea, Taiwan, Thailand, and the USA. The international network of like-minded HPC Centres provides a collaborative, dynamic platform that focuses on mutual support and cooperation, talent development and sharing of best practices across borders. During the meeting, the representatives explored opportunities to collaborate on HPC resource sharing, exascale development and common research themes.



Data Mover Challenge 2023 (DMC23) Award Presentation & Showcase

(Left) Team Falcon at the DMC23 Award Presentation; (Right) Team Falcon presenting their solution during the Winner's showcase.

Organised by NSCC Singapore, the international Data Mover Challenge (DMC) is a competition that aims to bring together experts from industry and academia in a bid to test their software and solutions for transferring huge amounts of research data. *Team Falcon* from the United States came up as the overall winner with their focus on parallelism for file transfer and online optimiser to find the optimal transfer settings.

Colin Martires and Parker True from the winning team took the stage during the Network and Data Movement Track session on 22 February 2024 to present their project idea. Falcon, an online transfer optimization algorithm, was developed as a solution. The algorithm can adapt in real-time to changing network conditions by combining optimization algorithms and a novel utility function. The utility function rewards high throughput and penalizes packet loss and excessive use of concurrency, which allows for a high-performance algorithm while maintaining low overhead.

APAC HPC-AI Competition Track Session: "HPC Resources in Singapore"



Mr Chung Shin Yee, Senior Assistant Director at NSCC Singapore, was invited as a featured speaker for the APAC HPC-AI track session at SCA24 to give a presentation on HPC resources in Singapore. During the session, he shared about the nation's tropical data centre and the upcoming developments in NSCC Singapore.

Mr Chung sharing his insights on NSCC's tropical data centre.

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6th APAC HPC-AI Award Presentation & the Launch of 2024 APAC HPC-AI competition

Organised by the HPC-AI Advisory Council with the support of the NSCC Singapore and the National Computational Infrastructure (NCI) Australia, the HPC-AI competition is a platform for university and technical institutions teams to showcase their HPC and AI expertise.



The organisers of the APAC HPC-AI together with the winning team from the National Tsing Hua University ZY Team at the 6th APAC HPC-AI Award Presentation during SCA24.

On 21 February 2024, the 6th edition of the APAC HPC-AI competition concluded with an award presentation during SCA24 to the winning team - National Tsing Hua University ZY team.

Following the ceremony, the HPC-AI Advisory Council, NSCC Singapore and NCI Australia announced the launch of the 7th annual regional APAC HPC-AI student competition.

This year's competition includes the following HPC and AI tasks which will be run on supercomputers from NSCC Singapore and NCI Australia:

- HOOMD-blue, a general-purpose particle simulation toolkit that performs Molecular Dynamics and hard particle Monte Carlo simulations. HOOMD-blue can be used to model nanoparticles, bead-spring polymers, active matter, and various other types of systems.
- Llama 2, a family of pre-trained and fine-tuned large language models (LLMs) from Meta AI. Llama 2 is open source and free of charge for research and commercial use of large language models, encompassing both base foundation models and fine-tuned "chat" models. It includes seven billion (7B), 13 billion (13B), or 70 billion parameters (70B) models.

The 7th APAC HPC-AI competition is open for student registration. Students should register before 17 May 2024 to secure their spot.

Register Now

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HPC is everywhere!

NSCC's Chief Executive, A/Prof Tan Tin Wee was one of the key panelists of the 'Edge Computing in Space Missions' session at the annual Global Space and Technology Convention (GSTC) 2024. Organized by Singapore Space and Technology Ltd, the GSTC was held at Sheraton Towers on 15-16 February 2024 and serves as the go-to platform for key businesses in space and satellite technology that connects the burgeoning space industry in Asia.

Inaugurated by the Guest-of-Honor – Mr Heng Swee Keat, Deputy Prime Minister and Coordinating Minister for Economic Policies, the GSTC 2024 edition of the conference opened with an overarching theme "Space for a Sustainable, Smart and Secure World". With a total of 71 speakers from around the world, the two-day programme delved into topics surrounding space for sustainability, space to power smart cities, and space for a secure world.



The opening of Global Space and Technology Convention 2024.

The conference focused on how space can offer innovative solutions to advance sustainability goals. In the context of the global Smart Nation movement, space emerged as the catalyst for the next big data revolution, set to power smart cities, redefining connectivity, and accelerating transformations in digital government, economy, and society. A significant highlight of the convention was the panel on 'Edge Computing in Space Missions'. A/Prof Tan Tin Wee, Chief Executive of the National Supercomputing Centre (NSCC) Singapore, led a panel discussion comprising of Mr Avi Shabtai from Ramon Space, Mr Victor Chun from TelePIX, Mr Michat Zachara from KP Lab, Dr Yonatan Winetraub from Crytosat. Edge computing holds the key to accelerating the democratization of space and extracting the value of massive amounts of space data. During the panel discussion, experts in the field discussed how satellites can be outfitted as edge devices, the challenges associated with edge computing in space, and the tremendous implications for accelerating access to space data and applications.

More information here

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AI, HPC and Climate Science Seminar

Jointly organised by the Institute of High-Performance Computing (IHPC) and NSCC Singapore, the AI, HPC and Climate Science Seminar featuring international HPC expert, Professor Torsten Hoefler, took place on 26 February 2024.



Prof Hoefler (third from the left) with NSCC Chairman Mr Quek Gim Pew (second from the left) and A/Prof Tan (fourth from the left) at the seminar.

IHPC and NSCC organised a two-part seminar on AI & HPC as well as AI for Climate, featuring Professor Torsten Hoefler as a distinguished keynote speaker for the event, which targeted key industry partners, researchers and AI practitioners.

Prof Hoefler is a Professor of computer science at ETH Zurich, where he directs the Scalable Parallel Computing Laboratory (SPCL) and has over 300 publications in top-tier international conferences and journals. He is also the Chief Architect for Machine Learning at the Swiss National Supercomputing Centre (CSCS) and a long-term consultant to Microsoft in the areas of large-scale AI and networking. Prof Hoefler

also leads the global research in high-performance parallel computing systems and networking for Weather/Climate Simulations and Deep Learning.

During the first part of the seminar, insights on AI and HPC was shared through a keynote presentation on "Scalable and Efficient AI: From Supercomputers to Smartphones". The presentation was followed by a lively panel discussion by Prof Torsten Hoefler from ETH Zurich, A/Prof Tan Tin Wee from NSCC Singapore, Professor He Bingsheng from National University of Singapore (NUS) and Professor Ivor Tsang, Centre for Frontier AI Research (CFAR), and moderated by Associate Professor Rick Goh from IHPC.

The second session delved into the topic of 'AI for Climate' with presentations by Prof Hoefler and Professor Dale Barker, Director of the CCRS. Prof Barker shared Singapore's experience in climate modelling through a keynote session titled "AI in Weather/ Climate Science: Priorities for Centre of Climate Research Singapore (CCRS) and Singapore". The session concluded with another meaningful panel discussion with the two keynote speakers and Emeritus Professor Lim Hock from NUS.

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Shared articles and news from the HPC world.

UChicago Scientists Uncover How HIV Invades Cell Nucleus with Help from TACC's Frontera

Supercomputers, paired with novel advances in computational methodology, can open up a whole new frontier in probing the behavior of dangerous viruses at an unprecedented scale.

A new study from two UChicago scientists has revealed how HIV squirms its way into the nucleus as it invades a cell. The finding, created by a simulation of thousands of proteins interacting, will point the way to a better understanding of HIV as well as suggest new targets for therapeutic drugs. Read more <u>here</u>.



Credit: HPC Wire

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Australian supercomputing center deploys Nvidia's Grace Hopper Superchips for quantum research

Australia's Pawsey Supercomputing Research Center will deploy eight of Nvidia Corp.'s powerful Grace Hopper Superchips nodes to power its open-source CUDA Quantum computing platform in Perth, as part of its mission to push the boundaries of quantum computing research.

The new supercomputer is expected to be able to deliver up to 10 times higher processing performance than the center was previously capable of, Nvidia said. According to Pawsey, the Grace Hopper Superchips will enable researchers to run more advanced simulation tools and attempt to engineer new breakthroughs in areas such as quantum algorithm discovery, device design, machine learning, chemistry simulations, astronomy, image processing for radio, bioinformatics, financial analysis and other areas of research. Read more <u>here</u>.



Credit: Silicon Angle

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NVIDIA Reveals Eos Supercomputer: 4,600 H100 GPUs for 18 AI Exaflops

NVIDIA released a video that offers the first public look at Eos, a monster 18.4 exaflops FP8 AI supercomputer powered by 576 DGX H100 systems.

Announced in November at the SC23 conference in Denver, Eos has a total of 4,608 H100 GPUs and an architecture optimized for AI workloads that need "ultra-low-latency and high-throughput interconnectivity across a large cluster of accelerated computing nodes," according to the company. NVIDIA said Eos would be ranked no. 9 on the TOP500 list of the world's fastest supercomputers, according to the latest list released last November. Read more <u>here</u>.



Credit: InsideHPC

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