

NEWSBYTES

November 2023



In this issue



Corporate News

[NSCC in action at SC23 Denver](#)

[NSCC joins consortium to create trustworthy and reliable generative AI models for science](#)

[NSCC and RIKEN Centre for Computational Science extend collaborative research partnership](#)

[Supercharge your career with high performance computing skillsets](#)

[NSCC's High Performance Computing Innovation Challenge is back](#)

Shared News

[Singapore to build nationwide quantum-safe network](#)

[World's fastest supercomputers are helping to sharpen climate forecasts and design new materials](#)

[UK to build its fastest supercomputer in bid to lead in AI](#)



CORPORATE NEWS

NSCC in action at SC23 Denver

NSCC made a significant impact at SC23 in Denver with its iconic booth showcase, the game-changing launch of the Altair Liquid Scheduling System and the formation of a number of MoU partnerships.



Visitors engaging in discussions at the NSCC booth.



WE WOULD LIKE TO HEAR FROM YOU!

Do you have a minute to spare to give us some feedback on our newsletter? As a valued subscriber, we are continuously looking for ways to improve our newsletter to provide relevant and suitable content for you. Click on the link below to begin!

Thank you!

LET'S BEGIN

The NSCC booth provided a curated experience, delivering a comprehensive understanding of NSCC's mission, vision, and research impact. Featuring a four-sided pillar narrating the story of NSCC, the booth engaged visitors to find out more about our key regional activities and upcoming events such as the Data Mover Challenge, the Alliance of Supercomputing Centres, and SupercomputingAsia 2024 (SCA24). The booth gained traction from

both exhibition vendors and visitors and through the conversations, it facilitated connections and spurred discussions on potential future collaborations.

A notable highlight was the 12th Alliance of Supercomputing Centres (ASC) meeting, which convened on 13 November 2023. The meeting was attended by 17 key stakeholders representing prominent HPC centres from Saudi Arabia, Australia, South Korea, Finland, Ireland, Taiwan, Japan, and the United States. Discussions were centred around the exchange of HPC resources and knowledge, identification of collaborative research opportunities, and the exploration of potential staff exchanges.



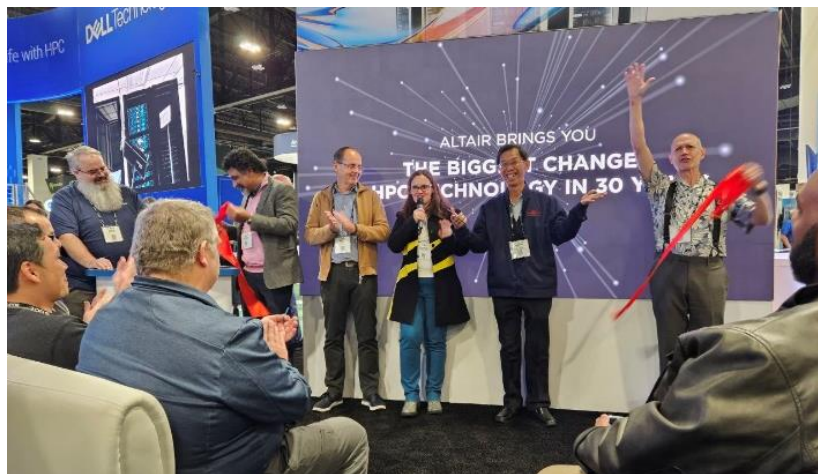
The 12th Alliance of Supercomputing Centres (ASC) meeting with key representatives from the various HPC centres.



Leaders from various HPC centres mingling at the NSCC Networking Dinner.

NSCC also hosted a networking dinner which facilitated meaningful interactions among leaders from diverse HPC centres and international partners, linking them with representatives of the Singapore HPC community. Singapore's dynamic economic landscape, coupled with the nation's digital initiatives and smart nation activities, positioned HPC in a pivotal role for spearheading vital research supporting these technological advancements.

NSCC and Altair collaborate to connect HPC communities and optimise resources
Altair® Liquid Scheduling™, a solution that ensures optimal job placement by streamlining user interactions with a single scheduler, was officially launched during SC23 by Altair and NSCC. The robust and scalable scheduling system is poised to revolutionise HPC in Singapore and around the world.



NSCC Steering Committee Chairman Mr Quek Gim Pew together with key stakeholders from Altair at the launch of the Altair® Liquid Scheduling™.

At the Altair-organised launch, Paul Hiew, NSCC Deputy Director of Technical Operations, shared on how NSCC came to work with Altair to design a solution that can meet the ambitious requirements of allowing users to run workloads using a global pool of resources, with the right workload running in the right place.

The recent deployment of NSCC's latest HPC system, ASPIRE 2A, underscores the urgency of ensuring seamless access to resources while efficiently integrating external computing systems. Liquid Scheduling extends the Altair HPC stack already deployed at NSCC, taking the Altair® PBS Professional® workload manager to another level of scalability and performance.

Liquid Scheduling improves utilisation by removing resource silos and giving users access to a wider compute pool without changing workloads. It connects multiple clusters and HPC sites without moving workloads or queueing them in specific places. With Liquid Scheduling, NSCC can easily control global resources without the complex overhead of shifting workloads between queues or requiring users to adjust their workflows.

Local institutions can harness the power of Liquid Scheduling to foster collaboration and resource sharing, with more efficient HPC-resource load balancing. Thereby, improving performance and encouraging cooperation

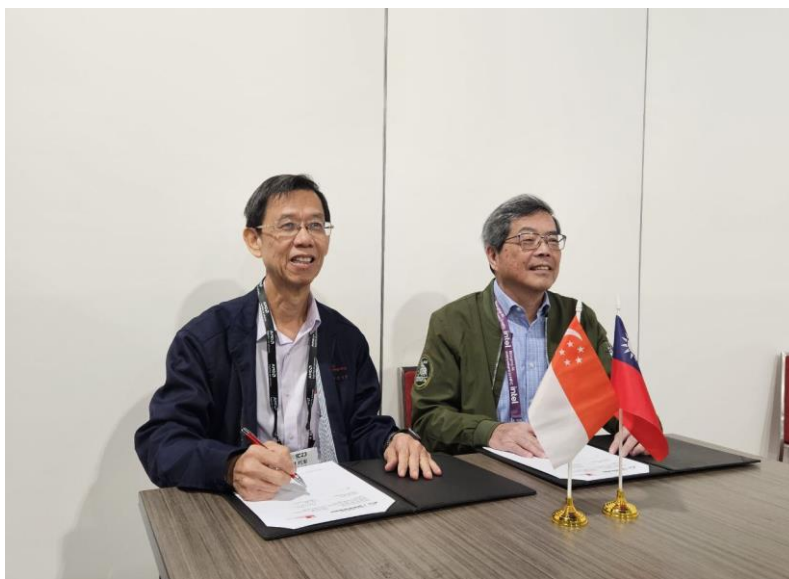


Paul Hiew presenting NSCC's case study to the audience at the launch.

“We are looking forward to delivering a better service to users, with wider access to compute resources enabled by Liquid Scheduling,” said Paul Hiew.

NSCC and the National Center for High-Performance Computing (NCHC) of Taiwan to build stronger HPC partnership through new MoU

NCHC and NSCC endorsed a Memorandum of Understanding (MoU) during SC23 to collaborate on greater HPC resource cooperation, capability development and talent upskilling. This collaboration will allow both centres to share their expertise and resources for the benefit of the academic and research community in their respective communities over the next five years.



NSCC Chairman Mr Quek Gim Pew (left) and NCHC Director General Chau-Lyan Chang (right) at the MoU signing ceremony.

The MoU between NSCC and NCHC was signed at SC23 when both centres met to set the directions for the identified areas of collaboration and joint research topics.

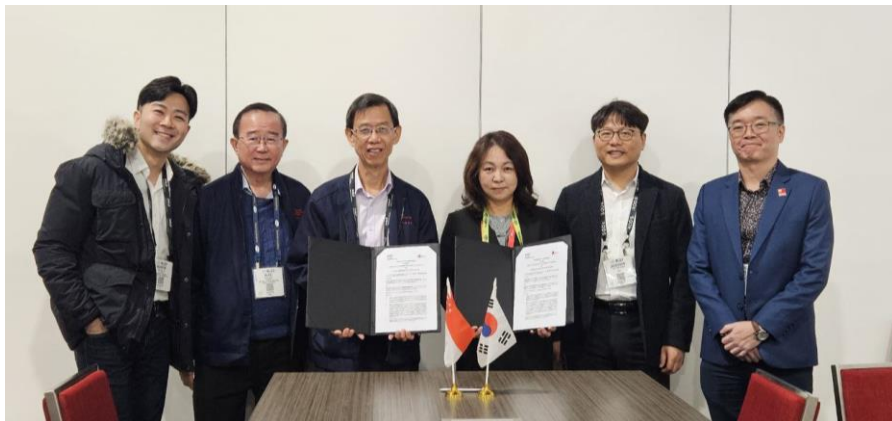
In the pursuit of HPC capability development, NSCC and NCHC agreed to share experiences and operational best practices and conduct peer-to-peer events such as capability training sessions, technical workshops, forums, seminars, and webinars.

With the stronger partnership and bilateral ties, Taiwan and Singapore will explore the optimisation of computational resources from both centres and promote cross-border research collaboration. The centres will also be collaborating through co-organised conferences like SupercomputingAsia and engaging in multi-HPC centre initiatives through the Alliance of Supercomputing Centres.

NSCC will explore cooperation with NCHC in activities and events that will enable the HPC research community to enhance their skillsets in HPC-related research fields. These fields include HPC infrastructure, research and education networks, genomics, weather and climate change, biomedical and healthcare research, nanotechnology, space technology, disaster mitigation, AI-related applications, and more.

NSCC and Korea Institute of Science and Technology Information (KISTI) promote closer ties with bilateral agreement

The MoU signed between KISTI and NSCC aims to leverage the complementary synergies between both HPC centres in the areas of HPC resources, capability building and human capital development for the next three years.



The endorsed MoU was exchanged between the representatives from NSCC and KISTI.

Representatives from NSCC and KISTI met during SC23 to endorse an MOU that will help further key areas of collaboration between the two centres. The centres from Singapore and South Korea will work together to explore the potential benefits from the optimisation of computational resources and the establishment of stronger network links between both HPC centres. The collaborative activities could help to support bilateral and regional HPC initiatives, cross-border research collaboration or international project grant applications that encourage HPC usage in the respective communities.

Both centres will share their expertise in related infrastructure operations and strategies to advance HPC adoption through joint training and technical workshops. In the area of talent development, NSCC and KISTI will be arranging skills training and exploring staff exchange programmes to provide greater growth opportunities for the technical operations staff in both centres.

Winners of the 6th Asia Pacific HPC-AI Competition announced

22 teams from 9 APAC countries and regions showcased remarkable innovations in HPC and AI-powered solutions focused on tackling pressing global climate problem and enhancing large language model inference capabilities.

High-performance computing and artificial intelligence provide the essential tools to fuel the advancement of science. The ever-growing demand for higher computational performance and the complexity of research problems called for a fast-paced innovation in the world of scientific computing.



This year's competition included tasks on improving the performance of the Model for Prediction Across Scales (MPAS), a collaborative project aimed at developing simulation components used in climate and weather studies; and enhancing the BigScience Large Open-science Open-access Multilingual Language Model (BLOOM) with the use of AI cluster to provide distributed inference service.

During the competition, all teams received state-of-the-art HPC and AI supercomputer resources and support from NSCC Singapore and NCI Australia. Industry leaders were also invited for each task to provide guidance and training on the fundamental technologies.

The teams showcased amazing performance improvements for both the HPC and AI tasks through creative ideas and innovative code execution. Teams utilised advanced profiling tools to analyse the computing and communication operations to understand where bottlenecks occurred in the applications, as well optimized the performance.

The National Tsing Hua University ZY team secured the championship, while Singapore's Nanyang Technological University Neutron team and the Southern University of Science and Technology team tied for second place. Following closely, the National Tsing Hua University SJ team, the Nanyang Technological University Nebula team, and the National Cheng Kung University team claimed third place. Merit prizes were awarded to the Monash University team, Thammasat University Lampang team, Kasetsart University team, Universiti Putra Malaysia team, and Lanzhou University team. Additionally, the Nanyang Technological University Neutron team earned recognition for the best HPC performance, and the National Cheng Kung University team was honored for the best AI performance.

"The teams this year showcased the power of innovation and collaboration in addressing global challenges. The competition tasks not only pushed the boundaries of HPC and AI but also underscored their pivotal role in shaping our future," said Associate Professor Tan Tin Wee, Chief Executive of NSCC Singapore. "Congratulations to this year's winners and to all participating teams. We look forward to seeing how their transformative solutions will address existing challenges and create greater opportunities in the future."

The 6th APAC HPC-AI Competition Award ceremony will be held during the [SupercomputingAsia 2024](#) conference in Sydney, Australia from 20 February – 23 February 2024.

For more information on the APAC HPC-AI Competition please visit www.hpcadvisorycouncil.com.

[Back to main content list](#)

NSCC and RIKEN Centre for Computational Science (R-CCS) extend collaborative research partnership

R-CCS and NSCC signed an amendment and extension of the Memorandum of Understanding (MoU) for Research Collaboration. This extension aims to prolong their ongoing partnership in the field of computational science, fostering academic and research cooperation and exchanges for an additional three years.



NSCC Steering Committee Chairman Mr Quek Gim Pew (left) and RCCS Professor Satoshi Matsuoka (right) endorsed the official extension of the MoU for Research Collaboration.

RCCS and NSCC renewed and extended their MoU for Research Collaboration, signifying an additional three-year commitment to their ongoing partnership. The amendment builds upon the foundation laid by the original MoU and emphasises further mutual support in the field of computational science.

NSCC currently collaborates with RCCS on a call for projects to use resources on the supercomputer Fugaku. This initiative will grant the local research community access to Asia's foremost cutting-edge supercomputer, catering to the high-performance computing needs in research.

In addition, NSCC and RCCS will be working together to roll out HPC educational projects aimed at nurturing talent, such as student internships, training courses, workshops, summer schools and the training of high-performance computing competition teams.

The two centres will also focus on several key areas, which includes Visiting Scientist/ Researcher Exchange programmes, high speed data transfer between Singapore and RIKEN-NSCC for data sharing and storage; and support for high impact consortium projects like the SYNAPSE brain mapping consortium.

The extended collaboration signifies a significant stride in fostering a stronger partnership between both centres.

[Back to main content list](#)

NSCC's High Performance Computing Innovation Challenge is back

Co-organised by NSCC, Infocomm Media Development Authority (IMDA) of Singapore and AI Singapore, the annual High Performance Computing Artificial Intelligence Innovation Challenge (HPCIC) seeks powerful solutions that apply to both high performance computing (HPC) and AI to tackle key challenges in today's society.



Speakers and attendees at the HPCIC information session

2023 has quickly emerged as the breakout year for the advancement of artificial intelligence (AI). AI's surge in prominence has ignited stiff competition for essential resources such as data, computing power and more. Evolving from a pipe dream to our present reality, AI now drives transformations and innovations across all facets of society.

Spanning six months, the HPCIC23 offers innovators the opportunity to harness their resources and accelerate the creation of transformative solutions in the following domains:

- Manufacturing, Trade and Connectivity
- Human Health and Potential
- Smart Nation and Digital Economy
- Urban Solutions and Sustainability



The Challenge is open to government agencies, local enterprises and students from local polytechnics, ITE and universities. Up to 15 teams will be shortlisted to proceed with the development of their solutions and will receive access to one of the most powerful supercomputers in Southeast Asia, ASPIRE 2A, as well as mentorship and training by subject matter experts.

The top 3 winning teams stand to win:

- Cash prizes of up to \$5000
- Special mention & recognition at National Youth Entrepreneurship Awards 2024 (For Students Category)
- Special mention & recognition at ACE.SG Startup Awards (For Open Category)
- Featured on Supercomputing Asia Magazine
- Speaking and panelist opportunities at related events.
- Internship opportunities (subject to evaluation and availability).
- Continued support and access to NSCC's HPC resources post-challenge

An information session on the challenge was held on 15 November 2023. During the session, Dr Rick Goh from A*STAR delved into the Significance of HPC and AI before Dr Eric Tan from Infocomm Media Development Authority discussed the Impact of Generative AI. Mr Laurence Liew from AI Singapore deep dived into Maximizing Business value with AI and HPC, and Dr Deb Goswami from NVIDIA shared Practical Tips when Working with Large Language Models (LLM).

Attendees of the information session also got to interact with the speakers to deepen their understanding about the industry and find out more about the NSCC HPC AI Innovation Challenge, which seeks to look for the brightest minds in AI to tackle the most pressing challenges for Singapore's digital future.

Applications are open from now till **10 January 2024**. For more information on HPCIC23, visit www.hpcic23.sg.

[Back to main content list](#)

NSCC joins consortium to create trustworthy and reliable generative AI models for science

The Trillion Parameter Consortium (TPC) brings together teams of researchers engaged in creating large-scale generative AI models to address key challenges in advancing AI for science.



Founding partners of the TPC gathered for a kickoff meeting. Not pictured are more than 130 remote participants from around the world.

A global consortium of scientists from federal laboratories, research institutes, academia, and industry has formed to address the challenges of building large-scale artificial intelligence (AI) systems and advancing trustworthy and reliable AI for scientific discovery. NSCC joined the TPC as one of its founding members.

The TPC brings together teams of researchers engaged in creating large-scale generative AI models to address key challenges in advancing AI for science. These challenges include developing scalable model architectures and training strategies, organizing, and curating scientific data for training models; optimizing AI libraries for current and future exascale computing platforms; and developing deep evaluation platforms to assess progress on scientific task learning and reliability and trust.

“At our laboratory and at a growing number of partner institutions around the world, teams are beginning to develop frontier AI models for scientific use and are preparing enormous collections of previously untapped scientific data for training.” Said Rick Stevens, Argonne Associate Laboratory Director for Computing, Environment and Life Sciences

Trillion parameter models represent the frontier of large-scale AI with only the largest commercial AI systems currently approaching this scale.

Training LLMs with this many parameters requires exascale class computing resources, such as those being deployed at several U.S. Department of Energy (DOE) national laboratories and multiple TPC founding partners in Japan, Europe, and elsewhere. Even with such resources, training a state-of-the-art one trillion parameter model will require months of dedicated time—intractable on all but the largest systems. Consequently, such efforts will involve large, multi-disciplinary, multi-institutional teams. TPC is envisioned as a vehicle to support collaboration and cooperative efforts among and within such teams.

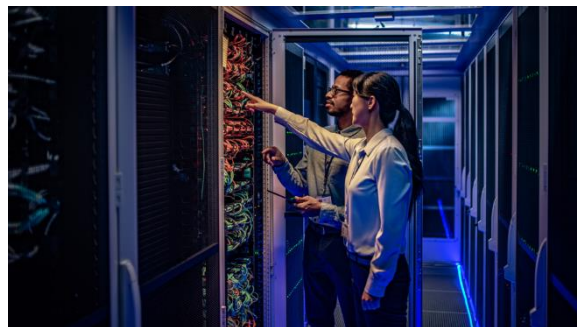
For more information on the TPC, visit tpc.dev.

[Back to main content list](#)

Supercharge your career with high performance computing skillsets

Jointly run by the National Supercomputing Centre (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 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. 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.

The next intake for the course is on **13 December 2023**. Fees for this course can be paid using SkillsFuture credits.

For more information, visit [https://www.ite.edu.sg/courses/course-finder/course/coc-in-introduction-to-high-performance-computing-\(hpc\)](https://www.ite.edu.sg/courses/course-finder/course/coc-in-introduction-to-high-performance-computing-(hpc)).

[Back to main content list](#)



Shared articles and news from the HPC world.

Singapore to build nationwide quantum-safe network

Singapore picks two local companies that will collaborate with Toshiba to build Southeast Asia's first quantum-safe network to future-proof its systems.

The city-state has appointed Singapore-based network provider SPTel and quantum firm SpeQtral to build the National Quantum-Safe Network Plus (NQSN+) network. The NQSN+ aims to secure its systems against the potential threats posed by quantum computing by utilizing quantum encryption. When completed, the quantum-safe network will provide “unparalleled” data protection for the government and commercial users, SPTel and SpeQtral said in a statement.

Read more at Cybernews [here](#).



Credit: Shutterstock

[Back to main content list](#)

World’s fastest supercomputers are helping to sharpen climate forecasts and design new materials

Researchers show off results emerging from Frontier, top “exascale” computer

To really understand how a material behaves, researchers need to simulate its whirling electrons, which govern most of its chemical and electronic properties. But they have traditionally faced a trade-off. They could simulate up to a couple of hundred electrons with near-perfect accuracy. Or they could simulate a much larger number—while accuracy fell off a cliff. The world’s most powerful supercomputers, operating at the far frontier of speed known as the exascale, have now begun to eliminate that trade-off. Read more at Science [here](#).



Credit: Oak Ridge National Laboratory

[Back to main content list](#)

UK to build its fastest supercomputer in bid to lead in AI

Isambard-AI, housed at the University of Bristol, will boast 21 exaflops of performance

The U.K. government has revealed details on its new £225 million (\$272 million) AI supercomputer – with hardware from Nvidia and HPE set to power the country's fastest supercomputer. Isambard-AI, which was first shown off in September, will be housed at the University of Bristol. HPE’s Cray EX supercomputers and some 5,448 state-of-the-art Nvidia Grace Hopper 200 Superchips will power the unit. The supercomputer be used by researchers to explore AI for robotics, climate research and drug discovery. The powerful hardware will deliver a whopping 21 exaflops of AI performance – and capable of reaching up to 200 quadrillion calculations per second. Read more at AI Business [here](#).



Credit: AI Business

[Back to main content list](#)



Powering Innovation
Supercomputing in Asia

National Supercomputing Centre (NSCC) Singapore

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