National Supercomputing Centre (NSCC) Singapore e-newsletter

NEWSBYTES

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In this Issue…

CORPORATE NEWS

SupercomputingAsia 2022 (SCA22) hybrid conference – Bringing the HPC community back together!

Themed "Towards Supercomputing for All - Powering a Future of Possibilities", the three-day hybrid event featured more than 155 speakers and panellists sharing their knowledge and expertise with more than 1000 participants and registrants from across the world.

Co-organised by HPC organisations from Australia, Japan and Singapore, the SCA22 concluded after three days of insightful conference sessions and exhibitions on the latest HPC technology innovations and developments. With the support from SCA's partners, speakers, sponsors and participants, the conference returned with in-person meetings and session after a hiatus of more than two years. Some 500 participants attended the event in-person over the 3-day conference, with an average of 770 virtual attendees a day, representing over 260 organisations across 14 countries.

"As we continue to explore the limitless potential of HPC, and build world-class digital infrastructure in Singapore, we have a lot to learn from our more established partners and collaborators at this conference and from across the world. I am confident that with your help and with our collective commitment, we will be able to work toward a future where Supercomputing is for all."

Dr Janil Puthucheary, Senior Minister of State, Ministry of Communications and Information & Ministry of Health, Minister-in-charge of GovTech Singapore

"...new partnerships underscore the importance of Singapore's supercomputing in today's most critical domains, such as healthcare and the environment. These partnerships explain why future demand for high performance computing will only get bigger. Smart nation initiatives and the growing importance of digital tools like AI and machine learning also point to an insatiable demand for more and more PetaFLOPS and petabytes."

Mr Peter Ho, Chairman, NSCC Steering Committee

Key highlights from SCA22

The conference covered a wide array of topics such as the latest trends in supercomputing, HPC-enabled research, data centre technologies, collaborations in areas of HPC and quantum computing. The event also brought new focus on talent development and inclusivity in the realm of HPC with new tracks on "Accelerating HPC Upskilling without Borders" and "Inclusivity and Diversity, the path to supercomputing for all".

Singapore HPC Innovation Challenge for the Environment

NSCC launched the first HPC Innovation Challenge for the Environment at SCA22 to encourage local teams to submit potential solutions and proposals in areas like creating smart city ecosystems, greener buildings, enhancing the quality of urban living and solutions to tackle climate change. Teams from Singapore government agencies, local enterprises and students from Institutes of Higher Learning will be invited to vie for Challenge Prizes totalling S$18,000. Find out more about the competition here.

2nd HPC Centre Leaders Forum

The second instalment of the HPC Centre Leaders Forum saw leaders from the APAC region and Europe sharing updates on their respective centres and discussing areas of interest relating to HPC infrastructure, operational best practices, talent development and the common challenges that the centres faced. Participants included Finland's CSC – IT Centre for Science, which manages Europe's pre-exascale LUMI supercomputer, Japan's RIKEN-CCS, which developed Fugaku, currently the world's top-ranked supercomputer as well as other established and regional HPC centres like NCI, Pawsey, KAUST, ThaiSC and NSCC.

2nd EU-ASEAN-Japan Symposium

Building on the success of the inaugural symposium in 2021, key opinion leaders and principals from EU, ASEAN and Japan gathered to talk about regional HPC infrastructure development, talent upskilling, international HPC collaboration and the opportunities, and challenges in cross-border HPC collaboration. Some of the ongoing collaborative initiatives involved included programmes like the Enhanced Regional EU-ASEAN Dialogue Instrument (E-READI) and the organisation of the EU-ASEAN High-Performance Computing (HPC) School.

A big ***THANK YOU*** to all our partners, speakers, track chairs, sponsors, exhibitors, participants, and co-organisers for making the SCA22 hybrid conference a success!

For more information on SupercomputingAsia, please visit https://www.sc-asia.org/.

SCA will be welcoming the ThaiSC supercomputing centre of the National Science and Technology Development Agency, Thailand as a co-organiser in the next iteration of the event, SupercomputingAsia 2023 (SCA23). SCA23 will also be held in conjunction with HPCAsia 2023.

Lock in your dates and dust off those suitcases as we wait to welcome you back to Singapore for SCA23 / HPCAsia 2023!

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Public-private partnership in supercomputing to spur advanced healthcare research in Singapore

NSCC, SingHealth and NVIDIA signed agreements to develop a research ecosystem of hardware and software tools to support healthcare and medical research at Singapore's largest public healthcare cluster.

NSCC, SingHealth and NVIDIA are collaborating to support healthcare research in Singapore with a new supercomputer based at SingHealth, access to advanced software, training, and high-performance computing (HPC)-enabled pre-trained AI models to significantly accelerate large-scale and complex healthcare research.

The collaborations work hand-in-hand to build a complete innovation environment that combines supercomputing infrastructure capabilities, the operating software and AI tools to power advanced research, and healthcare use cases for applying these capabilities and tools. Beyond healthcare, these tools will also support a variety of research in other fields like climate science and data centre operations.

SingHealth and NSCC will develop and deploy a supercomputer that will be 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. NVIDIA will provide access to its software tools and pre-trained AI models. Partners can further leverage NSCC's Supercomputing Digital Sandbox environment, which makes it easier for researchers not trained in HPC to use NSCC's supercomputer. SingHealth will leverage the supercomputing infrastructure and digital tools provided to advance a number of its ongoing medical research and innovation projects, so as to benefit patient care and improve clinical outcomes.

"These Public-private partnerships linking the entire value chain of infrastructure, software, digital tools and researchers will accelerate scientific outcomes, and in this case support Singapore's healthcare and medical services," said Dr Janil Puthucheary, Senior Minister of State for Communications and Information & Health, and Minister-in-Charge of GovTech who officially opened the SCA22 event. "The NSCC, SingHealth and NVIDIA agreements serve to deepen collaboration and will open up many more possibilities in other fields of medicine, beyond the initial use cases."

Mr Peter Ho, Chairman of the NSCC Steering Committee said, "NSCC is excited to work with partners like SingHealth and NVIDIA to benefit local researchers in an important field like healthcare. We also hope that this will spur the many local and international organisations attending SCA22 to do likewise and find mutually beneficial partnerships that will help advance Singapore's HPC community, and its related research fields."

“The adoption of emerging technologies is a game-changer in helping us enhance care delivery and optimise healthcare resources with the goal to improve clinical outcomes and the experience for patients,” said Professor Kenneth Kwek, Deputy Group CEO (Innovation & Informatics), SingHealth adding that the partnership will aid researchers in developing breakthrough research and innovations that will help shape the future of healthcare.

Dennis Ang, Senior Director, Enterprise Business, ASEAN and ANZ Region at NVIDIA said, “Our collaboration with NSCC and SingHealth will help to grow research and innovation in healthcare, as well as other key fields related to climate research and digital twin simulation in Singapore.”

For more information about the partnership, please visit https://www.nscc.sg/press-room/.

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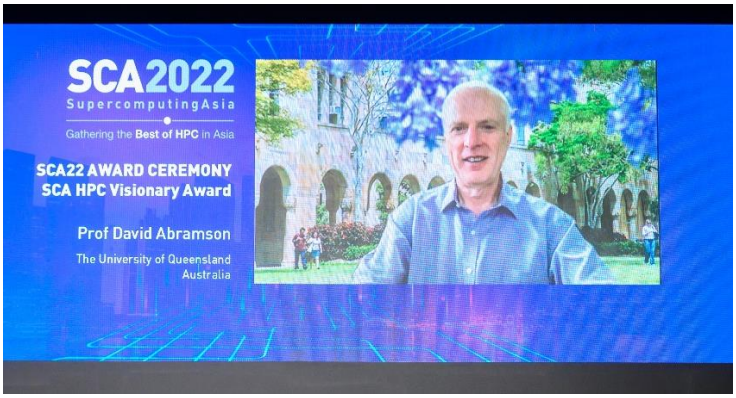
Recognising HPC pioneers and the innovators in global network data transfer solutions

The SupercomputingAsia 2022 (SCA22) Awards and Data Mover Challenge 2021 Awards were recently announced at the SCA22 held in Singapore. The awards honours key HPC pioneer-leaders from the regional and international communities as well as the winning teams of the international Data Mover Challenge 2021 (DMC21) competition.



Three key HPC pioneer-leaders were recognised through the conference’s annual SCA Awards. The SCA Awards are an opportunity for the HPC community to recognise and celebrate those who have contributed significantly in one way or another to High-Performance Computing, or those who have been instrumental in the development of the HPC ecosystem, particularly for the Asian or Indo-Pacific region. This year’s SCA22 Award recipients were recognised for their contributions towards the development of HPC in their respective countries as well as driving international HPC cooperation and collaboration through their activities. The winners were nominated, assessed and selected based on their significant and pioneering contributions to the HPC community.

The SupercomputingAsia 2022 (SCA22) Award winners are:

Name	Award Name	Organisation	Citation
Prof David Abramson	SCA HPC Visionary Award	The University of Queensland, Australia	For significant contributions to the advancement of Australian and global HPC through the development of world-leading HPC research and distinguished service in international HPC communities.
Dr Jysoo Lee	SCA HPC Leadership/ Achievement Award	KAUST (King Abdullah University of Science and Technology), Saudi Arabia	For leading pioneering initiatives to develop South Korea's HPC community and driving activities that have advanced international cooperation.
A/Prof Francis Lee Bu Sung	SCA HPC Network Achievement Award	Singapore Advanced Research and Education Network (SingAREN)	For contributions towards promoting global research and interaction between HPC communities through the establishment and growth of both local and international research and education networks.

For more information about the SupercomputingAsia Awards and past winners, please visit https://www.sc-asia.org/sca-awards/.

Data Mover Challenge (DMC) 2021 Competition

The international DMC competition is organised by NSCC and 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. The DMC competition encourages international teams to come up with the most advanced and innovative solutions for data transfer across servers located in Singapore, Australia, Canada, Europe, USA, South Korea, Japan and Saudi Arabia that are connected by 100Gbps international research and education networks. The five winning teams presented their winning solutions live at SCA22.

Team	Country	Award Name	Citation
Team MUSASHINO	Japan	Most Innovative and Best IPv6 Performance	Good proprietary reliable protocol, friendly to other internet protocol. Good, high speed IPv6 protocol.
Arcitecta	Australia	Most Complete Solution and Best Software Architecture	Good system architecture design.
Fast Is Good (Raysync/Robust)	Malaysia/China	Best Virtualisation Support	Good exploitation of containerisation
Globus	USA	Best Integrated Software Experience	Good end user software design and architecture
Ciena-iCair-UETN	Canada/USA	Best Long-Distance Performance AND Overall Winner	Highest consistent throughput, especially over long distance from Europe to Australia

For more information about the DMC21, the participants and the supporting partners, please visit https://www.nscc.sg/data-mover-challenge-2021/.

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Closer Singapore and Australia HPC collaboration

NSCC and National Computational Infrastructure (NCI) Australia signed a Memorandum of Understanding to build on their already close partnership. The MoU will deepen their joint activities into areas that will further improve technology, software development, staff and user training, and data sharing for both organisations over the next three years.

NCI and NSCC have signed a Memorandum of Understanding (MoU) in a ceremony that took place virtually at The Australian National University and the Australian High Commission in Singapore. The MoU was signed on the sidelines of the annual SupercomputingAsia 2022 (SCA22) conference, held in Singapore.

The collaboration is the next step in a productive working relationship that will grow the capabilities of both centres and lead to advances in computational science software and the technical development of our staff. Users will benefit from improved training materials and future access to novel computing technologies.

NCI Director Professor Sean Smith said, “NCI and NSCC have been close collaborators for many years now, and this Memorandum of Understanding builds and furthers the relationship that we’ve built. We are extremely excited to continue to work with our NSCC colleagues to further the interests of supercomputing, big data and high-throughput computing users in the Asia-Pacific region.”

NSCC Chief Executive Associate Professor Tan Tin Wee said, “NSCC and NCI share a bond that stretches

back to the early days of NSCC's establishment. NCI was one of the closest HPC centres that NSCC had reached out to in our journey to build a national supercomputing infrastructure for Singapore. We have learned much from our friends and continue to do so. This new MOU expands on the already good foundations that the two organisations have laid down and sets our collaboration on a new and exciting path."

As the supercomputing world progresses to exascale, NCI and NSCC are working together to see how both centres' capabilities can be geared up to keep in step with global HPC developments. Parts of the MOU will explore collaboration in the area of HPC infrastructure and capability development in areas like exascale systems, green data centre technologies, greater research network connectivity, and more secure data transfer using quantum encryption technology.

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Five Singapore research projects to use HPC resources on Japan's Fugaku system

The successful project awardees from Singapore, which were approved for a total of 1 million node hours of high-performance computing, span a number of research fields including materials research, advanced manufacturing & engineering and urban solutions & sustainability.

In an agreement signed between Japan's Research Organization for Information Science and Technology (RIST) and National Supercomputing Centre (NSCC) Singapore in November 2021, Singapore researchers were granted regular access to the world's most powerful supercomputer, Japan's Fugaku system. The first such arrangement of its kind outside of Japan, Singapore researchers can now access the available resources through an annual Call for Projects to Fugaku, which is facilitated by NSCC in partnership with RIST. The access to Fugaku's ARM chip-based architecture and compute power helps local high-performance computing (HPC) researchers broaden their experience by working on advanced CPU and interconnect technologies which are not available in Singapore. The collaboration also strengthens the well-established links between the national HPC centres of Singapore and Japan and contributes to the development of the high-performance computing field in both countries.

The first Call for Projects to Fugaku was launched in December 2021 with a total of 16 applications received. The applications were assessed by a panel of HPC experts from Singapore and Japan. Five Singapore research projects were shortlisted, selected and finally approved by RIST to start using the Fugaku supercomputer system from April 2022. The projects will be given a maximum duration of one year for each project to use the approved resources. The successful projects and their institutions are listed below.

Name of project	Organisation
Excitonic Effects in Nonlinear Optical Processes of Emerging Materials	National University of Singapore (NUS)
Simulation of Air-Sea Interactions with AI-Accelerated Computational Fluid Dynamics	National University of Singapore (NUS)
Big HPC Code Implementing the Adjoint-state Travel-time Tomography Method	Nanyang Technological University (NTU)
Ultra-large Molecular Dynamics Simulations of Complex Concentrated and Gradient Nanostructured Alloys for Engineering Applications	Agency for Science, Technology and Research (A*STAR)

Designing Stable, Active, and Selective Ni-based Nanoparticles for Dehydrogenation of Liquid Organic Hydrides	Nanyang Technological University (NTU)

More details about the projects can be found at https://www.hpci-office.jp/materials/e_adoptionlist2021_11_nscc.pdf

The annual Call for Projects to Fugaku via NSCC and RIST is in addition to NSCC's national Call for Projects, which are held every six months for all Singapore-based research projects. The additional access to Fugaku will give Singapore researchers more options for resources to meet their high-performance computing (HPC) needs. Singapore researchers will also have upgraded national HPC resources to tap on when Singapore's newest supercomputer system, with an aggregated raw compute power of up to 10 PFLOPS, comes online in the second half of 2022.

The Call for Projects will be regularly published on NSCC's websites at www.nscc.sg and https://help.nscc.sg/project-calls.

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THE LAST BYTE...

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Shared articles and news from the HPC world.

Communications Minister confirms Singapore's data center pilot program to accept applications from Q2

Call for 'best-in-class energy-efficient and decarbonized data center' applications to open in the second quarter of 2022

Singapore's Communications Minister has confirmed that the city-state will begin accepting applications for new data center developments from Q2 as part of a pilot project. Singapore has had a moratorium on new data center projects since 2019 amid a dearth of space and energy. But has recently begun to indicate it would relax the restrictions. Read more at Data Centre Dynamics here.

Credit: Data Centre Dynamics

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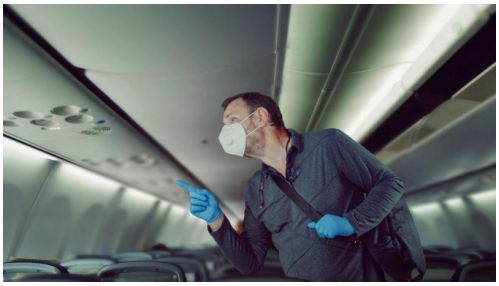
Argonne Supercomputer Powers Air Travel Covid-19 Research

The world is (once again) returning to some semblance of pre-pandemic life as the omicron variant wanes.

Many are now wondering about the risk calculus for popular activities such as plane travel, which can often be a high-density environment. Researchers at the Argonne Leadership Computing Facility (ALCF) have been applying supercomputing power to examine how different boarding procedures affect the risk of Covid transmission on airplanes. Read more at HPC Wire here.



Credit: HPC Wire

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The edge network is reshaping data center ecosystem

The edge of the network is becoming increasingly important as businesses look to improve their workloads and run applications.

Today, the edge is no longer just a point at the network. It is becoming increasingly core to the data center market, especially with edge computing changing the entire data center ecosystem. Often deployed as an alternative to cloud and central data centers, edge computing provides lower latency and data transmission costs compared to centralized resources. Read more at Tech Wire Asia here.

Credit: Tech Wire Asia

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