National Supercomputing Centre (NSCC) Singapore e-newsletter

NEWSBYTES

ASPIRE2A

January 2025

In this issue…

CORPORATE NEWS

NSCC Singapore's 2024 Roundup

2024: A YEAR OF PROGRESS AND HIGHLIGHTS

A NOTE FROM OUR CHIEF EXECUTIVE

2024 was an incredible year for NSCC Singapore. From the launch of our new supercomputers, ASPIRE 2A and ASPIRE 2A+ to strengthening international partnerships, we have achieved significant milestones and reinforced our position as a national HPC infrastructure on the global stage. We are also proud to have supported the next generation of HPC leaders and the research community through our HPC resources.

I would like to extend my gratitude to our partners for their unwavering support. Together, we look forward to shaping the future of HPC in 2025 and continuing to empower the research community in Singapore and beyond!
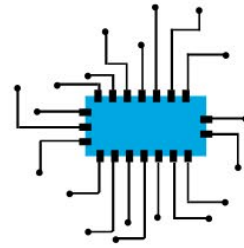
DR. TERENCE HUNG, CHIEF EXECUTIVE, NSCC SINGAPORE

ASPIRE 2A & ASPIRE 2A+ STATS

658,000
Combined GPU hours on ASPIRE 2A and ASPIRE 2A+

615M
Combined CPU hours on ASPIRE 2A and ASPIRE 2A+

727
Unique projects supported across ASPIRE 2A and ASPIRE 2A+

301
Participants for HPC Training Sessions for the local research community

338
Attendees at NSCC Singapore Events

ASPIRE 2A+ ranked No. 90 out of TOP 500 list (November 2024) of the world's most powerful supercomputers

2024 KEY MILESTONES

NSCC SINGAPORE'S SUPERCOMPUTERS

Launch of ASPIRE 2A and ASPIRE 2A+ supercomputers

New funding for development of next supercomputer

NSCC Singapore's new supercomputers, ASPIRE 2A and ASPIRE 2A+ were launched by Deputy Prime Minister and Chairman of the National Research Foundation (NRF), Mr Heng Swee Keat. The launch coincided with the announcement of a $270m grant to develop the next supercomputer and further develop HPC capabilities in Singapore.

NSCC Singapore updates its Strategic Resource Allocation Policy

As a National Research Infrastructure (NRI), NSCC Singapore introduced its new Strategic Resource Allocation Policy in 2024 to align its resources to support key research projects to achieve significant economic outcomes and scientific imperatives for Singapore. The policy also aims to better streamline the prioritisation, usage and optimisation of these national HPC resources.

New NSCC Singapore and Singtel AI Infrastructure collaboration to support local research with HPC resources

NSCC Singapore signed an MoU with Singtel at the launch of RE:AI to develop an AI-powered R&D platform for the local academia and the research community. The partnership will explore AI cloud solutions, leveraging Singtel's Paragon platform and AI Cloud services to deliver scalable, optimised HPC technologies for our users in AI and machine learning workloads, fostering innovation and increase operational efficiency.

Symposium on Singapore's third national climate study

The Centre for Climate Research Singapore (CCRS) of the National Environment Agency (NEA) unveiled findings from the 3rd National Climate Change Study, enabled by NSCC Singapore's supercomputing infrastructure, which supported high-resolution climate projections and accelerated 1,000 years of simulations in under three years, highlighting the critical role of supercomputing in advancing climate research for Singapore and Southeast Asia.

Project MERaLion: Multimodal Empathetic Reasoning and Learning in One Network

The MERaLion project, led by the Agency for Science, Technology and Research (A*STAR) Institute of Infocomm Research (I²R), is a multilingual, emotionally intelligent model that understands speech and text, interprets emotions, and responds thoughtfully. It integrates emotional intelligence, cultural awareness, and multilingual communication. NSCC Singapore's HPC resources plays a key role in supporting the training and fine-tuning of these models, which were showcased during the launch of ASPIRE 2A and ASPIRE 2A+.

NSCC Singapore a key resource partner for BEAP

The Built Environment Accelerate to Market Programme (BEAMP), organised by the Building and Construction Authority (BCA), JTC Corporation (JTC), and Enterprise Singapore (EnterpriseSG), leveraged NSCC Singapore's HPC resources to support innovators in test-bedding and piloting advanced solutions to address real-world challenges in the Built Environment sector.

NSCC Singapore facilitates access for local researchers to GPU Resources from CSC Finland's LUMI supercomputer

NSCC Singapore, in collaboration with Finland's CSC, provided Singapore researchers exclusive access to GPU resources from the EU's leadership LUMI supercomputer to support advanced computational projects, especially those related to AI and LLM research.

Memorandum of Understanding (MoU) with Quantinuum to explore hybrid computing solutions

Singapore's National Quantum Office, A*STAR, National University of Singapore (NUS), NSCC Singapore, and Quantinuum signed an MoU to access Quantinuum's advanced quantum computers, collaborate on hybrid computing solutions, and foster talent development, aligning with Singapore's National Quantum Strategy to bolster its position as a global quantum technology hub.

R-CCS and NSCC Singapore joint workshop on HPC operational excellence and system architecture planning

RIKEN Centre of Computational Science (R-CCS) and NSCC Singapore conducted a two-day workshop, bringing together 18 HPC experts from Japan and Singapore to enhance collaboration, share best practices, and advance HPC operations. Discussions focused on next-generation HPC systems, future infrastructure plans, AI and quantum integration, and security frameworks, laying the foundation for future joint initiatives in supercomputing excellence.

NSCC Singapore and CSC Finland strengthen HPC collaboration

In 2024, NSCC Singapore and CSC Finland deepened their longstanding collaboration at a trilateral meeting and seminar with A*STAR's Institute of High Performance Computing (IHPC), discussing HPC-Quantum integration, AI, green computing, and digital twins. A seminar hosted by the Finland Embassy in Singapore, highlighted HPC's role in sustainable development and fostering closer ties between Singaporean and Finnish HPC communities. The collaboration builds on engagements like the Alliance of Supercomputing Centres and Singapore's access to LUMI, Europe's fastest and greenest supercomputer.


HPCIC23 highlights innovative HPC-AI solutions from students and startups

Co-organised by NSCC Singapore, Infocomm Media Development Authority (IMDA), and AI Singapore, HPCIC23 celebrated the innovative HPC-AI solutions of 16 finalist teams, with winners including Team Water (Singapore Polytechnic), Team OwlShield (NUS & Singapore Management University (SMU)), and Team WeavInsight, highlighting the transformative power of collaboration and innovation, deepening industry connections and advancing technological excellence.

Nanyang Technological University (NTU)'s Team Supernova wins 3rd place for ISC Student Cluster Competition 2024

The NTU HPC student team, Team Supernova, secured 3rd place in the online category of the ISC24 Student Cluster Competition. Supported by NSCC Singapore, the students assembled their own HPC systems and tackled various challenges during the three-day event. Team leader Zhang Danxu, noted that the competition not only sharpened the team's technical skills but also deepened their passion for computational science and its capacity to address real-world challenges.
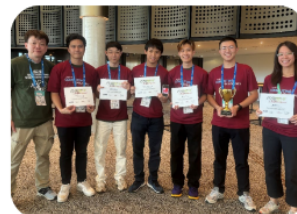
NSCC Singapore and Intel host AI workshop to upskill the local HPC community

NSCC Singapore, in collaboration with Intel Technologies, hosted a full-day workshop, equipping 27 attendees from institutions like A*STAR, IMDA, NTU, and NUS with hands-on experience in AI, ML, and LLM technologies, including Intel Gaudi2 and Llama2, fostering innovation within the HPC community.

6th APAC HPC-AI Awards and Launch of 2024 Student Competition

The 6th APAC HPC-AI Awards, held during Supercomputing 2024 (SC24), honored the National Tsing Hua University ZY Team and announced the launch of the 7th APAC HPC-AI competition, featuring tasks on supercomputers from NSCC Singapore and NCI Australia.

NTU and NUS student teams clinched awards at SC24

At SC24, NTU and NUS students teams excelled in the Student Cluster Competition (SCC). Team Supernova won the Highest Linpack Award at SC24 SCC, showcasing exceptional performance under strict 4500W power limits. Their winning setup featured 8 Nvidia H100 GPUs and AMD EPYC CPUs, achieving 236.4 TFlops. Meanwhile, NUS's Team Kent Ridge secured 1st place in the "Highest Linpack Benchmark" category at IndySCC, competing against 20 global universities. Their victory in optimising applications on Jetstream2, a supercomputer from Indiana University, marked a strong debut in international competitions.

NTU's Team Supernova

NUS's Team Kent Ridge

SUPERCOMPUTING ASIA 2024 (SCA24)

SCA24, co-organised by NSCC Singapore and HPC centre partners from the region, was themed "Exascale Readiness in AI, HPC, and Quantum" and concluded successfully in Sydney, Australia, featuring 172 speakers and panellists engaging over 1,200 attendees from 27 countries and 263 organisations.

NSCC SINGAPORE ADVANCES LLM CAPABILITIES AT IEEE AI 2024

At the IEEE AI 2024 conference, NSCC Singapore supported the AI-HPC community with workshops on optimising large language models (LLMs) and showcased the ASPIRE 2A+ supercomputer's advanced AI capabilities.

HPC USERS SYMPOSIUM 2024

NSCC Singapore hosted its inaugural HPC Users Symposium, bringing together 178 participants from academia, industry, and government to share insights and showcase HPC-driven research. The event marked the launch of the Strategic Resource Allocation Policy and provided updates on the Young Investigator Seed Project. Researchers highlighted innovative projects in AI, materials science, and sustainability, sparking meaningful discussions on the future of HPC in Singapore.

ISC HIGH PERFORMANCE (ISC24), HAMBURG

NSCC Singapore actively engaged with global HPC professionals, showcased its HPC capabilities at an exhibition booth, exchanged insights on national HPC strategies and advancements with international partners, highlighting its pivotal role in supporting local research through its ASPIRE 2A infrastructure.

NSCC SINGAPORE HPC USER GROUP EVENT 2024

The NSCC Singapore HPC User Group Event brought together 64 attendees from academia, industry, and research to for a deep-dive training in HPC and explore new advancements in supercomputing. The event featured insights from NTU, NUS, and leading tech companies like Intel, Altair, and AMD, while fostering collaboration through engaging discussions and networking.

SUPERCOMPUTING CONFERENCE (SC24), ATLANTA

NSCC Singapore leveraged the world's largest HPC conference to showcase its HPC advancements, gain insights on the latest HPC technologies and applications, foster global collaborations, and support talent development through the NTU and NUS student teams participating at the international student competitions.

Back to Main List

SupercomputingAsia 2025 (SCA2025) is officially open for registration!

The SCA25 conference serves as a major networking and collaboration platform, bringing together high performance computing (HPC) thought leaders, decision-makers, academics, multinational corporations, commercial partners, and industry professionals from across the regional and global supercomputing community. Hosted in Singapore this year, this dynamic event promises a week filled with knowledge sharing, strategic discussions, and opportunities for collaboration.

Secure your spot with Early Bird Pricing (Ends on 19 February 2025)

Register now to enjoy significant savings on your conference pass with the Early Bird Pricing! Bulk discounts are available if you are attending the conference with your fellow peers in groups of 5 or more. Click here to register.

Be Inspired by the Keynotes and Conference Tracks

SCA2025 will showcase an impressive lineup of distinguished keynote speakers, including Professor Jack Dongarra, Mr. Charlie Catlett, and Professor Jingbo Wang, who will share their expertise on the future of HPC and its pivotal role in advancing Quantum technologies, AI, and industry innovation. Aligned with the conference theme, 'HPC and Quantum: Empowering AI, Science, and Innovation,' the plenary session will offer invaluable insights into the transformative power of HPC.

This year's specially curated conference tracks also offer delegates the opportunity to explore diverse topics such as AI for Science, Fintech and Blockchain, Weather and Climate Science, Hybrid Quantum-Classical Computing, and more, making SCA2025 a key event for knowledge exchange and collaboration within the global HPC community.

Interested to have your research published in NSCC Singapore's NewsBytes?

We are looking for *guest writers / contributors* to be part of our e-newsletters, which are sent out to a subscriber base of more than **7,500** monthly.

If you are interested in contributing content to our NewsBytes, drop us an email at **e-news@nscc.sg** and we'll be in touch with you!

HPC Centre Leaders Forum 2025
The annual HPC Centre Leaders Forum returns at SCA2025, continuing its tradition as a cornerstone of the conference. This highly anticipated session will feature prominent leaders from various national HPC centres, who will share updates on infrastructure developments, highlight recent breakthroughs in HPC research, and discuss upcoming regional and international collaborations. Join this engaging track session to stay informed about global HPC trends and explore innovations in HPC optimisation.

Discover opportunities at the Talent Fair
The SCA2025 Talent Fair will run alongside the exhibition, offering attendees the chance to connect with researchers from institutes of higher learning (IHLs). Explore exciting career opportunities in HPC research, gain insights into what a career in this dynamic field involves, and learn more about the training programmes available. This will be an excellent opportunity for aspiring researchers and students to network with leading experts in the field and discover pathways into the world of HPC.

Don't miss your chance to be part of SCA2025, where the future of HPC and Quantum in AI, Science, and innovation takes centre stage. Register now to secure your spot and enjoy Early Bird Pricing before it ends on 19 February 2025.

Help us amplify the excitement around SCA2025 by sharing our LinkedIn post with your network!

Back to Main List

Strengthening HPC Capabilities in Singapore – NSCC Singapore's January Workshop Roundup

NSCC Singapore conducted the introductory workshop for ASPIRE 2A

NSCC Singapore organised two workshops this month for users of the ASPIRE 2A and 2A+ systems.

The introductory workshop for ASPIRE 2A provided new users with an overview of the supercomputer's setup, guiding them through a hands-on onboarding process and teaching them how to submit job requests. The advanced workshop catered to experienced users, focusing on debugging and profiling parallel applications with ARM Allinea and other tools from the Cray Programming Environment. Participants also learned to optimise application performance using detailed performance reports and resolved an application crash through debugging techniques.

The ASPIRE 2A+ introductory workshop gave a comprehensive overview of the NSCC Singapore ecosystem, covering the architecture of ASPIRE 2A+ including its login nodes, storage systems, and service unit allocation. Attendees were introduced to file transfer processes, the software environment, and the Portable Batch System (PBS) Professional job scheduler, with best practices for efficient usage and insights into leveraging NSCC Singapore's helpdesk and support services. The session concluded with a Q&A, ensuring participants had a solid foundation to use ASPIRE 2A+ effectively.

NSCC Singapore conducted a sharing session at NTU

NSCC Singapore also presented at NTU HPC Club's training event, sharing insights on HPC and the capabilities of NSCC Singapore's supercomputers. Engaging with undergraduate students is key to nurturing Singapore's future HPC talent pool and sparking an early interest in the field. By providing exposure to cutting-edge technologies and real-world applications, NSCC Singapore aims to inspire the next generation of HPC professionals, fostering innovation and cultivating a continuous pipeline of skilled talent to meet Singapore's growing demands in advanced computing and research.

Back to Main List

NTU and NUS Students Clinched Awards at SC24

Students from the NTU and NUS competed against top global universities to achieve the Highest Linpack Award at SCC and the Highest Linpack Benchmark Award at IndySCC24, respectively, in Atlanta, USA.

<u>NUS's Team Kent Ridge Secured 1st place in HPLinpack at the IndySCC</u>

Left to right: Professor Alex Siow (Senior Advisor, NSCC Singapore), Dr. Cristina Carbunaru (Team Advisor), Tan Chien Hao (Y1, CS), Akash Chandrasekara (Y4, CS), Win Way Yan (Y1, Mathematics), Wang Jiefan (Y4, CS), Lee Tze Han (Y4, Computer Engineering), Himaya Hewageegana (Y3, Engineering not pictured)

Team Kent Ridge, a collaboration between students from the NUS School of Computing and NUS College of Design and Engineering (Computer Engineering), won the Hero HPL Award at the largest virtual international student HPC competition, IndySCC. This remarkable victory marked NUS's debut at IndySCC, hosted at the SC24 conference in Atlanta, Georgia.

The overarching goal of the IndySCC 2024 competition was to optimise the performance of several applications when running on Jetstream2, a supercomputer from Indiana University. The NUS team competed against 20 universities, including world-renowned institutions such as Carnegie Mellon University, Georgia Tech, and Zhejiang University, demonstrating outstanding expertise in optimising performance on a supercomputing cluster.

In the months leading up to the conference, teams completed assignments remotely using cloud-based hardware with technical support provided by HPC experts. The competition culminated in an intense 48-hour contest, where teams raced to complete tasks using the experience and knowledge gained in the preceding

months. Although IndySCC is a virtual competition, select teams, including Team Kent Ridge, were invited to attend SC in person, and compete on the exhibition floor.

"As Team Kent Ridge began our competitive debut, we were quick to find out our strengths and weaknesses. Our members had to juggle the above concerns with the common tasks of building, researching and optimising the competition benchmarks, on top of university undergraduate work and commitments. I am exceedingly proud to say that we've not only managed to put down all challenges but we've also managed to clinch 1st Place in the "Highest Linpack Benchmark" category. This small victory has redoubled our efforts in preparing for ISC25 and SC25." - Wang Jiefan, Team Leader of Kent Ridge

NTU's Team Supernova Secured Highest Linpack Benchmark Award at SCC

Left to Right: Dr. Darshan Sarojini (SCC Vice Chair), Dr. Loke Yuan Ren (Team Advisor), Chua Ze Ming (CS, Year 2), Ng Woon Yee (CS, Year 4), Zhang Danxu (Team Leader, CS, Year 4), Saeng-Nil Nattakan (BCE, Year 3), Bryan Shan Guanrong (BCG, Year 2), Chanpaisis Nattapol (CS, Year 3) and Dan Dietz (SCC Chair)

Team Supernova has been competing in key supercomputing competitions for over a decade, achieving outstanding awards such as the Overall Champion and Highest Linpack at SC17's SCC and 3rd place at ISC24's Online SCC. At SC24 SCC, the team competed against top student teams from ten leading universities around the world, and secured the Highest Linpack Award.

The SC24 SCC is a globally recognised event where student teams design, build, and operate HPC clusters to tackle real-world scientific challenges. The 2024 competition imposed a strict 4500W power limit, making performance optimisation particularly challenging for the students. With most teams deploying similar hardware configurations, achieving the highest Linpack performance required not only technical expertise but also innovative strategies and meticulous system fine-tuning.

Team Supernova's winning configuration featured 8 Nvidia H100 PCIe GPUs and AMD EPYC 9654 CPUs, operating at a peak power consumption of 4360W while achieving 236.4 TFlops on the Linpack benchmark.

The outstanding performance underscores the team's ability to maximise efficiency and push the limits of computational power under stringent constraints.

"Our team's journey to winning the Highest Linpack Award at SCC was like tuning a race car for peak performance. We poured our hearts into optimising every component of our supercomputer, pushing the boundaries of what's possible. This experience not only sharpened our skills but also showed us the incredible potential of HPC in tackling real-world challenges. We're proud of what we achieved and we're excited to use our knowledge to drive innovation in the future." – Zhang Danxu, Team Leader of Supernova

Back to Main List

THE LAST BYTE...

<SHARED CONTENT>

*Shared articles and news from the HPC world.*

NUS: Janus Graphene Nanoribbons Revolutionise Quantum Computing

A team of researchers from NUS has made a groundbreaking discovery that could revolutionise the field of quantum electronics.

The research centres around the development of a novel type of graphene nanoribbon (GNR), called Janus GNR (JGNR), which has unique properties that could be crucial for advancing quantum technologies, particularly in the areas of quantum computing and spintronics.

The discovery of Janus GNR not only advances the field of graphene-based materials but also paves the way for the next generation of quantum electronics.
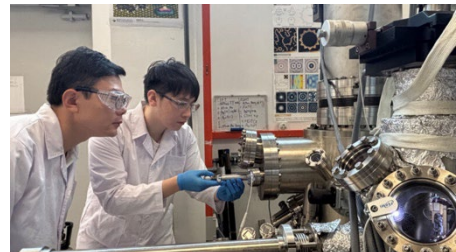
Credit: OpenGov Asia

[Read more](#)

Back to Main List

HLRS Unveils Hunter Supercomputer to Advance Science and Industry

The adoption of an architecture based on CPUs and APU accelerators will also make Hunter a powerful system for artificial intelligence

Credit: HPCwire

A celebration held today at the High-Performance Computing Center of the University of Stuttgart (HLRS) greeted the start of operation of HLRS's newest supercomputer, called Hunter. Designed and manufactured by Hewlett Packard Enterprise (HPE), Hunter will offer a world-class infrastructure for large-scale simulation, artificial intelligence, and data analytics applications in science, industry, and the public sector.

Read more

Back to Main List

BSC: ALIA Project Taps MareNostrum 5 to Build Europe's Largest Public AI Model

This pioneering initiative is 100% publicly funded to serve the public interest and democratise access to AI for citizens, public administration, universities and companies.

The Spanish Prime Minister announced the launch of the ALIA project, the first European public, open and multilingual infrastructure which, thanks to the unique supercomputing capabilities of the Barcelona Supercomputing Center- Centro Nacional de Supercomputación (BSC-CNS), reinforces the technological sovereignty of Spain and Europe in the development of a transparent, responsible artificial intelligence at the service of people.

Credit: HPCwire

Read more

Back to Main List