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CORPORATE NEWS

NTU students come out tops in the ISC Student Cluster Competition

NTU student team are champions in the online category of the annual Student Cluster Competition at ISC23, defeating top teams from around the world.
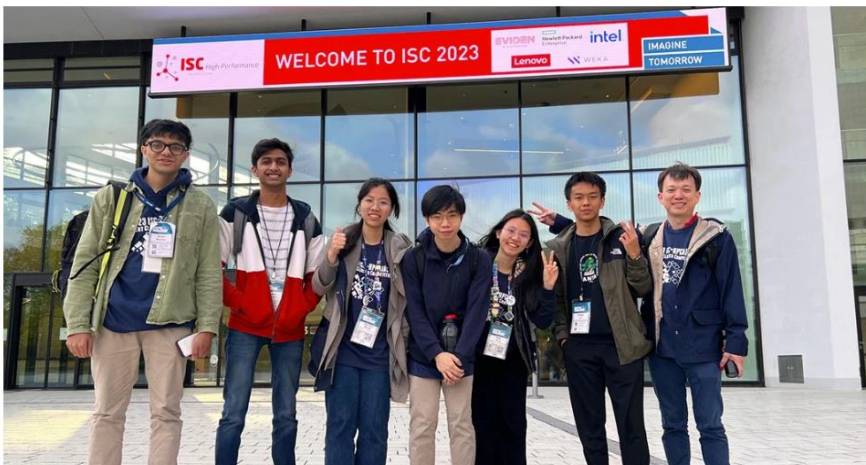
Team members (from left): Aryan Sharma, Lakshya Agarwal, Duong Ngoc Yen, Ding Dao Xian, Wang Ruisi, Luo Yihang, Loke Yuan Ren (Advisor).

WE WOULD LIKE TO HEAR FROM YOU!

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Thank you!

LET'S BEGIN

The ISC Student Cluster Competition (SCC) is an annual competition that encourages international teams of university students to showcase their expertise in a friendly yet spirited competition that fosters critical skills, professional relationships, competitive spirit and lifelong comraderies. A highlight of the ISC event, this year's SCC offered 15 student teams globally the opportunity to compete in the online competition, held on the Bridges-2 supercomputers of the Pittsburgh Supercomputing Center (Carnegie Mellon University and the

University of Pittsburgh) and the clusters, Fritz and Alex at the Friedrich Alexander Universität in Erlangen, Germany.

NTU student team, *Team Supernova*, comprising of students from various undergraduate programmes from the School of Computer Science and Engineering and the School of Electrical and Electronic Engineering, emerged as the winners of the online segment of the competition, defeating 14 top-tier teams from renowned universities and supercomputing centres worldwide. This remarkable victory marks their first time winning the championship in the SCC.

The competition, known for its rigorous challenges in high performance computing, tested participants with complex applications from fluid dynamics simulation, material modelling to solar coronal magnetic field, performance benchmarks, and real-world workloads. Team Supernova rose to the occasion, showcasing exceptional teamwork, problem-solving skills, and technical prowess throughout the intense three-month preparation for the competition.

Through unwavering determination, exemplary teamwork, and unparalleled technical prowess, *Team Supernova* surpassed all expectations to claim the coveted first-place position. The journey to victory was marked by countless hours of preparation, refining strategies, optimizing workflows, and pushing the boundaries of what is possible in HPC.

"We express our heartfelt gratitude to NSCC and our other sponsors, whose support and resources have been invaluable on this journey. Their belief in our potential has empowered us to achieve greatness and push the boundaries of technological advancement. We extend our thanks to all our alumni team members, NSCC staff, other sponsors, advisors and dedicated team members. Together, we will continue to make remarkable strides in the world of high-performance computing", said Dr Loke Yuan Ren, advisor to the team.

Leveraging the resources and support provided by NSCC, the NTU student teams have participated in 17 student cluster competitions since 2014 and are currently ranked third in both the Asia Pacific and Worldwide Student Cluster Competition Leadership List. Congratulations and well done *Team Supernova*!

To learn more about the SCC series, visit the Student Cluster Competition [website](#).

Registration deadline for Data Mover Challenge 2023 extended
Registration for the competition has been extended till 12 July 2023.
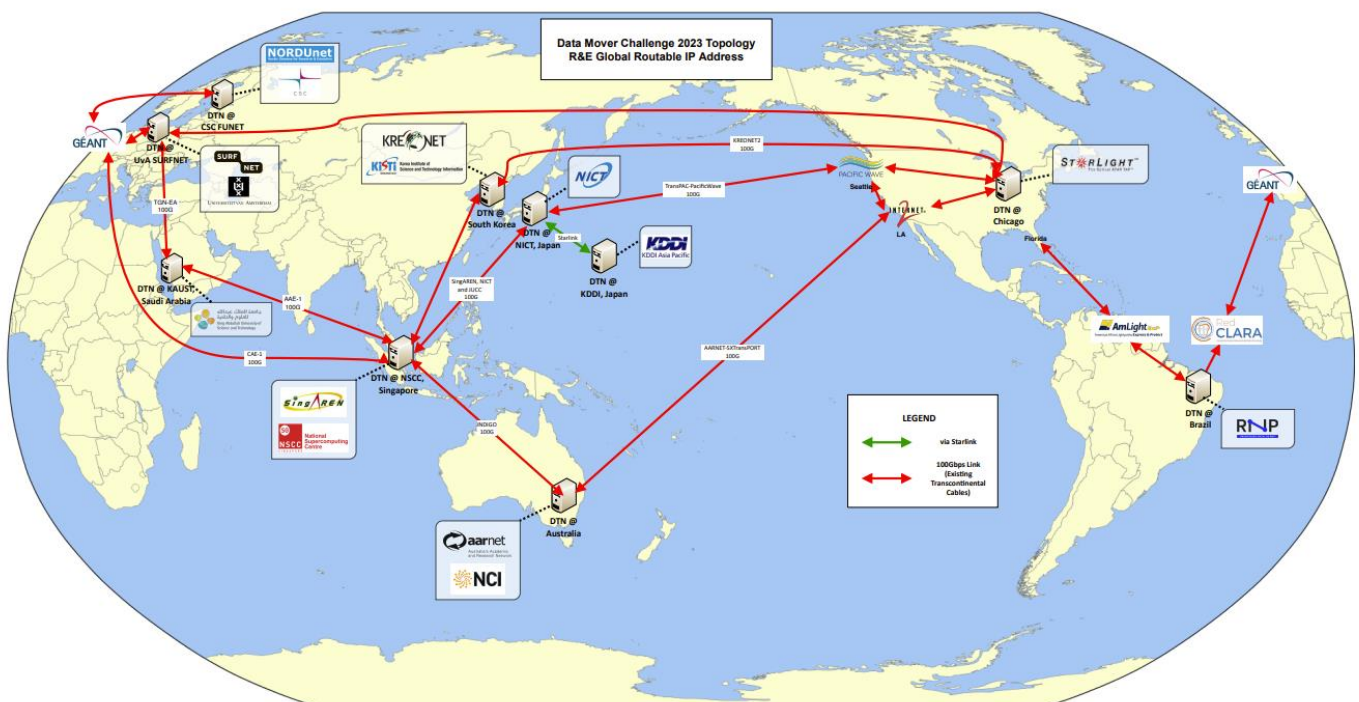
The international Data Mover Challenge (DMC) is a competition organised by the National Supercomputing Centre (NSCC) Singapore that aims to bring together experts from industry and academia in a bid to test their software and solutions for transferring huge amounts of research data. Run once every two years, 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.

DMC23 will run from 1 August to 31 October 2023 and registration for the challenge is open to all organisations, companies, research institutions, academia, researchers, post-graduate students and undergraduate students. The competitors will be assessed and selected by an international panel of judges comprising domain experts and professionals in the field of networking and data transfer.

The winning team will be announced at the SupercomputingAsia 2024 (SCA24) Conference. The winning team's leader will be invited to attend SupercomputingAsia 2024 (SCA24) from 19-22 February 2024 in Sydney, Australia, for an award presentation and solution showcase.

Registration for DMC23 has been extended till 12 July 2023.

REGISTER NOW

For more information about the Data Mover Challenge 2023 (DMC23), please visit https://www.nscc.sg/data-mover-challenge-2023/.

Accelerating electric vehicles research through HPC

Researchers from A*STAR IHPC leverage supercomputing resources to improve the performance of lithium-ion battery technology.

With the ever-increasing demand in energy storage media for applications such as Electric Vehicles (EVs), the energy density of current lithium-ion technology remains moderate leading to strong interest in developing better high-energy batteries globally. Sulphur-based batteries and lithium-metal batteries are some promising novel battery technologies with high-energy density.

However, bottlenecks in these technologies at the materials level have yet to be overcome. Additionally, battery chemistry is highly complex and a deeper understanding is required in order to improve it. For instance, the polysulfide shuttling effects are harmful to sulphur-based batteries therefore the need to design an effective host material for polysulfides becomes all the more crucial (Fig. 1).
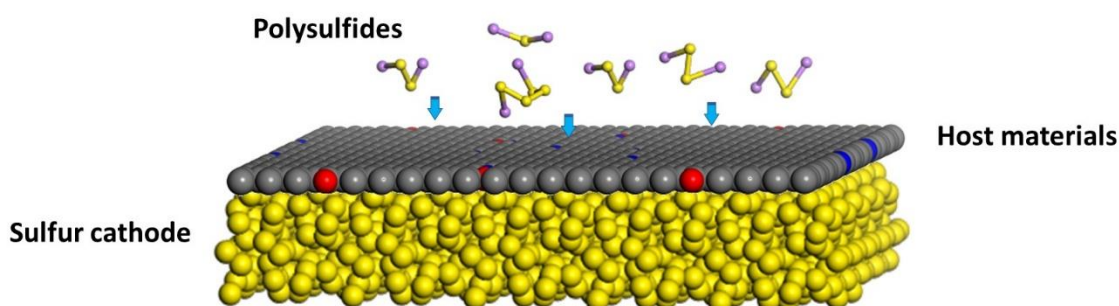

Fig. 1: First-principles design of polysulfide host materials for sulphur-based batteries.

> "As we use a computational material design and machine learning approach for material discovery, NSCC's supercomputing resources were very helpful in speeding up the calculations and analysis, and to tackle computationally intensive tasks such as ML model trainings and optimisations."
>
> *Dr Andy Ng*
> *Senior Scientist (Materials, Science & Chemistry)*
> *Institute of High Performance Computing, A*STAR*

This has inspired a team of researchers at A*STAR's Institute of High Performance Computing to embark on research to identify potential battery materials that can improve the performance of these novel battery technologies and help in its commercialisation. The objective of the project is to develop novel materials for advanced high-energy density and safer post-lithium batteries using a computational materials design approach.

The team is utilising a multiscale computational approach to tackle the challenges at different lengths and time scales. First-principles atomistic simulations provide insight into the material's intrinsic properties while dynamics simulations provide the details of the change of materials during operation. With improved batteries, EV adoption can be accelerated, which could help in mitigating global warming.

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

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Accelerating decarbonisation: Fugaku in the race to net zero
In a race against time, researchers are tapping into the computational power of Fugaku to solve our world's pressing carbon problem.
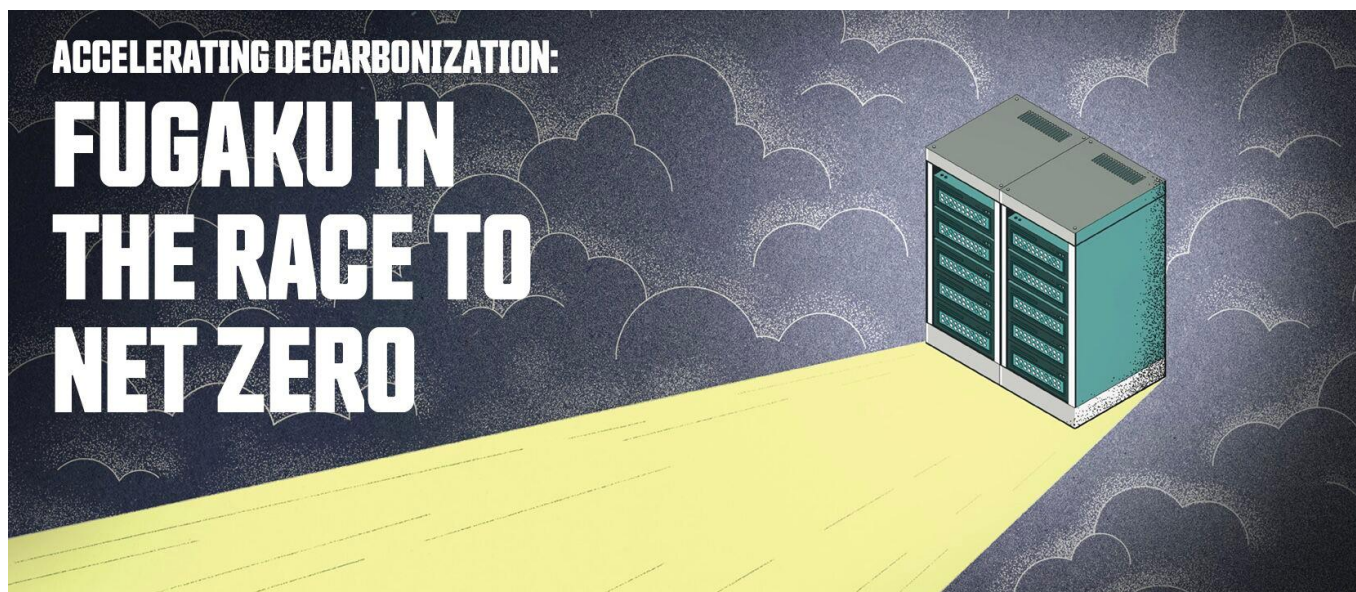
When it debuted in 2020, the supercomputer Fugaku was hailed as the centerpiece of Japan's Society 5.0—a vision of a country able to solve social problems and advance its economy with the help of digital technology. It was, after all, the world's fastest supercomputer at the time, a title it held on the biannual TOP500 list from its launch until June 2022.

"The main mission of Fugaku is to attain sustainability goals in the areas where it is involved," said Professor Satoshi Matsuoka, director of the RIKEN Center for Computational Science and part of the team behind Fugaku, in an interview with Supercomputing Asia.

Achieving 442 petaFLOPS of computational power, Japan's fastest supercomputer was developed by scientists at RIKEN with an application-first philosophy. That is, it wasn't just about achieving computational excellence

for its own sake—the machine was built to solve the biggest crises of our time. "Many of these crises pertain to carbon neutrality," Matsuoka noted.

More than just a buzzword, decarbonization has become a crucial goal among researchers in Japan—a country that is among the world's top carbon emitters. By the year 2030, Japan aims to reduce carbon emissions by 46 percent compared to 2013 baseline levels. With today's generation of high performance computing (HPC) hardware, software and talent, Japan is leading Asian countries in achieving this goal.

Head over to the January 2023 issue of NSCC's Supercomputing Asia Magazine to read the full article to explore more about Fugaku's groundbreaking contribution in combating decarbonisation.

This article was first published in the print version of Supercomputing Asia, January 2023.
Credit: Marinel Mamac and Jihan Al-Shdifat, Writer, Asian Scientist Magazine

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Shared articles and news from the HPC world.

Singapore launches sustainability standard for data centres in tropical settings
Singapore's Infocomm Media Development Authority (IMDA) introduced a sustainability standard for data centres operating in tropical climates.

It comes after a working group established guidelines to enable the operation of data centres at higher temperatures while optimising their energy efficiency. The new standard aims to help data centres gradually increase their operating temperatures to 26°C and above. Read more at TODAY here.

Credit: Pixabay

Singapore's vision to be a global hub for responsible AI innovation
The prospective economic, social, and technological benefits of transforming Singapore into an open and trustworthy global artificial intelligence (AI) hub are substantial.

The Ministry of Communications and Information (MCI) and a major technology firm announced their intention to work together to strengthen Singapore's AI national vision and strategy. This strategic partnership may support the adoption and development of innovative, responsible, and inclusive AI technologies to maximise opportunities arising in Singapore and the region. Read more at OpenGov Asia here.

Credit: OpenGov

Exascale-class Aurora supercomputer is finally ready for duty
It's a bit behind schedule, but Intel's Aurora supercomputer is now complete.

Initially expected to be ready by 2021, the Aurora supercomputer has now been equipped with all its 10,624 compute blades at the Argonne Leadership Computing Facility (ALCF) data center. A partnership among Intel, Hewlett Packard Enterprise (HPE), and the US Department of Energy (DOE), Aurora is expected to achieve a theoretical peak performance of more than 2 exaflops – or 2 billion billion operations per second. Read more at Tech Spot here.

Credit: Techspot

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Powering Innovation
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