NEWSBYTES

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In this issue

CORPORATE NEWS

SingHealth and NSCC launch new supercomputer to advance large-scale and complex healthcare research

The Computational Health Research and Optimisation for Medical Advancements (CHROMA) supercomputer is housed in the new Alice Lee Innovation Centre of Excellence @ SGH Campus, which aims to accelerate healthcare innovations such as medical technology and digital healthcare solutions.

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LET'S BEGIN

On 22 September 2023, Minister for Manpower and Second Minister for Trade and Industry, Dr Tan See Leng, opened the seventh SingHealth Duke-NUS Scientific Congress 2023. At the opening ceremony, Minister Tan launched the SingHealth Duke-NUS Academic Medical Centre's (AMC) Alice Lee Innovation Centre of Excellence

@ Singapore General Hospital Campus (A.L.I.C.E @ SGH Campus), a new innovation centre designed to accelerate the development and adoption of healthcare innovations such as medical technology and digital healthcare solutions.

One of the Centre's key features is a new supercomputer and SingHealth's first, called Computational Health Research and Optimisation for Medical Advancements (CHROMA), which was made possible through a partnership with the National Supercomputing Centre (NSCC) Singapore. CHROMA has high-performance computing capabilities that enables the processing and research of large amounts of clinical data. For example, it will allow clinicians and healthcare innovators to pre-train artificial intelligence (AI) models for large-scale and complex research for applications such as developing AI algorithms for disease risk prediction and facilitate personalised medicine. Together with access to anonymised, real-world clinical data, SingHealth clinician scientists will be able to simulate, test and validate new AI models for improving patient care.
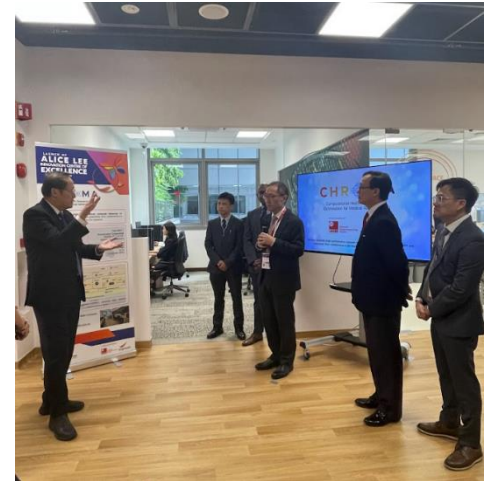
Associate Professor Tan Tin Wee, Chief Executive of NSCC, said, "A.L.I.C.E @ SGH Campus marks a remarkable milestone in the advancement of healthcare innovation. With state-of-the-art facilities and NSCC-SingHealth's new supercomputer CHROMA, we are empowering clinicians and healthcare innovators to push the boundaries of research with high performance computational and AI applications in healthcare. This collaboration between NSCC and SingHealth opens new horizons for large-scale and computationally complex healthcare research. We are excited to see the transformative impact it will have on healthcare in Singapore and beyond."

Professor Ivy Ng, Group CEO, SingHealth, said, "The opening of A.L.I.C.E@SGH Campus, the first innovation centre situated on our biggest campus, is a significant milestone in our efforts to improve care through innovation. A.L.I.C.E will bring together capabilities, software and hardware, including the new NSCC-SingHealth supercomputer, to spur new innovations and medical technologies. It will also catalyse new partnerships between our innovators and industry partners to generate new ideas, prototypes and smart technologies for better disease prevention, diagnoses and treatment. The Centre's co-location with our institutions on the SGH Campus is strategic, so that healthcare professionals can bring unmet clinical needs to the innovation table, and work with partners to ideate and test potential solutions in a real-world setting. We look forward to bringing more bench-to-bedside innovations to our patients and improving clinical outcomes as projects come to fruition through the network of A.L.I.C.E across all our campuses."

Congratulations to SingHealth on the new CHROMA supercomputer and the launch of the A.L.I.C.E @ SGH Campus!

Learn more about the supercomputer and the launch of the innovation centre here.

Keeping drones safe in urban airspaces
Researchers from NTU tap on high performance computing to identify hazardous airspaces through urban weather simulations in order to facilitate effective route planning and management.

An important aspect of urban airspace utilisation that is often overlooked is the effect of building wake on the usability of the airspace. Given the relatively low crosswind and turbulence tolerance of a multirotor at cruise velocity, the crossing of an intersection with perpendicular funnelled flow could easily send the multirotor crashing into buildings or into the ground.

A team of researchers at [Nanyang Technological University's School of Mechanical & Aerospace Engineering, Air Traffic Management Research Institute](#), are leveraging on NSCC's supercomputing resources to determine the fluid dynamic metrics that could be used to plot out hazardous airspaces to avoid based on prevailing surface wind conditions.

Urban wind field simulation was performed over a variety of terrain and buildings in order to identify very low-level airspace under or immediately above the building heights where funnelled, shear, or recirculating flow would pose a threat to multirotor stability or its track-keeping ability. Due to limitations with computational power and resolution of building models, only steady-state solutions could be used to construct the wind-field database.

The teams aims for the simulation studies to lead the way towards enabling Unmanned Aircraft System Traffic Management (UTM) service providers to identify hazardous airspaces to be geo-fenced out from usage and to enable route-replanning without encountering additional hazard.

> "A block size simulation domain requires a large amount of memory for mesh generation, and a large number of CPUs are needed to run the parallel solvers, even for stead-state simulations. The computational time requirement for unsteady simulations could be substantially greater. We used NSCC's HPC resources extensively for CFD simulations with OpenFOAM while the visualisation server allowed us to view the flow solution as a whole instead of in smaller chunks on a local workstation due to memory and bandwidth limits."
>
> *John Wang*
> *Senior Research Fellow / Assistant Programme Director*
> *School of Mechanical & Aerospace Engineering*
> *Air Traffic Management Research Institute (ATMRI)*
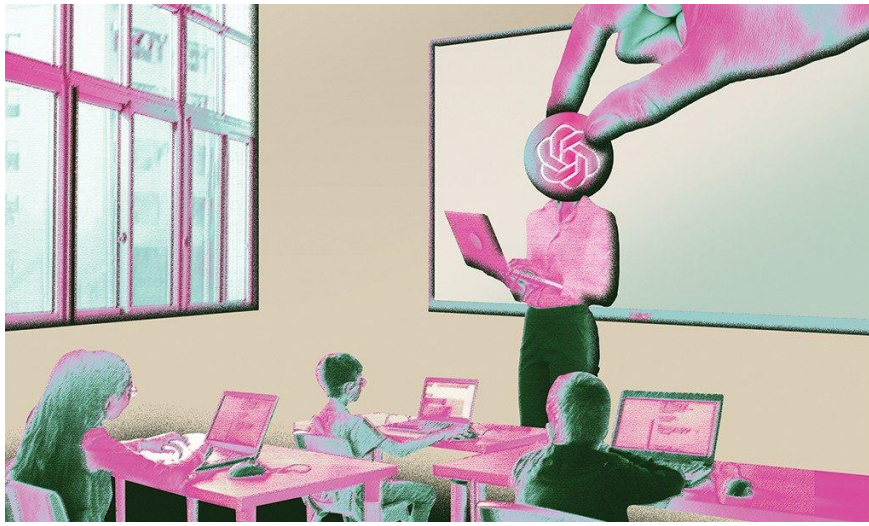> *Nanyang Technological University (NTU)*

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

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Playing nicely with AI
As curious students venture the uncharted territory of generative AI, education systems are tasked with ensuring its appropriate use while still delivering quality education.

New toys and gadgets have always been finding their way into schools—from the Tamagotchi to calculators and smartphones. While some are relatively benign, others can be highly disruptive to a student's education. ChatGPT, one of the best known generative artificial intelligences (GenAIs), is the latest tool to rapidly enter the education scene for its ability to converse and produce written text like a human. Within months of its initial release, millions of users explored ChatGPT's abilities, ranging from content creation and text translation to even code debugging.

Besides writing, other GenAIs, such as DALL-E and Midjourney, can generate original digital images from text prompts—some can even produce entire videos from a script or blog. With such fascinating capabilities, ease of accessibility and increasing popularity, the young and curious minds are inevitably finding ways to use them in the classroom.

Schoolboards are now faced with the difficult challenge of setting guidelines on how to use these technologies to enhance learning, while ensuring an even playing field for all students.

As we navigate the transformative AI journey, addressing issues surrounding legal, ethical, and privacy concerns becomes paramount.

Head over to the July 2023 issue of NSCC's Supercomputing Asia Magazine to read the full article.

This article was first published in the print version of Supercomputing Asia, July 2023.
Credit: Kai Xiang Lee, Writer, Asian Scientist Magazine

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Shared articles and news from the HPC world.

Data centre security: A Southeast Asia perspective

Across Southeast Asia, data centres are mushrooming due to various growth drivers and incentives. This of course is good news for physical security, which is much needed in data centres.

Data centers are a global phenomenon. Yet this is especially the case across Southeast Asia, where data centers are experiencing impressive growth. Drivers are manifold. Cloud adoption and national digitization efforts are some of them. Thailand, for example, aims at becoming the digital hub of Southeast Asia within 10 years and has launched the "Thailand 4.0" economic model, which "concentrates on digital improvements that enhance the quality of life and at the same time promotes productivity and efficiency," according to the website of the Thailand Board of Investment. Read more at A&S Magazine here.


Credit: A&S Magazine

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Quantum computing and AI getting a boost in South Korea

South Korea is hoping to become a leader in AI and quantum computing. The country is increasing its financial investment in these areas of technology.

South Korea has a long history of being an early adopter of emerging technologies. But when it comes to quantum computing and artificial intelligence (AI), South Korea has been playing catch up instead of being the innovator it has been in the mobile phone market. But that does not mean that technology is slow in the country. While the country may not be leading in quantum computing and AI, it has emerged as a prominent player in the global semiconductor industry. The country's dominance in memory chips and plans for a robust AI ecosystem could give it an advantage in the global AI chip race. Read more at Tech Wire Asia here.
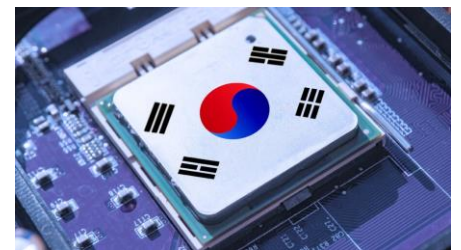
Credit: Shutterstock

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An artificial intelligence algorithm allows a supercomputer to process data far beyond its theoretical capacity

A machine learning algorithm has shown that it can provide the computer where it is installed with the capacity to process data even if it vastly exceeds the computer's available memory.

The algorithm identifies the key characteristics of a massive set of data and divides the set into manageable batches that do not drown computer hardware. Developed at the Los Alamos National Laboratory, the algorithm broke a world record by processing huge data sets during a test carried out on Summit, the fifth fastest supercomputer in the world, installed at the Oak Ridge National Laboratory, United States. Read more at Time News here.

Credit: Time News

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