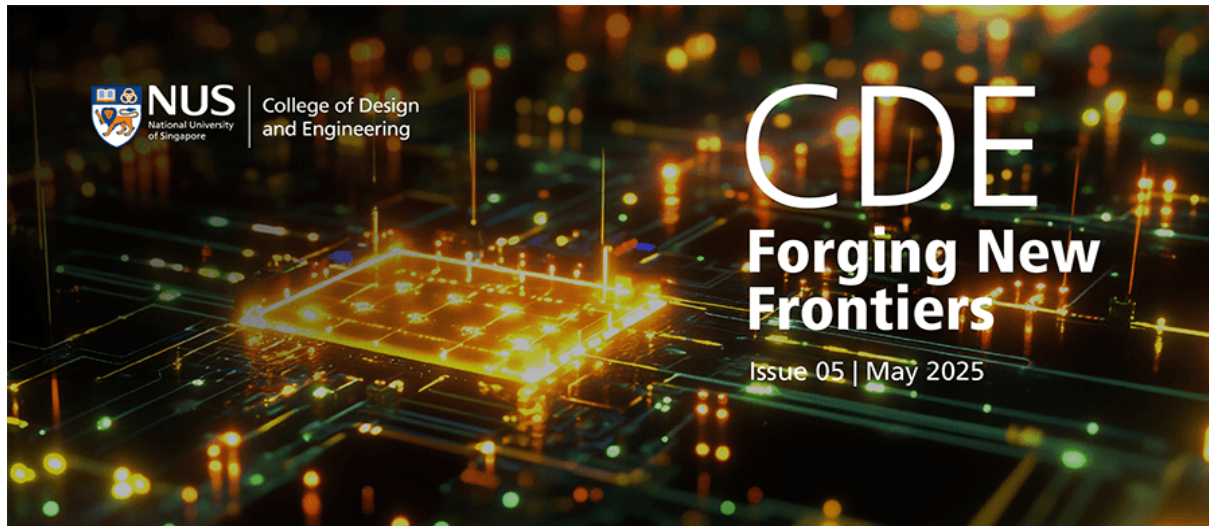


If you are unable to view this email, please [click here](#) to find out more about research developments from the College of Design and Engineering, National University of Singapore.



Welcome to our latest issue of the CDE Research Newsletter, covering an exciting array of innovations in a timely topic: Microelectronics.

Microelectronics have impacted so many facets of our daily lives, on a global scale. From helping artificial intelligence to achieve new heights, to driving our handheld technologies of tomorrow, the microelectronics domain has soared to new frontiers — here at CDE.

This issue highlights a series of remarkable advances from our ecosystem. They include Opto-Resistive RAM switches that are sensitive to light, while also being rapidly reconfigurable and durable across cycles, heralding neural computation capabilities with markedly reduced energy and space requirements. Additional innovations span multifunctional memory platforms, new ways to power the AI of the future, and other exciting discoveries.

Reaching unprecedented innovation takes a community, and in addition to the technology advances reported in this issue, we spotlight how our pioneering research centres, including Singapore Hybrid-Integrated Next-Generation u-Electronics (SHINE) Centre and Applied Materials-NUS Advanced Materials Corporate Lab are leading the way in first-in-kind academic-industry collaborations to power first-in-kind photonics while training our innovation leaders of tomorrow.

With each groundbreaking discovery, the CDE community continues to show that real-world impact is at the heart of our ethos. We hope you enjoy this window into our latest contributions.

Dean Ho
Editor-in-Chief



The quest for Singapore's technological future

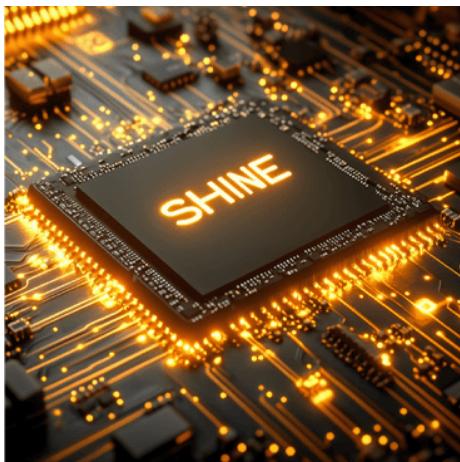
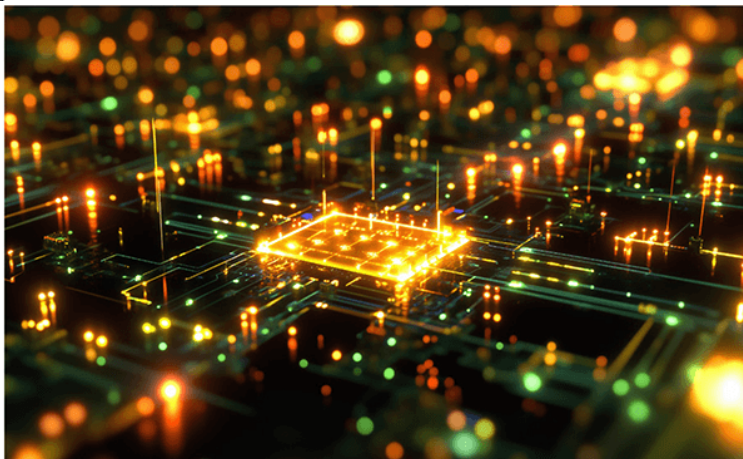
In an era defined by rapid technological change, forward-looking research and strategic talent development are key to maintaining Singapore's global leadership in semiconductor innovation.

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Lighting the path to faster, smarter AI

Bringing non-linearity into the light, a new photonic accelerator allows AI to compute and respond entirely in the optical domain.

[Read more >](#)



Shining a light on chip chatter

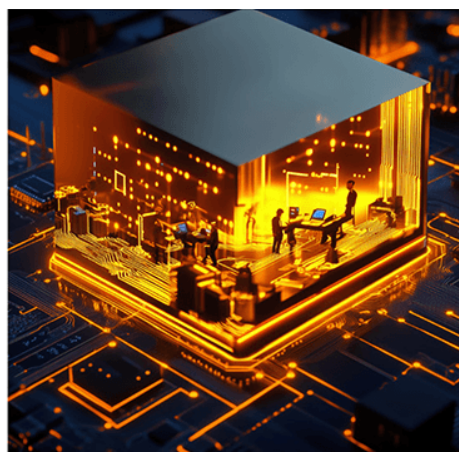
From lab concept to real-world integration, a multi-institutional collaboration produces a compact photonic modulator-memory device that turbocharges how data moves between computer chips — more efficiently, with far less energy.

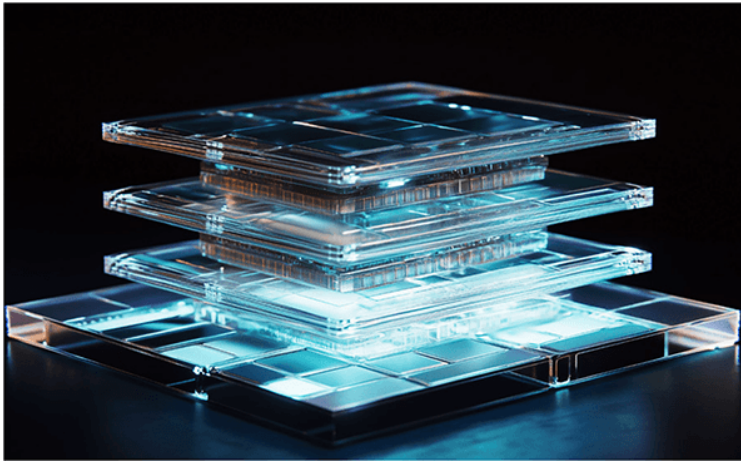
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Where atoms are engineered into impact

Forging new frontiers in semiconductor materials, the AMAT-NUS Advanced Materials Corporate Lab enters a new phase featuring advanced facilities, deeper industry integration and a strong focus on talent development.

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A smarter way to power artificial intelligence

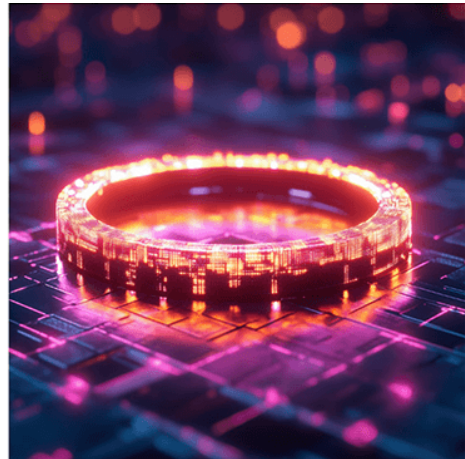
A fully integrated compute-in-memory system pairs 2D memristors with silicon selectors to offer a practical, energy-efficient route for powering next-gen AI applications.

[Read more >](#)

Bridging light and electrons

A new ferroelectric memory device stores and retrieves data using both light and electricity, offering a compact and scalable solution to bridge electronic and photonic computing systems.

[Read more >](#)



A chip off the old block

A single transistor can mimic the neural and synaptic behaviours of the human brain, bringing biologically inspired computing closer to reality.

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