

Tapping AI to hasten discovery of recipes for next-gen technologies

Materials Data Foundry is one of 8 projects under national AI-for-Science programme

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Affordable clean hydrogen and next-generation semiconductor chips are one step closer to reality with the set-up of a new materials laboratory between the National University of Singapore and the University of Toronto.

The lab aims to bridge the gap between lab discoveries and real-world manufacturing by using artificial intelligence to run thousands of rapid experiments to generate recipes for mass-producing tomorrow's critical technologies.

Called the Materials Data Foundry, the \$10 million lab is one of eight research projects under Singapore's national AI-for-Science (AI4S) programme. On June 16, these were the first projects to be unveiled since the AI4S programme was announced in October 2024.

Backed by \$120 million in funding from the National Research Foundation, AI4S aims to develop AI methods and tools to speed up scientific discoveries.

"We want to be able to move faster and more innovatively in terms of discovery," said Permanent Secretary for National Research and Development Tan Chorh Chuan on June 16, in announcing the projects.

The other projects span advanced manufacturing and materials, biomedical and health sciences, and aviation and maritime technologies.

Tan - who also chairs the local research agency A*STAR and the

Institutions behind the other projects include Singapore-based universities NTU and NUS, A*STAR, Imperial College London's first overseas research hub Imperial Global Singapore, the University of Illinois-affiliated Urbana-Champaign's Illinois Advanced Research Center in Singapore, and University of Cambridge's Cambridge Centre for Advanced Research and Education in Singapore.



Permanent Secretary for National Research and Development Tan Chorh Chuan speaking at the annual scientific meeting AI4X-Accelerate Conference 2026 on June 16. ST PHOTO: CHONG JUN LIANG

Ministry of Health's Office for Healthcare Transformation - was speaking at the annual scientific meeting AI4X-Accelerate Conference 2026.

While AI is increasingly being used to identify promising new

materials, Brandon Sutherland, the University of Toronto's director of research operations for Acceleration Consortium, said that there is not enough data on how to best manufacture these materials in the real world.

"The gap between (the materials that AI) can predict and what we can make is only growing and growing. So this effort is really to try to help close that gap by developing a lab that can generate real-world experimental data of mate-

rials (and how they can be made)," said Sutherland.

The tie-up is between the NUS Institute for Functional Intelligent Materials and University of Toronto's Acceleration Consortium.

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The projects include a collaboration between researchers from A*STAR and Imperial Global Singapore to develop an AI system to speed up the search for better catalysts.

Catalysts are materials that speed up chemical reactions, and are crucial for producing cleaner fuels and industrial chemicals. Finding new catalysts is difficult because there are countless possibilities to test. By using AI to predict the most promising candidates, the project aims to cut the time and cost of catalyst discovery by nearly five times.

Another project involving NUS and Imperial Global Singapore aims to ensure that the growing volume of AI-generated code is safe and reliable. Researchers will build AI tools that can automatically detect bugs, verify that software behaves as intended, and help developers and security professionals audit critical systems.

Other projects include building an AI agent that can automate the design process for mRNA vaccines, digital twins that can better predict farmland conditions in South-east Asia and an AI system that can better predict disease from a full blood-count test.

Tan also pointed out that the AI4S initiative will help cultivate a new generation of scientists who are both proficient in the sciences as well as AI.

"We hope we'll be able to position Singapore as a place where AI is very fundamental to research," he said.

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