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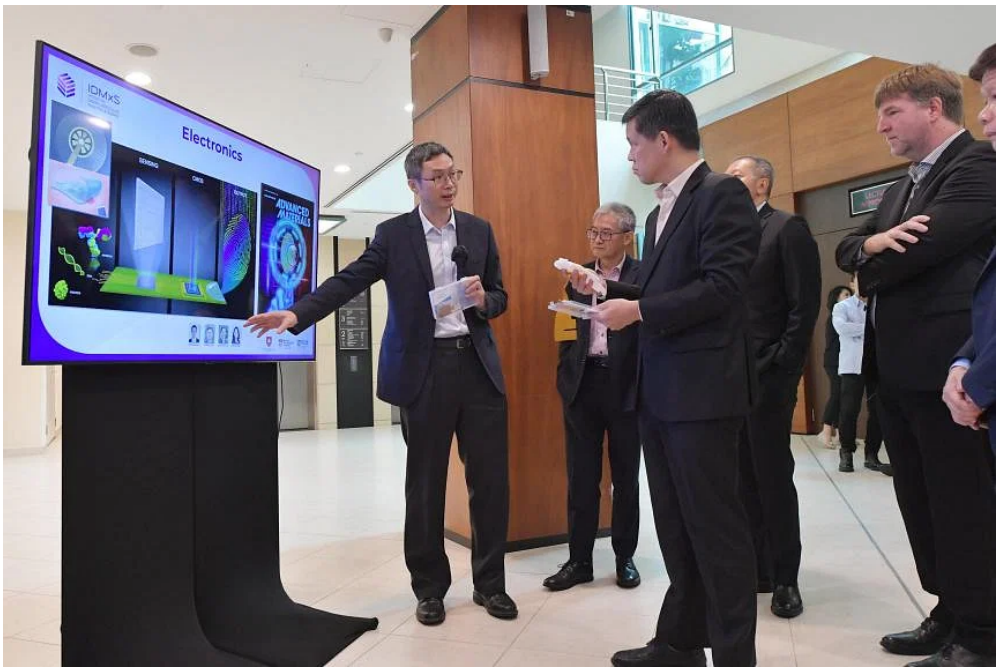
NTU institute launched to advance digital molecular analysis capabilities



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NTU Professor Chen Xiaodong (left) speaks with Minister for Education Chan Chun Sing at the Nanyang Executive Centre on Dec 1, 2022. ST PHOTO: ALPHONSUS CHERN

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SINGAPORE - Getting back the results of a blood test can take days, but this might change soon, thanks to research being conducted at a newly opened centre at Nanyang Technological University (NTU).

The work done at the NTU centre might eventually enable doctors to analyse a patient's blood sample on the spot using just a smartphone camera.

The Institute for Digital Molecular Analytics and Science (IDMxS), which was launched by Education Minister Chan Chun Sing on Thursday, aims to advance the science behind analysing biological molecules such as proteins and carbohydrates.

Digital molecular analytics forms a bridge between biology and information technology.

The goal of the institute is to develop the capabilities that will allow for real-time tracking of viral infections as well as the molecular signatures indicating the presence of disease.

The Covid-19 pandemic has shown how easily diseases can spread in an interconnected world, said Professor Ling San, NTU's acting president and provost.

"By integrating the digital and the biological, we can more quickly detect threats, inform policy and guide action in real time," he said during the launch of IDMxS, held on the NTU campus.

IDMxS will make use of artificial intelligence and machine learning to analyse and interpret the vast amount of information a biological sample provides.

Professor Jay Groves, the institute's founding director, compared molecular assays, or the process of analysing molecular information, to individual pixels in a digital image.

"The defining feature of digital molecular analytics is the way results from these thousands or millions of individual assays are collected, interpreted and ultimately reconstructed into a super-high resolution molecular analysis," said Prof Groves, who is also president's chair in bioanalytical sciences at NTU's School of Materials Science and Engineering.

Among the possible applications of the technology is the development of a tool to identify the different disease-causing molecules in the blood.

This would allow doctors to analyse a patient's blood sample immediately using a smartphone camera, reducing the need for lengthy laboratory tests.

Prof Groves said he expected such tools to be commercially available within the next decade.

Another project to be undertaken by the new centre is the large-scale monitoring of insect-borne diseases such as dengue and malaria.

The analysis of molecules making up the dengue virus will allow researchers to eventually develop an imaging system to monitor dengue within the mosquito population.

This could potentially be used to track not only dengue and malaria, but also other infectious diseases.

Prof Groves added that he expected the market for digital molecular analytics to grow substantially, with several multibillion-dollar companies in the field over the next 10 to 20 years.

IDMxS is Singapore's seventh research centre of excellence and is the third such centre under NTU. Research centres of excellence aim to carry out world-class research in line with the Republic's long-term strategic interests.

About $160 million will be invested in IDMxS over the next decade, with $94 million from the Ministry of Education and the remaining amount from NTU and the National University of Singapore.

The centre is expected to have 100 full-time researchers and staff with expertise in areas such as biology, medical technology and computer science.

It will also have a graduate programme, which will provide postgraduate NTU students with opportunities in interdisciplinary education and training.

The centre will provide funding for more than 30 PhD students – four of whom have already started their studies – and will develop continuing-education programmes that will help healthcare workers adapt to the digitalisation of clinical diagnostics.