

Singapore celebrated the work of nine outstanding researchers at the President's Science and Technology Awards this year, the highest form of recognition for research scientists and engineers in the country. [Mok Qiu Lin](#) and [Clara Chong](#) report on their work.



Winners of the President's Science and Technology Awards 2020

- President's Science and Technology Medal:**
Professor Ranga Krishnan
- President's Science Award:**
- Professor Liu Jianjun
 - Professor Nikolay Zheludev, Associate Professor Chong Yidong and Associate Professor Zhang Baile
- President's Technology Award:**
Professor Dario Campana
- Young Scientist Award:**
- Dr Chew Wei Leong
 - Assistant Professor John Ho
 - Dr Tan Si Hui

Professor Ranga Krishnan speaking from the United States in a video screened last Friday at the awards. He received the President's Science and Technology Medal for his role in advancing health and biomedical sciences research in Singapore. ST PHOTO: ALPHONSUS CHERN

Translating medical science from bench to bedside

Professors Ranga Krishnan, Dario Campana lauded for work in developing new therapies

Clara Chong

A renowned global leader in academic medicine and healthcare, Professor Ranga Krishnan re-

ceived the nation's highest honour for the field last Friday – the President's Science and Technology Medal – for his role in advancing health and biomedical sciences research in Singapore. Prof Ranga, who is now chair-

man of the Health Ministry's National Medical Research Council, helped establish the emerging infectious diseases programme at Duke-NUS Medical School when he was dean from 2008 to 2015. He is also a member of the SingHealth board, where he helped foster several important joint initiatives, such as the Academic Medicine Education Institute. He also established strong links

with the Agency for Science, Technology and Research to transfer technologies and build new ventures.

Much of his work was in the area of translational science – building on scientific research to create new therapies, medical procedures or diagnostics.

"My work has always been on tackling issues that beset patients and populations by building solu-

tions... by translating research into useful products," Prof Ranga said. Prof Ranga's work also extends well beyond the Republic.

He has held, and continues to hold, important leadership positions in the areas of medicine and healthcare systems, such as serving on the board of Community Health Systems in the United States.

Meanwhile, another award winner who has also excelled in translating science from bench to bedside is Professor Dario Campana, who received the President's Technology Award.

Prof Campana's research focused on using immune cells to treat cancer.

T cells – a type of white blood cell – equipped with a special chimeric antigen receptor (CAR) designed by Prof Campana's team produced remarkable results when given to

patients with acute lymphoblastic leukaemia, the most common cancer in children.

These CAR-T cells latch onto leukaemic cells, killing them and propagating, hence mounting a powerful anti-leukaemic response.

Clinical trials so far have showed that blood T cells that are extracted from acute lymphoblastic leukaemia patients, modified with the CAR and then reinfused back into patients could cure the cancer even when all other therapies have failed.

Besides acute lymphoblastic leukaemia, CAR-T cells have been proven to be useful in treating blood cancers lymphoma and myeloma, and may also benefit patients with other forms of cancer in the future.

chongcjy@sph.com.sg

Scientists lauded for research on Asian genetics, light at nano-level

Mok Qiu Lin

Research into the human genome has grown over the past decade but Asian populations remain understudied.

Professor Liu Jianjun, 57, is trying to change that – and gaining recognition for it. Last Friday, he received the President's Science Award.

"My research on the genetics of Asian populations has revealed new insights into the biological mechanisms of diseases that are prominent in Asian populations," said Prof Liu, deputy executive director at the Agency for Science, Technology and Research's Genome Institute of Singapore.

This will help in the development of clinical tests to look for such Asian "biomarkers", which will allow doctors to diagnose patients early, and help prevent adverse reactions to drugs, he added.

Prof Liu was part of a team that discovered the specific risk strains of the Epstein-Barr virus (EBV), which are associated with the development of nasopharyngeal carcinoma.

This nose cancer is found largely in populations in South China and South-east Asia, but is very rare in other regions.

The EBV risk strains can be used as biomarkers to identify individuals with high risk of developing the cancer, enabling early diagnosis and improved survival rates.

Prof Liu is one of two recipients

of the President's Science Award this year.

The award is one of three prizes under the President's Science and Technology Awards – the highest recognition for exceptional research scientists and engineers here.

The other President's Science Award went to a trio from Nanyang Technological University for their research into topological nanophotonics – a field in the science of light that has emerged in the past decade.

Professor Nikolay Zheludev, 65, Associate Professor Chong Yidong, 40, and Associate Professor Zhang Baile, 39, found that manipulating light at the nano-level – an extremely small scale – could allow scientists to probe objects such as viruses that are too small to be seen under a conventional microscope.

Photonics, the science of generating, harnessing and manipulating light, is a critical enabling technology of the 21st century, underpinning numerous other technologies ranging from imaging to security and defence, the research team told *The Straits Times*.

"We expect that our research innovations will lead to higher-density optical chips, more robust and compact lasers, universal super-resolution optical imaging for applications across various technologies, such as those used in the life sciences and biomedical industries, as well as ultra-fast 6G telecommunications," they said.

qiuilm@sph.com.sg

From smart clothing to cancer treatments, young researchers' work wins recognition

Three young researchers working in the areas of medical technology, gene therapy and cancer biology were recognised last Friday for their scientific endeavours.

They received the Young Scientist Award from Trade and Industry Minister Chan Chun Sing at the Istana.

Organised by the Singapore National Academy of Science and supported by the Agency for Science, Technology and Research (A*Star), the award recognises the accomplishments of researchers under 35 who have shown strong potential to be world-class experts in their chosen fields.

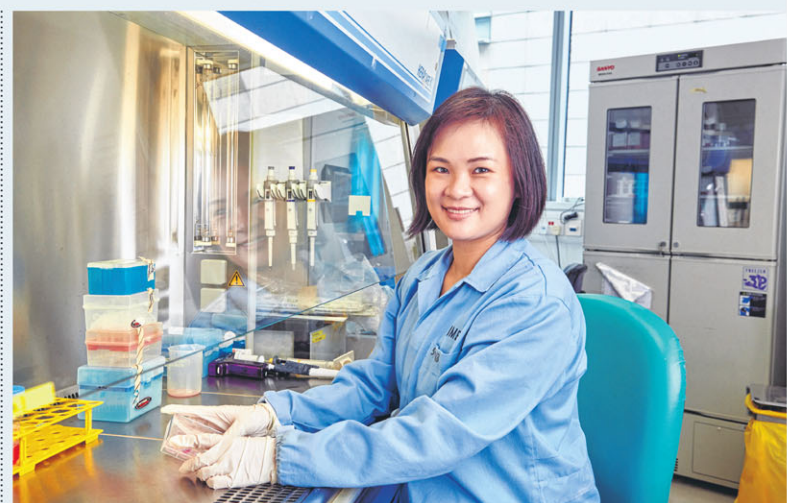
ASSISTANT PROFESSOR JOHN HO, 31

After smartphones and smart watches, National University of Singapore's (NUS) Assistant Professor John Ho believes smart clothing could be the next game changer.

He is part of a team that developed a smartphone-powered suit that is able to track a person's temperature, posture and movements, potentially helping clinicians better understand patients who face chronic back pain and, in turn, provide insights for diagnosis and treatment.

During the early stages of the Covid-19 pandemic, Prof Ho, who is principal investigator at the NUS Institute for Health Innovation and Technology, had also leveraged wireless medical technology to enhance diagnosis of possible infections in foreign worker dormitories.

One possible symptom of Covid-19 is low blood oxygen. The system developed by Prof Ho and his colleagues utilises Bluetooth-enabled pulse oximeters to measure blood oxygen levels, and can compile



Young Scientist Award recipient Tan Si Hui, 35, was part of a team which made a key discovery that identifies and isolates stem cells leading to stomach cancer. PHOTO: AGENCY FOR SCIENCE, TECHNOLOGY AND RESEARCH

pulse oximeter readings from thousands of individuals neatly on a dashboard.

Prof Ho said: "Wireless healthcare technologies have shown enormous promise in transforming the way that we manage chronic conditions like diabetes and obesity – the next step will be to address challenges like rigorous clinical tests and how to guarantee patient privacy."

DR CHEW WEI LEONG, 35

Dr Chew Wei Leong, a senior research scientist at A*Star's Genome Institute of Singapore, leveraged a gene-editing tool known as Crispr-Cas, which works like genetic scissors, potentially snipping out unwanted segments of human genetic material. "Unlike traditional medicines

such as small-molecule drugs that we take as pills, these Crispr-based nucleic acid therapeutics go straight to the DNA and perform molecular surgery on it," Dr Chew said.

"This means that Crispr-Cas edits our genes and permanently fixes the genetic diseases at the root causes."

He added: "Our work opens up treatment avenues to diseases that affect multiple organs."

Dr Chew's team is now working on how to make the process safer. "This is important because our work will reduce the severe risks of undesired immune reactions to these potent medicines," he added.

DR TAN SI HUI, 35

Dr Tan Si Hui, a cancer biologist, wants to use her expertise and

knowledge to develop novel cancer treatments.

Dr Tan, who previously worked at A*Star, had been part of a team which made a breakthrough discovery that identifies and isolates stem cells leading to stomach cancer.

The protein aquaporin-5 (AQP5), which is produced by stomach stem cells, can be used as a biological marker for developing treatments for diseased and cancerous stomachs.

Dr Tan, who now heads the research team at local biotechnology start-up Caregene Therapeutics, said: "I hope to make an impact on patients by developing drugs or platforms that can restore their health, either through more efficacious treatments or more accurate therapeutic recommendations."

Mok Qiu Lin