# NUS RESEARCH in brief

July 2023 | Issue 9

NUS National University of Singapore

**COVER STORY**
Building digital information resilience in a post-truth world

**NEW INITIATIVES**
Launch of REC@NUS Corporate R&D Laboratory for Next Generation Photovoltaics

# From the Deputy President

Today, the role of research institutions, and collaboration between them, has never been more critical. It is my greatest privilege to take on the role of Deputy President (Research & Technology) at NUS, as we endeavour to conduct research that is multi-faceted, dynamic, and most importantly, impactful.

I would like to thank Prof Chen Tsuhan, who has steered research strategies at NUS over the last five years. Looking ahead, I am excited to work with our talented researchers and partners to build peaks of research excellence that are truly world-leading.

To achieve this, we will continue to bring academia, industry and government together, encourage collaboration across disciplines, and provide the necessary infrastructure to enable research that creates value both academically and societally.

Already, 2023 is shaping up to be an impactful year for research. We recently launched the S$77 million REC@NUS Corporate R&D Laboratory for Next Generation Photovoltaics, jointly set up by the Solar Energy Research Institute of Singapore (SERIS) at NUS and industry partner REC Solar (REC). Directed by Prof Armin Aberle, the new research initiative will research, develop, and commercialise disruptive solar photovoltaic technologies based on perovskite-silicon tandem solar cells. This effort is key to accelerating Singapore's transition to renewable energy.

With the goal of continuously pursuing relevant and impactful outcomes, we empower our researchers to pursue ideas and solutions addressing society's most pressing needs.

I would like to congratulate three NUS researchers who have received funding under the Social Science Research Thematic Grant. They are Asst Prof Yvette van der Eijk for her work on exploring time poverty and mental health among Singaporean women with young children, Assoc Prof Irene Ng for her investigation into the types of "in-work" poverty among the young working class, and Prof Ivan Png for his research on behavioural biases at work and their implications on productivity and policy.

I would also like to recognize the team led by Prof Chen Tsuhan and Prof Lee Mong Li, who have embarked on a 5-year programme, funded by the Ministry of Education Academic Research Fund. Their research aims to explore the role of consumer behaviour in enabling the spread of mis-, dis- and mal-information in digital media.

Our researchers' contributions and efforts will pave the way for NUS to advance the frontiers of knowledge and societal impact, sealing NUS' position as Singapore's top research and innovation university.

**Professor Liu Bin**
Deputy President (Research & Technology)

**12,556***
Research publications

Our researchers collaborated with

**3984** institutes & universities from **170** countries

**6**
Research Centres of Excellence##

**5**
Corporate Laboratories#

**37**
Research Institutes & Centres#

**17**
Schools & Faculties#

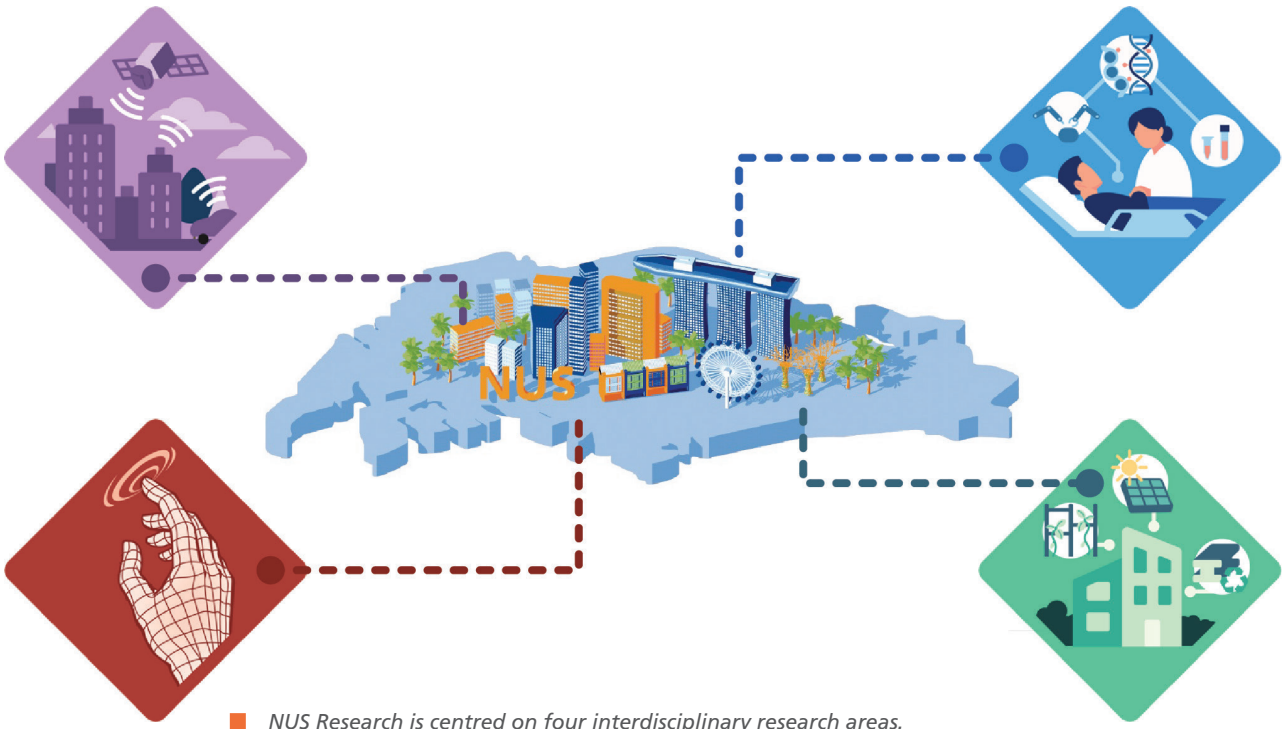
# NUS Research in Numbers

**$956m^**

Total research funds awarded by external sources in 2022

| $787m | $845m | $911m |
|---|---|---|
| FY2020 | FY2021 | FY2022 |

Research revenue 3-year moving average




*NUS Research is centred on four interdisciplinary research areas. These are health innovation, materials research, smart nation and sustainability.*

**808**
Patent applications

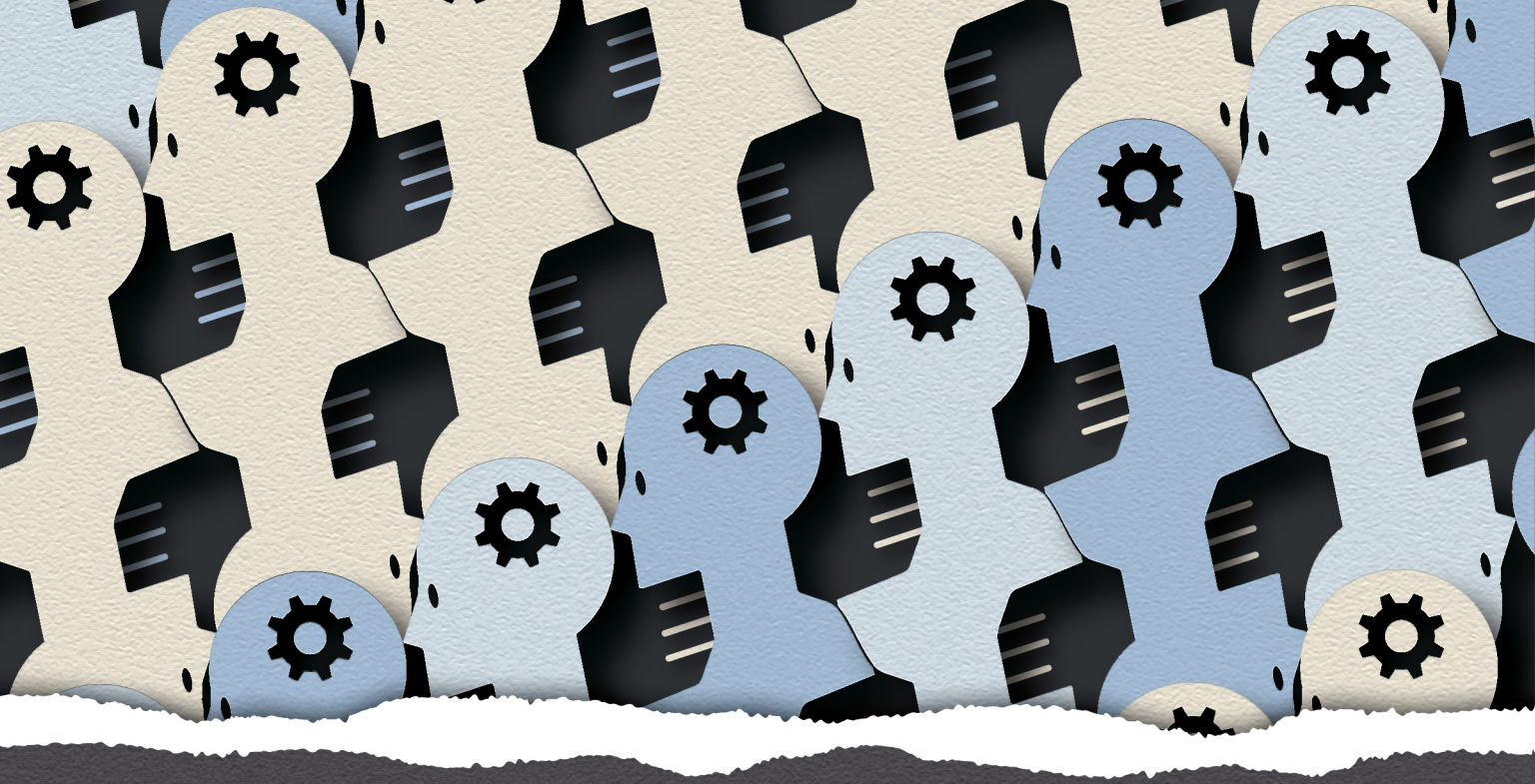
**111**
Patents granted

**346**
Invention disclosures

**74**
Technology licences executed

*Our researchers work to innovate and develop solutions that meet the present and emerging needs of Singapore, Asia, and the world.*

*Data extracted from the Scopus database 2 May 2023. Figure represents articles, reviews, conference papers, books, and book chapters for calendar year 2022. #Accurate as of Jun 2023. ##NUS is home to four RCEs and is a partner in two others. Accurate as of Jun 2023. ^Based on FY2022. All other data is based on Calendar Year 2022.



# Building digital information resilience in a post-truth world

The proliferation of mis-, dis- and mal-information (MDM) has been recognised as one of the biggest challenges faced in this century. It can mislead individuals and organisations into making potentially harmful decisions, and has been shown to divide society on contentious yet important issues.

Misinformation related to vaccine safety, for instance, is believed to have contributed to vaccine hesitancy, undermining efforts to contain the COVID-19 pandemic. During the 2016 United States presidential election, the spread of false information was linked to foreign interference campaigns aimed at further dividing what was a highly politicised social landscape. In response, MDM, colloquially known as "fake-news", was described as a genuine threat to democracy.

From an academic standpoint, their definitions are clear; misinformation is false or misleading information, disinformation is false information used to deceive others, while mal-information uses true information maliciously, to deceive or inflict personal harm. From a practical standpoint however, the presence and effect of MDM is far less clear; and this is a factor that makes it such an effective tool for those with malicious intent. When falsity in information goes unnoticed, or is accepted as truth, it will spread rapidly, and is inherently difficult to correct.

As consumers of digital information become increasingly aware of the presence of MDM in the digital space, and its ability to deceive and misguide them, trust in news and digital information is eroded.

Existing efforts to identify and curb the spread of MDM have mainly focused on technical interventions. The onus is placed on social media and news platforms to police their own content and flag to users when content may contain MDM. In some cases, users are banned or content removed. Some governments have also passed legislation to censor or correct verified false claims.

However, the effectiveness of such interventions remains questionable as they neglect to consider the influence of consumer behaviour, and in particular the beliefs and biases at play when individuals consume and interact with information. Once a false claim has been circulated and accepted as truth, its removal or censorship may be ineffective in correcting beliefs and reversing any damage that was done.

## Consumer behaviour at the core

To effectively address the threat of MDM, the problem must be viewed holistically, and this means understanding not only the technical aspects of its creation and dissemination, but also the motivations and decisions at play when consumers seek or are served particular information.

Consumers often have inherent biases based on pre-existing beliefs and values, and these can influence how they will respond when presented with a piece of information, be it true or false.

The question researchers are asking is how such behaviours facilitate or amplify the presence and impact of MDM. To answer this, Professor Chen Tsuhan, NUS Deputy President (Innovation and Enterprise) and Professor Lee Mong Li from the NUS School of Computing and the NUS Centre for Trusted Internet and Community have embarked on a five-year programme that will investigate digital information creation, dissemination and consumption using a lens of consumer behaviour. Through this unique approach, they hope to identify vulnerabilities in the digital information pipeline, and develop tools and strategies needed to instil digital information resilience in online citizens.

The project, which has been funded by the Ministry of Education Academic Research Fund, will be conducted together with researchers from the NUS School of Computing, NUS Business School, NUS Faculty of Law, Lee Kuan Yew School of Public Policy at NUS and NUS Faculty of Arts and Social Sciences. This highly interdisciplinary team brings expertise across many facets of MDM detection, data analytics, computer vision, natural language processing, artificial intelligence and machine learning, behavioural economics, as well as sociotechnical policy and governance.

"The ability to distinguish fact from fiction is a critical skill, and our understanding of how consumers interact with information, be it true or false, is key to building a more informed and resilient society," said Prof Chen.

Consumer behaviour will be integral to each aspect of the project.

For example, the team will explore how biases and social influences allow MDM to become entrenched in the online space, how beliefs are shaped by the types of information received, and how consumers draw information from various sources.

Their findings will inform and guide the identification and mitigation of vulnerabilities in the digital information pipeline that enable MDM to proliferate. Mitigation strategies and technologies will then be developed with an aim to nudge behaviours, and ensure only trustworthy, truthful information is consumed and shared.

Part of their investigations will, for example, focus on the formation of echo chambers, which arise when information that affirms beliefs or biases is shared between like-minded individuals. Recommendation and search algorithms that prioritise information diversity will be developed, along with machine learning algorithms that adapt to users' tolerance for diversity.

"We will integrate more fine-grained and nuanced classification of news, where the extent of falsity is determined from interrelated components of news articles. Particular focus will be placed on online social networks, where users often share information consumed, and therefore serve as content creators," explained Prof Lee.

Through this work, it is hoped that consumers will be empowered to compare and contrast information from multiple perspectives. Encouraging consumers to read more diverse digital information will be key to attaining a balanced and healthier use of digital media platforms.

Ultimately, the research aims to improve Singapore's digital literacy. Information exploration and reasoning tools that enable consumers to pursue a deeper analysis of the digital information they consume, will be crucial to attaining digital information resilience and restoring trust in digital information.

## About the cover

From online news to videos on social media, the spread of false information has reached unprecedented levels. Using a lens of consumer behaviour, researchers are studying how pre-existing beliefs and values can influence the way consumers respond to a piece of information, and develop tools and strategies to help them seek reliable sources in the pursuit of truth.

Cover art by Koh Pei Wen & Naoki Ichiryu

# Launch of REC@NUS Corporate R&D Laboratory for Next Generation Photovoltaics


A new S$77 million research initiative has been launched at NUS to boost innovation and research on advanced solar cell technologies in Singapore. Over the next five years, the REC@NUS Corporate R&D Laboratory for Next Generation Photovoltaics (REC@NUS Corp Lab), which is jointly set up by the Solar Energy Research Institute of Singapore (SERIS) at NUS and REC Solar (REC), will research, develop, and commercialise disruptive solar photovoltaic (PV) technologies based on perovskite-silicon tandem solar cells.

Supported by Singapore's Research, Innovation and Enterprise (RIE) 2025 Plan, this strategic investment in high-power clean energy solutions is crucial in accelerating Singapore's transition to renewable energy for a greener future, and maintaining the nation's leading position in PV R&D and manufacturing.

By bringing together NUS-SERIS' world-class research expertise in PV technologies and REC's deep experience in upscaling innovative solar PV technology, the new Corporate Laboratory aims to champion bold technology innovations for more powerful, more efficient, more sustainable and less costly solar energy. Successful outcomes from the Corporate Laboratory could transform the solar industry globally and, in turn, accelerate global energy transitions.

## NUS Sustainable and Green Finance Institute to advance data-driven research and development frameworks in sustainability measurement

Sustainable finance is emerging as a critical tool to mobilise resources towards sustainable projects and businesses. To support this burgeoning trend, NUS launched the Sustainable and Green Finance Institute (SGFIN) in April 2023. The institute, which is supported by the Monetary Authority of Singapore, commenced operations in December 2021. The institute aims to develop deep research and capabilities in green finance and sustainability, provide thought leadership, and shape sustainability outcomes and policymaking across financial sectors. Led by Prof Sumit Agarwal, the institute collaborates with industry on research initiatives to support the development of frameworks for more transparent and standardised measurement of companies' environmental and social performance, and for benchmarking to best practices across industries.


## New centre to improve eye health of Singaporeans

Making the diagnosis and treatment of eye diseases more accessible and affordable is one of the key goals of the new Centre for Innovation and Precision Eye Health, which is jointly established between NUS Yong Loo Lin School of Medicine and the National University Health System. The new Centre aims to promote community-based eye care and the use of advanced technologies to better prevent, detect and treat vision problems in Singapore.

The new Centre will employ big data analytics and artificial intelligence to identify patterns of eye disease, thereby aiding in cost-effective prevention and treatment. It will also enhance community-based eye healthcare by equipping optometrists with knowledge and portable screening tools.

## New initiatives to boost Singapore's capabilities for sustainability leadership

NUS has unveiled new initiatives aimed at further advancing the nation's sustainability goals. These initiatives include the creation of a new building cluster targeting net-zero energy, as well as the establishment of a new centre, NUS Cities, which is dedicated to developing innovative solutions for sustainable, resilient and liveable cities.

The building cluster consists of two recently completed adaptive reuse projects, namely SDE1 and SDE3, seamlessly integrated with the existing net-positive energy building SDE4. The adaptive reuse of SDE1 and SDE3 involves the optimisation of existing structures to meet new energy goals and preserving the buildings' embodied carbon. These efforts result in significant cost and carbon emission savings.

NUS Cities, which is helmed by Professor Khoo Teng Chye, aspires to be an interdisciplinary centre that draws upon the wealth of expertise across NUS to offer university-wide education and research programmes that will improve the planning, management and governance of high-density, high-growth, sustainable cities.

## Singapore Food Agency, NUS, Temasek Life Sciences Laboratory and industry partners sign MOU for the AquaPolis Programme

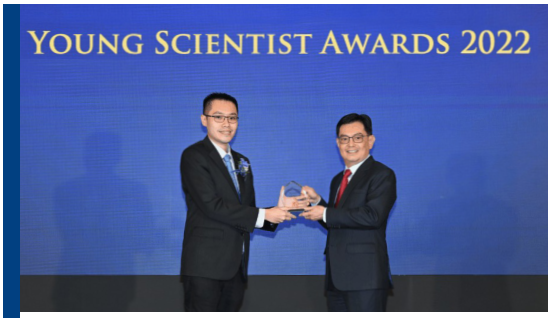
NUS, the Singapore Food Agency, the Temasek Life Sciences Laboratory, and seven industry partners recently signed a Memorandum of Understanding (MOU) to develop the AquaPolis Programme.

The AquaPolis Programme, an initiative under Singapore Food Story R&D Programme 2.0, envisions Singapore as a leading research and innovation cluster for sustainable tropical aquaculture. It brings together local and overseas aquaculture researchers and industry partners to harness strategic synergies in developing innovative and sustainable solutions, while nurturing talent for the industry's workforce. AquaPolis will leverage the technical, operational and research expertise of its strategic partners to achieve results in translational research and development, aiming to improve the productivity and competitiveness of our local farms to sustainably produce 30% of Singapore's nutritional needs by 2030. Beyond local production, the solutions and innovations developed may also be applied in other countries, contributing to sustainable food practices and enhancing food security.

# Top honours conferred for research excellence

Outstanding scientists from NUS have been honoured with top national awards for their exceptional achievements and contributions to the field of science and technology. Professor Hong Wanjin from NUS Medicine was conferred the prestigious President's Science and Technology Medal (PSTM), which is the highest honour of the President's Science and Technology Awards bestowed on exceptional research scientists and engineers in Singapore. Assistant Professor Koh Ming Joo from NUS Chemistry has received the Young Scientist Award (YSA), which recognises the accomplishments of researchers under 35 who have shown strong potential to be world-class experts in their fields.

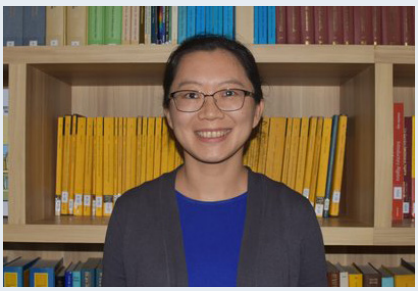

**Prof HONG Wanjin**
NUS Medicine




**Asst Prof KOH Ming Joo**
NUS Chemistry

## Two NUS faculty members awarded the Asian Young Scientist Fellowship

Dean's Chair Associate Professor Yao Yao from the Department of Mathematics at NUS Faculty of Science and NUS Presidential Young Professor Assistant Professor Reza Shokri from the Department of Computer Science at NUS School of Computing have been awarded the inaugural Asian Young Scientist Fellowship (AYSF) 2023. The Fellowship recognises early-career scientists in Asia who exhibit exceptional creativity and supports their transformative research in the fields of life science, physical science as well as mathematics and computer science.



### Asst Prof YAO Yao

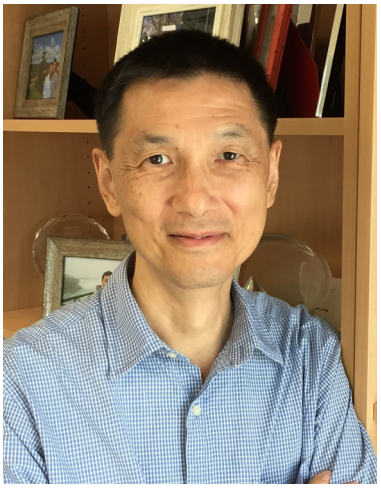
Assoc Prof Yao's research focuses on partial differential equations, fluid dynamics and mathematical biology. She was awarded the AYSF for her significant contributions to the field of modern applied analysis, and in addressing challenging questions in fluid mechanics and mathematical biology.

### Asst Prof Reza SHOKRI

Asst Prof Shokri's research is centered around data privacy and trustworthy machine learning. He was awarded the AYSF for his notable contributions to the algorithmic foundations of data protection and privacy, and to support his exploration in scaling up the privacy protection mechanisms and designing trustworthy and privacy-preserving algorithms for decision-making.

# 2022 Social Science Thematic Grant (SSRTG) Awardees

Three NUS researchers were awarded the prestigious Social Science Thematic Grant in 2022. The SSRTG is the first major initiative by the Social Science Research Council (SSRC) aimed at boosting social science and humanities research in areas of strategic relevance to Singapore and Asia.



Distinguished Prof

## Ivan PNG

NUS Business School, Strategy & Policy

### Behavioural Biases At Work: Implications For Productivity and Policy

Biases in decision-making in the workplace reduce productivity. Prof Png's research aims to develop a better understanding of behavioural biases in the workplace by investigating their effects on decision-making in the context of food manufacturing and personal transportation industries. The project seeks to uncover how behavioural biases impede optimal decision-making in work settings, with the ultimate goal of enhancing productivity and developing more effective policies. The findings of this research will provide decision-makers with valuable insights to increase productivity and assist policy-makers in formulating effective interventions.

Assoc Prof

## Irene NG

NUS Arts & Social Sciences, Social Work

### In-Work Poverty and the Challenges of Getting By among the Young

The low-earning young working class is currently facing a phenomenon known as "in-work" poverty, which refers to being employed but still experiencing poverty. This project aims to investigate the types of "in-work" poverty the young working class are experiencing using surveys, interviews, focus-group discussions, and text analyses. Assoc Prof Irene Ng, building upon findings from earlier work funded under the 2018 SSRTG call, aims to delve deeper and explore a broader understanding of the underlying factors that hinder the career advancement of low-earning young individuals.

Asst Prof

## Yvette VAN DER EIJK

NUS Saw Swee Hock School of Public Health

### Exploring Time Poverty And Mental Health in Singapore Women With Young Children

Gendered time poverty refers to women experiencing an unequal burden of unpaid caregiving and household tasks, limiting their personal development and societal progress. This project aims to explore time poverty among Singaporean women with young children by using an international time use diary method. This method captures users' daily activities in real-time. Data collected will be analysed to measure the association between time use and mental well-being. Findings from this project will provide insights into how women's time allocation impacts their mental well-being, contributing to ongoing initiatives in perinatal health and mental well-being.

# Three researchers awarded inaugural NUS Emerging Scientist Fellowship

Three early career researchers from NUS have been awarded the University's inaugural Emerging Scientist Fellowship to further their research careers. Established in 2022 by the NUS Office of the Deputy President (Research and Technology), the NUS Emerging Scientist Fellowship is a three-year programme aimed at attracting research fellows to work with, and move between institutes, faculties, and schools within NUS.

Research Fellow

## TANG Chi Sin

**Singapore Synchrotron Light Source (SSLS)**

Dr Tang's research focuses on synchrotron-based techniques to study the fundamental properties of materials. By accelerating electrons within 99.999 per cent of the speed of light, we can produce electromagnetic radiation over a broad spectral range and utilise it for research in many scientific disciplines. Studying a material's fundamental properties, such as superconductivity, could shed light on certain questions like how electrons behave in two-dimensional materials.

On receiving the Fellowship Dr Tang said, "The Fellowship allows for greater collaboration, and it gives me a greater latitude to study fundamental properties of quantum systems and how we could possibly translate them into applications related to next-generation electronic systems, computing devices and even highly-efficient clean energy applications."

Research Fellow

## Nicholas YAP

**NUS Tropical Marine Science Institute (TMSI)**

Dr Yap's primary research is focused on the taxonomy and systematics of sea anemones and jellyfish, in which the identities of these enigmatic animals are notoriously difficult to ascertain positively. Without knowing their identities, our understanding of the distribution, prevalence and ecology of these animals in Singapore and the neighbouring regions remain poor. Looking to rectify this, Dr Yap is undertaking efforts to put missing faces to known species names, and vice-versa, in the region.

Presently, he is part of an ongoing study that investigates the impact of climate change on tropical jellyfish blooms. With the number of rising incidents involving humans being stung by jellyfish, especially in local waters, findings from this project will be useful to formulate strategies to mitigate such events.

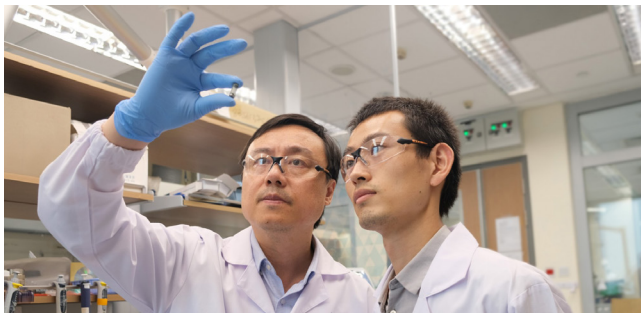
Research Asst Prof

## ZENG Yiwen

**Centre for Nature-based Climate Solutions (CNCS) & NUS TMSI**

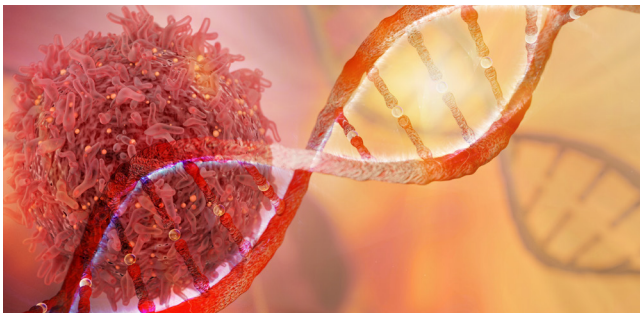
A spatial-ecological modeller, Dr Zeng is focused on finding ways to scale up conservation efforts across Southeast Asia, that are both socially responsible and ecologically sound. His goal is to develop research that can directly inform and shape conservation and sustainability policies. Southeast Asia's forests are some of the most biodiverse habitats in the world. They store large amounts of carbon in their aboveground biomass, however, they also experience high rates of deforestation. Finding better ways to protect these forests will have huge implications not only for biodiversity conservation, but also our ability to combat climate change. Dr Zeng's work aims to better understand how land-use management and conservation policy decisions can impact species and ecological processes.

## NUS researchers invent novel ingestible capsule X-ray dosimeter for real-time radiotherapy monitoring



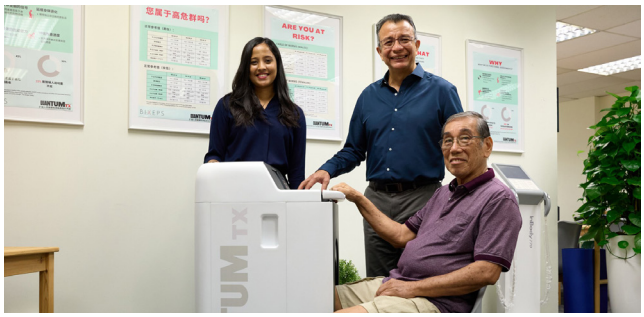
NUS researchers have developed an ingestible X-ray dosimeter capsule to improve the treatment of gastric cancer. This capsule enables real-time monitoring of radiation dose, improving the precision of radiotherapy, a common treatment for gastric cancer. The team reported that the design could provide approximately five times more accurate monitoring of the radiation dose delivered than current standard methods. This breakthrough has the potential to significantly enhance the effectiveness of radiotherapy in treating gastric cancer patients.

## CSI Singapore researchers uncover potential novel therapeutic targets against natural killer/ T-cell lymphoma



Researchers from the NUS Cancer Science Institute of Singapore, led by Prof Chng Wee Joo and Assoc Prof Takaomi Sanda, have identified a potential therapeutic target for Natural killer/T-cell lymphoma (NKTL), an aggressive form of non-Hodgkin lymphoma. Their study revealed that elevated levels of the transcription factor TOX2, a protein involved in DNA-to-RNA transcription, stimulate the growth and metastasis of NKTL. This breakthrough offers valuable insights into the molecular mechanism of NKTL progression and paves the way for the development of targeted therapies.

## NUS study: Brief weekly magnetic muscle therapy improves mobility and lean body mass in older adults




NUS researchers have developed a magnetic muscle therapy that can potentially reverse age-related decline in mobility and body composition. In a study involving 101 participants aged 38 to 91, weekly exposure to low levels of pulsed electromagnetic field (PEMF) using the previously developed BIXEPS device led to significant improvements in mobility and body composition after 12 weeks, particularly among older individuals. The trial was conducted by NUS researchers in collaboration with researchers from QuantumTX and the Healthy Longevity Translational Research Programme.

## NUS researchers invent powerful tool to gather data on immune response at single-cell level

A team led by Asst Prof Cheow Lih Feng from the NUS iHealthtech has invented a groundbreaking technique called TRAPS-seq, which enables the study of immune cell response at a single-cell level. This breakthrough addresses the challenge of understanding how cells communicate and coordinate in response to stimuli or pathogens. By capturing and analysing these proteins, valuable insights into immune responses in chronic diseases like cancer and autoimmune disorders can be gained, accelerating the development of targeted therapeutic strategies.

# Smart insole can identify and mitigate workplace accidents


More than a million workers worldwide sustain work-related injuries daily, with slips, trips and falls (STFs) being the primary causes. To address the issue of serious accidents, Prof Lim Chwee Teck from NUS Biomedical Engineering collaborated with FlexoSense to develop a smart insole that can detect a person's balance and track workplace accidents.

Comprised of pressure and motion sensors, the smart insole can capture real-time changes in foot pressure and motion during a slip, trip or fall, generating balance profiles for different users. Companies can use these profiles to identify high-risk areas in the workplace and implement preventive measures promptly. The insole's sensors can also detect incidents such as falling from heights, as such incidents usually have distinct profiles as compared to falls on level ground.

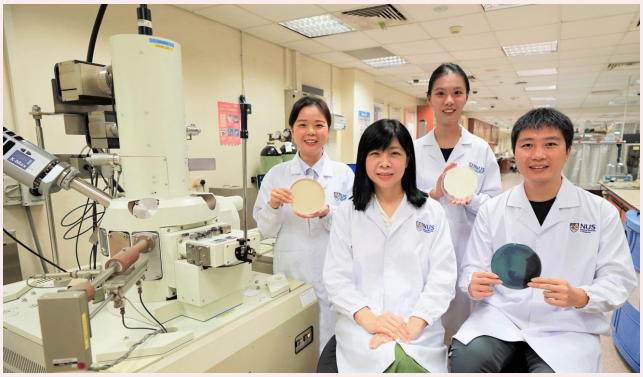
The research team was awarded the Maritime Innovation and Technology-STARTUP Grant by the Maritime Port Authority of Singapore for prototype development and test-bedding. They are currently looking into future applications and commercialisation of the smart insole to mitigate STFs in construction, aviation, manufacturing and other industries.

## CA2DM@NUS and CBMM develop advanced niobium-graphene batteries with unprecedented 30-year lifecycles

Batteries play a crucial role in powering various devices, including mobile phones and electric vehicles. However, traditional lithium-ion batteries are limited by safety risks, short life cycles, and long charging times. Researchers at the NUS Centre for Advanced 2D Materials developed novel niobium-graphene batteries that offer improved safety and performance compared to traditional lithium-ion batteries. These batteries are currently being tested at the new CBMM-CA2DM Advanced Battery Laboratory, which was established by NUS and CBMM and is equipped with state-of-the-art facilities to fabricate and test novel battery innovations.

## Breakthrough in achieving energy efficient and customisable ultrathin inorganic membranes

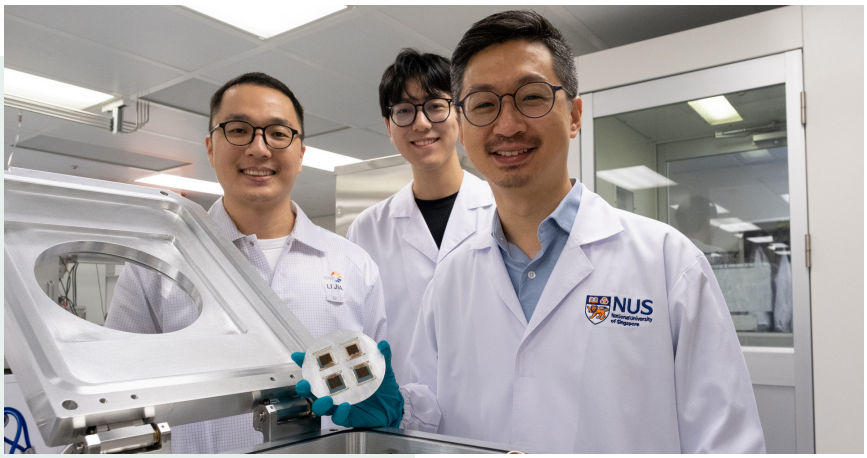
Conventional membrane technologies require a combination of pressure, heat, and chemicals to function, making their processes energy-intensive and expensive. To address this issue, a research team led by Prof Ho Ghim Wei from NUS Electrical and Computer Engineering developed a technique for producing ultrathin inorganic membranes through self-assembly of free-floating inorganic building blocks. This process is energy-efficient, highly customisable, and has the potential to revolutionise research areas in sensing, catalysis, and energy conversion, overcoming energy challenges in the face of climate change.



## Innovative paper-like, battery-free, AI-enabled sensor for holistic wound monitoring

Timely and effective monitoring of wound healing is critical to wound care and management. To enable this, NUS researchers developed the PETAL (Paper-like Battery-free In situ AI-enabled Multiplexed) sensor patch, which can monitor wound healing status quickly and accurately. Specifically, sensor images are captured by a mobile phone and analysed by AI algorithms to determine the patient's healing status. This allows doctors to provide a simple, convenient and effective method to assess wound recovery.

## NUS scientists set a new world record for power conversion efficiency with novel perovskite solar cells



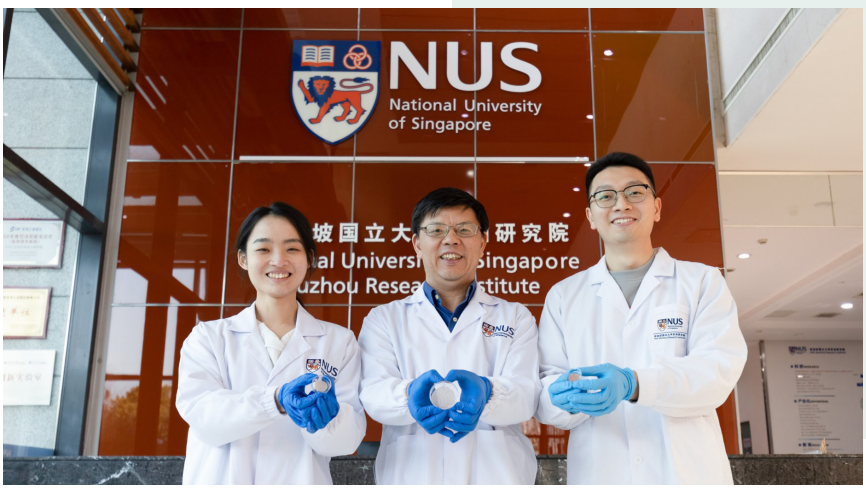

Perovskites are materials known for their ease of fabrication and high efficiency in absorbing light, making them promising for solar cell applications. A research team from NUS, led by Asst Prof Hou Yi, made significant efforts in developing innovative and scalable technologies to improve the efficiency of 1 $cm^2$ perovskite solar cells – the standard size of measurement used for benchmarking different solar cell technologies. Using an inverted-structure perovskite solar cell incorporated with an innovative charge-transporting material, the team has achieved record-breaking power conversion efficiency of 24.35%, surpassing the efficiency of normal-structured perovskite cells.

The promising results reported by the NUS team mark a pivotal milestone in advancing the commercialisation of a low-cost, efficient, stable perovskite solar cell technology. The team is now working to scale up the technology by expanding the dimensions of the perovskite solar cells and demonstrating their viability and effectiveness on a larger scale.

## NUS scientists develop plant-based cell culture scaffold for cheaper, more sustainable cultured meat

Cultured meat, a sustainable protein source produced by cultivating animal cells on scaffolds, is gaining popularity as consumers become more conscious of the environmental and ethical ramifications of their food choices.

However, conventional scaffolds made from synthetic or animal-based materials are too expensive or inedible. To overcome this, Prof Huang Dejian's team turned to plant proteins, which are generally biodegradable, biocompatible with animal cells, and suitable for food consumption. In an experiment, the team cultured pig skin cells on a plant protein scaffold, resulting in meat-like muscle tissue within 12 days. The cultured meat displayed a similar texture and overall appearance to real animal meat. This breakthrough highlights the potential of using plant protein scaffolds in cultured meat production, addressing environmental and ethical concerns associated with conventional meat production. As consumers become more conscious of their food choices, this innovation offers a promising solution for sustainable protein production.




Office of the Deputy President (Research & Technology)

nus.edu.sg/research