NATIONAL RESEARCH FOUNDATION
PRIME MINISTER'S OFFICE
SINGAPORE

Exceptional talent driving scientific innovation conferred Singapore's top honours

1 The **President's Science and Technology Awards (PSTA) 2025** honoured leaders and innovators who made exceptional contributions to the science and technology (S&T) ecosystem in Singapore. The PSTA 2025 ceremony was held on 3 October at the University Cultural Centre, National University of Singapore (NUS).

2 Administered by the National Research Foundation (NRF), the awards comprise the President's Science and Technology Medal (PSTM)[1], the President's Science Award (PSA)[2], the President's Technology Award (PTA)[3], and the Young Scientist Awards (YSA)[4]. President Tharman Shanmugaratnam and NRF Chairman Mr Heng Swee Keat, presented the respective awards below:

Awards presented by President:

- PSTM: Professor Tan Eng Chye, President, NUS
- PSA: Professor Lisa Fong Poh Ng, Executive Director, A*STAR Infectious Diseases Labs
  *[Prof Ng is concurrently Executive Director at A*STAR's Biomedical Research Council]*
- PSA: Professor Lim Chwee Teck, NUS
- PTA: Professor Ng Geok Ing, Nanyang Technological University, Singapore (NTU Singapore)
  [Prof Ng is concurrently Executive Director of the National Semiconductor Translational and Innovation Centre for Gallium Nitride (NSTIC-GaN)]

YSA awards presented by NRF Chairman:

- Dr Andy Tay Kah Ping (NUS)
- Dr Chan Yi Hao (A*STAR Infectious Diseases Labs)
- Dr Liu Ziwei (NTU Singapore)
- Dr Wang Xinchao (NUS)

3 Elaborating on the significance of the awards, **Professor Tan Chorh Chuan, Permanent Secretary (National Research Development)**, said: "Talent and cutting-edge S&T are critical for translating research into outcomes which significantly contribute to Singapore's competitiveness and continued growth. PSTA celebrates the achievements of remarkable research leaders who are breaking new ground in S&T and its application. It also underscores the value that Singapore places on research and innovation. This is particularly important as we launch the RIE2030 plan later this year – it signals our intent to keep Singapore as an attractive place for researchers and innovators to do pioneering work and achieve high impact."

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[1] The PSTM recognises individuals who have made distinguished, sustained and exceptional contributions, and played a strategic role in advancing Singapore's development through promotion and management of S&T. The accomplishments and contributions would generally be acknowledged by the S&T ecosystem as having a significant impact on the ecosystem's capabilities or international stature.

[2] The PSA recognises accomplishments generally acknowledged by other SS&T practitioners as being significant and impactful to their field. They need not have led to practical applications or products.

[3] The PTA recognises accomplishments that have led to transformative changes in the use or potential of technology in Singapore or further afield. The relevant technology need not be fully adopted or deployed at the point of nomination, but its potential must be acknowledged, and it must have progressed beyond academic or theoretical potential and be in the process of translation or adoption by end-users.

[4] The YSA is awarded to researchers aged 40 years and below, who are actively engaged in R&D in Singapore, and who have shown great potential to be world-class researchers in their fields of expertise. This award is administered by the Singapore National Academy of Science (SNAS) and supported by NRF.

PSTM: Transformative contributions that advanced Singapore's RIE landscape

4 The recipient of the apical, PSTM, award, **Professor Tan Eng Chye**, President of NUS, was recognised for his visionary leadership and lifelong dedication to driving science and technology (S&T) research at NUS and in Singapore. He substantially advanced the recruitment and development of top talent, from leading academics to promising young researchers, and brought NUS research to new levels of world-class excellence. Under his leadership, NUS education became more flexible and interdisciplinary, and he also expanded mentorship and entrepreneurship programmes. Prof Tan shaped a deeply collaborative culture within NUS, and pushed for stronger partnerships between NUS and research groups across Singapore as well as with leading centres worldwide. Prof Tan played a critical role in placing Singapore's S&T capabilities and achievements firmly on the world map.

PSA and PTA: Breakthroughs in science and technology delivering real-world impact

5 PSA recipient **Professor Lisa Ng** has led high-impact research on mosquito-borne viruses, especially Chikungunya. Her work revealed how infections trigger both helpful and harmful immune responses, and how these may explain why patients recover differently. These novel insights are underpinning improvements in the development of diagnostics, vaccines and treatments and strengthening outbreak readiness in Singapore and the region.

6 In the field of cancer, PSA recipient **Professor Lim Chwee Teck** has transformed our understanding of how cancers spread and how circulating cancer cells survive the intense physical and mechanical stresses they are exposed to as they travel through the blood circulatory system. Through creating novel insights into cancer progression, his research is informing new ways of detecting and treating cancer as well as steering pharmaceutical innovation, which benefit patients and healthcare systems.

7 PTA recipient **Professor Ng Geok Ing** has made significant contributions in growing Singapore's capabilities in Gallium Nitride (GaN) – an advanced semiconductor technology. His sustained efforts in setting up key facilities, training engineering teams and working closely with defence partners have greatly advanced its application, across a range of use cases. These efforts culminated in the creation of a national platform which positions Singapore among global leaders in GaN technology.

YSA: Emerging leaders shaping the future of science and technology

8 The exciting work of our four YSA winners highlights how the next generation of research leaders is already contributing to shaping the future of science and technology.

9 **Dr Andy Tay Kah Ping** (NUS) is advancing regenerative medicine with smart biomaterials that guide the immune system to speed up diabetic wound healing. His novel multi-pronged approach has demonstrated faster healing rates in preclinical studies, opening new possibilities for next-generation therapies.

10 **Dr Chan Yi Hao's** (A*STAR) research in infectious diseases has revealed how the brain defends itself against severe viral infections. His discoveries of new protective factors and vulnerabilities could lead to new approaches for better diagnosis and care of viral encephalitis.

11 Pushing the boundaries of artificial intelligence, **Dr Liu Ziwei** (NTU Singapore) is helping computers perceive and recreate the visual world in three and four dimensions. His work on generative AI and mixed reality enables realistic digital twins to be created and applied in areas ranging from healthcare to education.

12 **Dr Wang Xinchao** (NUS) is developing ways to train compact AI models with limited resources while keeping high performance, thereby increasing access but with greater efficiency. His methods make advanced AI more accessible, energy-saving and deployable on everyday devices.

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About the President's Science and Technology Awards (PSTA)

The President's Science and Technology Awards (PSTA) are Singapore's top honours for research scientists and engineers. Organised by the National Research Foundation, Singapore (NRF), the awards are conferred annually to individuals and teams who push the frontiers of science and technology. The PSTA comprises the President's Science and Technology Medal, the President's Science Award and the President's Technology Award, and also celebrates the Young Scientist Award, administered by the Singapore National Academy of Science and supported by NRF. Learn more about the PSTA at www.psta.gov.sg.

About the National Research Foundation (NRF)

The National Research Foundation, Singapore (NRF), set up on 1 January 2006, is a department within the Prime Minister's Office. The NRF sets the national direction for research and development (R&D) by developing policies, plans and strategies for research, innovation and enterprise. It also funds strategic initiatives and builds up R&D capabilities by nurturing research talent. Learn more about the NRF at www.nrf.gov.sg.

Chinese Glossary

PRESIDENT'S SCIENCE & TECHNOLOGY MEDAL	
Professor Tan Eng Chye President National University of Singapore	陈永财教授 校长 新加坡国立大学
PRESIDENT'S SCIENCE AWARD	
Professor Lim Chwee Teck NUS Society Professor Director, NUS Institute for Health Innovation & Technology Professor, Department of Biomedical Engineering, College of Design and Engineering, National University of Singapore	林水德教授 国大协会讲座教授 医疗健康创新与科技研究院院长 设计与工程学院生物医学工程系教授 新加坡国立大学
Professor Lisa Ng Executive Director, A*STAR Infectious Diseases Labs (A*STAR IDL) Executive Director, A*STAR's Biomedical Research Council	伍芳葆教授 院长 新科研传染病研究所 执行署长 生物医药研究理事会 新加坡科技研究局 (新科研)
PRESIDENT'S TECHNOLOGY AWARD	
Professor Ng Geok Ing Nanyang Technological University Executive Director National Semiconductor Translation and Innovation Centre for Gallium Nitride (NSTIC (GaN))	黄玉荣 教授 南洋理工大学 执行总监 新加坡氮化镓半导体技术转化创新中心
YOUNG SCIENTIST AWARD	
Dr Chan Yi Hao Principal Scientist A*STAR Infectious Diseases Labs (A*STAR IDL)	曾毅豪博士 研究主管 新科研传染病研究所 新加坡科技研究局 (新科研)
Dr Andy Tay Kah Ping Presidential Young Professor & Assistant Professor, Department of Biomedical Engineering, College of Design and Engineering, National University of Singapore	戴嘉平博士 杰出青年教授与助理教授 设计与工程学院生物医学工程系 新加坡国立大学
Dr Liu Ziwei College of Computing and Data Science Nanyang Technological University	刘子纬副教授 计算与数据科学学院 南洋理工大学
Dr Wang Xinchao Presidential Young Professor & Assistant Professor, Department of Electrical and Computer Engineering, College of Design and Engineering, National University of Singapore	王鑫超博士 杰出青年教授与助理教授 设计与工程学院电机与电脑工程系 新加坡国立大学

Full Citations for the PSTM, PSA, PTA, and YSA Recipients

Professor Tan Eng Chye
President, National University of Singapore

"For his transformative contributions in advancing Singapore's research and innovation landscape through interdisciplinary education, international partnerships, deep tech innovation and ecosystem building; and for nurturing future leaders and elevating Singapore's global standing in science and technology."

Professor Tan Eng Chye has dedicated his entire career to driving science and technology (S&T) research, through spearheading innovative initiatives, fostering international collaborations and nurturing critical talent in this field.

This lifelong commitment culminated in his appointment as President of NUS, where he astutely steered academic units to raise their standards in recruitment, talent development and research to world-class excellence. His foresight played a critical role in NUS' strong performance in recent global university rankings, ranking among the world's top 10 in S&T disciplines, including Chemistry, Data Science and AI. In education, Prof Tan instituted far-reaching reforms that have shaped S&T education in Singapore. Recognising the need for graduates with broad perspectives and technical depth, he led NUS to evolve from a disciplinary model towards one that is flexible, interdisciplinary and integrative. This is exemplified by the curricula of the College of Humanities and Sciences, College of Design and Engineering, and NUS College. A common curriculum now underpins flexible pathways, with foundations in data literacy, critical thinking, and 21st-century skills such as AI and computational thinking. This model prepares the next generation of scientists, engineers and graduates to think critically and across disciplines, remain agile in learning, and apply global and regional perspectives.

With an eye for talent, Prof Tan pioneered and developed schemes to recruit and nurture scientific talent for Singapore. This included, bringing in eminent scientists to lead programmes in strategic areas and appointing outstanding directors to helm the Research Centres of Excellence (RCEs) at NUS. Under their leadership, the RCEs advanced strong research programmes and trained a pool of S&T PhD talent, boosting Singapore's capabilities in quantum technologies, mechanobiology and intelligent materials.

With a consistent focus on nurturing Singaporean talent, Prof Tan also championed programmes such as the NUS Overseas Graduate Scholarships and Overseas Postdoctoral Fellowships to cultivate future academic leaders. He spearheaded the Presidential Young Professorship scheme, which has, to date, been awarded to nearly 120 individuals who are leading pioneering work across diverse fields, strengthening Singapore's research ecosystem.

Under Prof Tan's stewardship, translational research and research commercialisation took off strongly. In 2018, NUS launched the Graduate Research Innovation Programme (GRIP) to transform NUS technologies into investible, scalable deep tech startups. To date, 177 teams have been trained, and GRIP start-ups have attracted some S$70 million in external investments. Collaborating with the Nanyang Technological University (NTU) and with funding support from the National Research Foundation (NRF), NUS further established the National GRIP, which aims to train up to 300 start-up teams by 2028 and nurture more than 150 spin-offs by 2030.

Prof Tan also strengthened NUS' global engagement, with a special focus on Southeast Asia. He expanded education, research and enterprise collaborations by fostering connections among university leadership, academics, entrepreneurs, industry and students. NUS Overseas Colleges and

BLOCK71 accelerators grew to new locations in the region. NUS' S&T collaborations with global partners also deepened, including CREATE programmes with top institutions and joint university-wide research partnerships with 14 leading universities in North America and Europe. In Asia, Prof Tan set up four research institutes in China, creating opportunities for joint research, education, and new market entry for NUS start-ups.

Beyond NUS, Prof Tan has played a central role in shaping Singapore's S&T ecosystem, serving in leadership capacities across national institutions, including the National Research Foundation, Economic Development Board, National University Health System, NUS High School of Mathematics and Science, A*STAR, Defence Science and Technology Agency, and Defence Science Organisation.

With his visionary leadership and foresight, Prof Tan has been pivotal in advancing Singapore's research and innovation landscape and placing Singapore's S&T capabilities and achievements firmly on the world map.

Professor Lim Chwee Teck
Director, Institute for Health Innovation & Technology
National University of Singapore

"For his pioneering contributions to cancer research through innovative mechanobiology approaches, successfully bridging engineering, biological sciences and medicine to foster a deeper understanding of cancer metastasis."

Professor Lim Chwee Teck's pioneering research has fundamentally transformed the understanding of cancer metastasis, the leading cause of cancer-related deaths. He introduced the concept of "mechanoresilience", revealing why only a small subset of cancer cells survive the extreme physical stresses of travelling through the bloodstream, such as high fluid pressure and squeezing through narrow capillaries, to form secondary tumours, while most circulating cancer cells perish. Using custom-engineered microfluidic platforms that simulate these conditions, Prof Lim and his team identified that these mechanoresilient cells display distinctive traits: enhanced DNA repair, altered nuclear stiffness, and unique gene expression profiles. These confer a survival advantage, enabling the cells to seed new tumours and resist treatment.

What distinguishes Prof Lim's work is his focus on the physical and mechanical challenges faced by metastatic cancer cells; an aspect often overlooked in traditional cancer research, which has largely centred on genetic and biochemical factors. By showing that mechanical forces act as a natural filter, selecting only the most robust and adaptable cancer cells, his discoveries have reframed how scientists and clinicians understand cancer progression. This paradigm shift offers promising new strategies: therapies that could target DNA repair pathways or nuclear properties of mechanoresilient cells, while diagnostic tools could detect these traits early to better predict and manage metastatic risk. By integrating engineering, mechanics and biomedicine, Prof Lim has demonstrated the power of interdisciplinary collaboration to translate laboratory discoveries into clinical applications.

The impact of Prof Lim's research extends well beyond the laboratory. Cancer patients, particularly those at risk of metastasis, may benefit from more precise risk assessments and personalised treatment plans. Pharmaceutical innovation can also accelerate, as this new understanding inspires the development of drugs and diagnostics that directly address the mechanisms of cancer spread.

Complementing his academic achievements, Prof Lim is a serial entrepreneur who had co-founded six startups, including one that commercialised a cancer biochip and achieved a successful IPO in 2018. These efforts highlight his commitment to translating scientific discoveries into technologies that benefit patients and healthcare systems.

He also serves as Director of the Institute for Health Innovation and Technology at the National University of Singapore, where he leads multidisciplinary teams to drive advances in healthcare through translational research. Under his leadership, the institute fosters collaboration between engineers, scientists, clinicians and industry partners, accelerating the development and adoption of innovative healthcare solutions to improve patient care and public health.

Prof Lim's influence is also strongly felt through his mentorship and leadership in training the next generation of scientists and engineers. He has built a collaborative, interdisciplinary research environment in Singapore and globally, with his mentees going on to establish impactful careers of their own. In recognition of his outstanding mentorship, he was awarded the Nature Lifetime Achievement Award for Mentoring in Science in 2022.

Prof Lim's exceptional contributions have been recognised through numerous prestigious awards, including the President's Technology Award, Wall Street Journal Asian Innovation Award, Otto Schmitt Award, Vladimir K. Zworykin Award, Highly Cited Researcher, Asia's Most Influential Scientist Award, Asian Scientists 100, ASEAN Outstanding Engineering Achievement Award and IES Prestigious Engineering Achievement Award. He is also an elected fellow of ten esteemed academies—including the Royal Society (UK), Royal Academy of Engineering (UK), National Academy of Inventors (US), American Institute for Medical and Biological Engineering, International Academy of Medical and Biological Engineering, Singapore National Academy of Science, and Academy of Engineering, Singapore, reflecting international recognition of his contributions, leadership, and impact.

Professor Lisa Ng
Executive Director, A*STAR Infectious Disease Labs and
Biomedical Research Council, A*STAR

"For her pioneering contributions to viral infection immunology and advancing global pandemic management through groundbreaking research on Arboviruses, in particular, Chikungunya."

Professor Lisa Ng is a world-leading scientist in infectious disease research, renowned for her discoveries in viral infection immunology and leadership in strengthening global pandemic preparedness. Her passion for infectious diseases began as a young researcher, witnessing the devastating effects of outbreaks on communities and healthcare systems. The 2003 SARS outbreak was a turning point, motivating her to study virus–immune system interactions and develop better tools for detecting, managing, and preventing infectious diseases.

Prof Ng's research has produced significant discoveries that reshaped the field. Early in her career, she played a critical role in developing one of the world's first diagnostic kits for SARS, enabling rapid detection at a time when speed meant saving lives. Her work has since expanded to a wide range of viral infections, focusing on the immune responses shaping disease course and severity. Through advanced immuno-monitoring technologies, she has identified biomarkers showing how patients' immune systems respond to infections and vaccines, providing insights that inform better clinical interventions and public health strategies.

A major area of her pioneering research is on arboviruses, viruses transmitted by arthropods such as mosquitoes. Prof Ng was among the first to raise the alarm on Chikungunya virus, once overshadowed by dengue and now a growing threat. Her team's research uncovered how the virus triggers both protective and damaging immune responses, explaining why some patients recover quickly while others suffer prolonged joint pain. She identified immune signatures predicting disease outcomes, paving the way for improved diagnostics, vaccines, and therapeutics. These contributions advanced understanding of Chikungunya and improved outbreak response.

Beyond arboviruses, Prof Ng has led significant translational breakthroughs. She developed PCR-based assays for H5N1 during the 2005–2006 bird flu outbreaks, and her molecular and immunoassays for multiple pathogens have been shared globally. During COVID-19, her team's data guided national vaccination strategies and safety measures, while her diagnostic assays supported the public health system. After borders reopened, they studied vaccine booster effectiveness. As Executive Director of the A*STAR Infectious Diseases Labs, she established A*STAR's High Containment Biosafety Level 3 (BSL-3) Facility for safe study of high-risk pathogens. These milestones strengthened Singapore's preparedness and resilience against future crises.

Prof Ng is also a strong advocate for pandemic preparedness. Drawing on lessons from SARS, Zika, and COVID-19, she has worked closely with academia, public health agencies, industry, and research networks worldwide to translate laboratory findings into real-world solutions. Her leadership has strengthened global surveillance systems, informed vaccine pipelines, and enhanced international collaboration, including a strategic alliance with Institut Pasteur Paris via a Memorandum of Understanding (2024) and Master Research Collaboration Agreement (2025) to address global health priorities.

Equally remarkable is her commitment to mentorship. Prof Ng believes the future of infectious disease research depends on building the pipeline of scientific talent and equipping young scientists with technical expertise and resilience. She has supervised more than 20 PhD students and postdoctoral fellows, many now leading their own research programmes worldwide.

The breadth of her contributions is recognised through numerous accolades. She is a fellow of the Singapore National Academy of Sciences, an elected member of the Henry Kunkel Society, recipient of the Public Administration Medal (Silver), and regularly serves in scientific advisory roles and national taskforces. She has been named a Highly Cited Researcher by Clarivate and one of the Top 2% Scientists Worldwide by Stanford University for several years, with nearly one-third of her work ranked among the top 10% most cited globally.

Professor Ng Geok Ing
School of Electrical and Electronics Engineering, Nanyang Technological University
Executive Director, National Semiconductor Translational and Innovation Centre, Gallium Nitride (NSTIC-GaN)

"For his groundbreaking work in advancing Singapore's capabilities in radio-frequency Gallium Nitride (GaN) – an advanced III-V compound semiconductor technology – particularly in defence and commercial applications, by enabling local manufacturing capabilities and nurturing talents in this strategic field."

Professor Ng Geok Ing's contributions to Singapore's semiconductor and defence technology landscape have been instrumental in advancing national capabilities in "III-V compound" semiconductors, especially Gallium Nitride (GaN). Over the past three decades, his work has spanned deep-tech research, talent development, industry translation, and national ecosystem building, culminating in the creation of a national platform that positions Singapore among global leaders in GaN technology.

In the early 1990s, Singapore's semiconductor efforts were focused on silicon-based microelectronics. However, emerging applications in wireless communications, satellite communications, radars and advanced sensing technologies required materials with performance beyond silicon. Compound semiconductors held that promise, but local expertise was scarce. Recognising this strategic imperative, Prof Ng returned from the USA in 1995 to launch a national R&D programme at Nanyang Technological University (NTU).

At NTU, Professor Ng initiated foundational research on GaAs and GaN monolithic microwave integrated circuit (MMIC) technologies. He established Singapore's first III-V infrastructure, built and trained a core team of engineers, and forged long-term collaborations with DSO National Laboratories. These efforts laid the groundwork for a resilient defence and commercial base in compound semiconductors.

In 2000, Prof Ng co-founded DenseLight Semiconductors, NTU's first semiconductor spin-off. The venture transferred patented InP optoelectronic fabrication processes from lab to industry, establishing Singapore's first III-V device manufacturing plant. Today, DenseLight remains a global supplier of photonics components for sensing and datacom applications.

A strong advocate of national technological self-reliance, Prof Ng led the establishment of the MMIC Design Centre in 2005 with support from MINDEF – Singapore's only dedicated defence R&D laboratory for III-V semiconductors. Under his leadership, the centre developed a qualified GaN MMIC baseline process on 4-inch wafers, achieving performance on par with leading global foundries. The first fully indigenous GaN MMIC power amplifier produced through this platform continues to operate in space onboard a cubesat today, a testament to the robustness of Singapore-grown technology. In recognition of his sustained impact, Prof Ng was awarded the Defence Technology Prize in 2007 for his significant contributions to the MMIC R&D Team (Team R&D Category), and again in 2023 for building up Singapore's indigenous R&D capabilities in Gallium Nitride MMIC technologies for defence applications.

Looking beyond defence, he anticipated GaN's potential across commercial domains such as 5G/6G telecommunications, satellite communications, automotive radars, and advanced instrumentation. As early as 2008, Prof Ng began developing GaN-on-Silicon (GaN-on-Si) technologies at NTU, years before they gained industry traction. Despite limited initial support, he remained committed to pushing the performance boundaries. His group's results have been published in leading journals and conferences, featured in international semiconductor media, and formed part of the foundational intellectual property for Singapore's next-generation GaN platform.

To enable broader deployment, Prof Ng led a multi-agency effort with the Agency for Science, Technology and Research (A*STAR), NTU, and DSO to establish the National Semiconductor Translation and Innovation Centre for GaN [NSTIC (GaN)] in 2022. The proposal secured S$123M in Phase 1 funding from the National Research Foundation in 2023. NSTIC(GaN) is the world's first boutique foundry offering both 6-inch GaN-on-SiC and 8-inch GaN-on-Si wafer fabrication. The centre bridges the gap between research and manufacturing, supporting dual-use innovation and anchoring a growing radio-frequency GaN ecosystem in Singapore—from epiwafer suppliers and IC designers to system integrators.

Believing strongly in the dual importance of both groundbreaking discoveries and the ability to build enduring systems, Prof Ng aims to position Singapore not merely as a consumer but a producer and global driver of GaN technologies.

Dr Andy Tay Kah Ping
Presidential Young Professor, Department of Biomedical Engineering,
College of Design and Engineering, National University of Singapore

"For advancing biomaterial-based therapies that modulate immune responses to improve diabetic wound healing and enhance cancer immunotherapy outcomes."

Dr Andy Tay is a Presidential Young Professor at the National University of Singapore's (NUS) College of Design and Engineering, and a Principal Investigator in the NUS Institute for Health Innovation &

Technology (iHealthtech) and the NUS Tissue Engineering Programme under the NUS Life Sciences Institute. He is leading the emerging field of immuno-engineering, where new biomaterials are designed to modulate immune cells and their tissue environments to improve recovery from diseases such as diabetic ulcers and cancer. This is significant because 830 million people worldwide suffer from diabetes. Up to 25% of them are vulnerable to severe wounds, and a lower limb is amputated every 30 seconds due to diabetic wounds that cannot heal. In addition, every year, there are 20 million new cancer cases and 10 million cancer deaths.

To improve diabetic wound healing, Dr Tay's laboratory developed a multi-pronged "4R programme" to bring about a healthy number of the right subtype of immune cells. These complementary approaches were found to accelerate wound healing in preclinical models by up to 200% compared to existing therapies. The first strategy, Remove, uses microneedles to clear anti-healing immune cells from deep wound tissues, breaking the vicious cycle of chronic inflammation that impedes recovery. The second, Reprogram, delivers anti-inflammatory proteins through microneedles to convert immune cells from anti-healing to pro-healing subtypes. The third, Replace, employs a magnetic hydrogel to mechanically stimulate fibroblasts and enhance collagen production and tissue regeneration, restoring a vital function impaired in diabetic wounds. The fourth, Reimagine, explores unconventional approaches such as using microalgae to generate oxygen, which promotes blood vessel formation and accelerates wound closure.

Another focus in Dr Tay's lab is the development of cancer immunotherapies. His lab has engineered nanostraws – hollow tubes about 10,000 times smaller than a grain of rice – to deliver proteins, RNA and DNA that genetically enhance the ability of immune T cells to detect and kill cancer cells. This technique enables efficient delivery of biomolecular cargo, making it faster and more cost-effective to generate Chimeric Antigen Receptor T (CAR-T) cells, with the goal of broadening patient access to this transformative cancer immunotherapy.

Dr Tay has distinguished himself as both a prolific scientist and a dedicated educator. Since starting his lab in 2020, he has raised more than S$8.5 million in research grants as the sole principal investigator, filed 7 invention disclosures, and published 32 papers as the corresponding author. His lab has trained 19 postdoctoral researchers and research assistants, 22 graduate students and 40 undergraduates. Additionally, Dr Tay actively advocates for STEM education and outreach both locally and globally, training graduate students to produce accessible science videos for the public. He is also a faculty member at NUS College where he teaches an interdisciplinary course on cell manufacturing and therapy, exploring both the scientific foundations and the socioeconomic factors necessary to broaden patients' access to advanced cell therapies.

Dr Tay has received multiple prestigious international awards for his work. Some of these accolades include the IAMBE Early Career Award (2025), Young Scientist Award in Bioelectromagnetics (2025), and Terasaki Young Innovator Award (2023). He has also been recognised as a Forbes 30 Under 30 honouree (US/Canada, Science), a World Economic Forum Young Scientist and is ranked among the world's top 2% scientists.

Dr Chan Yi Hao
Principal Investigator
Genetics of Host Immunity Lab, A*STAR Infectious Diseases Labs
Agency for Science, Technology and Research

"For his research on viral encephalitis, revealing how the brain defends itself from life-threatening viral infections."

Dr Chan Yi Hao is a multidisciplinary biomedical researcher specialising in human immunogenetics and infectious diseases. Dr Chan's work aims to understand why people respond so differently to

the same infection. By identifying genetic flaws and immune weaknesses that make some individuals more vulnerable, he is uncovering new ways the body fights viruses and deepening our understanding of human biology.

Dr Chan's laboratory focuses on arthropod-borne viral diseases, which are of particular relevance in Singapore's tropical environment. To this end, Dr Chan has made landmark contributions in the fields of inborn errors of immunity and viral immunology. In a groundbreaking study involving an international cohort of patients with herpes simplex encephalitis, he identified a novel human restriction factor for HSV-1. This discovery revealed a new genetic cause of herpes-related brain infection and showed how brain cells can defend themselves against viruses. In another breakthrough, Dr Chan demonstrated that a rare genetic condition weakens the brain's ability to fight SARS-CoV-2, leading to severe brain infections. This provided the first clear explanation for a rare and serious illness.

Dr Chan also played a key role in Singapore's national COVID-19 response. Collaborating with clinicians across Singapore's major hospitals, he characterised the immune responses of SARS-CoV-2-infected patients and evaluated the therapeutic efficacy of anti-viral and anti-inflammatory drugs, such as remdesivir, etoricoxib and celecoxib. These studies guided primary care providers, serving not only as prognostic tools to identify patients likely to require intubation, but also in assessing the effectiveness of therapeutic interventions at a time when much about the pandemic remained unknown.

Despite his young age, Dr Chan's scientific contributions have earned wide recognition. He is the recipient of the National Research Foundation Fellowship (2025), the ASTAR Young Achiever Award (2023), the ASTAR International Fellowship (2021) and the A*STAR Graduate Scholarship (2015). He has published 39 peer-reviewed articles, including in prestigious journals such as Nature, Science and Cell, and has achieved an h-index of 25. His work has also been featured on the cover of the Journal of Experimental Medicine, a highly influential journal in medicine and biology. In addition, he was awarded The Rockefeller University's Center for Clinical and Translational Science (RUCCTS) pilot grant from the Shapiro-Silverberg Fund for the Advancement of Translational Research.

Beyond research, Dr Chan is deeply committed to mentoring the next generation of scientists, having guided over 10 young researchers. He also contributes to the scientific community, serving as an associate editor of Frontiers in Immunology and as a member of the editorial board of the Journal of Human Immunity.

Dr Liu Ziwei
Associate Professor, College of Computing and Data Science,
Nanyang Technological University, Singapore

"For his contributions to the field of generative AI, in particular, how it perceives, understands and recreates the visual world around us."

Dr Liu Ziwei is an Associate Professor at the College of Computing and Data Science, Nanyang Technological University, Singapore. He is recognised as a pioneer in AI-driven mixed reality, which bridges the digital and physical worlds and enables machines to intuitively perceive, understand and recreate our visual environment in immersive 3D and 4D. His work addresses a critical gap: while AI excels with text, it struggles to dynamically interpret and reconstruct the richness of our visual reality. By unifying generative AI with mixed reality, Dr Liu's approach creates a dynamic flywheel linking data to real-world applications, transforming passive digital interactions into active and collaborative experiences.

His core innovation lies in teaching AI to function as both a scientist and an artist. As a scientist, the AI observes visual scenes, studying light, geometry and movement, and reasons about object interactions. As an artist, it re-creates these scenes through neural rendering, generating digital twins of reality. This enables applications such as reconstructing historic streets from faded photographs or providing virtual try-ons that adapt to a user's exact size and lighting.

Dr Liu proposed the world's first deep neural network and database for facial attribute analysis, which is now covered in standard machine learning textbooks and incorporated into major deep learning platforms. He developed the world's first generative AI framework for video frame synthesis, which was later adopted in the Google Clips product. He built one of the most comprehensive multi-modal 4D human motion capture systems worldwide, comparable to existing systems in Tsinghua University, Carnegie Mellon University, Tencent and ByteDance. He also led one of the earliest efforts to develop open-source video generation foundation models, surpassing concurrent commercial models from Meta and Nvidia.

Dr Liu is a recipient of the PAMI Mark Everingham Prize, one of the most prestigious prizes in computer vision, MIT Technology Review Innovators under 35 Asia Pacific, a Computer Vision and Pattern Recognition (CVPR) Best Paper Award candidate (top 0.1%), and the International Congress of Basic Science Frontiers of Science Award (chaired by Turing Award laureate Andrew Yao). These honours recognise his fundamental contributions to 3D and 4D content creation.

Dr Liu now leads a vibrant and fast-growing team conducting frontier research in computer vision, machine learning and computer graphics, with a particular focus on AI-driven mixed reality. To date, he has successfully designed multiple AI systems that align with human values, collaborating with government agencies, industry partners, clinicians and educators. His team's outputs have been filed as patents, delivered to public services and commercialised into products, with the potential to bring new breakthroughs to Asia Pacific and beyond.

As a Young Scientist Award recipient, Dr Liu aims to take his mission to the next level, advancing AI driven mixed reality to unlock new possibilities for science, creativity and society. His work empowers artists, researchers and everyday users to create immersive digital worlds, positioning Singapore at the forefront of human-centric AI where mixed reality becomes as seamless as daily communication. Looking ahead, his research aspires to realise "pocket universes": on-device AI capable of instantly generating personalised 4D environments, connecting communities across generations and preserving memories at scale.

Dr Wang Xinchao
Presidential Young Professor, Department of Electrical and Computer Engineering, College of Design and Engineering, National University of Singapore

"For advancing machine learning techniques that train compact AI models using limited resources, while achieving the capabilities of larger AI systems."

Recent advances in machine learning have driven significant breakthroughs across diverse artificial intelligence (AI) applications, transforming many aspects of daily life. However, these achievements have also introduced substantial challenges. Advanced models now depend on massive datasets, increasingly complex architectures, and training processes that can span weeks or months on clusters of thousands of GPUs. Such demands hinder the deployment of AI on resource-constrained platforms such as edge devices and mobile systems, and limit the ability of researchers with modest resources to tailor models to their needs. They also raise critical concerns regarding environmental impact and long-term sustainability.

Dr Wang Xinchao's research addresses these challenges through efficient machine learning. His work streamlines training and inference while designing compact, high-performance architectures.

By lowering computational and financial barriers, his innovations enable smaller laboratories, startups and individual researchers to train competitive models using limited hardware, and facilitate deployment on platforms with strict computational and memory constraints. Optimising model size, speed and efficiency not only advances accessibility but also contributes to energy conservation and sustainable AI practices. The significance of these contributions has been recognised through prestigious honours, including the Institute of Electrical and Electronics Engineers (IEEE) AI's 10 to Watch and the National University of Singapore's Young Researcher Award.

Dr Wang's research spans three interconnected domains: efficient strategies, efficient models and efficient data.

In efficient strategies, he has developed methods to derive smaller, faster and more effective models from pre-trained networks. A prominent contribution is DepGraph, the world's most widely adopted structural pruning scheme, and the first fully automated approach to tracing neuron interdependencies in neural networks. Where previous methods required laborious manual tracing, DepGraph reduces the task to three lines of code, eliminating days of effort while maintaining full flexibility. Its open-source implementation, Torch-Pruning, has become the most popular structural pruning library in the community, with over 290,000 downloads, and has been integrated into NVIDIA's commercial products, underscoring its industrial impact.

In efficient models, his focus is on designing new network architectures that deliver state-of-the-art performance at reduced computational cost and model size. A notable breakthrough is MetaFormer, one of the most widely adopted efficient transformer backbones. By replacing the computationally intensive self-attention mechanism with a simple pooling operation, MetaFormer achieves competitive or superior performance while challenging the conventional view that self-attention is the defining component of transformer architectures. Its efficiency and versatility have led to broad adoption across applications, influencing the design of lightweight, high-performance models.

In efficient data, Dr Wang has advanced training efficiency through innovative approaches to data representation. His pioneering work on Dataset Distillation (DD) condenses large datasets into smaller, representative synthetic sets that preserve or enhance model performance while reducing computational burden. He introduced Dataset Factorization, the first decomposition-based approach to DD, which overcame the limitations of earlier methods that treated synthetic samples independently. By factorising a dataset into bases and a hallucination network that together generate synthetic samples, Dataset Factorization captures inter-sample coherence and achieves state-of-the-art performance. This paradigm has since become a dominant framework in DD, inspiring numerous follow-up studies and applications.

By lowering barriers to AI development, enabling deployment on constrained platforms, and reducing energy consumption, Dr Wang's work advances the goal of making AI more accessible, sustainable and impactful. In doing so, it reinforces Singapore's standing as a global hub for cutting-edge AI research and innovation, while fostering a dynamic and internationally competitive scientific ecosystem.