

Singapore's Top Science & Technology Awards recognise scientists and engineers pushing boundaries in cutting edge new technologies

Singapore, 27 September 2024 – Singapore's highest science and technology awards, the President's Science and Technology Awards (PSTA), were presented today to outstanding scientists and engineers who exemplify research excellence while advancing Singapore's strategic research and development (R&D) priorities and competitiveness. President Tharman Shanmugaratnam presented the awards to:

- a. **Professor Ho Teck Hua, President of Nanyang Technological University, Singapore (NTU Singapore).** Awarded the President's Science and Technology Medal (PSTM) for his profound impact on the science and technology (S&T) landscape in Singapore, especially in nurturing a pipeline of top talent, fostering interdisciplinary research, and building national R&D ecosystems.
- b. **Professor Richard Parker, Chairman of Singapore Aerospace Programme, Agency for Science, Technology and Research (A*STAR).** Awarded the President's Science and Technology Medal (PSTM) for his outstanding contributions in promoting international collaborations in research and technology to deepen Singapore's R&D capabilities in addressing real-world industry needs through partnerships with industry and academia.
- c. **Professor Liu Bin from the National University of Singapore (NUS).** Awarded the President's Science Award (PSA) for her discovery of the true cause of bright phosphorescence in the organic semiconductor carbazole, opening new possibilities in naked-eye sensing, afterglow devices, optical data encryption, and advanced medical diagnostics and treatments.
- d. **Professor Malini Olivo, Dr Gurpreet Singh, Dr Renzhe Bi from A*STAR and Adjunct Associate Professor Augustine Tee from Changi General Hospital.** Awarded the President's Technology Award (PTA) for their innovative integration of biophotonics, machine learning and clinical data to create Respiree, a healthcare solution which has the potential to transform cardio-respiratory disease management.

2 Mr Heng Swee Keat, Deputy Prime Minister and Chairman of the National Research Foundation also presented the Young Scientist Award¹ (YSA) to the following researchers at the ceremony:

- a. **Dr Jonathan Göke from A*STAR** for developing computational methods to better understand ribonucleic acid (RNA), the complex molecules that play crucial roles in cellular functions.
- b. **Dr Daniel Ting Shu Wei from the Singapore National Eye Centre (SNEC)** for harnessing Artificial Intelligence (AI) in ophthalmology to prevent blindness.

¹ Administered by the Singapore National Academy of Science (SNAS) and supported by the National Research Foundation, Singapore (NRF).

- c. **Dr Li Qianxiao from NUS** for developing mathematical foundations of deep learning, a crucial technology that underpins the success and scalability of modern AI systems.
- d. **Dr Lu Jiong from NUS** for developing novel catalysts that significantly advance sustainable chemical manufacturing processes.

Refer to **ANNEX A** for more information about the PSTA, and the awards categories, the PSTM, PSA, PTA, and YSA. **ANNEXES B and C** provide the respective citations for the PSTM, PSA, PTA, and YSA recipients.

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About the National Research Foundation

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

- Ho Teck Hua - 何德华
- Liu Bin - 刘斌
- Renzhe Bi - 毕人哲
- Augustine Tee - 池金发
- Daniel Ting Shu Wei - 张书维
- Li Qianxiao - 李干骁
- Lu Jiong - 吕炯

ANNEX A: ABOUT PSTA

<p>About the President's Science and Technology Awards (PSTA)</p>	<p>The PSTA are the country's top honours for research scientists and engineers in Singapore. Given annually, the PSTA recognises individuals and teams that have made exceptional contributions in pushing the boundaries of the science and technology (S&T) landscape in Singapore.</p> <p>There are three distinct awards – the President's Science and Technology Medal (PSTM), the President's Science Award (PSA), and the President's Technology Award (PTA). The PSTA also celebrates the Young Scientist Award (YSA) administered by the Singapore National Academy of Science (SNAS) and supported by the National Research Foundation, Singapore (NRF).</p> <p>As the highest accolade, the PSTA brand carries prestige, and influence, and most importantly, inspires the next generation of STEM talent. PSTA winners create orbits of impact through their exceptional work, personal ingenuity, and continued search for excellence; they are role models for their peers and aspiring researchers in the science and tech fields.</p> <p>Individuals nominated for the PSA and the PTA are peer reviewed in two selection committees comprising eminent researchers, industry veterans and public servants involved in the S&T ecosystem. The respective selection committees make their recommendations to the PSTA Main Committee, comprising senior figures and public servants in the S&T ecosystem as well. The Main Committee directly evaluates nominations for the PSTM and makes the final recommendation for all the awards. PSTA nominations are open to anyone who has worked in the Singapore RIE ecosystem regardless of nationality.</p>
<p>President's Science and Technology Medal (PSTM)</p>	<p>Awarded to 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.</p> <p>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. The PSTM is not meant to recognise research accomplishments or contributions to advancing individual technologies, as these are awarded under the PSA and PTA respectively.</p> <p>Examples of achievements recognised by the PSTM include, but are not restricted to:</p> <ul style="list-style-type: none"> • Being the driving force in pioneering the establishment of an important field of study in Singapore. • Being the leader who was instrumental in the raising of an S&T institution to world-class status. • Contributing exceptionally to a major levelling-up of our S&T ecosystem's capabilities or international stature.
<p>President's Science Award (PSA)</p>	<p>Recognises accomplishments generally acknowledged by other S&T practitioners as being significant and impactful to their field. They need not have led to practical applications or products.</p>

	<p>Achievements recognised by the PSA include, but are not restricted to, individual discoveries or a collective body of research work that has led to:</p> <ul style="list-style-type: none"> • Spawning or enabling new avenues of study, • Revolutionising or significantly advancing the research methodology of a field, • Significantly advancing or overturning our previous understanding of a field, or the potential for such advancement
President's Technology Award (PTA)	<p>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.</p> <p>Achievements recognised by the PTA include, but are not restricted to, individual breakthroughs or a collective body of R&D work that has led to:</p> <ul style="list-style-type: none"> • Disrupting the industry's status quo with a new technology, • Advancing the state-of-the-art performance of an impactful technology, • Innovative application of existing technology in a new, impactful way, • Pioneering development of local technology capabilities.
Young Scientist Award (YSA)	<p>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. There are two categories of Awards, namely Biological and Biomedical Sciences; and Physical, Information and Engineering Sciences.</p>

ANNEX B: FULL CITATIONS FOR 2024 PSTA WINNERS

PSTM	<p>Ho Teck Hua President, Nanyang Technological University, Singapore</p> <p>"For his profound impact on the science and technology landscape in Singapore, especially in nurturing a pipeline of top talent, fostering interdisciplinary research, and building national R&D ecosystems."</p> <p>-----</p> <p>Professor Ho's contributions to Singapore's science and technology ecosystem have been wide-ranging, spanning research and innovation and enterprise. He has strived to make the National University of Singapore (NUS) and Nanyang Technological University, Singapore (NTU Singapore) top-ranked by transforming them into powerful talent magnets that draw both young and established researchers to Singapore.</p>
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At NUS, Professor Ho served two roles, as the deputy president of research and technology (2015-2018), and later, the senior deputy president and provost (2018-2023). The university saw remarkable growth and expansion during these years. In 2016, he was appointed the founding executive chairman of AI Singapore (AISG), to lead the nation's nascent efforts in artificial intelligence. Since 2019, Singapore has had the highest average quality of AI publications in the world. In 2023, he assumed the role of the fifth president of NTU and dramatically ramped up recruiting young talent at the university.

Professor Ho has contributed to the science and technology ecosystem in Singapore by:

1. Nurturing a pipeline of top talent,
2. Fostering interdisciplinary research, and
3. Building national research and development ecosystems.

Professor Ho's most significant contribution to Singapore has been the creation of a pipeline of talent in science and technology. Professor Ho believes that NUS and NTU should be universities of choice for top academics and scientists who want to work in Asia. He transformed the hiring culture at both universities and raised the quality of hires. He believes that top talent hires other top talent, creating a cascading effect in recruitment. Therefore, his key strategy has been to provide a conducive environment in which top talent can thrive and succeed.

Professor Ho is a strong believer in interdisciplinary research. He led the creation of two interdisciplinary colleges: the College of Design and Engineering (CDE) at NUS, and the College of Computing and Data Science (CCDS) at NTU. CDE was a merger of the Faculty of Engineering and the School of Design and Environment, while CCDS was created to deepen NTU's strengths in AI, data science, and computing. Both colleges champion research that cuts across multiple disciplines.

Professor Ho believes in translating academic research into tangible solutions that benefit society. He created several corporate laboratories and forged multiple collaborations with universities and governments in China and ASEAN. Professor Ho conceived of the idea of the Graduate Research Innovation Programme (GRIP) at NUS; GRIP has since produced more than 100 start-ups. He also helped create a tripartite partnership between Temasek, NUS, and NTU, to develop a deep-tech incubator for the most promising start-ups.

Professor Ho led the creation and growth of AI Singapore (AISG). AISG is one of the largest national research and development programmes; its goal is to build a vibrant ecosystem to help realise Singapore's ambition of becoming a global, trusted AI hub. Since 2019, AI research publications produced in Singapore have had the highest average quality in the world. To produce a constant pipeline of AI talent, AISG launched a nine-month AI Apprenticeship Programme in 2017 and an AI PhD programme in 2020. The apprenticeship programme was a winner in the Talent Accelerator category at the 2019 IDC Digital Transformation Awards. AISG has launched several national grand challenges, in health, education, and transport. The Health Grand Challenge, for example, aims to provide scalable AI solutions to reduce the rate of complications arising from high blood pressure, high blood sugar, and high blood cholesterol by 20% in 5 years.

Before returning to Singapore, Professor Ho was a chaired professor at the University of California, Berkeley's Haas School of Business. In 2015, the Haas School presented him with the Williamson Award, the School's highest faculty award, named in honour of Oliver Williamson, recipient of the 2009 Nobel Memorial

	<p>Prize in Economic Sciences. The award celebrates honourees who best reflect the character and integrity associated with Williamson’s scholarly work and legacy.</p> <p>Professor Ho is also the president of the Academy of Engineering, Singapore, and an academician of Academia Sinica. He sits on the boards of DSO National Laboratories, the Government Technology Agency, and the National Research Foundation. In 2023, he was awarded the Public Administration Medal (Gold) for his many, significant contributions to education.</p>
PSTM	<p>Richard Parker Chairman, Singapore Aerospace Programme Agency for Science, Technology and Research</p> <p>“For his outstanding contributions in stimulating the establishment of corporate R&D capabilities in Singapore, leadership in bringing companies and research institutions together for the benefit of Singapore, and for promoting international collaboration in research and technology.”</p> <p style="text-align: center;">-----</p> <p>Professor Richard Parker has, throughout his long industrial career, been passionate about developing effective collaborations between research practitioners and industry. Professor Parker is currently a Special Advisor to A*STAR: a post he has held since 2016. He holds several other roles in Singapore including Chairman of the Singapore Aerospace Programme; Chairman of the National Low Carbon Energy Research Programme, Technical Committee and Chairman of the Technology Centre for Offshore and Marine, Singapore, Scientific Advisory Board. He holds, or has held advisory positions with NRF (CRP IAB), NTU, MTI, SUTD and SMI.</p> <p>From 2001 to 2016 he was Director of Research and Technology for the Rolls-Royce Group, visiting Singapore several times each year over that period. He established his first joint lab with the A*STAR Institute of High Performance Computing in 2002. He created the Rolls-Royce Advanced Technology Centre, subsequently on the Company’s Seletar Campus in 2007. He soon realised that Singapore was very fertile ground for the models of Industry-Academic collaboration that he was successfully developing in the UK and elsewhere. Singapore has strong universities, with a keen focus on industry collaboration; a national research organisation, A*STAR that sees translation of research as a key part of its mission; and a government with coherent, long-term strategies for R&T as expressed through the RIE.</p> <p>Professor Parker was responsible for Rolls-Royce’s many collaborative research relationships worldwide. Rolls-Royce did not have a large, central research centre, unlike its competitors. Professor Parker inherited 19 University Technology Centres (UTCs), all in the UK. He went on to expand this network by a further 12 Centres, with the majority of these outside the UK. Most notably, he worked with NTU and NRF to develop the Rolls-Royce@NTU Corporate Lab, which opened in 2013. Several other companies have now opened similar Corporate Labs in Singapore.</p> <p>In 2003, Professor Parker was instrumental in developing the first Advanced Manufacturing Research Centre (AMRC) at Sheffield in the UK. There are now six similar UK centres. The model was successfully exported to Singapore leading to the establishment of the A*STAR Advanced Remanufacturing and Technology</p>

	<p>Centre in 2012. Initially focused on aerospace, and supporting MRO (Maintenance, Repair and Overhaul), the centre has broadened considerably to include several industrial sectors, now with over 95 industrial partners, and many different manufacturing technologies.</p> <p>Rolls-Royce, under Professor Parker’s guidance, was a founder member of the Singapore Aerospace Programme (SAP) in 2007. This programme is hosted by A*STAR and co-funded by a consortium of major aerospace industrial players from Singapore and overseas: e.g. Rolls-Royce, Boeing, Thales, SIAEC, ST Engineering. In 2018, Professor Parker took over as Chairman of the programme. One of its major events is the Singapore Technology Leadership Forum, which SAP hosts every two years at the beginning of the Singapore Airshow. Professor Parker brings together all the major thought leaders from the industry, worldwide, to share their vision and technology needs for the future.</p> <p>In 2021, Singapore launched the National Low Carbon Energy Research programme (LCER), and Professor Parker was asked to chair its Technical Committee. This is an initiative to support research, development and demonstration projects, conducted by Singapore researchers and supported by their industry partners, to advance low-carbon technologies, and to enable decarbonisation of the power and industry sectors.</p> <p>Another excellent example is the Technology Centre for Offshore and Marine (TCOMS), Singapore. Professor Parker has been involved since its inception. It is a world-class maritime simulation facility, supported by a strong academic team, which can support the local maritime industry, but also attract partners from overseas. It was opened in 2022. Professor Parker is now the Chairman of its Scientific Advisory Panel.</p> <p>Professor Parker has also been instrumental in encouraging international collaboration on research with Singapore. This year, an MoU was signed between the UK National Physical Laboratory (NPL) and TCOMS to establish a joint research programme supporting the future of autonomous shipping.</p> <p>Professor Parker has been awarded honorary doctorates by seven universities worldwide, most notably, his Honorary Doctor of Science from NTU, presented by President Tony Tan, in 2013. He was made a Commander of the British Empire (CBE) in 2013 for services to engineering and awarded the Singapore Public Service Medal (PBM) in 2021.</p> <p>Through his various industry/academic collaborations Professor Parker estimates that he has been responsible for creating and sponsoring up to 2,500 PhDs: a source of great personal satisfaction.</p>
PSA	<p>Liu Bin Tan Chin Tuan Centennial Professor National University of Singapore</p> <p>“For her discovery of the role of carbazole isomers in room temperature phosphorescence of carbazole, and subsequent revelation of the transformative impact of isostructural doping on the optical properties of organic semiconductors, opening new avenues of study and application.”</p> <p style="text-align: center;">-----</p>

Professor Liu Bin is a world-renowned researcher in the field of organic functional materials. She specialised in bringing organic semiconductors into aqueous media, with a focus on the exploration of their unique applications in biomedical research, security and electronic devices. In recent years, she has worked on biocompatible luminogens that serve as highly sensitive light-up molecular probes and nanoparticle probes, opening up new horizons for non-invasive tracking of analytes and biological processes in real-time. In 2014, Professor Liu co-founded an NUS start-up company "Luminicell" to commercialise these luminescent probes and serve the biomedical community.

In the quest to develop organic luminogens with extended lifetimes for phosphorescence imaging, Professor Liu's team discovered that a trace amount of carbazole isomer existed in commercial carbazole crucially determines its optical properties. This curiosity-inspired discovery resolves a 95-year debate on carbazole emission reported in the literature and provides alternative insight on the mechanisms behind ultralong organic phosphorescence.

The findings on carbazole isomer subsequently inspired her team to develop an iso-structural doping strategy, which can effectively capture and utilise triplet state excitons to yield new materials with bright luminescence and long emission lifetime, opening opportunities for afterglow devices, naked-eye theragnostics, and optical data encryption.

Professor Liu represents a rare example of a passionate scientist whose dedication and perseverance have given rise to scientific discoveries that have a profound impact on our lives. Besides being a prolific researcher, Professor Liu also has a creative and entrepreneurial mindset, which highlights her exceptional talent in the scientific community. Professor Liu is the co-inventor of 31 patents and know-hows on energy and biomedical applications, among which 16 has been licensed to different companies in US, UK, and Asia. Beyond contributions to the research and innovation paradigm, Professor Liu also has an excellent record of national and global engagement and service. She has served the senior leadership roles in NUS and has been invited to serve the editorial board of 18 materials and chemistry journals published by 5 top publishers.

Professor Liu is also passionate about nurturing the next generation research leaders and encouraging more women to pursue careers in engineering and science. So far, she has mentored and supervised over 90 PhD students, postdocs and visiting scientists. More than 50 of them hold professorships in academia and the rest have prominent positions in research labs and industry around the world.

In recognition of her exceptional performance in research, education and service, Professor Liu has been elected to the US National Academy of Engineering, Singapore National Academy of Sciences, Asia-Pacific Academy of Materials, the Academy of Engineering Singapore, and the Royal Society of Chemistry. Professor Liu has also received many prestigious awards, including the National Science and Technology Young Scientist Award 2008 and President's Technology Award 2016, the highest honours bestowed to exceptional scientists and engineers in Singapore; Elsevier Materials in Society Lectureship 2015, American Chemical Society *ACS Nano* Lectureship Award 2019 and Royal Society Centenary Prize 2021, each was awarded to only three candidates across the globe. Professor Liu is also the winner of the Kabiller Young Investigator Award in nanoscience and nanomedicine 2021 and the IUPAC Distinguished Women in Chemistry or Chemical Engineering Awards 2023. Thomson Reuters and Clarivate Analytics have identified Professor Liu as one of the TOP 1% highly cited researchers in

	<p>materials or chemistry category and among the World's Most Influential Scientific Minds consecutively since 2014.</p> <p>For her outstanding research and innovative work on organic functional materials, particularly the iso-structural doping to transform the optical properties of organic semiconductors, Professor Liu Bin is awarded the 2024 President's Science Award.</p>
PTA	<p>Malini Olivo Distinguished Principal Scientist Translational Biophotonics Lab A*STAR Skin Research Labs Agency for Science, Technology and Research</p> <p>Gurpreet Singh CEO and Founder Respiree Pte Ltd</p> <p>Principal Scientist Translational Biophotonics Lab A*STAR Skin Research Labs Agency for Science, Technology and Research</p> <p>Renzhe Bi Principal Scientist Translational Biophotonics Lab A*STAR Skin Research Labs Agency for Science, Technology and Research</p> <p>Augustine Tee Chairman, Division of Medicine and Senior Consultant, Department of Respiratory & Critical Care Medicine Changi General Hospital SingHealth</p> <p>“For their innovative integration of biophotonics, machine learning and clinical data to create Respiree, a healthcare solution which has demonstrated the potential to transform cardio-respiratory disease management in real-world settings.”</p> <p style="text-align: center;">-----</p> <p>Professor Malini Olivo and team are recognised for their development of a groundbreaking optical wearable technology to measure respiratory and lung physiological parameters. This innovation has the potential to revolutionise clinical decision-making across the healthcare continuum, from post-operative care and general wards to home settings.</p> <p>Monitoring of respiratory rates is a routine vital sign in healthcare, but standard counting methods are laborious. Automated, reliable and continuous measurement of breathing has the potential to improve healthcare delivery. By integrating these respiratory and lung physiology metrics, healthcare professionals can gain a more accurate and timely understanding of patient condition, improving overall care efficiency and potentially preventing fatalities.</p>

To validate the use of the optical wearable technology, Professor Olivo's team, collaborated with Adjunct Associate Professor Augustine Tee's team at Changi General Hospital (CGH) to conduct patient trials at CGH since 2018, and translate the technology for clinical applications. This included a study for patients with respiratory diseases such as asthma, chronic obstructive pulmonary disease (COPD) and pneumonia, and a three-month trial for some 100 patients at COVID-19 isolation facilities in 2020. The same year, during the pandemic, the technology was licensed and spun-off to Respiree™ Pte Ltd to scale and commercialise the technology.

Since 2020, there have been notable commercial achievements of the solution. The optical wearable technology has received four global regulatory clearances including FDA-clearance, Therapeutics Goods Administration (TGA), Europe's CE (MDD) as well as clearance from Singapore's Health Science Authority (HSA). The optical technology has also received five international patent grants including by the US Patent Technology Office, China's Patent Office, Japan's Patent Office, EU's Patent Office and Singapore IPOS. The system is also presently enterprise-integrated into health IT systems and clinical pathway management services.

Respiree has further signed several commercial distribution agreements with large multi-national companies to scale up internationally. It has also developed key clinical partnerships with academic medical centres across US and Australia namely Massachusetts General Hospital, Kaiser Permanente, and recently with Mayo Clinic under the Mayo Clinic Platform Accelerate Program as well as Alfred Health in Australia. To support these partnerships and expansion, Respiree has raised more than US\$ 7M USD in venture funding through institutionalised venture capital.

Locally, the team has solidified several strategic partnerships with hospitals in Singapore. In a paper presented at the inaugural American Thoracic Society Conference in 2022, Professor Olivo and team demonstrated that direct respiratory rate and breathing patterns could predict patient deterioration, even when traditional bedside cardiovascular indicators such as pulse oximetry appeared normal. With the National Research Foundation's Central Gap Funding, the technology's predictive AI algorithm, developed and validated in continued collaboration with Changi General Hospital to further enhance the device for improved patient outcomes, has exhibited the capacity to predict patient deterioration, providing a lead time of 18-21 hours prior to the manifestation of deterioration at a performance of 91.7%. With funding from the National Health Innovation Centre (NHIC), the optical wearable technology has also been validated at the KK's Women's and Children Hospital for clinical use beyond adults to pediatrics.

Prof Olivo has also led several first-in-human clinical studies translating biophotonics technologies to improve healthcare outcomes in skin cancer, breast cancer, vascular disease and skin inflammation. She has more than 75 patents/patent applications on medical biophotonics technology platforms and devices in diffused-optical methods, photo-acoustic hybrid imaging, confocal Raman, surface enhanced Raman and nanophotonics optical strategies. She has published extensively with more than 500 peer reviewed publications with over 15,500 citations. In addition, she has trained over 50 PhD scientists, including team members Dr Singh and Dr Bi, who have become leaders in biophotonics research and its translation to clinical and commercial applications.

ANNEX C: FULL CITATIONS FOR YSA WINNERS

Biological and Biomedical Sciences	
YSA	<p>Jonathan Göke Senior Principal Scientist I Laboratory of Computational Transcriptomics Genome Institute of Singapore Agency for Science, Technology and Research</p> <p>“For his pioneering work in developing computational methods for long read RNA sequencing data that have enabled the profiling of RNA transcription and modifications at unprecedented resolution and accuracy.”</p> <p style="text-align: center;">-----</p> <p>Dr Jonathan Göke is a computational biologist specialising in ribonucleic acid (RNA) research. His pioneering work in developing computational methods for third-generation, long-read RNA-Sequencing has been instrumental in advancing the ability to profile RNA expression and modifications at high resolution, paving the way for new insights into RNA biology and the role of RNA in human diseases.</p> <p>RNA is the central messenger molecule that interprets the genetic information stored in DNA. Each cell contains hundreds of thousands of RNA molecules that collectively provide a detailed, high-dimensional picture. RNA sequencing is the technology that allows scientists to read these RNAs and study their roles and how they are affected in human diseases. However, it is not just the RNA sequence that defines their function; post-transcriptional, chemical modifications of RNA impact almost all aspects of RNA biology and have been essential for the success of mRNA-based vaccines.</p> <p>Through the development of computational methods for long read RNA-sequencing, and the analysis of transcriptomics data in human patient samples, Dr Jonathan Göke has played a pioneering role in enabling the large-scale, high-accuracy, and high-resolution profiling of RNA sequences and modifications. By using machine learning algorithms combined with direct RNA Sequencing, his work has, for the first time, enabled the identification of RNA modifications at single-base, single-molecule resolution. His contributions to identifying modified RNA from the raw current signal of nanopore RNA sequencing data have made RNA modification profiling accessible to a much broader scientific community. Dr Göke’s work has been published in high-impact journals such as Nature, Cell, Nature Biotechnology, and Nature Methods. His computational methods have been downloaded more than 200,000 times, and have been independently benchmarked as among the best in the field.</p> <p>Since becoming a group leader, Dr Göke has supervised more than 25 postdoctoral, Phd students, and undergraduate students. His lab members have received numerous prizes and awards, including the GIS Graduate Student Award (2020, 2023), the ISMB Best Presentation Award (2021), the Postdoctoral Award at the RNA Meeting Singapore (2024), and an international DREAM Machine Learning Challenge to identify high-risk cancer patients. Dr Göke has been active as a mentor for early-career scientists, postdoctoral and PhD students through</p>

	<p>mentorship programs from Agency for Science, Technology and Research (A*STAR) and Genome Institute of Singapore (GIS). In 2022, Dr Göke was appointed as Adjunct Associate Professor in the Department of Statistics and Data Science at the National University of Singapore where he teaches undergraduate students in genomics and data science.</p> <p>Dr Jonathan Göke’s scientific contributions have been widely recognised. He has been a scholar with the German Academic Exchange Service (2007 and 2012-2014), selected as a GIS Fellow (2014-2016), and an A*STAR Fellow (since 2024). Dr Göke actively participates in international consortia and leads the Singapore Nanopore Expression project (SG-NEx). He has delivered more than 30 presentations as an invited speaker in Singapore and around the world. Dr Göke has published 49 articles, with his work being featured on the covers of prestigious journals such as Cell, Nature, Molecular Cell, and Trends in Genetics.</p>
YSA	<p>Daniel Ting Shu Wei Senior Consultant (Surgical Retina) Chief Data and Digital Officer Singapore National Eye Center</p> <p>Director AI Office SingHealth</p> <p>“For his significant contributions to AI in ophthalmology and healthcare, and his pioneering work in deep learning, generative AI, and trustworthy AI, advancing global ocular health.”</p> <p style="text-align: center;">-----</p> <p>Dr Daniel Ting Shu Wei is a senior consultant vitreo-retinal surgeon working in the Singapore National Eye Center (SNEC), an Associate Professor with Duke-NUS Medical School and an Adjunct Clinical Associate Professor and an Innovation Mentor at Stanford University. He is also the Director of Singapore Health Service (SingHealth) AI Office, SNEC Chief Data and Digital Officer, and the Head of AI and Digital Innovation in Singapore Eye Research Institute (SERI). He also represents SingHealth at the Ministry of Health AI Steering Committee.</p> <p>Dr Ting has made significant contributions to the fields of AI in ophthalmology and healthcare, focusing on the development of safe, ethical, and responsible AI applications. His research integrates advanced technologies such as machine learning, deep learning, and trustworthy AI to address critical challenges in global eye health. With over 300 publications, including 50 in high-impact journals like JAMA, NEJM, and Lancet, his work has been instrumental in advancing the field. A key example is SELENA+, a deep learning algorithm for detecting major blinding eye diseases including diabetic retinopathy, glaucoma and age-related macular degeneration, which has been used in over 500,000 screenings worldwide.</p> <p>Motivation for this groundbreaking work is deeply rooted in a commitment to improving global health outcomes and advancing health equity. Passion for both the technical and ethical aspects of AI drive his mission to develop innovative tools that enhance diagnostic accuracy while ensuring patient safety and data privacy. This dedication is further demonstrated in contributions to international AI</p>

	<p>standards and guidelines, such as STARD-AI, QUADAS-AI, and DECIDE-AI, which are essential for the safe and reliable use of AI in clinical practice.</p> <p>A comprehensive approach to research, combining cutting-edge AI technologies with practical clinical applications, distinguishes Dr Ting’s work. The primary objective is to reduce the global burden of eye and systemic vascular diseases. Beyond SELENA+, research innovations have extended to areas such as myopia, diabetic macular edema, chronic kidney disease, and generative AI for structured data, medical imaging, and electronic health records. These advancements are not only implemented in clinical settings but are also transitioning into new startups and licensing agreements, broadening their impact.</p> <p>The impact of Dr Ting’s research is vast, benefiting patients who receive early and accurate diagnoses, healthcare systems that access cost-effective AI tools, and the medical community through the adoption of global AI consensus standards and guidelines. Recognition for his work includes prestigious local and international awards, such as the USA Evangelos Gragoudas Award, USA ARVO Bert Glaser Award for Innovative Research in Retina, MICCAI OMIA Prestigious Achievement Award, Tatler Asia Gen T Award, and Singapore NMRC Clinician Scientist Award. Global recognition is further underscored by consistent inclusion in the World’s Top 100 Ophthalmology Power list by The Ophthalmologist (2022-2024) and ranking as a Top 3 Deep Learning AI Researcher over the past 13 years among more than 100,000 researchers worldwide (2011 to 2024) by ExpertScape.</p> <p>Mentorship of the next generation of researchers is a key focus of Dr Ting’s work, with an emphasis on fostering innovation and collaboration across institutions. His educational philosophy, centered on kindness, collaboration, and excellence, inspires mentees to dream big, work hard, and make meaningful contributions to the field. Through continued research and mentorship, Dr Ting aims to further enhance Singapore’s research, innovation, and startup ecosystems, particularly in AI and digital health. He is committed to ensuring sustained global leadership and a strong pipeline for the next generation of Singaporeans to compete in the global AI race for health. This vision is not only about fostering individual success but also about establishing Singapore as a global hub for technological innovation and entrepreneurship.</p>
Physical, Information and Engineering Sciences	
YSA	<p>Li Qianxiao Presidential Young Professor Department of Mathematics National University of Singapore</p> <p>“For his innovative work on the mathematical foundations of deep learning, its connections with dynamical systems, and applications in AI for science.”</p> <p style="text-align: center;">-----</p> <p>Dr Li Qianxiao has made significant contributions to the development of mathematical foundations of deep learning, a crucial technology that underpins the success and scalability of modern AI systems. His work has provided rigorous</p>

	<p>mathematical frameworks necessary for understanding and improving deep learning methodologies, laying the groundwork for future innovations in the field.</p> <p>Together with his team, Dr Li pioneered the understanding of how expressiveness – the ability to learn arbitrary relationships – arises in deep neural networks. The team’s work revealed intricate connections between this modern technology and classical mathematics, including dynamical systems theory and control theory. This has not only improved our understanding of how and when deep learning works, but also how to systematically improve its performance in new application settings. For example, Dr Li’s research has led to faster ways of training low-precision neural networks, effective methods to improve adversarial robustness, and efficient approaches for fine-tuning large language and vision models.</p> <p>In addition, through his joint appointment with the Institute for Functional Intelligent Materials at NUS, Dr Li’s research, which is at the intersection of deep learning and dynamical systems, has found new applications in AI for science, particularly those that involve dynamical processes. For example, he developed a general methodology to learn intuitive descriptions of physical processes directly from observations of complex trajectories. This methodology has been applied to study complicated physical phenomena, such as the convection dynamics of fluids and the stretching dynamics of polymers.</p> <p>Dr Li’s work is highly interdisciplinary, and he has published in leading journals in mathematics (JEMS, SIAM journals), computer science (ICML, ICLR, CVPR) and the sciences (Nature Computational Science, Nature Reviews Materials, PNAS, Matter). He has been invited to deliver plenary talks in international conferences spanning applied mathematics (SciCADE 2024), machine learning (MSML 2021, CSML 2024) and the physical sciences (WINQ program at Nordita 2024). Dr Li is also the recipient of the Singapore National Research Foundation Fellowship in 2021.</p> <p>Dr Li actively contributes to the local academic community. He delivered the annual Singapore Mathematical Society (SMS) lecture in 2024, served as a judge for the SMS essay competition in 2024 and as the chief setter for the Singapore International Mathematical and Computational Challenge in 2022. Furthermore, Dr Li mentors students and post-doctoral researchers with dedication, and his efforts have been recognised by NUS Faculty of Science’s Faculty Teaching Excellence Award in 2021.</p>
YSA	<p>Lu Jiong Dean’s Chair Associate Professor Department of Chemistry National University of Singapore</p> <p>“For his groundbreaking work in developing next-generation dynamic atomic-precision catalysts that are reshaping the current landscape of sustainable manufacturing processes in the fine chemicals and pharmaceutical industries.”</p> <p>-----</p> <p>Dr Lu is at the forefront of advancing next-generation materials and catalytic technologies, focusing on achieving atomic-level precision and high sustainability. His groundbreaking work promises significant economic and environmental</p>

benefits, particularly in transforming manufacturing processes in the fine chemicals and pharmaceuticals industries, with the goal of fostering a more sustainable future.

Current catalysts used in these industries face several challenges, including high production costs, difficulties in separation and reuse, and the risk of harmful metal contamination.

Dr Lu's team has developed novel catalysts that greatly enhance greener and more sustainable chemical manufacturing processes. These advanced catalysts not only achieve significantly higher yields and greater efficiency but also offer a markedly improved environmental impact compared to conventional options. Achieving a carbon footprint and production cost that is 10 times lower than traditional catalysts, these advanced catalysts are highly appealing for industry adoption.

Several patents have been granted arising from these advancements. These breakthroughs have also enabled Dr Lu to lead a Competitive Research Programme (CRP) project funded by the National Research Foundation (NRF) in 2023. Additionally, these works have garnered considerable interest from major pharmaceutical companies, leading to substantial industrial funding and collaboration.

Beyond his research pursuits, Dr Lu is deeply committed to scientific communication and education. He actively engages in local and international science forums, workshops, and outreach programs, during which he shares his research findings and experiences with aspiring science enthusiasts. Dr Lu is also dedicated to nurturing the next generation of researchers by mentoring talented postdoctoral, graduate, and undergraduate students within his group. Under his guidance, several members have received recognition, including best student researcher awards, and have gone on to establish successful careers in many prestigious institutions, emerging as influential leaders in their respective fields.

Dr Lu's contributions to science are reflected in his extensive publication record, with over 130 papers in top-tier scientific journals, including Nature, Nature Nanotechnology, Nature Materials and Nature Chemistry, with a h-index of 55 and over 11,000 citations. Dr Lu has been honoured with several prestigious awards, including the JMCA Emerging Investigators Award in 2019, the National University of Singapore (NUS) Faculty of Science Young Scientist Award in 2021, and the NUS Young Researcher Award in 2022. He also serves as the Associate Editor for Chemistry of Materials, a well-recognised journal published by the American Chemical Society.