

The

ALUMNUS

issue #132 — JAN-MAR 2023

"By tapping into Southeast Asian expertise in forestry, geospatial technology and other sectors, we can tailor global models to our unique context."

PROFESSOR KOH LIAN PIN (SCIENCE '00), DIRECTOR, NUS CENTRE FOR NATURE-BASED CLIMATE SOLUTIONS

SAVOURING THE JOURNEY

MS KATRINA LEE
(BUSINESS '21)

PURSuing ARTS IN THE SPACES BETWEEN

THE INSPIRATION
BEHIND THE UPCOMING
NUS ARTS FESTIVAL

ADDRESSING A GROWING CONCERN

THE NUS RESEARCH
CENTRE ON SUSTAINABLE
URBAN FARMING



POWERING A GREENER FUTURE

NUS BLAZES A TRAIL IN TECHNOLOGICAL BREAKTHROUGHS
AND INNOVATIONS THAT WILL ENABLE US TO LEARN,
WORK AND LIVE MORE SUSTAINABLY

Dear alumni and friends,

2022 was a strange and interesting year. Singapore started to emerge from the throes of the COVID-19 pandemic around April, with community Safe Management Measures [SMMs] gradually lifting and borders progressively opening, it seemed like we were finally coming out of the woods.



For the first time in about three years, we brought back many programmes in person, including our signature annual homecoming events. Alumni grooved to disco hits at *Bukit Timah Homecoming* and were welcomed back for a day of carnival fun at *Kent Ridge Alumni Family Day*, signifying better days ahead.

While the pandemic caused disruptions, it also created new opportunities. The *NUS Day of Service* has evolved and matured from a single-day movement to a year-long movement and is now called *NUS Cares*. Built on NUS' cherished tradition of service to society, it is a movement to rally the NUS community to champion ground-up initiatives and volunteer in ways that speak to their hearts. It is this collective enthusiasm to reconnect, strengthen and forge closer relationships, that has brought about a bumper crop of *Alumni Happenings* in this issue. Alumni based locally and overseas contribute their heartfelt memories, reflecting on fun times at casual networking events, class reunions and celebrating the achievements of accomplished alumni.

On the topic of honouring distinguished alumni – this year marks the 10th edition of *NUS Alumni Awards*, a biennial award ceremony which celebrates alumni who have distinguished themselves through significant and impactful contributions. I am pleased to announce that we are calling for nominations from now till 31 March 2023, for the four different categories – Eminent Alumni Award, Distinguished Alumni Service Award, Outstanding Young Alumni Award and Team (Alumni) Award. If you know of someone inspiring and deserving, who has made a difference to alma mater, community and society, please nominate them. The University Community would like to celebrate and applaud their contributions, achievements and stellar work.

As we usher in 2023, my colleagues and I extend our very best wishes for a great and wonderful year ahead. Here's wishing everyone a Happy New Year!

Warmest wishes,

Mr Bernard Toh
(Architecture '84)
Director, Alumni Relations



SUBMIT YOUR STORIES TO US!

Read The *AlumNUS* online at nus.edu.sg/alumnet/TheAlumNUS!

If you have submissions for the following, let us know at alumnihelpdesk@nus.edu.sg:

- ▶ Lifelong Learners Highlight
- ▶ Book Corner



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The *AlumNUS* clinched the following award at APEX 2022:

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Magazines, Journals and Tabloids
– Custom Published



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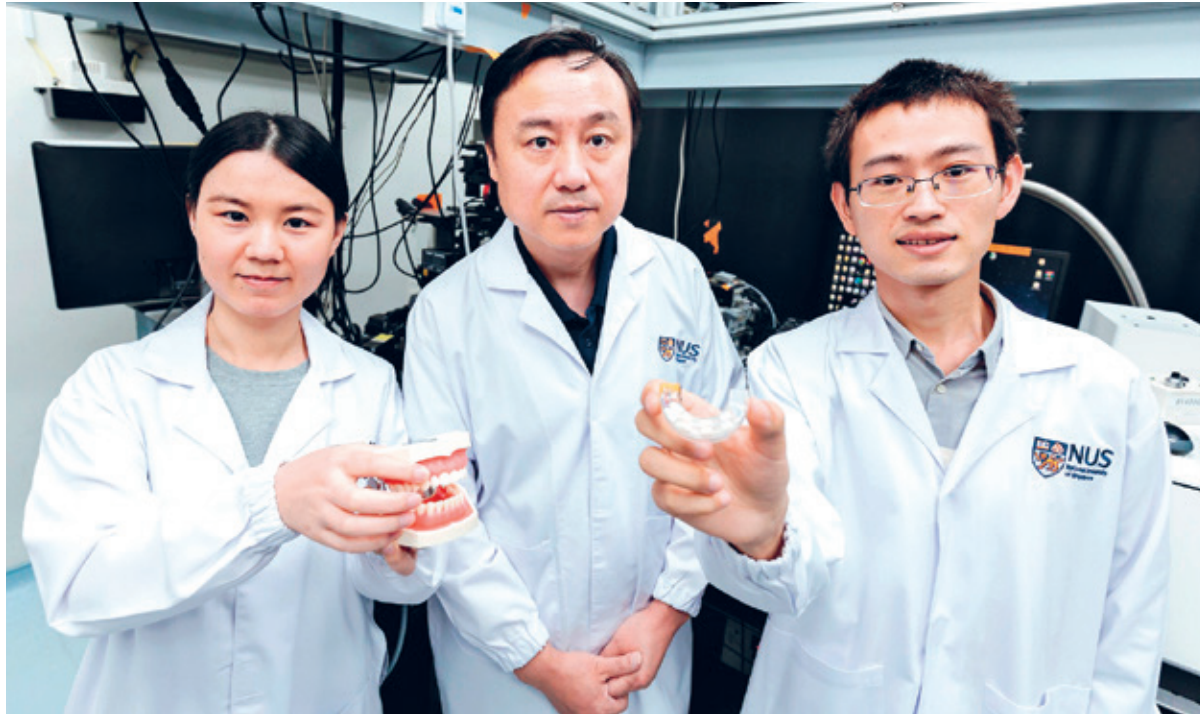
The **ALUMNUS**

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An NUS research team led by Prof Liu Xiaogang (centre) has created a revolutionary mouthguard that uses bite force to operate electronic devices such as computers, smartphones and even wheelchairs with high accuracy.

NUS RESEARCHERS INVENT AN INTERACTIVE MOUTHGUARD FOR CONTROLLING ELECTRONIC DEVICES

Affordable, lightweight, compact and easy-to-use, this groundbreaking invention is sensitive in detecting bite forces, enabling users to control devices such as computers, smartphones and wheelchairs with precision.

INDIVIDUALS WHO HAVE LIMITED HAND FUNCTION CAN SOON HAVE A SIMPLE WAY OF CONTROLLING DEVICES such as computers, smartphones and wheelchairs by wearing a smart mouthguard that translates complex bite patterns accurately and quickly into instructions to control electronic gadgets. This first-of-its-kind bite-controlled optoelectronic system was invented

by a research team led by Professor Liu Xiaogang from the Department of Chemistry at the National University of Singapore (NUS) Faculty of Science, together with collaborators from Tsinghua University.

Various assistive technologies such as voice recognition, eye tracking and brain-computer interfaces have been developed in recent years to help people – especially those with limited dexterity or neurological disorders – control electronic devices. However, these technologies have limitations associated with environmental interference, control accuracy, cost and maintenance.

To offer a promising alternative to existing assistive technologies,

Prof Liu and his team have successfully designed and demonstrated a smart mouthguard containing integrated pressure sensors to detect occlusal patterns. These patterns are translated into data inputs with 98 per cent accuracy, and can be used to control computers, smartphones and wheelchairs. The team's technological breakthrough was published in the journal *Nature Electronics* on 10 October 2022.

Besides supporting human-computer interaction, the interactive mouthguard can also be used for medical assistance, healthcare devices such as smart electronic skin, and dental diagnosis.

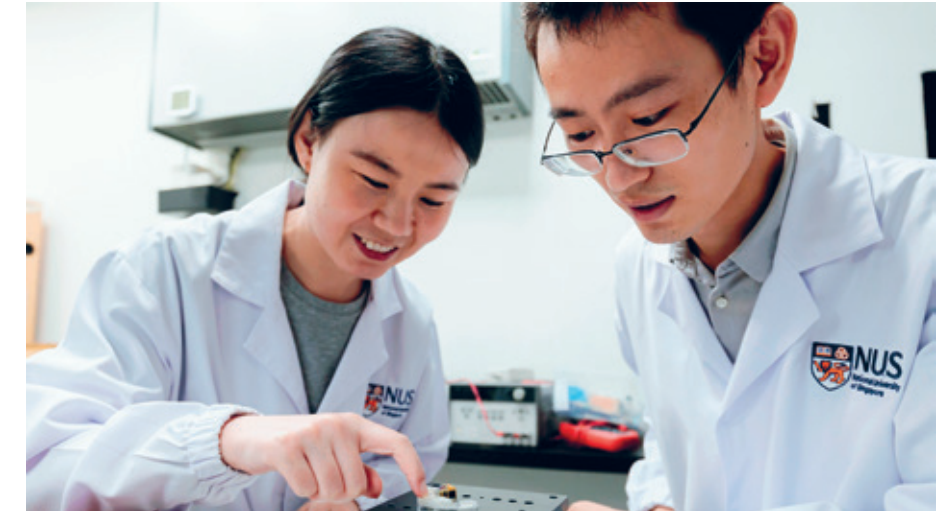
LIMITATIONS OF CURRENT ASSISTIVE TECHNOLOGIES

Assistive technologies help to promote independence and autonomy for people with disabilities. Unfortunately, such technologies also have significant drawbacks. For example, voice recognition requires a large operating memory and needs to operate in a low-noise environment, while eye tracking requires a camera to be mounted in front of the user and is prone to fatigue. Although brain-computer interfaces have improved considerably in recent years, this technology is invasive and requires cumbersome wired instruments.

Bite force – often used as a parameter to assess masticatory (chewing) function – is a promising area that is not well understood or yet capitalised on. As dental occlusion provides high-precision control and requires minimal skill, Prof Liu and his team came up with a new concept for assistive technology by utilising unique patterns of occlusal contacts.

TRANSLATING BITE PATTERNS INTO USEFUL DATA FOR DEVICE CONTROL

The research team first designed a sensor comprising a series of contact pads containing different-coloured phosphors – these are substances that emit light in response to pressure.



This revolutionary mouthguard is affordable, lightweight, compact, and requires less training time compared to existing assistive technologies.

The array of contact pads is placed within a flexible mouthguard.

Biting causes the contact pads to mechanically deform and emit light in different colours and intensities, which can be measured and processed using machine learning algorithms. The data collected is then used for high-accuracy remote control and operation of various electronic devices, such as a computer, smartphone and wheelchair.

Weighing about 7 grams, the novel mouthguard requires less training experience when compared to existing assistive technologies.

“Our bite-controlled optoelectronic system is capable of translating complex bite patterns into data inputs with 98 per cent accuracy. We have also demonstrated that our novel sensors can distinguish mechanical deformations, including strain, compression and bending, making them applicable to multifunctional mechanical sensing applications, such as miniaturised force sensing, flexible electronics, artificial skin and dental diagnosis,” explained Prof Liu.

Each smart mouthguard currently costs \$100 to produce in the lab, and the team expects the cost to be reduced substantially in mass production. Although the current prototype is designed for well-aligned teeth, a mouthguard with an irregular arrangement of phosphor-infused pads could be developed for users with different tooth patterns or for individuals who wear dentures.

NEXT STEPS

The research team has filed a patent for this innovative technology, and is exploring opportunities to validate the device in a clinical setting, such as care centres or nursing homes. Concurrently, the researchers are also looking at ways to enhance their technology, such as faster data processing and training.



This novel bite-controlled optoelectronic system developed by NUS researchers is capable of translating complex bite patterns into data inputs with 98 per cent accuracy.

This article was first published on 11 October 2022 on NUS News at news.nus.edu.sg/first-ever-interactive-mouthguard-that-controls-electronic-devices-by-biting.

GIVING A RESOUNDING "AYE" TO AI

NUS partners with Schmidt Futures to accelerate postdoctoral research for artificial intelligence in STEM.

NUS IS ONE OF NINE LEADING UNIVERSITIES SELECTED TO JOIN THE ERIC AND WENDY SCHMIDT AI IN SCIENCE POSTDOCTORAL FELLOWSHIP, A PROGRAMME OF SCHMIDT FUTURES. Launched on 26 October 2022, this Fellowship aims to enhance discoveries in science, technology, engineering and mathematics (STEM) through innovative artificial intelligence (AI) technologies.

Schmidt Futures is a philanthropic initiative founded by Eric and Wendy Schmidt that helps to bring together networks of talented people to prove their ideas and solve pressing issues in science and society.

The Fellowship seeks to support postdoctoral talents in their research who are incorporating AI techniques into the natural sciences, engineering and mathematical science. It will also

provide access to AI tools and training to the experts at the forefront of scientific innovation.

"AI is already revolutionary – but it is not yet as accessible, equitable or interdisciplinary as it needs to be," said Wendy Schmidt, Co-founder of Schmidt Futures and President of The Schmidt Family Foundation. "By supporting postdoctoral candidates around the world in the fields beyond computer science, we hope to create a community that can develop and improve this technology and discover novel ways to apply it in solving some of the world's most pressing problems."

Schmidt Futures selected nine universities from the United States, Canada, the United Kingdom and Singapore to be this prestigious programme's first cohort of partners. The Fellowship programme will provide

support totalling US\$148 million, which will aid the research of up to 20 postdoctoral fellows from each of the nine universities each year for six years.

In Singapore, NUS and Nanyang Technological University will jointly administer the support allocated through the Fellowship programme to a maximum of 110 postdoctoral fellowship positions over six years.

"NUS appreciates Schmidt Futures' vision in attracting and empowering top postdoctoral talents to leverage NUS AI expertise and capabilities to further excel in their scientific research," said Professor Chen Tsuhan, NUS Deputy President (Research and Technology). "NUS is a comprehensive university with excellent research in many scientific disciplines and we are fully committed to bringing out the best in the enrolled postdoctoral fellows."

▶ Scan the QR Code to read more about the Eric and Wendy Schmidt AI in Science Postdoctoral Fellowship.



EXPANDING THE AI TALENT POOL AND RESEARCH CAPABILITIES

As a world-leading university, NUS is committed to an interdisciplinary and holistic approach to conducting research and providing quality education by integrating expertise and establishing collaborations with key industry and government partners from various disciplines to help solve complex real-world problems. The University has devoted resources to grooming AI talents and establishing research capabilities through the years to leverage AI for application in a wide range of key areas, such as healthcare and materials research.

The NUS N.1 Institute for Health seeks to drive innovation and reshape healthcare by adopting emerging AI technologies. The institute has established the IDentif.AI platform, a groundbreaking AI platform which brings together clinicians, researchers and engineers to optimise combination therapy designs for infectious diseases quickly.

AI is already revolutionary – but it is not yet as accessible, equitable or interdisciplinary as it needs to be. By supporting postdoctoral candidates around the world in the fields beyond computer science, we hope to create a community that can develop and improve this technology and discover novel ways to apply it in solving some of the world's most pressing problems.

Wendy Schmidt, Co-founder, Schmidt Futures and President, The Schmidt Family Foundation

A national-level institute, the Institute for Functional Intelligent Materials (I-FIM) is NUS' newest national Research Centre of Excellence. The I-FIM was established to promote the use of AI in developing cutting-edge materials for smart applications.

Other interdisciplinary national research programmes such as the Quantum Engineering Programme (QEP), Singapore Blockchain Innovation Programme (SBIP) and Centre for Trusted Internet Community (CTIC) have been using AI technologies to empower their research process.

Aside from research capabilities, NUS is dedicated to growing the pool of AI talent through various courses provided by the NUS School of Computing and NUS Institute of System Science. These two institutes provide a comprehensive suite of AI

courses that cater to a wide range of participants looking to upskill their knowledge in AI. The courses aim to empower the participants with the technical and practical know-how in AI to have industry applications. Many of the AI researchers at NUS are also associated with AI Singapore, a national programme launched by Singapore's National Research Foundation to anchor deep national capabilities in AI.

With the support from the Eric and Wendy Schmidt AI in Science Postdoctoral Fellowship, a programme of Schmidt Futures, NUS will continue to develop talents and research capabilities from various scientific disciplines to utilise cutting-edge AI technologies to accelerate scientific discoveries and develop technologies that have real-world impact.



▶ This article was first published on 28 October 2022 on NUS News at news.nus.edu.sg/nus-partners-with-schmidt-futures-to-accelerate-postdoctoral-research-for-ai-in-stem.

IMPROVING THE CREDIBILITY OF NATURE-BASED CARBON PROJECTS IN SOUTHEAST ASIA

A NEW \$15 MILLION RESEARCH PROJECT THAT WILL SUPPORT THE ESTABLISHMENT AND MONITORING OF HIGH-QUALITY NATURE-BASED CARBON PROJECTS across Southeast Asia was launched on 11 November 2022 at the United Nations 27th Conference of the Parties (COP27), the annual climate summit that took place in Sharm El-Sheikh, Egypt.

With an initial \$10 million funding coming from Singapore's National Research Foundation (NRF) and \$5 million co-funding from the NUS, the

five-year research effort, called the Carbon Market Integrity Research and Development Programme Singapore — or Carbon Integrity SG — will be led by the Centre for Nature-based Climate Solutions (CNCS), a research centre under the NUS Faculty of Science.

The new programme will build on earlier research done at CNCS, which leverages satellite data and existing datasets to map out where nature-based projects in Southeast Asia can

be developed as potential sources of high-quality carbon credits. The Carbon Prospecting Dashboard, launched in September 2022, also enables users to calculate the estimated yield of carbon credits and their financial return-on-investment, based on user-defined assumptions such as project duration, costs and carbon prices.

Carbon Integrity SG will see CNCS researchers working with partners — including other universities, government agencies and corporations — to establish monitoring plots at various natural habitats across the region. Tools such as Light Detection and Ranging technology (LiDAR) will be used to help generate precise, three-dimensional information about the habitats. LiDAR data, as well as other measurements like the girths of trees, will allow scientists to estimate and map the biomass carbon stocks across various forest ecosystems in the region, helping to improve estimates on carbon yield on the dashboard.

The collaborations will help to improve the credibility of nature-based carbon projects in Southeast Asia, which is home to many natural ecosystems including rainforests, peat swamps and mangroves.

Prof Koh Lian Pin, Director, NUS CNCS

Access to the sites will also allow researchers to develop new methods for calculating carbon storage potential for specific ecosystems, instead of relying on a one-size-fits-all approach. Currently, most estimates on natural carbon storage by forests are made using global or pantropical models. Carbon Integrity SG will help to establish region-specific carbon estimation models for various tropical habitats, including rainforests, mangroves, freshwater swamp forests, peatlands and deciduous forests.

ENSURING THE CREDIBILITY AND INTEGRITY OF NATURE-BASED CARBON PROJECTS

In the Asia Pacific region, 58 per cent of forests are under threat and could currently be protected as economically-viable forest carbon projects. CNCS research shows that the Asia Pacific region has the highest concentration of the most profitable carbon projects, which can generate returns on investment at close to US\$25 billion per year. These carbon projects would not only avoid 835 million tonnes of carbon dioxide equivalent each year from deforestation — which is almost half the emissions of Indonesia in 2018 — but also provide other co-benefits. Protecting these forests as nature-based carbon projects could help with water purification services and the safeguarding of food security as well as biodiversity conservation.

However, there are concerns about the credibility and integrity of nature-based



carbon projects in the market today. Uncertainty over the amount of carbon stored in a natural habitat can also be a deterrent to project developers and investors. To ensure high-quality nature-based carbon projects, research needs to provide the evidence base for informing policy and investment decisions.

Carbon Integrity SG will develop and improve internationally-recognised standards and methodologies to ensure the credibility and integrity of the global carbon marketplace; and help to ensure a stable supply of high-quality, nature-based carbon offset credits from the Southeast Asian region to meet global market demands. The CNCS-led effort will contribute to the realisation of Singapore's ambition to be a global hub for climate-related services.

In the Philippines, CNCS is partnering with renewable energy company Energy Development Corporation (EDC) to monitor the forests at its geothermal sites that enable the latter to sequester carbon emissions each year. "CNCS looks forward to working with partners across the region on Carbon Integrity SG. By tapping into Southeast Asian expertise in forestry, geospatial technology and other sectors, we can tailor global models to our unique context. The collaborations will help to improve the credibility of nature-based carbon projects in Southeast Asia, which

is home to many natural ecosystems including rainforests, peat swamps and mangroves. Carbon Integrity SG's work will give investors greater confidence in the quality of nature-based carbon projects, helping to promote the conservation of these important habitats," said Professor Koh Lian Pin, Director of NUS CNCS.

"Carbon Integrity SG will enable high environmental integrity for nature-based carbon projects, by ensuring that credits generated from these projects represent real and additional emissions reduction," said Mr Benedict Chia, Director General for Climate Change at the National Climate Change Secretariat. "Given the large potential for nature-based abatement in the region, this initiative can play an important role in accelerating climate action in the region."

"EDC strongly believes in the urgency of tackling the climate crisis by primarily conserving nature to help the world get to net-zero by 2050," said Atty. Allan V. Barcena, Assistant Vice President and Head of Corporate Relations and Communications at EDC. "By partnering with NUS CNCS to establish a forest monitoring plot at our geothermal facility in Southern Negros in the Visayas region, we hope to be able to contribute to research that will aid in preserving Southeast Asia's forests."



The Carbon Integrity SG launch event saw NUS Centre for Nature-Based Climate Solutions' (CNCS) Science Communication and Outreach Lead, Ms Audrey Tan (Arts and Social Sciences '13) (left); Director General for Climate Change at Singapore's National Climate Change Secretariat, Mr Benedict Chia (centre); and Director of NUS CNCS, Prof Koh Lian Pin (Science '01) (right) discuss how the five-year research effort will improve the credibility and integrity of nature-based carbon projects in Southeast Asia.

This article was first published on 11 November 2022 on NUS News at news.nus.edu.sg/nus-to-lead-s15-million-research-project-to-improve-the-credibility-of-nature-based-carbon-projects-in-southeast-asia.

Outstanding young NUS scientists lauded in list of Asia Pacific luminaries



NUS honourees of the MIT Technology Review Innovators Under 35 Asia Pacific 2022 (from left): Asst Prof Hou Yi, Asst Prof Liu Yuxin, Asst Prof Lum Yanwei and Asst Prof Steven Touzard

FOUR SCIENTISTS FROM NUS HAVE BEEN LAUDED IN THE 2022 EDITION OF MIT TECHNOLOGY REVIEW'S "INNOVATORS UNDER 35" list for making game-changing advances in Science and Technology.

Announced on 14 November 2022, the list recognises the 35 best young talents in the Asia Pacific region who have demonstrated expanding influence in their field of research and pioneered cutting-edge achievements.

Each year, MIT Technology Review recognises brilliant talents for making important discoveries in diverse technical fields such as biotech, artificial intelligence, materials science, energy, computing and quantum technology. These outstanding innovators are commended under five categories: Inventors who build the stuff of the future; Entrepreneurs who hope to turn

innovations into disruptive businesses; Visionaries who find powerful new uses of technology; Humanitarians who take unconventional routes to bring about a healthier, cleaner and more adaptable world; and Pioneers who push the edge of science to create new approaches to tackling technology challenges.

► PIONEER: ASSISTANT PROFESSOR HOU YI

The vast majority of solar panels today are made with silicon, a plentiful and reliable material that has lowered the cost of solar energy production similar to that of coal and natural gas power plants. However, silicon solar cells are still relatively expensive to manufacture and can only capture a limited portion of solar energy. Perovskite is believed to be the answer for the next generation of solar panels.

However, perovskite-based solar cells — despite being ultra-efficient and cost-effective — still have a number of issues as an early-stage technology. Presidential Young Professor Hou Yi from NUS College of Design and Engineering (CDE) and the Solar Research Institute of Singapore at NUS has found a way to solve one of them: a series of losses of perovskite/organic tandem solar cells that reduce power production efficiency.

Asst Prof Hou led a team that developed a novel and practical route to simultaneously reduce various losses to combine high efficiency, longevity and low cost in one tandem solar cell, which resulted in a record-breaking efficiency of 23.6 per cent. This research clears a major obstacle to the development of perovskite/organic tandem solar cells, demonstrating that they can match or even outperform their rivals' performances.

"It is a privilege to be named in the MIT Technology Review Innovators Under 35 Asia Pacific 2022," said Asst Prof Hou. "Special thanks to my group and former mentors who had supported my application. It has been very exciting working in the field of the renewable and sustainable arena at NUS."

► INVENTOR: ASSISTANT PROFESSOR LIU YUXIN

The human neural system is fundamentally flexible and dynamic, yet existing neuroelectronic devices are not able to intelligently adapt to such a complex biological microenvironment.

To overcome this challenge, Presidential Young Professor Liu Yuxin from NUS CDE, NUS N.1 Institute for Health and NUS Institute for Health Innovation & Technology developed the first implanted electronic device with Young's modulus comparable to nervous tissues, and addressed the problem of foreign body reaction and implant rejection.

To accommodate dynamically-moving organs, Asst Prof Liu developed a soft and elastic neurotransmitter sensor array, with which he achieved the seamless tracking of multiple neurochemical messengers along the brain-gut axis for the first time. In collaboration with doctors and clinicians, the neurochemical sensors have demonstrated their potential to serve as diagnostic devices for depression and Parkinson's patients, as well as for new treatments through gastrointestinal intervention.

To make neural interfaces "grow" with developing brains and nerves, Asst Prof Liu designed a new type of implanted device: morphing bioelectronics that can change its morphology in a way similar to living tissues in the body and can automatically react to the growth of cells and organisms. Morphing electronics technology makes implantable devices safe for paediatric patients.

"I am honoured to join the list of MIT Technology Review Innovators Under 35 Asia Pacific," said Asst Prof Liu. "I am excited to develop next-generation bioelectronics and neurotechnology together with my students and colleagues

Each year, MIT Technology Review recognises brilliant talents for making important discoveries in diverse technical fields such as biotech, artificial intelligence, materials science, energy, computing and quantum technology.

at NUS. I hope our innovation can go from bench to bedside and benefit patients who suffer from chronic diseases in the near future."

► INVENTOR: ASSISTANT PROFESSOR LUM YANWEI

The manufacturing of carbon-based materials, such as plastics, disinfectants and pharmaceuticals, accounts for 10 per cent of worldwide carbon dioxide emissions due to the high energy consumption and use of non-renewable fossil fuels as raw materials.

Scientists have been investigating methods to construct these materials from the other way around: building up the molecules from carbon dioxide and water using electricity produced from renewable sources.

At the heart of such reaction processes is the catalyst. Traditional catalyst discovery is mainly empirical, making the design less efficient and slow. Presidential Young Professor Lum Yanwei from NUS CDE developed a suite of novel techniques to label the atoms in the reaction mixture based on their origin, to yield entirely new insights into the catalytic mechanisms.

The breakthrough hints at the possibility of creating catalysts that only produce one product, eliminating the need for energy-consuming downstream product separations. Using these innovative techniques, Asst Prof Lum also uncovered the role of oxides in the catalyst systems and the importance of water in the reaction mixture. These findings have inspired new strategies to control the carbon dioxide conversion reaction pathways, which could finally lead to the construction of catalyst systems with unprecedented performance.

Asst Prof Lum said, "I am very honoured to receive this award and would like to express gratitude to all the brilliant

colleagues and collaborators who have worked hard together with me. I believe the carbon conversion technology that we are developing can help reduce our reliance on non-renewable fossil fuels and enable a sustainable future."

► PIONEER: ASSISTANT PROFESSOR STEVEN TOUZARD

From pioneering experiments in quantum error correction to novel proposals for quantum networks, Presidential Young Professor Steven Touzard is recognised for his work in quantum technologies. An Assistant Professor at NUS CDE, as well as the NUS Faculty of Science, he is also a Principal investigator at the Centre for Quantum Technologies at NUS and MajuLab at NUS.

Earlier in his career, Asst Prof Touzard made significant contributions towards developing quantum error correction — a potentially important ingredient in realising the unprecedented power of quantum computing. This approach counters the noise that naturally affects quantum bits, or qubits. He demonstrated techniques that led to noise suppression in the so-called cat qubits and GKP qubits.

His current work focuses on building quantum networks, with the goal of connecting superconducting qubits with telecom photons. This could simultaneously offer a way to scale quantum computers towards performing useful tasks, a way to transmit un-hackable information, and a way to improve sensing by connecting quantum sensors.

Asst Prof Touzard said, "I am honoured to be on the list of Innovators under 35 APAC. Although such awards always bring one name forward, it must be seen as a recognition of the wonderful collective work, enabled by the brilliant people I've had the chance to work with."

This article was first published on 18 November 2022 on NUS News at news.nus.edu.sg/outstanding-young-nus-scientists-lauded-in-list-of-apac-luminaries.

NUS graduates ranked 8th most employable worldwide



NUS graduates across diverse fields have been recognised as eighth in the world by international employers in the 2022-2023 Global Employability University Ranking and Survey.

NUS GRADUATES WERE RANKED THE EIGHTH MOST EMPLOYABLE IN THE WORLD BY RECRUITERS, rising up one notch from last year, according to the 2022-2023 Global Employability University Ranking and Survey results.

NUS also retained its position among the top two in Asia – behind only the University of Tokyo at seventh place – and maintained its spot as the only Singapore university in the top 10. This is the third year in a row that NUS has emerged in the top 10 of the ranking.

Produced by the Paris-based HR consultancy Emerging and published by Times Higher Education, the ranking lists the top 250 universities according to graduate employability based on the views of international recruiters. The

universities were assessed on six key drivers identified by businesses as the main contributors to creating employable graduates: academic excellence, internationality, digital performance, focus on work expertise, graduate skills and specialisation.

“We are delighted that NUS graduates across diverse fields have been recognised as eighth in the world by employers in Singapore and globally. It is a testament to the talented students we receive at NUS, and the quality of our professors and programmes,” said an NUS spokesperson.

“With global turmoil and a tightening job situation in the time ahead, the University will strive to ensure that our graduates continue to be grounded in broad-based, interdisciplinary and lifelong learning, to help them

stand out and thrive in a constantly evolving workplace.”

Ms Sandrine Belloc, Emerging's Managing Partner, called NUS' results in this year's list an “incredible performance”. She noted that the University had swiftly risen up in the ranking over the past decade, moving from 49th place in 2013 to ninth just seven years later in 2020. She added that the University had been rated particularly well in internationality, which considers a university's international reputation, its international staff and curriculum, and share of international students.

Now in its 12th year, the survey gathered 98,014 votes from participating employers worldwide on which universities taught the key skills that students need to thrive in the workplace.

With global turmoil and a tightening job situation in the time ahead, the University will strive to ensure that our graduates continue to be grounded in broad-based, interdisciplinary and lifelong learning, to help them stand out and thrive in a constantly evolving workplace.

Employers who took part provided around 800,000 graduate jobs or placements in 2022-2023 in total. Respondents of the survey were corporate managers from 24 countries who recruited and/or supervised more than five graduates a year.

Findings from this year's results showed that digital skills – measured under the graduate skills component – have become the most important factor to employers since the COVID-19 pandemic. The two other key employability drivers regarded as important by recruiters were subject specialisation and work expertise.

“Today, 92 per cent of respondents to the survey believe universities should do more to increase digital skills. Digital skills are not the exclusive concern anymore of computer science faculties and their students. Any university digital plan needs a transversal approach that includes all stakeholders,” said Ms Belloc in a press release.

STAYING AHEAD WITH RELEVANT SKILLS

To equip students with the relevant skills to stay ahead in an increasingly digitalised world that has transformed the work environment, NUS had enhanced its General Education curriculum for students admitted from AY2021-22 to include both Data Literacy and Digital Literacy as part of its six key pillars of knowledge under the curriculum.

In recognition of the importance of a holistic education, the University also offers students global exposure through study-abroad programmes with over 300 partner universities in more than 40 countries. Students can also gain valuable real-world experience through internships at start-ups in entrepreneurial hotspots around the world under the NUS Overseas Colleges programme. As part of the NUS Centre for Future-ready Graduates (NUS CFG) Global Industry Insights programme, students can explore emerging and growth trends across industries by heading overseas to places like Thailand and Indonesia to learn about regional businesses and engage with industry professionals.

To boost the future readiness of NUS students and graduates, the University launched two new digital platforms – the Internship-As-A-Service (IAAS) and conNectUS in January this year. Led by NUS CFG and NUS Enterprise, IAAS is

a platform that enables students to take on curated short-stint projects of flexible duration with local and overseas companies whether during the semester or vacations, with all projects recognised as internships. Meanwhile, conNectUS is the University's professional networking platform that allows NUS students and alumni to connect, exchange career insights and tap into the hidden job market.

NUS CFG also holds career fairs to provide students engagement opportunities with industry players across diverse sectors. Other than large-scale signature fairs like the NUS Career Fest, Internship Day and Postgraduate Career Fair, this includes the inaugural College of Humanities and Sciences (CHS) Navigator and College of Design and Engineering (CDE) Career Fair, both the result of close collaboration with each college.



TOP 10 UNIVERSITIES GLOBAL EMPLOYABILITY UNIVERSITY RANKING AND SURVEY 2022-2023

Rank	University	Country/Region
1	Massachusetts Institute of Technology	USA
2	California Institute of Technology	USA
3	Harvard University	USA
4	University of Cambridge	UK
5	Stanford University	USA
6	University of Oxford	UK
7	The University of Tokyo	Japan
8	National University of Singapore	Singapore
9	Princeton University	USA
10	Yale University	USA

Source: GEIURS

This article was first published on 24 November 2022 on NUS News at news.nus.edu.sg/nus-graduates-ranked-8th-most-employable-worldwide.

FEATURE FILMS

Mr Toilet: The World's #2 Man



Participants excitedly awaiting the screening.

TO THE UNINITIATED, HE MAY SEEM LIKE A QUIRKY SINGAPOREAN OBSESSED WITH TOILETS, but to those who know him, Mr Jack Sim (Public Policy '13) campaigns for global sanitation. A former entrepreneur, Mr Sim uses his sense of humour to advocate for something that is often less discussed – a crisis that impacts over two billion people worldwide – sanitation.

More than 180 alumni and their family and friends turned up at Shaw Foundation Alumni House for a screening of *Mr Toilet: The World's #2 Man*, on 29 September 2022.

The documentary film follows Mr Sim's journey in helping to implement Prime Minister Narendra Modi's promise of turning India into an open defecation free zone, after he established World Toilet Day, a United Nations international observance day. With few resources and no help from the government, Mr Sim discovers the difficulties in getting the country to achieve the goal.

Following the screening, Mr George Yeo, Visiting Scholar at NUS Lee Kuan Yew School of Public Policy, and Mr Sim took the stage for a lively and enlightening panel discussion, moderated by Mr Eugene Seah. The discussion then segued to a Q&A session where participants had their questions answered by the panel.



Mr Jack Sim (third from left) and Mr George Yeo (second from right) recreating the movie poster with attendees.

HEALTH & WELLNESS

SLEEP IN CHILDREN AND ADOLESCENTS – WHAT EVERY PARENT NEEDS TO KNOW

WE SPEND AT LEAST A THIRD OF OUR LIVES SLEEPING – even more so for the young – yet we don't spend enough time understanding and learning about sleep and its problems. Dr Daniel Goh (Medicine '88), Dr Michael Lim and

Dr Mahesh Babu Ramamurthy from Khoo Teck Puat – National University Children's Medical Institute shed some light on sleep in adolescents and children during the 6 October 2022 online Health and Wellness session.



More than 200 participants gained insights into the importance of sleep in children and learned how to identify abnormal sleep patterns in children. The speakers shared strategies and tips on ensuring a good night's sleep for children, as well as where and when parents may seek help for their child's sleep problems. The speakers then fielded questions from the audience on their children's sleep behaviours and more, before concluding the evening with a summary of the topics discussed.

➔ **Catch up on all our webinars at alum.events/webinars!**



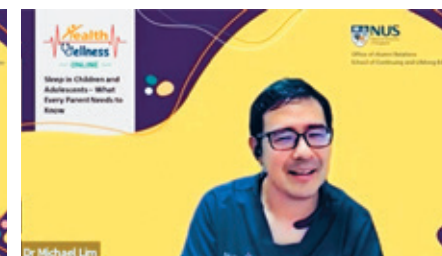
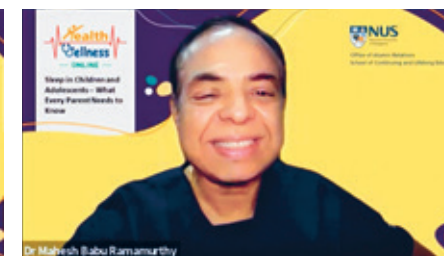
Above: Mr Jack Sim presenting a token of appreciation to Mr George Yeo for attending the screening. Right: An educational panel discussion.



A participant taking the opportunity to ask her question during the Q&A session.



Another audience member enthusiastically raising a point.



FEATURE FILMS [COLOMBIAN]

BAD LUCKY GOAT

AS PART OF THE GOAL TO BRING GREATER AWARENESS OF THE MYRIAD CULTURES WITHIN SINGAPORE, NUS Alumni Relations is proud to have partnered the Embassy of Colombia for the screening of *Bad Lucky Goat* at Shaw Foundation Alumni House on 27 October 2022.

Almost 200 alumni and their guests attended the screening of the heartwarming, comedic coming-of-age film. The film follows the 24-hour adventure of a pair of teenage siblings on a journey of reconciliation after they accidentally run over a goat with their father's truck.

Attendees mingled with one another over delectable Colombian hors d'oeuvres and wine, before taking their seats in the auditorium. Before the screening began, Guest-of-Honour, His Excellency Manuel Hernando Solano Sossa, Ambassador of Colombia to Singapore, greeted attendees with a Welcome Address. Mr Bernard Toh (Architecture '84), Director, NUS Alumni Relations, followed up with his opening remarks and invited guests to enjoy the film.



H.E. Manuel Hernando Solano Sossa (second from right) and Mr Bernard Toh (right) with embassy guests.



Guests catching up with one another before the movie.



Alumni enjoying refreshments prior to the film screening.



H.E. Manuel Hernando Solano Sossa, Ambassador of Colombia to Singapore, giving his Welcome Address before the movie screening.

10TH CHINA FILM FESTIVAL

FORGING TEN YEARS OF SINGAPORE-CHINA RELATIONS

THE CHINA FILM FESTIVAL, JOINTLY ORGANISED BY THE EMBASSY OF THE PEOPLE'S REPUBLIC OF CHINA, Singapore China Friendship Association and NUS Alumni Relations, returned for the 10th time to Shaw Foundation Alumni House from 14 to 16 September 2022. The inaugural *China Film Festival* took place in 2012, coinciding with the much-anticipated arrival of two giant

pandas, Kai Kai and Jia Jia, in Singapore. Over the years, the Festival has provided a window for locals to find out more about China.

The Festival showcased three highly-acclaimed films – *Hi Mom*, *Cliff Walkers* and *My Country, My Parents* – across the three nights. More than 800 alumni and friends attended the Festival, and several lucky members of the audience also went home with attractive lucky draw prizes, including globally-loved *Bing Dwen Dwen*



figurines, sponsored by the Embassy of the People's Republic of China in Singapore.

To commemorate the Festival's 10th anniversary, a film poster display exhibition, titled *Light, Sound and Shadow: A Decade of China Film Festival (2012-2022)*, was also set up at Shaw Foundation Alumni House. We hope the Festival will continue to foster an appreciation of different cultures in China among Singaporeans.



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- 10% for Singapore Citizens and PRs
- Additional 5% for NUS alumni

*Terms and Conditions apply

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<p>➤ MSc in Venture Creation NUS Multidisciplinary Programme (Offered by Six NUS Schools and Faculties)</p>	<p>➤ Master of Computing NUS School of Computing</p>
<p>➤ Master of Music Leadership Yong Siew Toh Conservatory of Music</p>	<p>➤ MSc (Computer Engineering) College of Design and Engineering</p>
<p>➤ MA (Arts and Cultural Entrepreneurship) NUS Faculty of Arts and Social Sciences</p>	<p>➤ MSc (Biomedical Engineering) College of Design and Engineering</p>
<p>➤ MSocSci (Communication) NUS Faculty of Arts and Social Sciences</p>	<p>➤ MSc in Engineering Design & Innovation College of Design and Engineering</p>
<p>➤ MSc (Maritime Technology and Management) Centre for Maritime Studies and College of Design and Engineering</p>	<p>➤ MSc in Energy Systems College of Design and Engineering</p>
<p>➤ MSc in Digital Financial Technology NUS School of Computing and NUS Business School</p>	<p>➤ MSc (Building Performance and Sustainability) College of Design and Engineering</p>
<p>➤ MSc in Business Analytics NUS Business Analytics Centre (BAC)</p>	<p>➤ MSc (Project Management) College of Design and Engineering</p>
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Shaping the Future.
#TheTimeIsNow



Canapes and Conversations with Award-winning Author Dr Kamal Al-Solaylee

THE ICONIC SINGAPORE RIVER BATHED IN THE WARM GOLDEN GLOW OF A SATURDAY EVENING set the stage for a cosy gathering of book connoisseurs for *An Evening with Dr Kamal Al-Solaylee*. The event was hosted by NUS Alumni Relations at Privé, Asian Civilisations Museum, on 19 November 2022, in partnership with the Singapore Writers Festival.

A Canadian journalist and award-winning author of three non-fiction books, *Intolerable* (2012); *Brown* (2016); and *Return* (2021), Dr Kamal holds a PhD in English from Nottingham University and is the director of the School of Journalism, Writing and Media at the University of British Columbia in Vancouver.

Prior to Dr Kamal's mini lecture based off his newest book, *Return: Why We Go Back to Where We Come From*, alumni had an enjoyable time getting to know one another over an evening of wine and delicious canapes.



The attendees' event passes.



Alumni getting to know one another over canapes and wine.

Dr Kamal took time out of his busy schedule to join alumni for some pre-lecture wine and bites, and chatted with them in an intimate setting. Participants took the opportunity to ask Dr Kamal their burning questions and pick his literary mind, with some even getting their personal copies of his book signed.

Participants then adjourned to the lecture session, hosted by the Singapore Writers Festival, where Dr Kamal shared more about what draws us back to our origins. Dr Kamal spoke in detail about his personal experience with attempting to unravel the underlying emotions that compels one to long for a sense of home and understand a culture that feels altogether foreign and familiar at the same time.



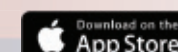
The lecture was held at the Ngee Ann Auditorium, Asian Civilisations Museum.



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THE UNITED NATIONS (UN) CLIMATE CHANGE CONFERENCE MAY NOT, to some minds, be the likeliest place to bump into an NUS academic. Yet several of them were part of the Singapore contingent at the 27th Conference of the Parties to the UN Framework Convention on Climate Change (UNFCCC) — commonly referred to as COP27 — in Egypt in November 2022. Together with government officials, business leaders and youth activists, NUS faculty and researchers flew to the Egyptian city of Sharm el-Sheikh, where they sat in on multilateral negotiations, hosted panel discussions at the inaugural Singapore Pavilion, and took part in other side events.

In fact, NUS staff and students have been a regular presence at the annual climate summit since 2014 (COP20), following the University's accreditation by the UNFCCC as an observer

organisation. This in itself reveals a lot about the global reach NUS has achieved, as well as its commitment to environmental sustainability. Such dedication to the cause is apparent in the wide-ranging actions NUS has taken, from launching new educational offerings and exploring ground-breaking ways of reducing carbon emissions to supporting eco-minded alumni in their entrepreneurial journeys. Increasingly, technology is the lever driving these efforts forward.

A STATEMENT OF INTENT

Recent changes at the senior leadership level have laid down a marker of NUS' ambition to advance sustainable development and contribute to the global fight against climate change. In August 2022, former Faculty of Engineering

Dean Professor Low Teck Seng stepped down from his post as Chief Executive Officer of the National Research Foundation to assume the brand-new position of Senior Vice President (Sustainability & Resilience) at NUS. His role is to serve as a catalyst in facilitating collaborations between different NUS research institutes, as well as with industry partners, to augment Singapore's climate resilience and sustainability through the development of novel mitigation and adaptation solutions.

"We will look towards achieving thought leadership in sustainability by NUS with these key work streams — research, education, carbon net-zero campus, and building a culture of consciousness of sustainability and resilience. Looking into the future with the outcomes from our efforts, and with the



For the first time, Singapore had its own pavilion at the UN Climate Change Conference in November 2022. (Photo: COP27 SG Pavilion)

SMART TRANSITION, GREEN TRANSITION

To quote United Nations Secretary-General António Guterres, climate change — or rather, the climate emergency — is a "battle for our lives". Fortunately, we have technology on our side. Numerous technological breakthroughs and innovations are being created, including at NUS, enabling us to learn, work and live more sustainably.

TEXT BY WANDA TAN



Looking into the future with the outcomes from our efforts, and with the right technological solutions in place, we will be able to build up resilience against the impact of climate change.

Professor Low Teck Seng, Senior Vice President (Sustainability & Resilience), NUS

right technological solutions in place, we will be able to build up resilience against the impact of climate change," said Prof Low prior to returning to NUS. "I hope to bring together colleagues from many different faculties to address the concept of resilience. This could be via research which straddles different disciplines — for example, the nexus of energy, water, waste, environment and food security. There are many areas we need to examine as these are existential issues for Singapore."

Prof Low is also a member of the University Sustainability and Climate Action Council, which was formed in 2021 in response to the increasing urgency of climate change. Made up of faculty and staff from a wide spectrum of disciplines, the Council coordinates the University's activities across the fields of education, research, innovation and enterprise, campus operations and administration, and community engagement, to catalyse solutions for greater sustainability impact.

The Council is chaired by NUS President Professor Tan Eng Chye (Science '85), who touched on NUS' growing momentum in this area in an interview with *The Straits Times*. "As a university at the forefront of scientific research, we are at a great vantage point to drive change and test cutting-edge practices and solutions by serving as living laboratories for experimentation. Green research is an exciting new frontier offering opportunities for interdisciplinary

collaboration,” he said. “By harnessing the knowledge and expertise of our faculty and researchers from different disciplines, we can make significant contributions to enhance the climate resilience and sustainability of Singapore.”

INFUSING SUSTAINABILITY – AND TECHNOLOGY – INTO THE CURRICULA

In the educational arena, NUS has rolled out a raft of undergraduate and postgraduate courses to empower students to contribute to the sustainability movement. For example, a new degree programme by the College of Design and Engineering (CDE), the Bachelor of Engineering (Infrastructure and Project Management), seeks to nurture built environment professionals with the interdisciplinary knowledge and skills to create sustainable urban environments in the face of the changing climate. It covers modules in engineering, design, management, technology, building science and law, with electives focusing on digital technologies like building information modelling and smart facilities management. Alternatively, interested



students can pursue a Second Major in Sustainable Urban Development or a Minor in Meteorology and Climate Science, among other options.

A variety of sustainability-themed master's programmes is also available to postgraduate students. New offerings include the Master of Science (Energy Systems), which combines understanding of energy technology and innovation

management to facilitate decision-making in energy solutions and investment; and the Master of Science (Sustainable and Green Finance), launched by NUS Business School in collaboration with NUS' Sustainable and Green Finance Institute. The latter programme extends conventional, profit-maximising finance models to incorporate environmental, social and governance (ESG)

→ SINGAPORE'S PATH TO NET-ZERO

WHAT HAS SINGAPORE PLEDGED?

- To cut greenhouse gas emissions to **60 million tonnes in 2030** (updated in October 2022 from the previous target of 65 million tonnes)
- To achieve **net-zero emissions by 2050**

The Government submitted its enhanced climate targets to the UNFCCC at the COP27 summit.

THE CHALLENGE > Singapore's alternative-energy disadvantaged status

- Serious difficulties in pursuing renewable energy sources (e.g., solar, hydroelectric, wind, nuclear, geothermal) due to geographical limitations
- These include small land area, relatively flat and low-lying terrain, low wind speeds, high urban population density and a lack of natural resources

THE SOLUTION > Adopt low-carbon energy technologies such as:

- **Creative ways to maximise solar deployment** – e.g., installing solar panels on rooftops, reservoirs and open sea
- **National Hydrogen Strategy** – hydrogen (a clean fuel that produces only water vapour, not carbon dioxide, when burned) to supply up to half of Singapore's power needs by 2050
- **Carbon capture, utilisation and storage** – trapping carbon dioxide emissions and either reusing them or permanently storing them deep underground
- **Green mobility** – electrifying vehicles
- **Transformation of the built environment** – developing Super Low Energy and Zero Energy buildings

➤ **READ ON** to find out how NUS supports this transition!



“Even though Singapore only accounts for just 0.1 per cent of global emissions, we want to do our part in the global effort to address the climate crisis and steward our resources for future generations.”

Mr Lawrence Wong, Deputy Prime Minister and Minister for Finance, at the Singapore International Energy Week in October 2022

[I]n the near-term, even as Singapore contributes to the research and development of emerging low-carbon technologies, it would need to buy carbon credits to meet its eventual goal of having its emissions reach 60 million tonnes in 2030, before coming down to net-zero by 2050. Nature ... has a ready-made ‘technology’ that does exactly that: trees.

Ms Audrey Tan, an NUS climate science communicator, in a *TODAY* commentary

considerations into business and investment decisions. Using various measurement tools which harness big data and analytics, students are trained to assess business impacts on society and the environment, identify opportunities for sustainable investing and propose novel green financial instruments.

Not forgetting the importance of lifelong learning and workforce upskilling, NUS is ramping up its continuing education programmes in this area as well. For instance, C-suite executives can enrol in the five-day programme, *Leading in Sustainability and Climate Change: Lessons from the Little Green Dot*. Administered by the School of Continuing and Lifelong Education (SCALE), it gives participants a better understanding of the science behind climate change, relevant regulatory and technical aspects, and how to champion sustainable business practices in their organisations. Other bite-sized courses allow working adults to obtain certification in specialised topics such as green fintech, urban farming biotechnology, and key analytical tools for biodiversity conservation and nature-based climate solutions.

LEVERAGING NATURE THROUGH TECH

One might ask, what are nature-based solutions to climate change? They refer to the conservation, restoration and responsible management of landscapes and ecosystems to remove carbon dioxide from the atmosphere. Examples include protecting or restoring forests and mangroves, as well as practising regenerative agriculture such as no-till farming and cover crop rotation. Based on research by global non-profit The Nature Conservancy, natural climate solutions can provide over one-third of the greenhouse

gas emissions reductions needed by 2030 to stabilise warming to below two degrees Celsius.

At NUS, research in this field is led by its Centre for Nature-based Climate Solutions (CNCS), housed within the Faculty of Science. Ms Audrey Tan (Arts and Social Sciences '13), Science Communication and Outreach Lead at CNCS as well as the Tropical Marine Science Institute (TMSI), discussed the importance of nature-based solutions – especially reforestation – in a *TODAY* commentary which was published on 17 November 2022. “[I]n the near-term, even as Singapore contributes to the research and development of emerging low-carbon technologies, it would need to buy carbon credits to meet its eventual goal of having its emissions reach 60 million tonnes in 2030, before coming down to net-zero by 2050,” she noted. “Nature ... has a ready-made ‘technology’ that does exactly that: trees. Reforestation projects can help to draw down the amount of planet-warming carbon dioxide (CO₂) in the atmosphere. Each tonne of CO₂ removed by the reforestation project could be sold as a carbon credit, which can be bought by another country who can claim the emissions reduction as its own.”

Two new initiatives demonstrate CNCS' resolve to grow the carbon market. In September 2022, together with ST Engineering Geo-Insights (known for its satellite data and geospatial analytics capabilities), CNCS launched the Carbon Prospecting Dashboard (CarbonProspecting.org). This is an open-access platform that maps out high-quality nature-based carbon credit projects worldwide. Policymakers and investors can use this first-of-its-kind dashboard to identify the location of carbon-rich natural ecosystems like forests and mangroves;



E-LEARNING: UNLOCKING ENVIRONMENTAL BENEFITS

When it comes to the intersection of technology and sustainability in education, there is more to it than learning about the latest green tech inventions. The way such learning is delivered – specifically, the switch to remote learning during the COVID-19 pandemic – also matters.

In a study by the United Kingdom-based Open University, researchers found that the provision of online learning courses produced carbon profiles that were almost 90 per cent lower than for face-to-face classes. Environmental gains were derived from a mix of factors, including reduced air pollution as students and staff no longer had to travel to and from campus; reduced deforestation by eliminating the need for paper; reduced energy consumption in university buildings; and reduced raw material requirements (e.g., plastic, metal, wood, concrete) to construct and upgrade those facilities.

The widespread adoption of virtual learning may have been forced during the pandemic, but it had the benefit of lowering the carbon footprint of individuals as well as educational institutions. Now that face-to-face (or hybrid) learning is back in full force, discussions are ongoing about how best to balance the need for physical interaction with the use of digital learning to make education more accessible and to help achieve urgent environmental goals. It is a complicated issue, but one that deserves scrutiny.





Prof Koh Lian Pin (standing) using the Carbon Prospecting Dashboard.

By tapping into Southeast Asian expertise in forestry, geospatial technology and other sectors, we can tailor global models to our unique context.

Professor Koh Lian Pin, Director, NUS' Centre for Nature-based Climate Solutions, on the Carbon Integrity SG initiative



As part of the Singapore Green Plan 2030, the city-state aims to position itself as a **LEADING CARBON SERVICES HUB** — home to firms offering an array of carbon-related services including but not limited to the generation and trade of carbon credits.

calculate the estimated yield of carbon projects and their financial return on investment; as well as quantify other positive benefits of the projects, such as improving food security, ensuring clean water supply and conserving key biodiversity areas.

A team from CNCS, including its Director Professor Koh Lian Pin (Science '01) and Ms Tan, also represented NUS at the COP27 summit in November. There, they launched the Carbon Market Integrity Research and Development Programme Singapore (Carbon Integrity SG), a five-year research project to support the establishment and monitoring of high-quality nature-based carbon projects across Southeast Asia. Under this \$15 million programme, which is funded primarily by the National Research Foundation, CNCS researchers will work with partners — including other universities, government agencies and corporations — to set up a network of forest carbon monitoring plots around the region. They will use high-tech tools like Light Detection and Ranging (LiDAR) to accurately measure biomass carbon stocks in those habitats, thus improving carbon yield estimates on the Carbon Prospecting Dashboard.

According to Prof Koh — who also heads TMSI and sits on the University Sustainability and Climate Action Council — the key advantage of Carbon Integrity SG is that it enables the development of more precise, region-specific carbon estimation models for different habitat types, instead of relying on a pantropic or one-size-fits-all approach. "By tapping into Southeast Asian expertise in forestry, geospatial technology and other sectors, we can tailor global models

to our unique context. The collaborations will help to improve the credibility of nature-based carbon projects in Southeast Asia, which is home to many natural ecosystems, including rainforests, peat swamps and mangroves," he said in a press release. "Carbon Integrity SG's work will give investors greater confidence in the quality of nature-based carbon projects, helping to promote the conservation of these important habitats."

HIGH HOPES FOR HYDROGEN

While nature-based climate solutions may provide the quickest route to cutting carbon emissions, a longer-term outlook is also evident among NUS faculty and researchers who are intent on developing and implementing cutting-edge sustainable technologies. This is the express goal of the Keppel Infrastructure–NUS Low Carbon Living Laboratory, which was established to create, testbed and scale up the deployment of commercially-viable innovations in energy management and decarbonisation.

Under this on-campus collaboration, Keppel Infrastructure and NUS have jointly identified four project foci:

1. A **hybrid microgrid** that integrates renewable and distributed energy resources (e.g., solar photovoltaic systems) into the main power grid without disruption to the electricity supply
2. Smart **electric vehicle (EV) charging algorithms** that balance the needs and constraints of the existing electrical network
3. Next-generation **district cooling systems** to help buildings save energy and space, as well as reduce the urban heat island effect
4. Enhanced **pre-treatment of seawater** before the desalination process, for better carbon dioxide sequestration and scalant removal

Another promising sustainable tech trend is using hydrogen to generate energy as an alternative to fossil fuels. At NUS' Centre for Hydrogen Innovations (CHI), researchers are



exploring ways to make hydrogen more affordable and to accelerate the large-scale adoption of this clean-burning molecule. Current projects include, for example, finding more cost-effective and energy-efficient methods of converting ammonia into hydrogen; evaluating infrastructure and pipelines to ensure hydrogen's safe storage, transport and distribution; and collaborating with industry partners to test new hydrogen applications, be it as a transportation fuel or as a raw material for chemicals production.

Professor Liu Bin (Science (PhD) '01) is the Director of CHI, which commenced operations in July 2022. "Through the new Centre, we aim to advance hydrogen-related R&D in Singapore to solve high-value problems that can significantly bring down the cost of green hydrogen as a fuel. At the same time, we will provide talent training for both academia and industry to grow the pool of hydrogen-related researchers, as well as upskill the workforce to prepare Singapore for a hydrogen economy," she said upon CHI's opening. A member of the University Sustainability and Climate Action Council, Prof Liu also oversees NUS' sustainability research cluster in her capacity as Senior Vice Provost (Faculty & Institutional Development).

In related news, a team led by Associate Professor Xue Jun Min from CDE's Department of Materials Science and Engineering is making waves in the global

→ HERE COMES THE SUN

Due to its land scarcity, Singapore has been forced to get creative to harvest as much sunlight as possible and increase solar power capacity. Such ingenuity seems to be paying off, with news that the Energy Market Authority (EMA) will incorporate a new, made-in-NUS solar forecasting model into the national power system in 2023.

NUS' Solar Energy Research Institute of Singapore (SERIS) has developed a model capable of accurately predicting the country's solar irradiance — the amount of light energy received from the sun — up to 24 hours in advance. By collecting and aggregating data from various sources, including irradiance sensors installed island-wide, satellite imagery and machine learning



Solar irradiance sensors used in the solar forecasting model developed by SERIS. (Photo: SERIS)

algorithms, the model was found to have an average error rate below 10 per cent for one-hour forecasts.

Following SERIS' successful year-long trial of the model, EMA plans to adopt it later this year as part of a broader strategy to boost the reliability and resilience of Singapore's

power grid. Anticipating solar power output ahead of time could increase its share of the energy mix, allow power generation plants to adjust their output accordingly (e.g. lowering output on a sunny day), and better match electricity supply with demand.

scientific community for having devised a revolutionary technique of extracting hydrogen from water. They discovered that light can trigger or enhance the catalytic activity of a nickel oxyhydroxide-based material commonly used in water electrolysis (i.e. the splitting of water into hydrogen and oxygen). "This should

require less energy in the electrolysis process, and it should be much easier using natural light," said Assoc Prof Xue on his team's findings, which were published in the journal *Nature* in October 2022. "More hydrogen can be produced in a shorter amount of time, with less energy consumed."



Prof Liu Bin (second from right) with fellow researchers at the NUS Centre for Hydrogen Innovations.

Through the new Centre, we aim to advance hydrogen-related R&D in Singapore to solve high-value problems that can significantly bring down the cost of green hydrogen as a fuel.

Prof Liu Bin, Director, Centre for Hydrogen Innovations, NUS

→ A GREEN FINANCE HUB IN THE MAKING

Developing and deploying decarbonisation technologies does not come cheap. According to a McKinsey report, around US\$9.2 trillion per year will need to be spent globally on physical assets for energy and land-use systems to reach net-zero by 2050. Roughly one-third of that amount will need to be spent in Asia — and as a leading global financial centre, Singapore is well-placed to contribute to the effort.

Speaking at the launch of the COP27 Singapore Pavilion, Mr Ravi Menon (Arts and Social Sciences '87), Managing Director of the Monetary Authority of Singapore (MAS), outlined several measures Singapore is taking to mobilise capital and put the region on the path to net-zero. Technology plays a key role in creating "credible disclosure and transition plans", said Mr Menon. "We must give investors confidence to invest in the transition, especially given concerns around 'greenwashing' [exaggerated environmental claims]. ... Singapore has been contributing to international efforts towards comparable sustainability disclosures and sound climate data and metrics."

For example, MAS is currently developing an artificial intelligence (AI) tool dubbed NovAI to help financial institutions assess the performance of companies which have taken out sustainability-linked loans. AI-derived insights would help define and track a firm's key ESG metrics and detect greenwashing, while natural language processing would cut the time spent collecting, processing and analysing data. Once deployed, NovAI will join other MAS digital solutions in the pipeline, such as a blockchain-based registry to verify the provenance of ESG certifications, and an online marketplace connecting the global green fintech community.



Mr Ravi Menon, Managing Director of MAS, at the COP27 summit. (Photo: COP27 SG Pavilion)

 **US\$3.1 TRILLION**
Annual infrastructure investment required between now and 2050 for Asia to meet its net-zero target.



Asst Prof Yuan Chao (centre) together with his research team setting up a weather station atop the roof of a building in the Tanjong Pagar area in 2022.

Not only is their method less energy-intensive but it is also cheaper, thus cracking the door open for wide-scale hydrogen production and utilisation. Assoc Prof Xue's team hopes to build on their findings by designing better industrial methods of obtaining hydrogen; one possibility, for instance, is to make the electrolysis cells containing water transparent so that light can be introduced into the process. If successful, it could spur greater use of green hydrogen among food companies, welders and aircraft manufacturers, to name a few.

BEATING THE HEAT

That our planet is getting hotter is not a hunch or opinion, but an incontrovertible fact. On this point, it could be argued that Singapore has got the short end of the stick. From 1948 to 2019, Singapore's annual mean temperature rose by about 0.25 degrees Celsius per decade — double the trend in global temperatures. In other words, climate change and global warming are happening everywhere, but Singapore is heating up twice as fast as the rest of the world. This is largely due to the urban heat island effect, which occurs when cities replace vegetation with buildings, roads and other heat-absorbing infrastructure, causing temperatures to rise. Factor in the carbon-emitting human activities in these built-up, densely-populated areas (e.g. greater use of air-conditioners and vehicles), and what emerges is a vicious circle of higher

daytime temperatures, reduced nighttime cooling and higher air pollution levels.

Fortunately, climate-sensitive urban planning and design offers a solution to help mitigate or adapt to our new reality. Assistant Professor Yuan Chao from CDE's Department of Architecture has dedicated his research to this area. "When I was a student, we talked about sustainability to ensure that there would be enough resources for the next generation. But now, we work on climate resilience, which is for the current generation, which highlights the urgency to tackle current climate issues," said Asst Prof Yuan in an interview with NUS News. His team uses numerical simulation and field measurements to study the impact of building design and urban planning on the microclimate, such as the surrounding air temperature and wind flow. They have also developed a user-friendly Geographic Information System tool to estimate the impact of urban planning on anthropogenic heat dispersion (i.e. heat released due to human activities).

"Many people focus on combating climate change, but they often neglect the impact of urbanisation. As buildings are getting taller and cities become denser, we need to rethink our living environment and look at the joint effect of urbanisation and climate change," said Asst Prof Yuan, who was awarded the NUS Presidential Young Professorship in 2019 for his research work. He added, "Another misconception is that we need

[T]hrough better building design and planning, we can actually increase the [urban] density and still achieve better living environments that are sustainable and resilient against the effects of climate change.

Asst Prof Yuan Chao,
Department of Architecture, NUS

to decrease urban density to achieve a better living environment. But through better building design and planning, we can actually increase the density and still achieve better living environments that are sustainable and resilient against the effects of climate change."

NUS is transforming its own built environment as part of the Campus Sustainability Roadmap 2030. A shining example is SDE4, Singapore's first new-build, net-zero energy building (which was formerly part of the School of Design and



SDE4 has clinched the Green Mark 2021 In Operation Platinum Positive Energy Award.

Environment, a precursor to CDE). Operational since January 2019, numerous sustainable design features have been built into the 8,500-square-metre, six-storey structure so that it consumes only as much energy as it produces while ensuring occupant

comfort. These include a smart Building Management System with sensor-based lighting and air-conditioning controls; a large overhanging roof hosting more than 1,200 solar photovoltaic panels; naturally-ventilated spaces;

→ A LIVING LABORATORY

Sustainability research at NUS comprises six key pillars. In addition to **nature-based climate solutions**, **green energy technologies** and **urban heat resilience** (which are covered in this article), below is a quick round-up of the rest. By test-driving innovative solutions in these priority areas, NUS is set on translating new discoveries into ground-breaking technologies that could help Singapore — and other countries — meet its ambitious climate targets.

AGRICULTURE-FOOD TECHNOLOGY

➡ NUS' new **Research Centre on Sustainable Urban Farming (SURF)** brings together interdisciplinary experts to develop high-tech solutions to boost Singapore's food security amid climate change-induced uncertainty. For example, investigators are using genome editing to boost the yield and nutritional value of important crops for indoor farming. LED illumination is also being explored as a potential tool to prolong the quality and shelf life of leafy greens in retail stores.

➡ Scientists at NUS have developed a **novel technique of producing cell-based meat** by exposing animal cells to magnetic pulses. Their discovery — which was recently published in the journal *Biomaterials* — departs from the conventional lab-grown method using animal serum, and is touted as more cost-effective, greener, cleaner and safer. The team has filed a patent for its invention and is in talks with potential industry partners to commercialise the technology.

COASTAL ENGINEERING AND FLOOD PREVENTION

➡ NUS hosts the newly-opened **Technology Centre for Offshore and Marine, Singapore (TCOMS)**, a national R&D centre and the

country's first deep-water ocean basin facility. Equipped with state-of-the-art wave and current generation systems, as well as advanced modelling and simulation capabilities, one of TCOMS' objectives is to come up with solutions to protect low-lying areas like Singapore against flooding brought about by climate change and rising sea levels.

WATER TREATMENT AND PURIFICATION

➡ A team from the NUS Environmental Research Institute (NERI) has pioneered a low-energy strategy of applying anaerobic membrane bioreactor (AnMBR) technology, which combines anaerobic digestion and membrane filtration, for **municipal wastewater treatment**. They are working to fully optimise the process in hopes of enhancing the appeal of municipal wastewater not only as an alternative water source, but also to produce biogas and recover nutrients.



Demonstration of a 1:10 scale model tugboat going through simulated wave and wind conditions at TCOMS.



Above: NUS' internal shuttle buses are going fully electric.
Below: NUS aspires to develop a biophilic campus enveloped in a tropical rainforest with lush greenery to mitigate rising global temperatures.

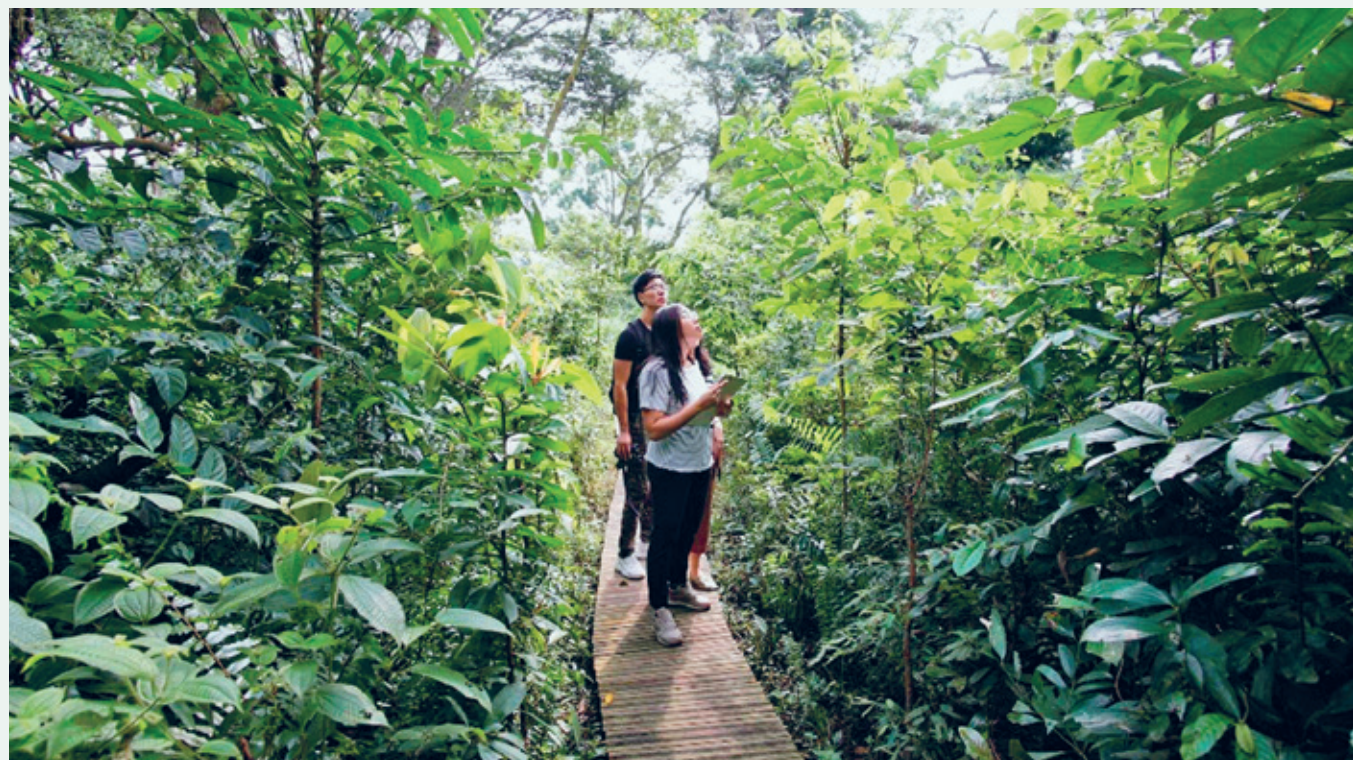
and an innovative hybrid cooling system where fresh, pre-cooled air is supplied together with ceiling fans that elevate airspeed. Having previously attained Green Mark (GM) Platinum Zero Energy certification by Singapore's Building and Construction Authority (BCA), SDE4 has now gone one step further and was accorded BCA's GM 2021 In Operation Platinum Positive Energy Award — signifying that it produces more energy than it consumes.

The other two zero-energy buildings on campus are CDE's Block E2A and the Faculty of Science's Frontier canteen, and plans are continuing apace to construct more energy-efficient buildings and upgrade existing ones. In recognition of these efforts, the University was named a BCA GM

Platinum Champion in 2021. NUS is also going beyond the built environment sector to reduce its carbon footprint, such as electrifying its entire fleet of in-house vehicles (e.g. internal shuttle buses, patrol cars, pickup trucks), replete with EV charging points in parking lots across campus; and 're-wilding' green spaces to restore the natural landscape and boost biodiversity. Collectively, these strategies aim to bring temperatures down, develop a climate-resilient campus, and achieve carbon neutrality by 2030.

VENTURING FORTH, SUSTAINABLY

More than a footnote, NUS alumni contributions to sustainable tech — chiefly in the start-up world — should not go unsaid either. Many alumni came up with their business ideas while studying at NUS, and received valuable support and guidance from the University in bringing their ideas to life. For instance, NUS Enterprise runs a wide network of incubation and accelerator facilities both on and off campus, in addition to entrepreneurship-themed undergraduate and postgraduate courses. There is also *Innovation with Societal Impact*, a cross-division team established by NUS Enterprise to educate, engage and empower innovators to address environmental, social and sustainability-related issues. Meanwhile, the Industry Liaison Office — the University's technology translation and commercialisation arm — guides NUS PhD students and researchers to create their own deep tech start-ups through its Graduate Research Innovation Programme (GRIP).



Co-founders of treatsure, Mr Kenneth Ham and Mr Preston Wong (front, left to right), collaborate with hotel brands to offer surplus food to consumers at a discounted rate.



"We are in the business of making being sustainable attainable," said Mr Preston Wong (Business '13 + Law '16) to *NUS News* about his company, treatsure, which he co-founded in 2017 with his friend, Mr Kenneth Ham (Computing '17). To tackle Singapore's food wastage problem, they developed a mobile app that connects hotel restaurants and grocers with surplus food to consumers at affordable prices. From their initial base at The Hangar, NUS' on-campus start-up incubator, and with seniors from NUS Business School's alumni network sharing industry insights, the two have since made great business strides. The app currently has more than 30,000 users and, to date, saved about 30 tonnes of food from going to landfill.

In the deep tech sector, Mr Bryan Oh (Business '19) and Mr Kenneth Palmer (Engineering '20) are co-founders of NEU Battery Materials, a start-up born out of GRIP in 2021. They aim to produce clean and sustainable lithium ion phosphate (LFP) batteries needed for EVs, with near-zero waste and minimal emissions, by bringing a patented electrochemical technology to market. Originally invented by CDE's Associate Professor Wang Qing — who has joined the venture in an advisory capacity — the technology is believed to be the world's first redox targeting-based solution for recycling spent LFP batteries. The company raised S\$800,000 in seed funding in June 2022, and is now focused on building a pilot recycling plant in Singapore to process LFP batteries that can then be supplied back to manufacturers, hence promoting a circular economy.

We are in the business of making being sustainable attainable.

Mr Preston Wong, NUS alumnus and co-founder of treatsure

Ventures like these may fulfil the entrepreneurial passion of individuals, but more importantly, they are vital to guarantee a sustainable and liveable future. As youth activist Ms Swati Mandloi (MEM '18), a COP27 delegate from non-governmental organisation Singapore Youth for Climate Action, told CNA during the summit, Singapore plays a strong and clear role in driving regional climate action, including "creating good carbon systems by financing projects, by decarbonising and by creating demand for certain energy solutions and technologies". It may be too late to prevent climate change, but such innovations can help us avoid the worst impacts. The climate clock is ticking. **A**



Ms Swati Mandloi, an NUS alumna, was part of Singapore's youth delegation to COP27. (Photos: COP27 SG Pavilion)



PURSuing ARTS IN THE SPACES BETWEEN

An appreciation of the arts beyond the pandemic serves as the inspiration for the upcoming *NUS Arts Festival*.

THE VALUE OF THE ARTS IN SOCIETY WAS A HOTLY CONTESTED TOPIC DURING THE EARLY DAYS OF THE COVID-19 RESTRICTIONS. A public poll by *The Straits Times* in 2020 had ranked "artist" as being the most "non-essential" worker, sparking outrage and feelings of injustice within the arts community. The irony is glaring, considering that a National Arts Council study published a year later showed that digital arts consumption shot

up by between 78 and 88 per cent during the COVID-19 pandemic.

Despite the seeming disconnect between reality and public perception, what is clear is that the arts are essential to daily living, even in the midst of a pandemic. More than a pleasant distraction from the trials of life, the arts serve as a valuable channel through which today's university students can develop interdisciplinarity, negotiate the unknown and create new possibilities.

One key platform through which NUS supports the development of the arts is the *NUS Arts Festival*, which has been a campus arts staple since 1998. The platform seeks to use the arts as a launchpad to discuss contemporary issues that deserve deeper attention or discussion. The festival, which runs from 10 to 26 March 2023, is themed *Spaces Between*, and touches on ideas of transition, change, pause and ambiguity. This discussion of Space is the final chapter in a trilogy of festival themes that covered universal concepts of Time (in *A Question of Time* in 2020, and Light (in *Shades of Lightness* in 2021). "The purpose of the festival theme is to allow us to reflect on the times we live in through art – and so *Spaces Between* seems especially apt given how we are still adjusting to what a new normal means," shared Ms Jobina Tan, from NUS Centre For the Arts (CFA), who is in her second year as Festival Director. "Furthermore, art has always been a vehicle in which we discover ourselves and find a confluence between different states." A veteran in the arts scene, Ms Tan has over 20 years of combined experience in arts education and programming.

A BUMPER CROP OF INTER-DISCIPLINARY COLLABORATIONS

NUS CFA has been hard at work, collaborating with more than 700 student and alumni artists, industry collaborators and faculty members to prepare over 20 live productions, films, installations and dialogues. A signature feature of the festival is its interdisciplinary collaborations, many of which are the first-of-its-kind in NUS or Singapore. These partnerships encourage artists to leave their comfort zones and navigate the spaces between, to present a blended balance of separate art forms and presentation styles. "There is a bumper crop of four collaborations between the student arts groups this year – a mammoth undertaking, given that all productions are original works, and so the preparations become even more complex," shared Ms Tan. Some of these pairings are particularly uncommon, such as NUS Chinese Dance with NUS Indian Instrumental Ensemble, NUS Chinese Drama with NUS Chinese Orchestra, and NUS Ilsa Tari (our Malay Dance group) with NUS Dikir Barat."

AN AVENUE FOR ENGAGING OUR ALUMNI

Held since 1998, the *NUS Arts Festival* features three weekends of arts programming, making it NUS's largest arts event. Over the span of 25 years, the festival has been a constant platform to nurture, grow and evolve generations of student artists, some of whom have gone on to become influential artists and educators in Singapore and beyond. Despite their busy schedules, many of these alumni return to give back to NUS by being involved in shaping the arts experience of current students, and the *NUS Arts Festival* is one of these avenues.

NUS CFA consciously seeks to connect with alumni, leveraging their experience both onstage as artists, and offstage as role models, "The alumni we have invited are respected artists and leaders in their own fields. The intention is that they become inspiring examples for students to see that they could aspire to be like these creative individuals – pursuing passions, taking risks and overcoming obstacles along the way," Ms Tan added. The *AlumNUS* meets some of our alumni artists to learn more about the festival programmes they are involved in.



MS JUDY NGO (ARTS AND SOCIAL SCIENCES '96)

Ms Judy Ngo is the Artistic Director of 1N THE ACT, which focuses on education through drama. She started teaching in 2000 and often works with schools as a CCA instructor, drama instructor and Artist-In-School. She has over 25 years of experience in acting, teaching and directing theatre, and has worked with many theatre companies in Singapore including The Theatre Practice, Wild Rice, The Necessary Stage and Drama Box. She directs *Essentially Macbeth*, a Chinese theatre production about a group of ex-drama club members returning to the theatre to present *Macbeth* while searching for their own identity. It is the first collaboration of its kind between NUS Chinese Drama and NUS Chinese Orchestra (NUSCO).

What inspired you to pick *Macbeth* as source material for this production?

At its heart, *Essentially Macbeth* poses the perennial question "are the Arts Essential?". I used *Macbeth* and his dream to be king as a basis of comparison to my lead character's wild ambition of making the arts essential in Singapore.

Essentially Macbeth touches on the changes in goals and aspirations that we experience between life stages. Is this a reflection of the reality you see within your drama students who have left the arts upon graduation?

Ideally, I hope that the arts will remain a part of their lives so that they do not have to go through what some of the

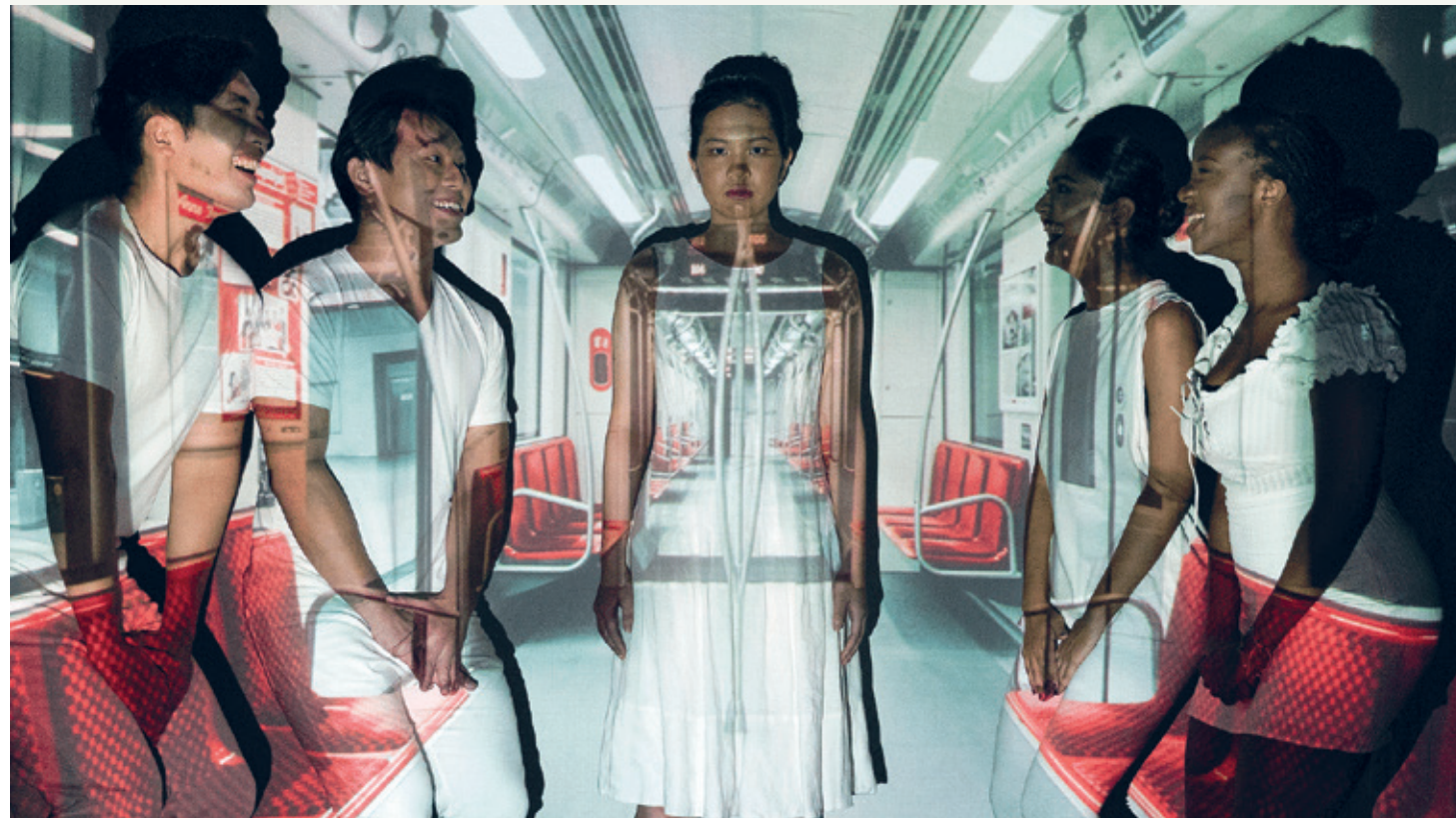
characters went through. But there is also a much larger picture at play here, I hope that *Essentially Macbeth* will remind every single one of us that the arts play a crucial part of our daily lives.

How did the collaboration between NUS Chinese Drama and NUSCO come about?

When I first approached Moses Gay (conductor of NUSCO) with the idea of collaboration, we had no idea what we wanted to do but were game for anything. I suggested upping the challenge by making both Chinese Drama and Chinese Orchestra tackle Shakespeare. Moses was hooked on that idea, and he suggested getting NUS alumni and music composer Phang Kok Jun (Music '15) to write original music for this daring piece of work. We both saw this as a chance to play, learn and explore new boundaries for our art forms. And the rest, as they say, is creative history!

MR PAUL TAN (ARTS AND SOCIAL SCIENCES '95)

An Honours graduate in English Literature, Mr Tan has published five collections of poetry and various short stories in anthologies and journals. Besides being a published author, he was formerly Deputy Chief Executive of the National Arts Council and Director of the Singapore Writer's Festival. He is currently a PhD candidate at Nanyang Technological



University. For *NUS Arts Festival 2023*, he is the curator of *Not Only Lines*, a multi-site installation of poetry by 30 NUS alumni, all of whom are prominent literary figures in Singapore. In keeping with the festival's focus on liminality, the works will be displayed at transitory spaces within NUS Kent Ridge and Bukit Timah Campuses.

The project title *Not Only Lines* is inspired by the late Dr Arthur Yap (Arts and Social Sciences '63)'s first poetry collection, *only lines*. How does *Not Only Lines* pay homage to him?

It wasn't difficult to land on Arthur Yap's poem *only lines* as an organising framework for this public art project. The poem seems like a modest, seemingly whimsical piece of writing. But it touches on the power of language and the different ways of seeing the world. Like many of his poems, Yap's meanings are always open-ended, and often slippery; behind the lines, you get the hint of a knowing poetic sensibility with a wry sense of irony.

How do you hope the project will be received by audiences on campus?

The *NUS Arts Festival* allows us to celebrate the many poets that NUS has nurtured through the years, and to represent the diversity of their voices and bring their talents to an audience on campus. Of course, poetry in a public space is encountered differently from when reading verse in the quiet of one's mental solitude. We hope these poems on public display put a smile on those who encounter them but at the same time, whet the appetite to read and know more about the poets who have contributed significantly to Singapore's literary landscape.

You were active in the NUS arts scene as a student. How does it feel to return to NUS as an alumni and contribute to the arts scene once again?

As an alumnus and English Literature graduate, I am glad to have the opportunity to contribute to this meaningful project. Apart from Yap's work, most of the other poems will be new works so the team and I are confident that NUS students, faculty members and visitors will have fresh, thoughtful, site-specific encounters with these poems throughout campus.



CHUREN

CHUREN (MUSIC '15)

Singaporean contemporary classical pianist CHUREN has performed as a soloist and with orchestras in Singapore, Hong Kong, Cambridge, London, Paris, Milan, Dresden, Vienna and Hamburg, amongst others. The 2021 season included debuts at the Singapore International Piano Festival, Singapore International Festival of Arts and the Candlelight Concerts by Fever series. In July 2022, she opened the Singapore Symphony Orchestra's 2022/23 season with Grieg's *Piano Concerto* conducted by Han-Na Chang. CHUREN attained her two Masters Degrees in Music and Philosophy from Yale University and Cambridge University, as well as her Bachelors from the Yong Siew Toh Conservatory of Music, where she is currently an Artist Fellow.

How did the concept for *MOONRISE* come about?

The moon is a source of beauty and inspiration for me. There's something magical about sitting beneath a full moon and observing the infinite colours as it shifts between wisps of clouds. This sounds a bit airy-fairy, but somehow magical things or moments of clarity and creativity tend to come to me when I spend time under the moon. I do that alone a lot and also some of my favourite

moments with the people I love have been spent that way. Clearly some classical composers thought so too – like Debussy with *Clair de Lune* or Beethoven with the *Moonlight Sonata*.

How is *Spaces Between* explored?

This marks the first time I am fully producing a multi-genre and multi-disciplinary show. We explore the liminal space between three different artistic praxes: classical piano, music production and video art. We want to transcend the boundaries of our individual disciplines and build synergy between the realms of sound and vision. The 'Spaces Between' are where we feel there is the most potential for innovation.

Why did you choose a less-conventional space like the University Cultural Centre (UCC) Atrium as the venue for *MOONRISE*?

I chose the UCC Atrium to create a sense of unexpectedness of walking into an artistic world for audience members. The Atrium is quite a unique space; with its arced main wall, and the way the lowered ceiling at the transition from the foyer relents to the relative cavernous height of the main area. This spacious, somewhat cave-like quality (especially when the space is darkened) is perfect for pulling an onlooker into a different world from the outside. Rightly so, as one of the 'Spaces Between'.

MR CHONG TZE CHIEN (ARTS AND SOCIAL SCIENCES '99)

Mr Chong, a graduate from the NUS Theatre Studies programme, is the Artistic Director for NUS Stage, a core member of The Finger Players and an award-winning playwright and director. Some of the awards he has won include the Singapore Dramatist Award and *The Straits Times Life! Theatre Awards*. His plays have been staged in Singapore, UK, Hungary, Taiwan and Japan. He has produced two collections of plays, that include critically-acclaimed works such as *Charged* and *PIE*. For his contributions to Singapore theatre, he received the Young Artist Award 2006 by Singapore's National Arts Council.

Mr Chong is involved in two productions within *NUS Arts Festival – End of the Line*, a fantastical jukebox musical performed by theatre group NUS Stage, and *The Future Show*, a one-woman play featuring NUS alumna, Ms Jo Tan (Law '04), which tells the 'true story' of the rest of one performer's life, starting from the end of the performance and ending on the day they die.

How do you juggle your commitments to both?

I'm probably mad trying to juggle both but it's all in a day's work! The two pieces are vastly different from each other, with different goals and approaches. For that reason, I am driven by the different challenges presented by each production.

How different is *End of the Line* compared to past NUS Stage works?

We are incorporating pop music and lip syncing in a piece that takes on the style of a jukebox musical. With that in mind, the members have been undergoing lip syncing and movement exercises as well as dancing sessions on top of their regular actors' training. The learning curve is steep but the members are learning and applying these new skills in our devising sessions with gusto.

The *Future Show* is based on a concept and score by Deborah Pearson. What drew you and Jo Tan to the source material, and how has it been adapted for Singapore/NUS audiences?

I was drawn to the imagination and vision of a singular idea explored to its fullest



Mr Chong Tze Chien

potential. The writing of the original is robust and visceral, which also provides room for additional input by whoever adapts it. I'm terribly excited by the possibilities we are generating from marrying our input with Deborah's narrative score, which serves as a template for our adaptation. Conceptually, the script will be reframed to suit a Singapore context. The additional input and revisions will be informed by Jo's personal anecdotes and experiences from the time when she was a student in NUS, and more.

The performance will also take place in a secret location within the NUS campus! Audiences will only know the exact place upon arrival at our front-of-house. We hope to create an intimate performance which resonates experientially with its unique storytelling style and form.

MR BENJAMIN ANG (LAW '93)

Mr Ang never left the NUS Electronic Music Lab (EML) – he enjoyed his time performing, composing and recording as a student member so much that he stayed on as alumni, eventually becoming appointed as Principal Tutor. Today, he is one of the select few Ableton Certified Trainers in Southeast Asia, and trains EML members in producing, performing and promoting original electronic music. Guided by Mr Ang, NUS EML presents *OmniVerse: The Fourth Dimension*, an immersive sonic experience in collaboration with designers Bernice Ong and bani haykal that highlights the liminality of space, music and material to take audiences to a superliminal fourth dimension.

How did the concept of *OmniVerse: The Fourth Dimension* come about?

Our *OmniVerse* series of concerts started three years ago, with the concept of exploring different universes of sound. Because while electronic music takes many forms, many people perceive electronic music on the whole as sounding out of this world. We combined these ideas into *OmniVerse: The Fourth Dimension* because time is a fourth dimension that,



Mr Benjamin Ang

when applied to a three-dimensional space, can make it liminal. For example, a walkway may be distinct and busy during the day, but become empty and liminal in the night.

This is a site-specific performance. What can audiences expect?

Instead of sitting in fixed seats facing a fixed stage, the audience can move around the studio, which is divided into multiple spaces, some of which are liminal, and some of which are not. In this way, they experience the feelings of being in liminal spaces which are transient and change. They will find music in the 'spaces between' because some of the performers are in some of these spaces, while other spaces are activated with electronic soundscapes.

For people unfamiliar with electronic music, how would you encourage them to come to experience *OmniVerse: The Fourth Dimension*?

Come and discover the 'spaces between spaces' that we usually pass through without noticing in our everyday lives. Experience the sounds of those spaces and the music inspired by them, some which could be soundtracks that evoke the mood in between, while others could be surprising rhythms and beats from unexpected sources. **A**

➔ **NUS Arts Festival takes place from 10 to 26 March 2023. It is open to the public, and ticketed shows are sold via Bookmyshow. Visit www.nusartsfestival.com for details.**

THE CREAM OF THE CROP

The new Research Centre on Sustainable Urban Farming (SURF) at NUS brings together interdisciplinary experts – such as plant and food scientists, engineers and computer scientists – to develop novel solutions for urban farming.

Addressing a Growing Concern

Finding sustainable solutions to alleviate potential disruptions to food supply involves rethinking the way urban farming is carried out — and that is exactly what a team at NUS has been doing.

IN THE FACE OF CHALLENGES POSED BY CLIMATE CHANGE, POPULATION INCREASE and potential food-chain disruptions caused by pandemics and natural calamities, ensuring an adequate supply of food for the coming decades requires a significant change in the way crops are grown. A solution to alleviate food supply disruptions includes growing crop plants in indoor urban farms. However, the mere adoption of currently-available growing solutions from traditional outdoor farming is grossly inadequate for indoor vertical farming, as there are different requirements for this.

Addressing the need for indoor urban farming solutions, the National University of Singapore (NUS) officially launched the Research Centre on Sustainable Urban Farming (SURF) on 5 August 2022, to bring together the diverse expertise of principal

investigators from across the University to develop novel science and technology-based solutions for urban farming in Singapore. The launch event was graced by Mr Lim Kok Thai (Science '95), Chief Executive Officer of the Singapore Food Agency, as the Guest-of-Honour.

The University has committed \$10 million to set up the new Centre. Additionally, projects by researchers

in SURF have also secured external research grants of about \$11 million. SURF had commenced operations in January 2022, while a new state-of-the-art research facility is expected to be completed in 2023.

"NUS is committed to making significant contributions towards Singapore's food policy agenda, together with partners in the public sector and

the industry," said Professor Tan Eng Chye (Science '85), NUS President. "We aim to create a globally competitive research programme in sustainable urban farming that incorporates smart agriculture solutions for diverse stakeholders. The Research Centre on Sustainable Urban Farming (SURF) provides a platform to focus our multidisciplinary efforts and accelerate Singapore's food security research and innovation."

Echoing this aim, Professor Prakash Kumar, Director of SURF, highlighted that "SURF boasts an interdisciplinary team with expertise spanning plant science, genomics and gene editing, microbiomes, food science, materials and polymer science, sensor technology, data science, and Artificial Intelligence for indoor farming. Our research efforts in areas such as variety improvement and enhancing the nutraceutical values of edible plants could benefit growers and consumers directly." He added that the novel solutions developed by the team could contribute to making food production more efficient and sustainable for the long-term benefit of Singapore and the region.

A HOLISTIC AND HIGH-TECH APPROACH

SURF's research scope covers three stages of food production – namely pre-production, production and post-production. The Centre aims to develop solutions for growers, and collaborate with local industries to address their needs.

A new facility for the Centre is expected to be completed by early 2023, with about 200 square metres of indoor plant growth area for research. There will be three growth rooms, and an additional precision growth room where various environmental parameters – such as temperature and the spectrum of light – can be varied to ensure better plant growth with, possibly, improved phytonutrients. Research equipment will include the PlantEye, a phenotyping system to monitor plant growth and record plant health in a non-destructive manner; and several analytical equipment to study nutrient content. The Centre will also have access to the high-tech laboratories at NUS to conduct molecular genetics research including gene editing.



NUS SURF was officially launched on 5 August 2022 at an event graced by Guest-of-Honour Mr Lim Kok Thai (fourth from right), CEO of the Singapore Food Agency, and NUS President Prof Tan Eng Chye (third from right).

The Research Centre on Sustainable Urban Farming (SURF) provides a platform to focus our multidisciplinary efforts and accelerate Singapore's food security research and innovation.

Professor Tan Eng Chye, NUS President

ENHANCING AGRICULTURAL PRODUCTIVITY

There are currently 16 principal investigators in SURF from the NUS Departments of Biological Science, Food Science and Technology, Biomedical Engineering, Electrical and Computer Engineering, and Computer Science, and they are leading about 10 research projects.

One of these projects focuses on improving leafy green varieties for urban farms. Most crop plants produced in indoor farms are unideal cultivars for controlled environments, as they are bred under field conditions. This causes ineffective and unsustainable indoor crop production with low yield. Research led by Professor Yu Hao, Head of the NUS Department of Biological Sciences (DBS) and Chair of SURF's Management Board; and Associate Professor Chew Fook Tim from NUS DBS, are exploring advanced breeding strategies, including genomic selection and gene editing, to create leafy vegetable varieties with traits

tailored for controlled environments to maximise agricultural productivity and quality.

The researchers are looking into improving the yield and nutritional values of economically important food crops including *choy sum* and kale for indoor growing. Other traits such as taste, shelf life, metabolite and nutritional value can also be selected to breed new plant varieties for consumption.

Another project, led by NUS DBS Associate Professor Sanjay Swarup, focuses on devising sustainable agricultural management practices by studying interactions between crops and microbes in their environment. For example, researchers found that root-produced volatile organic compounds promote microbial biofilms which can, in turn, promote plant growth by 25 to 30 per cent. With a comprehensive understanding of the plant-microbe-environment system, the researchers can target specific



(Anti-clockwise from front row extreme right) NUS Research Centre on Sustainable Urban Farming (SURF) is led by Professor Prakash Kumar, Director of SURF, and comprises a multidisciplinary team including Professor Yu Hao, Chair of SURF's Management Board; Professor Zhou Weibiao, Co-Chair of SURF's Management Board; Associate Professor Sanjay Swarup (Affiliate Alumnus '19), Principal Investigator at SURF; and Associate Professor Chew Fook Tim, Principal Investigator at SURF.



Prof Yu Hao (left) and Assoc Prof Chew Fook Tim (right) with a kale cultivar tailored for indoor farming as part of their project on improving leafy greens for urban farms.



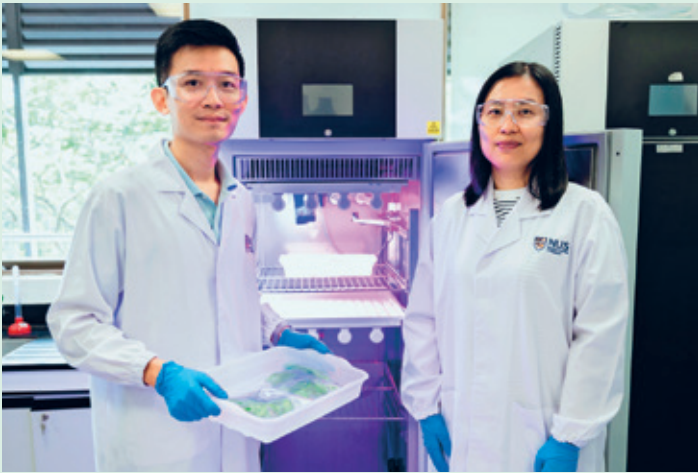
Assoc Prof Sanjay Swarup (right) with Dr Darren Sim (Science '16) (left) are working on developing sustainable agricultural management practices using microbes.

For more information on SURF, please visit www.dbs.nus.edu.sg/surf.



interactions of interest and develop novel agricultural solutions. Specifically, the team designed bio-inoculants of plant growth-promoting bacteria that can cater to different agricultural circumstances such as growing plants in various growth substrates including soil, peat and coconut fibres, or using hydroponic systems. This could improve crop production and resilience in a sustainable manner while reducing reliance on chemical fertilisers.

Post-harvest intervention can also help improve the nutritional qualities and microbial safety of produce. A project led by Professor Zhou Weibiao, Head of the NUS Department of Food Science and Technology (FST) and Co-Chair of SURF's Management Board; and




Asst Prof Li Dan (right) and Mr Seah Rui Hong (left) are part of a research team that aims to improve the quality of produce in retail storage using LED light.

Our novel solutions could contribute to making food production more efficient and sustainable for the long-term benefit of Singapore and the region.

Prof Prakash Kumar, Director, SURF

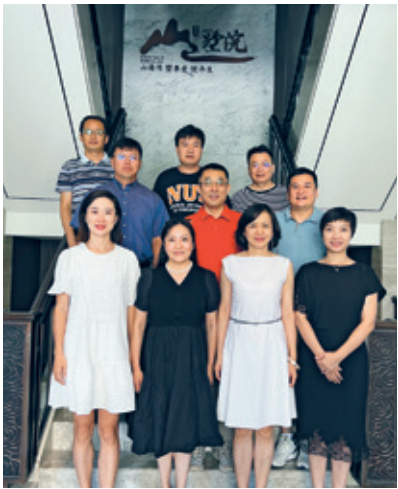
Assistant Professor Li Dan from NUS FST and Associate Director of SURF, aims to minimise the wastage of leafy vegetables in Singapore's distribution chain by improving the quality and shelf-life of produce in retail storage. Currently, Singapore's distribution chain is heavily reliant on refrigeration which does not kill microorganisms that cause spoilage. The team's preliminary results have shown that LED illumination not only eliminates organisms that cause spoilage, but also improves the nutritional quality of leafy vegetables. The next steps for the research team include developing LED illumination technology specifically for leafy vegetables commonly consumed in Singapore and testing their technology in simulated retail conditions.

Going forward, SURF aims to create multidisciplinary teams to discuss and propose joint projects to support the food sustainability efforts of various government and research agencies. The Centre also intends to work closely and facilitate focus group discussions with industry representatives to propose innovative solutions for local urban farming. 

Networking Lunch at Qingdao Enma Villa



21 August 2022



A group photo taken at the networking lunch.

On 21 August, a group of NUS alumni in Qingdao gathered for a networking lunch hosted by Mr Ma Hao (Business '18) at Enma Villa in Qingdao. Kudos to Mr Ma, who is the Chairman of the Shandong Enma Group and Founder of Qingdao Enma Boai Charity Foundation, for hosting the networking lunch at his clubhouse. Attendees first went through a round of self-introduction and networking, before enjoying a sumptuous lunch prepared by the chefs from the clubhouse. The networking lunch involved Mr Wang Chun (Business '16), Mr Liu Zong Guo (Public Policy '15), Mr Yang Zhuan Yi (Public Policy '12), Ms Li Wei (Business '19), Ms Zhang Yan (Business '04), Mr Qin Lu Tao (Business '07), Mr David Lye (Business '95) and Ms Wang Yu from the Bank of Qingdao.



The networking and self-introduction segment during the lunch event.

\$614,000 Raised for New NUSS Bursary



1 September 2022

A newly-endowed bursary, named the **NUSS Bursary**, has been established at National University of Singapore (NUS) with an initial funding of \$641,000. This amount was raised through the NUSS Charity Golf 2022, organised by NUS Society (NUSS) on 1 September – with a matching contribution of \$100,000 from the Tote Board – and was the highest amount raised at NUSS' charity golf events. The golf flights were played at the Tanah Merah Country Club and ended with a dinner held at NUSS Kent Ridge Guild House. The Guest-of-Honour for the dinner was NUS President Professor Tan Eng Chye (Science '85). During the dinner, a cheque for the amount raised was presented to Prof Tan by NUSS President Mr Edward Tay (Law '92).

The establishment of the NUSS Bursary is another fundraising initiative aimed at supporting the NUS Alumni Bursary Fund (ABF) Campaign. The ABF campaign, led by NUS alumni, was launched in 2013, with an annual gift pledge of up to \$250,000 by NUSS. The campaign aims to cultivate the spirit of giving among NUS alumni and friends, and provide financial assistance to NUS' needy students. To date, NUSS has donated \$2.25 million in fulfilment of this pledge. With the collective efforts and strong support of the NUS alumni community, the ABF campaign has raised in excess of \$25 million since its inception.

The NUSS Bursary – like the previously-established NUSS Golf Section Bursary, as well as all the other named bursaries established under the ABF campaign

– is an endowed bursary. The capital on these bursaries will not be drawn upon. Instead, bursaries will be awarded from investment income generated by the amounts contributed and matching contributions from the government. Every \$25,000 donated to NUS will enable the University to award perpetual bursaries of around \$2,500 per year.


An additional amount of \$40,000 was raised from the NUSS Charity Golf this year, which will go towards supporting two of the NUSS-adopted charities, namely, Children's Wishing Well and Dover Park Hospice. Each of these organisations will receive \$20,000 in donations – reflecting NUSS' resolve to ensure the accessibility of education to all students, and also champion comfort care, a cause close to the NUSS' community's hearts. NUSS President Mr Edward Tay also shared, "NUS has shown its commitment to meritocracy and equality of opportunity through the financial support schemes it has recently announced. NUSS is honoured to be able to support this initiative with its pledge and annual fundraising efforts."



NUS President Prof Tan receiving the cheque for \$641,000 from Mr Tay at the dinner held at NUSS Kent Ridge Guild House.



NUSS Charity Golf 2022, played at Tanah Merah Country Club on 1 September 2022.

 This article was first published on 8 August 2022 on NUS News at news.nus.edu.sg/research-centre-on-urban-farming-seeks-solutions-for-food-security.

NUS Alumni Jakarta Chapter's Networking Dinner



27 September 2022

On 27 September, NUS Alumni Relations, NUS Society (NUSS) and NUS Alumni Jakarta Chapter organised a networking dinner and dialogue with Guest-of-Honour, the Ambassador of Singapore to Indonesia, His Excellency Mr Kwok Fook Seng (Public Policy '04). 80 people attended the event, including 19 delegates from NUSS, 45 NUS alumni and other guests from the Singapore Embassy and Block71 Indonesia.



Participants of the networking dinner and dialogue.

Temasek Hall TGreen Kayak Clean-Up



22 October 2022

On 22 October, nine alumni and 37 current Temasek Hall members participated in a kayak clean-up event at Jurong Lake Gardens, hosted by PAssion WaVe. The event was organised by Temasek Green, a committee in Temasek Hall which focuses on raising awareness and promoting efforts to preserve the environment. In order to shed light on the littering situation in one

of Singapore's water bodies, and to better equip the students and alumni community on what sort of litter should be picked up, a pre-event Zoom briefing was conducted by the organising committee, as well as an event day briefing by facilitators from PAssion WaVe.

Alumni expressed that they were surprised at the amount of litter in the lake, even with constant



A post-event group photo of current Temasek Hall residents and alumni, together with their facilitator for the day.

efforts from the members of the public and professional cleaners to clean it regularly. The group were divided in pairs, quickly filling up a bucket full of litter each by the end of the event. To conclude, the students and the alumni community not only had great fun, but also shared a memorable learning experience.



From left: Mr Ng Shi Xun (Engineering '20) and Mr Toh Chun Yang (Business '18).

NUS BIZAlum Whisky Business 2022



30 September 2022

On 30 September, NUS BIZAlum organised its first-ever fully-booked whisky tasting and networking event, held at NUS Business School. Attendees enjoyed a roaring good time over whiskies from Speyside, Highland, Lowland and Islay. NUS BIZAlum would like to thank the following generous sponsors for the fast bidding silent auction goodies: Penfolds for the Penfolds Bin 707; Brotzeit German Bier Bar & Restaurant for the Wild 12 Pointer Black Wood Peated Whisky; Geometra for the Glenglassaugh Peated Virgin Oak Wood Finish; Flipper's Singapore for the Kiseki



Dean of NUS Business School, Prof Andrew Rose addressing attendees for the evening.

Pancake; and Mangiano at Novena for the Italian dinner. To all the generous silent bidders – a big Thank You, as the funds will contribute towards the NUS Business Student Welfare Development Fund.



Alumni having a drink with Prof Rose.

NUS BIZAlum also presented the Best Dressed Award each to a lady and gentleman attendee – it was difficult to select the winners, as everyone looked immaculate in

their black-tie outfits and evening gowns. It was a most memorable evening with attendees getting a chance to form new connections while enjoying exquisite whiskies.

✉ Lindagouw@nus.edu.sg

➤ More photos of the event can be found here: flic.kr/s/aHBqjA9kyq



Dashing gentlemen and lovely ladies posing for the camera!

Touched 2022: Homecoming 2 November 2022

The NUS Piano Ensemble Alumni (NUSPEA) presented a sold-out two-piano concert on 2 November at the Esplanade Recital Studio. The event, supported by NUS Office of Alumni Relations, signified the group's Esplanade debut and their return to live music-making post-pandemic. An entourage of 25 pianists and alumni put up riveting and complex works, including Ravel's *La Valse*, Smetana's *Sonata for Two Pianos* and Poulenc's *Capriccio for Two Pianos* – thrusting NUSPEA into the spotlight as an alumni group of serious musicians to follow.



Dentistry Class of 2011's 11th Year Reunion



11 November 2022

Due to COVID-19 and Safe Management Measures in 2021, what was supposed to be a tenth year reunion was delayed by a year for Dentistry's Class of 2011. Regardless, an 11th year reunion, held on 11.11 was still a significant milestone for the class, as they had not caught up one another since graduation. Set at The Villa located within the Singapore Botanic Gardens, the Class spent the night reminiscing the good old times over videos



Enjoying table games while chatting over food and drinks



Presenting the Class of 2011!

which captured their undergraduate life at the Faculty of Dentistry. They also caught up with each other over food and drinks and indulged in merrymaking through table games planned by the organising committee.

Despite their hectic schedules, 80 per cent of the class managed to carve out time to attend this event, which took months of planning and preparation. The healthy turnout was testament that many still held dear the moments spent, experiences shared and friendships built during their undergraduate years. The Class is grateful to the enthusiastic organisers Dr Wong Kuan Yee (Dentistry '11), Dr Lim Wen Yi (Dentistry '11), Dr Adrian Shi (Dentistry '11) and Dr Chan Boon Hui (Dentistry '11). The Class would also like to thank the Office of Alumni Relations (OAR) for their support in providing the door gifts and seed funding for the event. Special thanks also to the Faculty of Dentistry's Alumni Relations team, including Dr Betty Mok (Dentistry '81), Ms Ow Yong Oi (Business '83) and Ms Tiffany How for making the connections between OAR and the organising committee. Till the next time at the 20th year reunion!

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NUS College of Design and Engineering Alumni Award Ceremony



16 November 2022

The inaugural NUS College of Design and Engineering (CDE) Alumni Award Ceremony, held

on 16 November, celebrated the achievements of ten outstanding alumni. The Distinguished Alumni Award was conferred to three recipients: Mr Dalson Chung (Engineering '89), Dr Uma Maheswaran Cheyyar Ramanathan (Design and Environment '06) and Mr Teo Swee Ann (Engineering '00). This year's Outstanding Young Alumni Award was conferred to three recipients: Mr Jeffrey Tiong Jee Hui (Engineering '08), Dr Andy Tay Kah Ping (Engineering '14) and Dr Aishwarya Bandla (Engineering '17).

2022 saw the institution of three new alumni awards, namely the Alumni Excellence Award, the Alumni Rising Star Award and the Alumni Team Award. The recipient of the inaugural Alumni Excellence Award was conferred to Er Cong Zhengxia (Engineering '09), while this year's Alumni Rising Stars Award was conferred to Mr Andy Soh Wei Zhi (Engineering '18), Mr Ong Kok Chung (Engineering '22) and Ms Poh Yun Ru (Design and Environment '18) respectively.

➤ To find out more about the event, please visit CDE Alumni Relations website: cde.nus.edu.sg/alumni/alumni-awards/alumni-awards-ceremony-2022



Welcome address by CDE Dean Professor Aaron Thean.

NUS College's Guided Autobiography Course



30 November 2022

The Guided Autobiography course by Professor Philip Holden for NUS College was held weekly from September to November. Attendees had varied motivations for attending this course – some had been consistently journaling, while others felt that the time was right to take a structured chronicling of their lives thus far. The first meeting between the coursemates and facilitator was one of curiosity and apprehension of what the course entailed – especially since everyone signed up for the course as strangers and would be expected to exchange non-trivial stories of their lives.

Over the next ten weeks, Prof Holden adeptly brought the attendees through the major themes of the human experience. Attendees exchanged stories on family, personal identity, work and grief. Laughter and tears were shared while mulling over the roles in their families, communities and society; and examined the impact that these, in turn, have had on them. The course allowed attendees to revisit their memories and perspectives, in an attempt to understand themselves and the world around them better. Beyond this, there was also the recognition that memory is sometimes fickle, and that – sometimes – no matter how hard one searches in their memory for a reason for their actions, the reason that rings true may not yet be forthcoming.

Throughout the course, attendees were introduced to different ways of writing and recollecting. Even as they experimented with techniques learnt, the underlying theme of wanting to live well-examined lives sounded time and again. The attendees greatly appreciate the opportunity to learn and grow through this course.



Front row (left to right): Mr Ong Kok Chung, Mr Soh Wei Zhi Andy, Ms Poh Yun Ru, Mr Teo Swee Ann, Prof Thean, Mr Dalson Chung and Er Cong Zhengxia. Second row (left to right): CDE Deputy Deans Prof Heng Chye Kiang (Affiliate Alumni '19) and Prof Teo Kie Leong (Science '92), Vice Dean Assoc Prof Kua Harn Wei (Science '96) and Assistant Dean, Assoc Prof Teo Chiang Juay (Engineering '97).



The AlumNUS thanks all contributors for the articles and photos in Alumni Happenings, showcasing our vibrant alumni community. For the full stories, please visit nus.edu.sg/alumnet/TheAlumNUS/issue-132/community/alumni-happenings.

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SAVOURING THE JOURNEY

Ms Katrina Lee (Business '21) is the co-founder and CEO of a startup that aims to fight food waste in Singapore.

FOOD INSECURITY WAS AN ISSUE THAT THEN-NUS BUSINESS SCHOOL YEAR 3 STUDENT MS KATRINA LEE witnessed first-hand when she volunteered with community service clubs to distribute food rations to low-income households in Singapore. During such sessions, Ms Lee noticed recipients did not want commonly-donated items such as canned soup and instant noodles, as these were staples which most of them already had.

While working part-time in the F&B industry, Ms Lee also observed how restaurateurs threw away perfectly edible food by the bulk at the end of the day – it being more

convenient to dispose than to resell or donate them. She also saw how water insecurity and water pollution directly affected the local community when she worked at an international consulting agency, The Water Agency in Myanmar, during a summer internship.

These experiences inspired her to co-found tech social enterprise Savour! to tackle food waste and food insecurity in Singapore – a topic that has grown in salience with the advent of COVID-19. Officially launched in August 2020,

this one-stop business-to-business (B2B) e-commerce marketplace website and app platform seeks to connect companies such as retailers and importers to other companies and non-profit organisations to procure regular, expiring, blemished and surplus food at corporate discounts, as well as in-kind sponsorships for their operations, programmes and events.

FROM DREAM TO REALITY

The journey to the company's launch was not an easy one. Ms Lee had first come up with the idea a year earlier, when she was a member of student group Enactus NUS (now called NUS Social Impact Catalyst), pitching it to other members in the student group to join her core team. To gain customers, she started out by cold-calling potential customers and merchants. A breakthrough came when she and her team won The OCBC Green Pitch 2019 for Savour!. This helped to secure funding to develop the platform, acquire customers and manage operations.

Ms Lee shares that during her first month of trying to do so, she sent out 100 emails to potential merchants and received only one reply. "Most were small-to-medium-sized enterprises that had not heard about sustainability," she recalls.

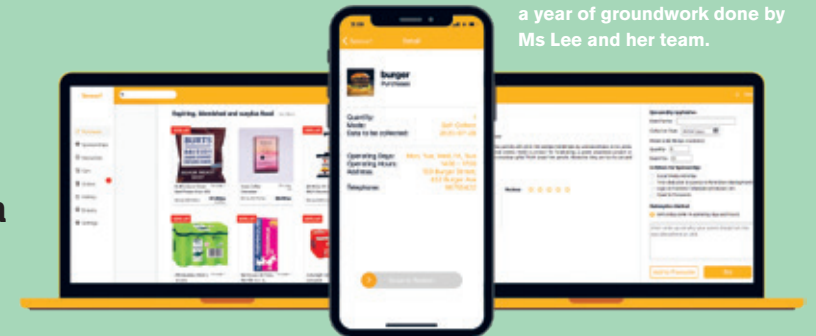
If you have an idea, just do it. You don't have to have a complete idea or team to start digging into the issues and working through possible solutions. Don't be afraid of rejections and embarrassing yourself.

"The challenge was to convince them of the benefits of reducing food waste through the platform – they would be able to recoup costs, clear inventory and generate positive publicity." She used various channels to reach out to them and even visited the stores. "I then tried different ways of pitching to them to see what worked best," she adds.

Ms Lee's persistence has paid off. To date, Savour! counts about 140 merchants and B2B customers on its platform, including brands and non-profit organisations such as Gong Cha, Grain, Beyond Social Services and The Salvation Army, as well as student groups such as NUS Students' Community Service Club and NUS Students' Business Club. Her team has also since grown to 10, with other NUS students, Ms Jessie Chia and Ms Zatalyn Ho, joining the startup to work on marketing and business development. The platform has even expanded its offerings to include corporate gifts, office supplies and event rental services.

Ms Lee credits the rigour of a NUS Business education for equipping her in her startup journey. "The courses that I took, confidence gained from the active class participation, and high expectations of presentation skills and content set by my professors trained me to deliver compelling pitch decks confidently to engage my stakeholders and encourage buy-ins," she says. These have also served her well in her role as Savour!'s CEO, where she oversees marketing, business development and finance within the company.

The Savour! platform on laptop and phone. Savour! was officially launched in August 2020 after a year of groundwork done by Ms Lee and her team.



HELPING ASPIRING ENTREPRENEURS

Even while a student, Ms Lee found time to pursue her twin passions of fostering entrepreneurship and giving back. She even took time out to co-found NUS Angel Ventures – a student group that connects NUS alumni who are angel investors and mentors with startups by NUS students and graduates. The inspiration to do so came after meeting many student entrepreneurs at NUS Entrepreneurship Startathon (a NUS Design-Your-Own-Module entrepreneurship module).

"I got to know many student startup founders there who had ideas with traction and potential and just needed the funding to execute them," she shares. "I was fortunate enough to secure funding for Savour!, but there are many students who face challenges with this. I want to help, and I see this as my way of giving back to the NUS community both in the short and long term."

Ms Lee – who caught the startup bug during her polytechnic days, when she ran a business as part of an entrepreneurship project – was certain then that she wanted to found a startup that is not only financially sustainable but one that also makes a positive community impact. Her advice for aspiring entrepreneurs? "If you have an idea, just do it. You don't have to have a complete idea or team to start digging into the issues and working through possible solutions," she says. "Don't be afraid of rejections and embarrassing yourself. If you put yourself out there and take the initiative to speak with your customers as well as mentors, people will be more than happy to take time out to give you advice, and link you up with the relevant connections and resources. Entrepreneurship is not a smooth-sailing journey, but I can say it is a meaningful and fulfilling one." A



Ms Lee (third from left) with her Savour! teammates and judges from The OCBC Green Pitch 2019.



Ms Lee (third from left, second row) with her peers at the NUS Entrepreneurship Startathon module.

This article was first published on 12 November 2020 on NUS News at news.nus.edu.sg/student-entrepreneur-saviours-journey-towards-fighting-food-waste.

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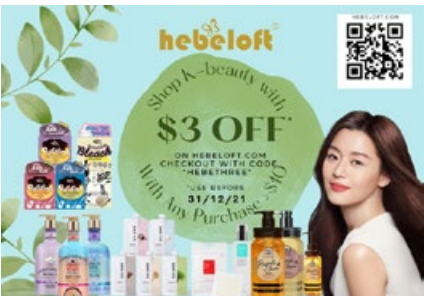
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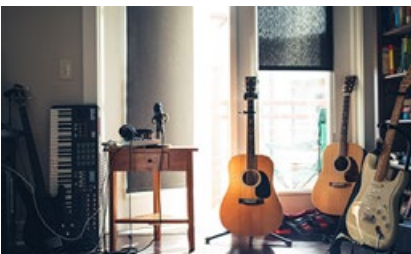


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