

issue #133 — APR-JUN 2023

The ALUMNUS

"Some people are starting to think of [ChatGPT] as possessing human-level intelligence – which it does not."

PROFESSOR SIMON CHESTERMAN, DEAN, NUS COLLEGE, AND SENIOR DIRECTOR, AI GOVERNANCE, AI SINGAPORE

MAN VS MACHINE

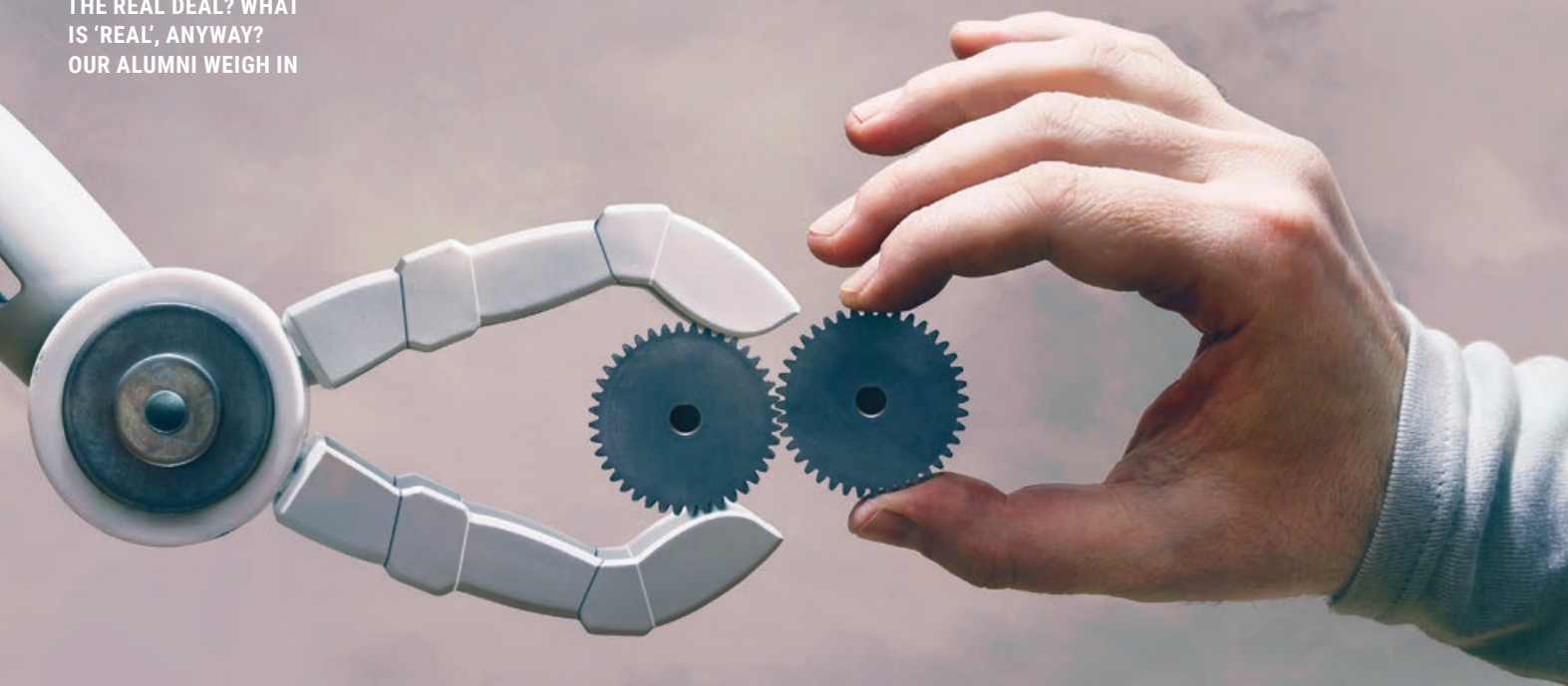
MR WANG WEIMIN
(SCIENCE '17)

TAKING 'CREATIVE LICENCE' TO A NEW LEVEL

IS AI-CREATED ART
THE REAL DEAL? WHAT
IS 'REAL', ANYWAY?
OUR ALUMNI WEIGH IN

TURNING UP THE TEMPO

WE TUNE IN TO
PROFESSOR PETER TORNQUIST,
DEAN, YONG SIEW TOH
CONSERVATORY OF MUSIC



TEMPERING TECH WITH A HUMAN TOUCH

INNOVATION IS TRANSFORMING THE WAY WE WORK, PLAY AND LIVE,
BUT WHAT ARE THE ETHICAL IMPLICATIONS OF THIS?

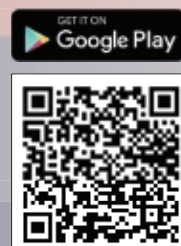
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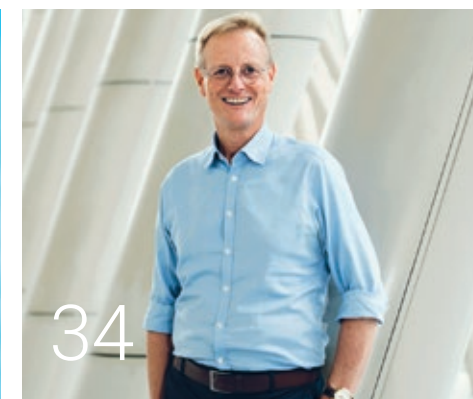
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The *AlumNUS* clinched the following award at APEX 2022:

GRAND AWARD
Magazines, Journals and Tabloids
- Custom Published

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PUSHING FOR CHANGE AS WOMEN IN STEM

As we mark the International Day of Women and Girls in Science 2023, four academics and leaders take centre stage as they spearhead advancements in research and champion greater opportunities for females in science-related fields.

FROM MENTORSHIP TO MANAGEMENT, the scientific enterprise is built on so much more than just laboratory experiments and publications. Beyond individual merits, thriving in Science, Technology, Engineering and Mathematics (STEM) also often hinges on a strong support system — including leaders who can cultivate a nurturing atmosphere, and collaborators who come together in diverse and fervently-driven teams.

The United Nations declared 11 February as the International Day

of Women and Girls in Science to better support women to rise up in science. Here, we feature four trailblazing researchers at NUS who are not only pushing frontiers in their respective fields but also showing why and how women can take the lead in STEM.

PROFESSOR LIU BIN

A prolific researcher, senior leader, entrepreneur and mother — Professor Liu Bin (Science (PhD) '01) can do it all. Besides being a multi-hyphenate, she also transcends many fields and bridges various sectors through her work.

An organic chemist, Prof Liu dives deep into the world of polymers and nanomaterials to develop innovative applications in biomedicine and sustainability. Her team hopes to design better diagnostic and therapeutic tools by tapping into biocompatible organic luminogens with aggregation-induced emission characteristics. These luminogens do not give off light in dilute solutions but can assemble into intensely illuminating bundles. "This unique optical feature allows us to develop highly sensitive light-up molecular probes and very bright nanoparticle probes, which have been used for non-invasive tracking of biological processes and various cells in real-time," explains Prof Liu, who is from the Department of Chemical and Biomolecular Engineering under the NUS College of Design and Engineering.

To translate research into impact, Prof Liu co-founded Luminicell in 2014 to expand

the reach of the technology. By providing enhanced duration and brightness, their luminogen-powered technique for real-time cell tracking has supported novel applications in research or clinical bioimaging with greater accuracy and safety. In 2016, this technology won the prestigious President's Technology Award.

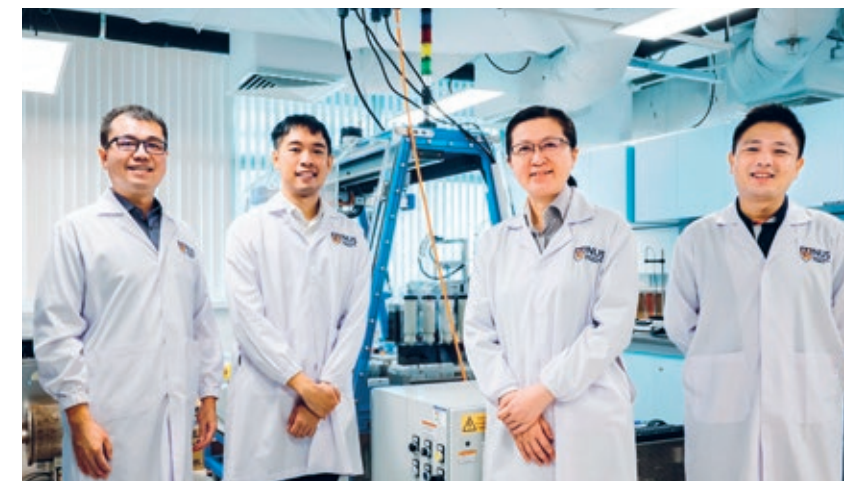
"I enjoy doing research very much. It challenges us to overcome failures and find unique solutions to important societal problems, such as treating diseases or creating alternative energy solutions," shares Prof Liu, who is also the founding director of the NUS Centre for Hydrogen Innovations — the first of its kind in Southeast Asia — which aims to bring green hydrogen from the laboratory to society.

Unsurprisingly, this extensive track record has garnered her multiple accolades, including being recognised among the World's

Most Influential Scientific Minds and the Top 1% of Highly Cited Researchers by Clarivate, alongside receiving the Royal Society of Chemistry's Centenary Prize and Kabiller Young Investigator Award in 2021. In 2022, Prof Liu was elected as an international member of the US National Academy of Engineering, making her the first female Singapore-based researcher to receive this prestigious accolade.

More recently, Prof Liu was one of 12 outstanding women around the world selected for the International Union of Pure and Applied Chemistry (IUPAC) 2023 Distinguished Women in Chemistry or Chemical Engineering, in recognition of their excellent basic or applied research, distinguished accomplishments in teaching or education, as well as leadership or managerial excellence in the chemical sciences.

I enjoy doing research very much. It challenges us to overcome failures and find unique solutions to important societal problems, such as treating diseases or creating alternative energy solutions. Prof Liu Bin



Among the many hats she wears, Prof Liu Bin (second from right) heads the NUS Centre for Hydrogen Innovations — the first of its kind in Southeast Asia — which aims to bring green hydrogen from the laboratory to society.



The secret to her success, Prof Liu reveals, comes from the constant outpouring of support from family, colleagues and the university management team. "Everything can go on well with the help of many hidden heroes to support me," she adds.

Between juggling management and research duties, she highlighted the value of spending time with her family — through which she derives comfort and strength to push forward with her multitude of endeavours.

Thanks to her own leadership journey, Prof Liu knows the difficulties that rising scientists face as they hope to find their footing in the scientific ecosystem. Indeed, her passion for research excellence is rivalled only by her dedication to fostering an environment that is conducive to the growth of all.

As Senior Vice Provost (Faculty & Institutional Development), she is working with fellow administrators at NUS to develop a mentoring culture at the institution and initiate strategies that empower more colleagues to become leaders. "Having sound advice and great inspiration from experienced leaders will certainly make a difference," Prof Liu says. "We also need to listen to what motivates women scientists and how we can support their aspirations."

From 1 April 2023, Prof Liu will start a new role as NUS' Deputy President (Research & Technology) where she will take charge of the University's research strategies. (Turn to page 30 for more.)

DR WENDY WANG

Scientists are not just confined to the pristine walls of the laboratory. Many of them, including Dr Wendy Wang (Science '08), head out into the field and get their hands dirty. Her interest in biology took root in secondary school. "In biology class, we would go on field trips into the wild and observe nature as it happens," she shares.

From a young girl fascinated by observing the natural world, Dr Wang now serves as a Curator of Entomology at the Lee Kong Chian Natural History Museum (LKCNCNHM). While museums may seem like fixed collections of what is already old and known, they can actually become a zone for new discoveries and unearthed secrets — if one knows where to look.

For trained eyes like Dr Wang, these archives are a treasure trove. LKCNCNHM is home to legacy specimens, she explains, including rare ant species collected from the 1920s to the 1980s that may no longer be found in Singapore. Without these collections, no one would have known about their existence — or

disappearance. This includes *Metapone murphyi*, an endemic species which has not yet been spotted anywhere else in the world.

"I feel a sense of achievement when I can find out new things from my data or satisfy my curiosity about phenomena I observe," says Dr Wang. Last year, she published a monumental 150-page paper detailing over 400 ant species found in Singapore, marking the city-state as one of the world's hotspots for ant diversity.

While men may outnumber women in STEM fields, Dr Wang is undeterred. With her can-do attitude, Dr Wang decided it was better to focus on doing her own work well and not worry about proving herself to others. On a broader scale, gender imbalances

I believe it's also important for leaders in the field to adopt fair practices, and not discriminate against underrepresented groups.

Dr Wendy Wang



Dr Wendy Wang (left) published a monumental 150-page paper detailing over 400 ant species found in Singapore, marking the city-state as one of the world's hotspots for ant diversity.

and minority representation pose a complex challenge for the scientific community. But the root causes of these inequalities vary across fields, Dr Wang notes, adding that there is no "silver bullet" to fix the underlying socio-economic and cultural issues as well as implicit barriers in STEM.

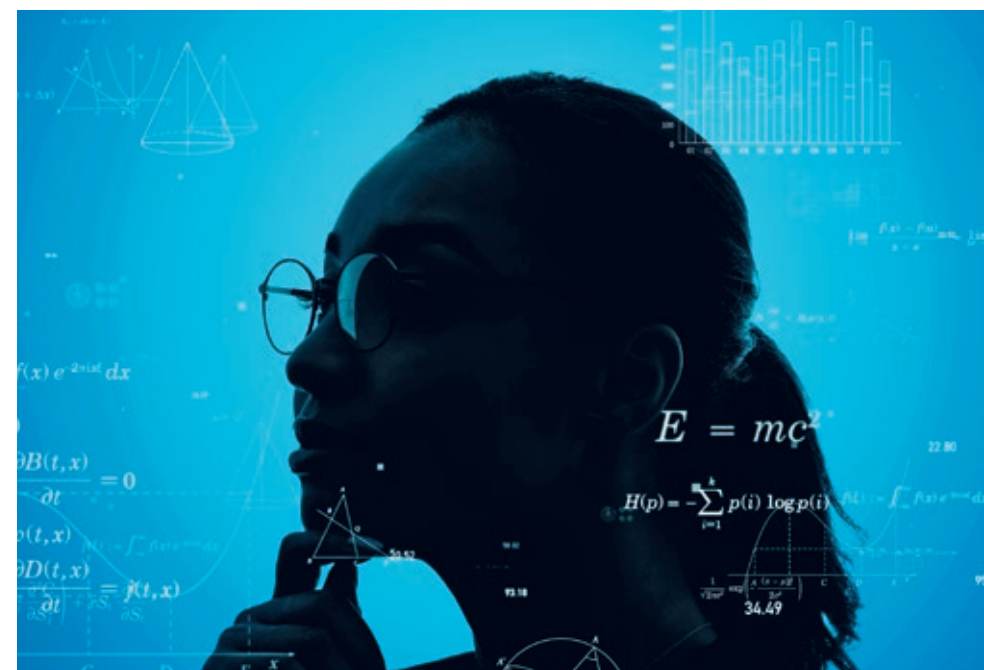
As a start, however, an increasing number of institutions and organisations are stepping up with concrete actions to support underrepresented groups. Dr Wang shares that most job advertisements in her field now explicitly encourage females and minority races to apply, and that these groups would be given priority consideration for the positions. "I believe it's also important for leaders in the field to adopt fair practices, and not discriminate against underrepresented groups," she emphasises. "Leaders in STEM should lead by example and be understanding and empathetic."

PROFESSOR TULIKA MITRA

For Professor Tulika Mitra, solving problems is her core driving force, be it in her research on the Internet of Things (IoT) at NUS Computing or her role as Vice Provost for Academic Affairs. "My mantra is to do the right thing and give my all to any effort that I am involved in," she shares.

Her mantra precisely reflects the foundation that allowed her to build a long and thriving career in STEM. Even back in her student days, she was the type of person to charge valiantly into unfamiliar but thrilling territory — during the dawn of computer science as a discipline — and push forward regardless of what others thought.

"I was quite oblivious to the gender stereotypes in the early stages of my career," she shares. "I loved maths and greatly enjoyed the problem-solving



aspect of computer science at university, so I did not see myself as any different from my peers, who were almost exclusively men."

As the tech industry has now ballooned into a staple of everyday life, Prof Mitra has grown and evolved with the field, with her research revolving around one of the most innovative and emerging technologies to date. Ranging from smartwatches to automotive, computers are hidden inside our favourite electronic devices, together materialising as embedded systems and creating an IoT framework.

Prof Mitra, who is from the NUS Department of Computer Science, navigates this boundary between software and hardware, aiming to develop energy-efficient yet high-performance embedded systems to advance the next generation of computing technologies. "My dream is to bring the power of today's desktops to tomorrow's tiny IoT devices," she shares.



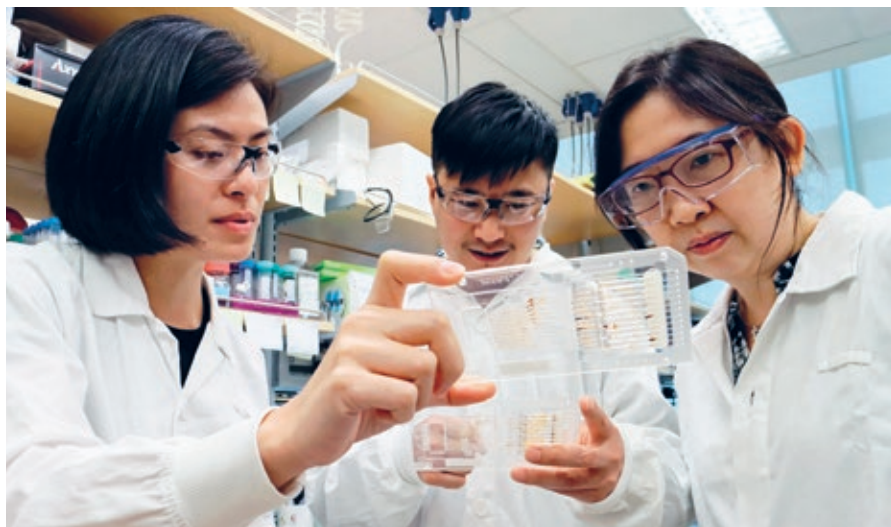
Prof Tulika Mitra (right) and her colleagues are developing innovative solutions to make wearables faster, less power-hungry and more independent.

The biggest challenge is to convince young women to choose STEM as a career option. The serious lack of role models in these disciplines alienates young girls as they cannot envision their future.

Prof Tulika Mitra

environment for girls to pursue science. "The biggest challenge is to convince young women to choose STEM as a career option. The serious lack of role models in these disciplines alienates young girls as they cannot envision their future," she points out.

As not only a veteran researcher but also a part of the university management team, Prof Mitra serves as a mentor and cheerleader to junior researchers. She encourages them by creating a space where they can freely express their ideas and explore novel ground, as well as urges them to persevere when they face failures, letting them know that



Asst Prof Yvonne Tay (right) hopes to uncover novel cancer biomarkers to guide improved detection or design more effective therapies.

they can reach out for help when they need it. "My simple advice to early-career STEM women: Just go for it!" she says. "If you are excited about what you are doing, you will have fun and everything else will fall into place."

For Prof Mitra, the hope is that as more women stay in STEM and take up leadership roles, the perception of women scientists will change for the better and the gender gap will eventually close.

ASSISTANT PROFESSOR YVONNE TAY

One such rising scientist is Assistant Professor Yvonne Tay (Science '04), who helms a vibrant research group at the Cancer Science Institute of Singapore and NUS Yong Loo Lin School of Medicine. In making the leap from a follower to an independent researcher steering the ship, she credits the leadership at the institution, including the RNA programme grant led by Professor Daniel Tenen, and the collaborations formed that have long

supported her as her team expanded and matured.

Asst Prof Tay's group works at the cutting edge of cancer science, hunting for breakthroughs in the world of non-coding RNAs — molecules that have recently entered the spotlight for their potential regulatory roles in important biological and disease processes. By gaining a deeper understanding of their functions and how their expression changes in disease, she aims to uncover non-coding RNAs as novel cancer biomarkers to guide improved detection or designing more effective therapies.

Within her domain, Asst Prof Tay looks up to the many brilliant women scientists, such as Nobel Laureate Professor Jennifer Doudna and Professor Joan Steitz from Yale School of Medicine, who have revolutionised the field through their discoveries and innovations. "I am always inspired by their approach to science, and the thoughtfulness and rigour that they have for testing scientific hypotheses," she says. "What

excites me the most is the potential to make 'disruptive' discoveries that will change how we think about science and that can advance patient care."

But while her research could potentially help save lives and benefit many families in the future, Asst Prof Tay still remembers to keep her own family front and centre. Her decision to pursue science stemmed in part from her father, who had advised her to choose a career that she would find exciting and meaningful. "My mother has also been a great role model in how she always looks after family and friends, and gives back to the wider community," she shares.

Now as a mother herself, Asst Prof Tay makes it a point to strike a balance between work and personal duties, especially as a researcher's responsibilities sometimes include keeping odd hours and travelling overseas. "I am blessed with a supportive husband and parents — it really takes a village to raise a child!" she quips. Her family also influences her outlook on academic life. As education and mentoring are critical pillars in the academia, she hopes to do her part in nurturing the next generation of young scientists.

To the up-and-coming stars in the scientific sphere, Asst Prof Tay says, "Be true to yourself and focus on research that you find impactful, yet be resilient and flexible as rejections and changes are a part of science!"

Be true to yourself and focus on research that you find impactful, yet be resilient and flexible as rejections and changes are a part of science!

Asst Prof Yvonne Tay

NUS BUSINESS SCHOOL LAUNCHES LINKEDIN NEWSLETTER

LAUNCHED IN JANUARY 2023, NUS BUSINESS SCHOOL'S LINKEDIN NEWSLETTER, *The Business Beat*, offers monthly practical business insights and relevant tips for business professionals. Subscribers can glean research insights from faculty members and learn useful content from the school's Executive Education courses.

In the inaugural issue, *It's a new start. Don't get stuck*, Assistant Professor Ke Michael Mai shared tips on achieving new year's resolutions. It is important to make goals smaller and more specific. His research has also shown that a fresh start encourages new goals, but one needs to be mindful



NUS Business School's LinkedIn newsletter, *The Business Beat*, attracted over **7,000** SUBSCRIBERS as of late February 2023.

of only working hard when the new start arrives and leaving all the hard work to the future self.

In the second issue, *Create the change you want to see*, digital transformation takes centre stage. Provost's Chair and Professor David De Cremer, who teaches the Executive Education course "Leading Transformational Change for Agility and Sustainability", shared tips on how leaders can inspire their employees in change transformation. Besides adopting a growth mindset, leaders also need to make teams feel psychologically safe to raise

concerns about any work changes before embarking on redesigning business models.

Ms Chong Koh Ping (Business '13) said, "This newsletter provides useful bite-sized tips for business professionals. I particularly like the tip on reminding ourselves about past consistent actions to stay motivated about our new year goals."

"*The Business Beat* is a good read, providing me with insights and updates on recent research from NUS. These are very industry-relevant," said Mr Adrian Kee (Computing '04).

Ms Chor Khieng Yuit (Business '00) also values the newsletter for its short nuggets of useful tips. "It is good for the busy executive. It is not so long and draggy, so I managed to read the whole edition," said Ms Chor, who hopes to see content covering insights into other areas, such as business and financial trends.



Interested alumni can get regular business tips by subscribing at bit.ly/TheBusinessBeat



NUS researchers revisit potent drug as promising treatment for acute leukaemia

The two-pronged attack of a “forgotten drug” simultaneously targets two cancer-causing pathways of leukaemia to stop the disease in its tracks.

A TEAM OF RESEARCHERS FROM THE CANCER SCIENCE INSTITUTE OF SINGAPORE (CSI SINGAPORE) AT THE NATIONAL UNIVERSITY OF SINGAPORE,

led by Associate Professor Takaomi Sanda and Dr Lim Fang Qi (Science '17), has breathed new life into an existing drug — combating a type of blood cancer called T-cell acute lymphoblastic leukaemia, or T-ALL.

The drug, PIK-75, was initially discovered over a decade ago

but was dismissed in favour of newer ones. Now, it has made a comeback that deems it unmissable — the researchers established that the drug could block not just one but two crucial cancer-causing pathways of T-ALL, enabling them to develop new treatments that could effectively stem the disease.

Predominantly afflicting children, T-ALL is aggressive and progresses rapidly, affecting stem cells in the bone marrow

that produce T-cells, which help maintain an individual's ability to fight off infection. The condition results in the formation of immature — or ill-developed — T-cells that accumulate and overwhelm their normal counterparts, thereby compromising the patient's immunity. Many patients who have previously recovered from paediatric T-ALL suffer from relapses, and in some cases even fail to respond to first-line therapy.



KILLING TWO BIRDS WITH ONE STONE

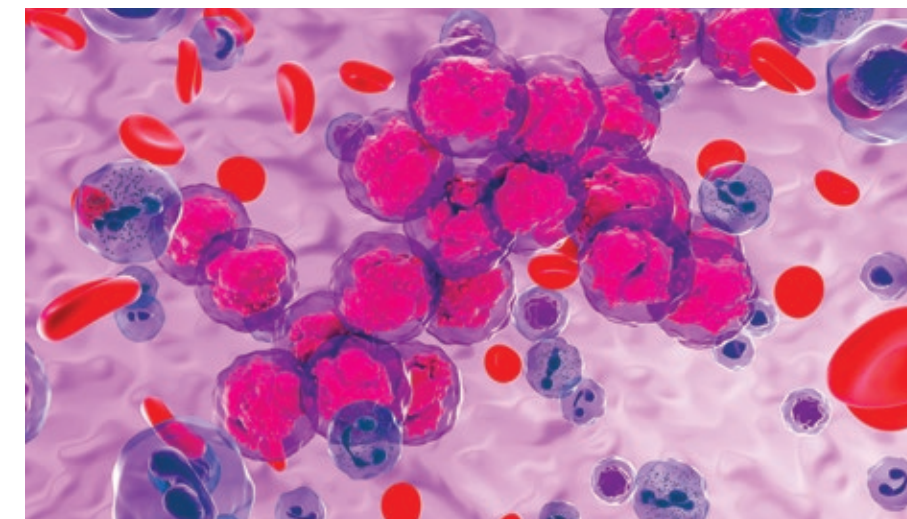
“Current cancer treatment strategies mostly focus on targeting a single molecule specific to the disease, like an oncoprotein,” said Assoc Prof Sanda, lead author of the study. “We learned that the ability of cancer cells to survive and proliferate is underpinned and promoted by multiple mechanisms, of which identifying and inhibiting just one is often not sufficient to slow the march of the disease.”

With that in mind, the team uncovered the relevant underlying pathways, so that medical interventions can be deployed to destroy all the potential routes the disease can take as it attempts to spread throughout the patient's body.

In T-ALL, the mechanisms that drive the disease progression are differentiated into “type A” and “type B” abnormalities. A prime example of the former is the overexpression of the TAL1 oncogenic transcription factor — powerful proteins that sustain the multiplication of cancer cells and are prevalent in nearly half of all human T-ALL cases. In contrast, type B is characterised by the activation of an abnormal signalling pathway such as PI3K-AKT-PTEN pathway — a series of reactions in which a group of proteins in a cell team up to control the function of the cell, ultimately promoting the emergence of cancer cells. Together, these two mechanisms

We also plan to unearth more novel drugs that can efficiently inhibit the primary oncogenic mechanisms of T-ALL.

Dr Lim Fang Qi



work together to support the proliferation of malignant T-ALL cells in patients.

In their study, the researchers performed a drug screening to hunt for potential candidates that could treat T-ALL. Among roughly 3,000 compounds, PIK-75 stood out for exhibiting the ability to block TAL1 transcription factor activity as well as the PI3K-AKT-PTEN signalling pathway, thereby greatly reducing the survivability of T-ALL cells.

To the researchers' surprise, PIK-75 had originally been touted as an inhibitor of the PI3K-AKT-PTEN pathway 15 years ago but has since been left in oblivion as newer drugs come to the fore. “Focusing on an ‘oncogenic collaboration’ mechanism, we demonstrated the efficacy of the novel therapeutic compound in inhibiting the core oncogenic machinery — which includes both type A and type B abnormalities — that drives T-ALL progression,” explained Assoc Prof Sanda. “PIK-75 produced a strong cytotoxicity against T-ALL cells at low doses

compared to previous studies involving other types of drugs that required higher concentrations to inhibit their growth.”

The team's efforts are a notable contribution to NUS' pursuit of research breakthroughs in biomedical science and translational medicine. Their findings were published in the scientific journal *Haematologica* on 8 September 2022.

LOOKING AHEAD TO MORE EFFECTIVE TREATMENTS

As the dual-inhibition mechanism of the novel drug is highly feasible in a clinical setting, the researchers are now looking to develop a soluble analogue of the drug, which is currently in an insoluble form, so that it can eventually be administered to patients. “We are delving deeper into the pathogenesis of cancers to uncover more life-saving insights,” said Dr Lim. “We also plan to unearth more novel drugs that can efficiently inhibit the primary oncogenic mechanisms of T-ALL.”

 This article was first published on 30 January 2023 on NUS News at news.nus.edu.sg/revisit-potent-drug-as-promising-treatment-for-acute-leukaemia.

DUKE-NUS DIALOGUE:

The Signature Event for the Duke-NUS Medical Alumni

THE DUKE-NUS DIALOGUES WERE CONCEIVED IN LATE 2016 TO PROMOTE DUKE-NUS MEDICAL ALUMNI'S

core mission through alumni dialogues with prominent clinicians, scientific researchers and political leaders. At each Duke-NUS Dialogue, alumni, current students, faculty and SingHealth Duke-NUS Academic Medical Centre leaders meet over dinner before gathering for the Dialogue, which begins with the Distinguished Speaker's opening remarks, followed by a lively Q&A session. Chatham House Rules ensure a vibrant, open and meaningful debate.

Mr Tony Chew, founding chairman of the Duke-NUS Medical School Governing Board, and his family generously host the Dialogues at their home. The sole Honorary Member of the Duke-NUS Medical Alumni, Mr Chew is a stalwart advocate for Duke-NUS and has taken a special interest in supporting this small but ever-growing alumni body.

The inaugural Duke-NUS Dialogue was held in January 2017 with Dr Janil Puthuchery, Minister of State, Ministry of Communications & Information and Ministry of Education, as Distinguished Speaker. Dr Janil, who trained as a paediatrician, served as a founding faculty member at Duke-NUS and made important contributions to

the innovative team-based learning pedagogy that the school employs.

The Dialogues have entered a new era with the 9th instalment of the Duke-NUS Dialogues in March 2023, featuring an overseas speaker for the first time. Professor Victor J. Dzau, President of the US National Academy of Medicine (NAM), is an internationally-acclaimed clinician leader and physician scientist who has made a significant impact through his seminal research in cardiovascular medicine pioneering gene therapy for vascular disease. In addition to serving as Vice Chair of the US National Research Council, he is also Chancellor Emeritus at

Duke University and former CEO of the Duke University Health System.

Choosing Prof Dzau as the first international Distinguished Speaker for the Dialogues was a natural decision for the alumni leadership, given his active involvement with Singapore and his pivotal role in the formation of Duke-NUS Medical School in 2005. He serves on the Board of Singapore Health Services Pte Ltd and the Academic Medicine Advisory Council of SingHealth and Duke-NUS. A thought leader on academic medicine, Prof Dzau spoke on the theme of "The role of academic medicine in Singapore's future".



Guests at the 9th Duke-NUS Dialogue with Prof Dzau (front row, centre).

A FRIEND TO THE NATION



At NAM, Prof Dzau leads a strategy of innovation, action and equity. He designed and led many important initiatives, including the Global Health Risk Framework; Global Health and Future Role of the US; Integrating Clinical Research

into Epidemic Response: The Ebola Experience; Human Genome Editing; and in October 2022, NAM released the National Plan for Health Workforce Well-Being to strengthen health workforce well-being.

In 2014, his contributions to Singapore were rewarded with the National University of Singapore's Outstanding Service Award and the 2014 Singapore National Day Public Service Medal, and in 2019, he was named an Honorary Citizen of Singapore.



RETHINKING CARE IN A FAST-AGEING SOCIETY

Researcher and NUS alumna **Susana Concorde Harding** (Public Policy '09) explores how to tackle the gender disparity and perceptions of caregiving as Singaporeans age, in the wake of her recent *WoW: Ignite* talk held on 8 March 2023.

INTERVIEW BY EVELINE GAN

reshape the caregiving experience and enhance its positive aspects so it becomes more satisfying, rewarding and meaningful?

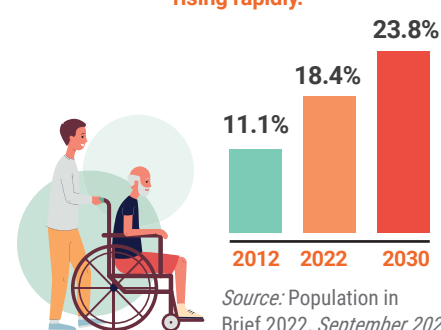
Ms Susana Concorde Harding, Senior Director at the International Longevity Centre Singapore by Tsao Foundation, addressed these hard questions in an interview with *The AlumNUS*, following her recent *WoW: Ignite* talk titled "Insights into Caregiving Transitions: Towards Positive Caregiving Experiences and Resilience". Drawing insights from local research and her policy and advocacy work in successful ageing, Ms Harding unpacked key factors that contribute to positive caregiving trajectories and suggested interventions that could benefit caregivers in the community. Much of her research centres around older women, who bear the brunt of the caregiving load even as they age and grapple with declining health.

MIND THE GENDER GAP

Research shows a gender disparity in ageing and caregiving, and women are at a higher risk of facing isolation, financial challenges and

AN AGEING SOCIETY

The proportion of Singaporeans aged 65 and above is rising rapidly.



SINGAPORE IS AMONG THE FASTEST-AGEING NATIONS IN THE WORLD.

An estimated one in four Singaporeans will be aged 65 and above by 2030. However, not everyone is ageing well. While life expectancy has gone up, many people are spending a significant part of their lifespan in poor health due to chronic disease and disability.

This means many of us will take on caregiving roles for our loved ones, even as we grow older and require care ourselves. So what can individuals and society do to minimise the challenges associated with growing old? How can we

lack of support as they grow older, said Ms Harding, who is also the Honorary Secretary of the Board of Directors at Centre for Seniors, a non-profit social service agency dedicated to helping seniors remain meaningfully engaged.

Citing the *Caregiving Transitions among Family Caregivers of Elderly Singaporeans (TraCE)* study by the Centre for Ageing Research and Education, she highlighted large gender gaps in caregiving roles. For example, women make up three in four caregivers; the mean caregiver age is around 62 years old; and two-thirds do not hold full-time jobs — either they are not working, have already retired or work part-time. A third of caregivers also report clinically significant depressive symptoms.

"Data like this clearly shows a strong gender dimension to ageing," said Ms Harding. "With women living longer, it means the burden of caregiving falls on them. When they need care themselves, what happens?"

Gender inequity in caregiving also has socioeconomic ramifications.

With women living longer, it means the burden of caregiving falls on them. When they need care themselves, what happens?

Ms Susana Concorde Harding,
(Public Policy '09)

Recalling her encounter at the *WoW: Ignite* talk with an attendee, who stopped working to care for her late mother with Parkinson's disease, Ms Harding said it is not uncommon to see caregivers give up their full- or part-time jobs due to disrupted schedules — losing their self-esteem and identity along the way.

"The current cohort of caregivers becomes increasingly vulnerable," she explained. "They end up being out of the labour force, and when their care recipient passes on, they have to rebuild their lives. It can be very difficult for them because they may lose their self-esteem and confidence as they have been on the margins of their social network while providing care all this time."

A SILVER LINING

But it need not be this way. On changing the perception that caregiving is primarily a woman's job, Ms Harding said, "Society's expectations are not cast in stone and can evolve and change. But we need to start somewhere and continue to advocate for changes to happen. It's up to everyone to make it happen collectively."

While the caregiving discourse tends to focus on the negatives, such as disrupted work schedules, financial strain and burnout, Ms Harding said caregivers report several positive aspects too. These include fulfilment in being filial, reciprocating care, being a role model to future generations and gaining knowledge about ageing, she said, citing data from the *Qualitative Insights into Caregiving Transitions (Quali-T)* study by Duke-NUS Medical School.

"We are so used to looking at the negative aspects of caregiving that we don't see there are also benefits — it's not just a burden," said Ms Harding. "There are benefits (of caregiving) even in

CAREGIVING IN SINGAPORE, BY THE NUMBERS

73.4%
of caregivers
are women.

1/3
of caregivers report clinically
significant depressive symptoms.

Informal primary caregivers spend **29.3 HOURS A WEEK** — or about **3.5 DAYS** of work — juggling caregiving responsibilities. Unlike formal caregivers, who are professionals paid for their work, informal primary caregivers care for and assist a friend or family member without pay.

THE 4 TYPES OF CAREGIVERS

The *Qualitative Insights into Caregiving Transitions (Quali-T)* longitudinal study by Duke-NUS Medical School looked at the subjective life experiences and caregiving trajectories of caregivers in Singapore.

It identified four types of caregivers:

> **BALANCED**
Low burden and moderate benefits.

> **SATISFIED**
Low burden and high benefits.

> **DISSATISFIED**
Moderate burden and low benefits.

> **INTENSIVE**
High burden and high benefits.



the dissatisfied group of caregivers, a sense of doing it for filial piety." (See sidebar on the left.)

SHARING THE LOAD

Based on data collected, Ms Harding suggested several strategies to support caregivers. At the clinical level, healthcare teams could actively engage and involve caregivers when developing care plans for patients. For instance, a nurse clinician could start a conversation with the caregiver while the care recipient is being treated by his or her doctor, a nurse.

"The idea is to get to know the caregiver, build a relationship, provide some health education in the process and detect the risk of breakdown of care and caregiving burnout early," said Ms Harding, adding that Tsao Foundation may soon pilot such a practice in its clinics and services. At the same time, caregivers would do well to build up their emotional resilience and incorporate self-care into their daily routines.

Ms Harding also suggested rethinking caregiving as solely a family responsibility, particularly for those

who do not have families of their own or get little family support. In such situations, individuals could build their "family of choice" — a group of people who are not biologically related but who band together for ongoing social support. "Not all of us will have a family to care for us. Data shows a growing number of singles. Who will take care of them? Some of us will need to start building our family of choice."

An example might be friends pooling resources to live together or near one another, she said. Or it might include co-workers, neighbours, old school connections or familiar people in the neighbourhood, who look out for the person requiring care.

Last but not least, Ms Harding also hopes to look into ways to support and engage more men to take up caregiving roles. "It may not mean having a 50-50 (caregiving load between men and women) — it could be negotiated — but the conversation needs to start now. At this moment, we could say we want to change, that caregiving shouldn't just be a woman's role. Everyone should be given a chance to say, 'I want to be a caregiver.'"



Ms Susana Harding tackled the issues of caregiving in Singapore at her *WoW: Ignite* talk on 8 March 2023.



NUS CARES

BEFRIENDING SENIORS AT BLOSSOM SEEDS' CHARITY LUNCH

NEARLY 40 NUS CARES VOLUNTEERS – COMPRISING NUS ALUMNI, RAFFLES HALL ALUMNI AND NUS STUDENTS' UNION (NUSSU) MEMBERS – joined fellow volunteers and over 1,100 seniors and community partners at Fairmont Hotel for Blossom Seeds' charity lunch, "Blossom: A Tribute to Seniors", on 19 February 2023.

Organised by Blossom Seeds, the event commemorated Blossom Seeds' 10th anniversary of working with seniors and enabling them to stay active and blossom in the community. Our friendly NUS Cares volunteers came together as Befrienders for the day to spend time and bond with the seniors over a sumptuous lunch.

Mr Leonard Tan (Engineering '18), Secretary and Director of Events, Raffles Hall Association, was happy to have the opportunity to enjoy a lunch with the seniors. "Having a lunch out is a daily thing to do but many of the beneficiaries do not have the opportunity to do so, and feel alone. I am glad that we could come together to build a more inclusive and caring society," he shared.

After enjoying activity booths and dance performances, seniors and Befrienders then sang their hearts out to classic tunes such as 朋友 and 月亮代表我的心 during a sing-along session with Guest-of-Honour, Minister Ong Ye Kung.



Volunteers and community partners with Guest-of-Honour, Minister Ong Ye Kung (second row, middle).

It was an enjoyable experience talking to seniors and hearing their perspectives on housing, healthcare and healthy ageing in Singapore. I've gained a better understanding from this and I plan to further support this important community.

Mr Ang Wei Jun (Science '22)



Guests taking part in the sing-along session.

FIND YOUR LANE

Whether your passion is to aid the disadvantaged, champion environmental causes or be a steward for animal welfare, there are plenty of ways to give back. You don't have to do it alone: Join fellow alumni and the NUS community in making a difference and start giving back today!

Visit nus.edu.sg/alumnet/events/NUSCares for details!



"MY FAVOURITE PART OF THE EVENT WAS SINGING ALONG IN UNISON WITH EVERYONE IN THE ROOM REGARDLESS OF AGE. IT WAS WONDERFUL TO FEEL UNIFIED AS ONE."

Ms Ni Yi Wen, Director of Alumni Relations and Community Engagement, NUSSU

#NUSCares



Extend your helping hand to give back to society, under the umbrella of NUS Cares.

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- Sports

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Facebook Page
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Website



Keen to participate but unsure of what is required? Drop us a note at

✉ alumnihelpdesk@nus.edu.sg

WORKING TO MAKE IT RIGHT

Technology continues to transform the way we live, but conversations around the ethics of phenomena such as artificial intelligence have lagged behind adoption. How can we stay ahead of the curve? Learn how NUS is contributing to the conversation.

TEXT BY ROY SIM



CHANCES ARE, YOU KNOW SOMEONE WHO HAS BROUGHT UP CHATGPT IN A RECENT CONVERSATION.

The seemingly ubiquitous chatbot — developed by American artificial intelligence (AI) research laboratory OpenAI — has leapfrogged other consumer apps such as Instagram and TikTok to become the fastest-growing web platform ever. Since its November 2022 launch, the chatbot has over 100 million monthly active users — and counting.

ChatGPT's use might have been accelerated by its reputation for safety, thanks to content moderation guardrails that promised to limit hate speech, violence, misinformation and instructions on doing illegal things. But that illusion was shattered when users found ways to get around the content moderation. For example, according to *The Guardian*, ChatGPT can be tricked into making derogatory remarks about women and speaking sympathetically about war criminals like Adolf Hitler.

The ChatGPT experience should offer some food for thought, as a raft of generative AI tools from the likes of Google and Baidu are set to hit the market. It shows how even well-meaning technology, if left in the wrong hands, can be used to create more harm than good. Beyond perpetuating bias and discrimination — as jailbroken forms of ChatGPT have proven able to do — tech developments without ethical considerations and safeguards can also infringe on privacy rights or cause outright harm to individuals.

RECOMMENDED READS

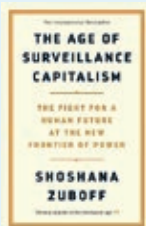


Keen to sink your teeth into the intersection of ethics and nascent technologies like AI? Here are some handy books:

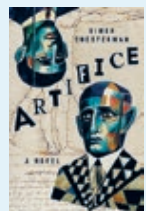
✓ ***The Black Box Society: The Secret Algorithms That Control Money and Information*** by Frank Pasquale



✓ ***The Age of Surveillance Capitalism*** by Shoshana Zuboff



✓ ***Artifice*** by Prof Simon Chesterman



Professor Julian Savulescu, Chen Su Lan Centennial Professor of Medical Ethics and Director of the Centre for Biomedical Ethics at the NUS Yong Loo Lin School of Medicine, summed up today's ethical dilemma in a commentary for *The Straits Times*. "At the heart of these problems is one about ethics and responsibility — how can new technologies be used to enhance society, rather than to endanger or undermine it?" he wrote.

WHY NOW?

The notion that tech may be more harmful than helpful is not new, explains Professor Simon Chesterman, Senior Director of AI Governance at AI Singapore, an NUS-hosted body that champions the research and deployment of AI. "There was a real change in how people thought about the issue of ethics and tech between 2016 and 2018, when the Cambridge Analytica scandal broke," he says in an interview with *The AlumNUS*. The scandal had global repercussions as it demonstrated how unchecked data manipulation and ad targeting could affect democratic processes, even in seemingly robust democracies like the United States.

But every time we pause to reflect on the ethics of new technological advancement, another one comes along, capturing the world's imagination about its possibilities. "The (ethical) challenge presented by ChatGPT is not unique —

it is a problem raised by the Internet, social media and modern life in general," observed Prof Savulescu in his article.

To his point, ethics is a sprawling topic covering every aspect of research. In today's tech-driven world, we associate it with developments like AI, but there are plenty of other non-tech areas where ethics come into play. Take the worlds of medicine and science, for example. Nearly 30 years ago, scientific communities were divided over Dolly the sheep, the first mammal cloned from an adult somatic cell. And ethical debates about everything from animal testing to euthanasia still rage on today.

Given its status as a global leader in cutting-edge research, NUS cannot shy away from these conversations. For its part, it has made teaching and the practice of ethical considerations a priority. This extends to its continuing education programmes, with courses that distil ethical issues for management executives. Lectures with global partners also give students and faculty an idea of how things are done overseas so that lessons can be drawn for Singapore. Underpinning these discussions is the University's approach to ethics, which reflects the principles of respect for people and the law that form the basis of broader student conduct.

STRIKING A BALANCE

The first port of call for many seeking an ethical approach to tech is regulation and laws. But these must strike a delicate balance. Premature or sweeping regulation — such as

Preventing research from taking place isn't necessarily the ethically safe option. While we delay, people are dying who could be saved. How should these difficult decisions be made? How should we weigh public opinion, individual preferences, and the predicted best outcomes for society?

Professor Julian Savulescu, Chen Su Lan Centennial Professor of Medical Ethics, and Director of the Centre for Biomedical Ethics at the NUS Yong Loo Lin School of Medicine, on the ethical dilemma facing medical researchers



[CHATGPT IS] JUST COMING UP WITH PREDICTIONS ON WHAT THE NEXT BLOCK OF TEXT IS, BASED ON HUGE DATABASES OF PAST TEXT. BUT SOME PEOPLE DON'T REALISE THIS AND THINK OF THE TOOL AS POSSESSING HUMAN-LEVEL INTELLIGENCE — WHICH IT DOES NOT."

Prof Simon Chesterman, Senior Director of AI Governance at AI Singapore

of the world's foremost scholars in the field of biomedical ethics. He proposes three principles: Think First, Take Responsibility and Act Ethically. This approach builds on society's ability to question assertions and assumptions and accept the responsibility of using new technologies.

Before ethical conversations can take place, people need to get a good grasp of the subject matter they are studying. But understanding can sometimes be lacking in conversations about complex technologies like AI. "Take ChatGPT, for example," Prof Chesterman highlights. "People don't understand that it's essentially a probabilistic engine. It's just coming up with some predictions on what the next block of text is, based on huge databases of past text. But some people don't realise this and start to think of the tool as possessing human-level intelligence — which it does not." Thus, he believes that when we have conversations about the ethics of technology, it is important that we focus on the ethics of the people who are *programming* the technology because they can have a big impact on the technology's ethics.

Knowing what is ethical and what's not is not enough. There also has to be an understanding in society that ethical breaches are not acceptable. This has played out in the business world, where some

outright bans of specific technologies — risks stifling the benefits of tech advancements. On the other hand, allowing technology to go unfettered is not a feasible option either.

To Prof Chesterman — the former dean of the NUS Faculty of Law and the Co-President of the Law Schools Global League — this may not involve tearing up current laws and drafting new ones. "Most laws can already cover the use of new technologies, especially AI, although a few areas need new rules," he says.

He points to potential regulations surrounding autonomous vehicles.

Would these require a new set of road traffic rules? Probably not, he says. They would have to be updated to take into account the unique features of driverless cars. "So you would have to adapt your rules and work out new ways of applying them," adds Prof Chesterman, who has explored these issues extensively in his book, *We, The Robots? Regulating Artificial Intelligence and the Limits of the Law*.

Beyond the law, society can also enjoy a more positive relationship with tech if it adopts three guiding principles, wrote Prof Savulescu, one



Those working at the front-end of technology development realise that what they're doing is cutting-edge and could change the world. And they're asking for a little help in trying to maximise the chance that it changes the world for the better and not the worse.

Prof Simon Chesterman, on the tech industry's approach to ethics

people are beginning to think that human intelligence can be replaced with AI to make decisions, according to Professor David De Cremer, Director of the Centre on AI Technology for Humankind (AiTH) at the National University of Singapore Business School. If left unchecked, these algorithms could be used to fire staff, a phenomenon known as robo-firings.

But as Prof De Cremer stresses, machine intelligence has no intuition and consciousness. "This approach means that people have to work in very consistent ways. But sometimes, as a human, you have a bad day or a good day," he points out.

Businesses should be aware of such nuances before rushing to adopt technologies. Set up in 2020, the AiTH aims to champion such views in the business community. Through such efforts, it hopes to build a human-centred approach to AI (HCAI) in society. HCAI designs AI systems with the understanding that intelligent technologies are fully embedded in society. Such systems can therefore be expected to act in line with the

norms and values of a humane society, including fairness, justice, ethics, responsibility and trustworthiness. HCAI also preserves human agency and a sense of responsibility by designing AI systems that give users a high level of understanding of, and control over, their specific and unique processes and outputs.

PUSHING THE BOUNDARIES

Ethics is an especially dicey issue in the world of computing and tech. Professor Jungpil Hahn, Vice Dean, Communications, at the NUS School of Computing, highlighted this in a 2021 lecture, where he observed that for many new technologies, there was no good way to balance the harms against the benefits since many of the harms are unknown, unquantifiable or unpredictable. There is also a lack of consensus about the correct ethical approaches to technology. So it is important that Singapore and her institutions — including NUS and AI Singapore — remain at the forefront of governance debates, adds Prof Chesterman, who is also



IN THE TECH WORLD, THERE'S A SAYING THAT 'DONE BEATS PERFECT', WHICH SUGGESTS THAT ITS FOCUS WAS ON DEVELOPING A WORKING PRODUCT, RATHER THAN PRIORITISING SECURITY AND PRIVACY.'

Dr Reuben Ng, Assistant Professor, Lee Kuan Yew School of Public Policy



DID YOU KNOW?

ChatGPT is the largest language model created to date.

It has **175 BILLION** parameters and receives **10 MILLION** queries per day.

Source: InvGate

Dean of NUS College. Prof Savulescu agrees, saying that power comes with responsibility. "The decision to do nothing accrues responsibility when action is a possibility."

To achieve this, AI Singapore is pumping resources into research about whether we should trust AI; the circumstances in which humans will, in fact, trust AI; and strategies to ensure that it is safe and accountable. In this way, efforts to build a consensus around the ethics of tech are picking up speed. But Dr Reuben Ng, from the Lee Kuan Yew School of Public Policy (LKYSPP) and the Institute for the Public Understanding of Risk (IPUR), cautions against making ethical considerations an afterthought. Dr Ng, who used to work in the tech sector, has seen how doing so can hamper the development of ethical tech products. He tells *The Alumnus*, "In the tech world, there's a saying that 'done beats perfect', which suggests that its focus was on developing a working product, rather than prioritising security and privacy."

Even more worrying is when developers deliberately design a product or service unethically. Take excessive screen time in childhood, which has been linked to health problems, including a higher risk of obesity and reduced cognitive development. Behavioural design specialists have made it nearly impossible for kids to put down their phones. They use simple hacks, such as continual notifications and prompts to trigger regular engagement, which can be used for other purposes, such as advertising and marketing.

Dr Ng has seen this himself when he was put in tight spot. "I was working on a project that pricked my conscience — it involved increasing the stickiness to a harmful product," shares Dr Ng. "It was a directive beyond my pay grade, and I was caught in a situation where whistleblowing might attract retaliation." He eventually left the project because of the moral dilemma he faced.

It should come as a good sign, then, that discussions around ethics are increasingly being driven by the tech industry itself, because ethics in tech is not just for the good of society — it can also be good for business. "Today's consumers are increasingly discerning, are aware of risks and want to be shielded from them," Prof Chesterman explains. "If you could confidently say your product was ethical or exhibited good governance, that wouldn't just help avoid problems with regulators or your own moral conscience. It could also be a selling point to consumers. I've not had anyone in the AI space say, 'No, we want less governance.' If anything, they want more."

Consumers are not the only ones clamouring for more ethical practices and behaviours; employees are also making their voices heard. This is probably because of a growing realisation of the importance of ethics, thanks to a shift in the way



Behavioural scientist Dr Reuben Ng advises against considering ethics as an afterthought.

ethics are taught in school. These days, ethics is no longer taught in a conceptual manner. Instead, teachers ground these ideas in practical and applicable ways. For instance, Dr Ng tries to make ethics come alive in his classes at LKYSPP through immersive roleplaying activities and policy exercises. “It can’t be a dry, conceptual exercise,” as he puts it. That way, students see how ethics can be used in real-world scenarios, which they can then apply when they enter the working world.

A CONTINUING CONVERSATION

The world of biomedical sciences has long been subject to strict ethical regulations, given its potential impact on human life. But as Prof Savulescu pointed out, there are still some thorny issues that the industry needs to address. Some of these — such as the balance between personal liberty and social responsibility — were brought to the fore by the pandemic.

But other medical trends have thrown up yet more issues, Prof Savulescu noted. “Antimicrobial resistance has the potential to make once-beaten diseases deadly again. The maintenance of effective antibiotics requires international collective action. Does the patient’s best interest demand the best available care now or the collective protection of antibiotic efficacy for the future? These are decisions we will need to make in the clinic, nationally and internationally, as antibiotics are a communal resource.”

With the rapid and continuing advances the world has made in genomics, precision medicine, big data and AI, we now have an unprecedented opportunity to drastically improve people’s lives with new health approaches and technologies.

Prof Chong Yap Seng, Dean of NUS Medicine, and Lien Ying Chow Professor in Medicine



The unleashing of new frontiers in medicine has raised novel issues as well, said Professor Chong Yap Seng (Medicine '88), Dean of NUS Medicine, and Lien Ying Chow Professor in Medicine. “With the rapid and continuing advances the world has made in genomics, precision medicine, big data and AI, we now have an unprecedented opportunity to drastically improve people’s lives with new health approaches and technologies.” Prof Chong added that in order to reap these benefits, however, the ethics of today must be updated. We must also address structural and social factors that increasingly contribute to disease,

such as limitations of access and social disadvantage.

One such issue is the development of organoids, a tissue model of various organs made from stem cells. Expounding on their benefits, Prof Savulescu said, “They can model diseases and help find and test new treatments for some of the most intractable diseases. Scientists have transplanted human brain cells into the brains of baby rats, offering immense possibilities to study and develop treatment for neurological and psychiatric conditions. But what is the moral status of these new life forms?”

These issues are being deliberated and debated at the Centre for Biomedical Ethics (CBmE) at the NUS Yong Loo Lin School of Medicine, one of the largest academic research centres for bioethics in Asia. Summarising his team’s work, Prof Savulescu explained, “Our goal isn’t to tell you what to think, but to support effective, responsible, goal-oriented discussions to help us

understand the costs and benefits of the decisions we make in healthcare as patients, caregivers, institutions and policymakers.”

Research is a key plank of CBmE, with platforms that study clinical, health system and public health ethics; regulation of emergent science and biomedical technologies; and research ethics and regulation. It aims to generate outputs that are relevant to policy and accessible to a broad

base of professional, academic and non-academic communities.

In addition to everyday bioethical issues, the Centre also examines groundbreaking and novel areas where such issues may arise — including space exploration. For example, this July, it will lead a global discussion on bioethical issues that may occur from space travel through the Centre’s first-ever short course on the matter. It targets space industry operators, as well as those from research, education and medicine who have an interest in bioethics, critical thinking and space medicine. The course introduces learners to bioethical issues that may emerge when humans venture to outer space for short and long durations. Various ethical frameworks will be used to address the impacts of spacefaring on the physiological and psychological aspects of human well-being as well as concerns arising from the modification of humans for space and of extraterrestrial environments for human habitation.

EVERYONE, EVERYWHERE

Ethical considerations cannot be properly appreciated in silos, which explains why the University is such a proponent of cross-border and cross-disciplinary conversations about the matter. For one, the CBmE space

travel discussion is designed to be global, with the Centre sponsoring up to five participants from low- and middle-income countries and tertiary students from around the world. Beyond spaces for discussion and deliberations, there also need to be avenues for redress. Dr Ng — who felt that there were none for fellow engineers like him when he was working in tech — is leading the charge on this front. He is now collaborating with other professionals to build a global whistleblowing platform. “This would make it easier for anybody to report and hopefully raise awareness on unethical practices,” he says.

Perhaps this ties back to an enduring principle of ethical tech use: That it must be inclusive to all. Having more stakeholders may sometimes be viewed as inefficient since disciplines can have conflicting interests and views on ethics, which can slow the process. But if the past few years have taught us anything at all, it is that cooperation and coordination bode much better for the world than isolation. ▲

➤ **Sign up for Bioethics for Outer Space at** medicine.nus.edu.sg/cbme/education/bioethics-for-outer-space.

➔ IN A NUTSHELL

Ethics in technology — as summarised by ChatGPT:

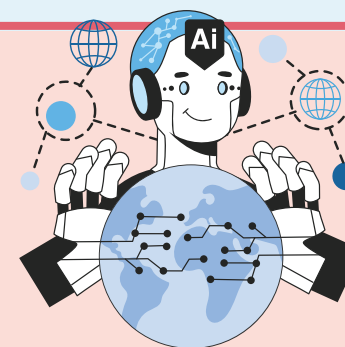
Ethics in technology refers to the principles and values that guide the development and use of technology in a way that benefits society while minimising harm. It involves considering the impact of technology on individuals, communities, and the environment, and making decisions that prioritise the well-being of these stakeholders.

Some key ethical issues in technology include privacy, security, accountability, transparency and fairness. For example, technology companies must consider how they collect and use personal data, and how they can ensure the security of that data. They must also be accountable for any negative consequences of their technology, and be transparent about how it works and how it is used.

Overall, ethics in technology is about creating and using technology in a responsible and

socially conscious way, with a focus on maximising the benefits while minimising the harm to individuals and society as a whole.

The above should give you a sense of how powerful tools like ChatGPT can be. That is because the three paragraphs you just read were written by the tool after we gave it the simple prompt, “Tell us about tech and ethics”. All this text was generated in under 20 seconds, suggesting that



generative text might be the way of the future. Of course, such tools are prone to inaccuracies, so do not just take their word as the truth.



DID YOU KNOW?

With the rise of the metaverse, the definition of what is 'real' no longer has to consider a place/person/object's physical iteration. Even luxury goods are going virtual. In 2021, fashion house Gucci sold a virtual handbag for over US\$4,000 (S\$5,400) on online gaming platform Roblox, exceeding the price of the bag's physical iteration. Roblox has established itself as a leading player in the metaverse space, with over 58 million daily active users.

NEW WORLDS, NEW ETHICS

Our first-ever Vox Alumni poll gathers your opinions on how AI-created art and the metaverse impact creativity, authenticity and the blurring of lines between the physical and the virtual.

A

AS TECHNOLOGY BECOMES INCREASINGLY

UBIQUITOUS, ethical considerations have

emerged as an important topic that can no longer be ignored. For example, the use of technology in creative fields — such as art created by artificial intelligence (AI) — raises questions about the role of advanced digital tools in artistic expression and the relationship between humans and machines. Similarly, using real and fake identities in the metaverse has prompted urgent discussions around privacy, consent and authenticity.

The complex and multifaceted debate involves various stakeholders, including technology companies, policymakers and the general public. In this inaugural Vox Alumni column, we explore opinions among the NUS community on the ethical implications of these two digital frontiers.

In doing so, we seek to better understand the attitudes towards these technologies and their impact on society, and shed some light on prevailing views on AI-created art and the metaverse to promote an informed discussion about the responsible use of technology in the digital age.

DOES AI-CREATED ART DEVALUE ART AND CREATIVITY?

"On the contrary, AI will increase the value of art by heightening awareness and providing more access to collectors and a stronger means of authentication through blockchain technology."

"NO. VIEWED POSITIVELY,
IT WILL DRIVE DIVERSITY
AND INNOVATION IN
THESE AREAS."

"No, though some might use it in devaluing ways. Depending on what it does, it could engender more creativity, promote art and make it more accessible. It is wonderful."

"AI-generated art lacks the human touch and emotional depth that comes from the artist's lived experience and creative process."

"No, it's just a different technology with a different set of implications, questions of authorship and authorial intent."

WHAT ARE YOUR THOUGHTS ON THE METAVERSE AND AVATARS?

"It allows people to hide behind a façade, resulting in malicious online activities, such as cyberbullying. It can also give them an anonymous voice to speak up on issues they cannot discuss in real life."

"It is an unexplored dimension that would be good to venture into. However, we will need some regulation in this space."

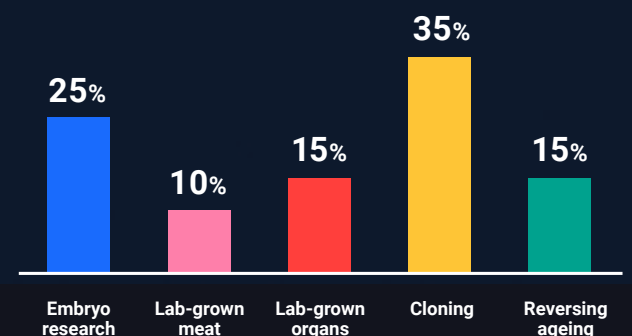
"The metaverse is a form of creative expression and a whole new platform for engagement and interaction."

"The metaverse is a fictional concept. There is only one world, and that is the physical world that we live in. Most people use online identities to mask their true identities to be unfiltered and free."

"Online identities allow users to explore different aspects of themselves, experiment with different personas and connect with like-minded individuals."



POLL WHICH OF THESE EXAMPLES HAS ETHICAL CONCERNS?

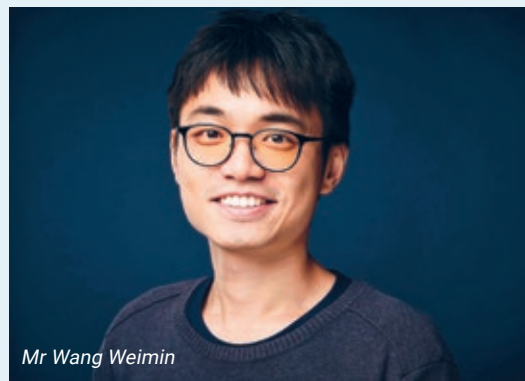


➡ WHO HE IS

The term “AI-driven problem-solver” sums up Mr Wang Weimin perfectly. He burnished these credentials at the Trusted Media Challenge in 2022, where he took home the top prize for developing an AI model that can identify disinformation. He is committed to furthering this cause through his work at ByteDance, the Chinese tech giant behind TikTok.

MAN VS MACHINE

How the pitfalls of tech can be tackled by tech, according to **Mr Wang Weimin** (Science '17).



Mr Wang Weimin

THERE WAS A TIME WHEN SEEING WAS INDEED BELIEVING. But not in today's age of deepfakes, when technology can be used to create impressive videos of someone doing or saying things they never did or said. Politicians and celebrities have been the victims of deepfakes, including former American president Barack Obama and Tesla's Elon Musk. There are mounting concerns about how deepfakes could impact future elections and national security.

To encourage research into combating deepfakes, AI Singapore, a national programme supported by the National Research Foundation and hosted by NUS, organised the Trusted Media Challenge. Some 470 teams gathered to turn tech on tech by developing

AI models that weed out deepfakes. Entrants were presented with thousands of videos, some authentic and some fake. They then developed AI models that spotted trends to determine the authenticity of any given video.

Minister of State for Communications and Information Mr Tan Kiat How praised this method at the prize presentation ceremony. “Technology is not just part of the problem; it can also be part of the solution,” he said.

That is precisely what one-man team Mr Wang Weimin demonstrated with his winning AI model. Mr Wang, who graduated with a Master of Science in Mathematical Statistics and Probability from the University in 2017, developed a model that was 98.53 per cent accurate at telling apart genuine clips from deepfakes — besting his nearest competitor by 0.2 per cent.

To inch ahead of the competition, Mr Wang studied the competition's dataset in even greater detail. “I found that the fake videos in the dataset had two additional traits: They could feature a newscaster with a faked voice to mislead people with what appears to be a media report,” he says. “Another type of fake video was selfie recordings of people with their voices also faked.” Armed with these, he spent several months developing the winning model.

That model earned Mr Wang first place at the competition and a handsome cash prize of



AI has developed so fast that people can't ignore it anymore.



US\$78 billion

That's what fake news costs the global economy annually (about S\$105 billion), as found in a 2019 study.

Source: University of Baltimore

\$100,000. The 33-year-old also received an offer for a \$300,000 start-up grant to commercialise his invention, but he preferred to use the technology at his current organisation, ByteDance. He works at its in-house AI research team based in Singapore.

A TREK THROUGH TECH

Mr Wang is increasingly aware of how AI-generated content could threaten society. Currently, victims of deepfakes can release a statement distancing themselves from a fake image or video. But the prevalence of deepfakes will only grow in time, making it nearly impossible to rebut each one, he says. “So, it's important that we develop tools that can detect deepfakes.”

He believes such tools could even help those who are confident that they would be able to spot deepfakes. “But deepfakes are increasingly sophisticated,” he admits. “When I was viewing the videos provided for the competition, even I couldn't always tell which ones were fake or real.”

He adds that battling disinformation should not stifle innovation or technological advancements either, citing AI's benefits in many areas of society, including healthcare and education. “AI

has developed so fast that people can't ignore it anymore. Just look at the success of ChatGPT,” he says, referring to the popular AI chatbot that boasts 100 million users and counting since its launch in November 2022. As a technologist, he advises people to use these platforms cautiously. “It's fine if you're using it for harmless fun. But it gets a bit tricky if you are using AI-generated content for news creation because the information still needs to be verified and authenticated by a human.”

SOLVING PROBLEMS WITH AI

Mr Wang's penchant for AI developed after he earned his Bachelor of Engineering in Electrical and Electronic Engineering from Nanyang Technological University. “I attended a lecture by Dr Andrew Ng, the co-founder of Google Brain, and he shared the possibilities of AI,” recalls Mr Wang. He adds that the world of AI called out to him because of its blend of mathematics and coding — two subjects he grew to love during his undergraduate days. “But in the engineering programme, we did very little coding. So, I taught myself how to do it, spending hours studying models and getting savvy with the foundations.”

To shore up his knowledge, he enrolled in the MSc (Statistics) programme at NUS. “I had this interest in machine learning but found a gap in my education — statistics — which is key to understanding machine learning models,” he says. He juggled school with a full-time job at pharmaceutical company MSD and, after graduating, got a job at Gojek. As a data science lead at the ride-hailing company, he put his newfound skills to the test to develop systems that would better connect riders and drivers. “So that's why I applied for the Master's programme, just to develop machine learning systems that helped people.” If his recent success is anything to go by, it seems like it was a worthy investment. **A**



Singaporean Mr Wang Weimin (centre, in red shirt) won AI Singapore's Trusted Media Challenge, which sought to find the best AI solutions to detect fake media. Photo: AI Singapore.

WHO THEY ARE

To Mr Bryan Oh and Mr Kenneth Palmer, the best way to make an impact for a cause you care about is to do it yourself as an entrepreneur. The pair — who met as undergraduates at NUS — are the co-founders of lithium battery recycling company NEU Battery Materials, which has commercialised the technology to recycle lithium from used batteries. This potentially reduces the need for lithium mining, which has an adverse impact on the environment.

Leading the 'Charge' in Zero-waste Efforts

How Mr Bryan Oh (Business '19) and Mr Kenneth Palmer (Engineering '20) are spearheading the recycling of lithium in batteries.

ROADSWORLDWIDE ARE BECOMING MUCH GREENER THANKS TO THE GROWING ADOPTION OF ELECTRIC VEHICLES (EVs). These rides — which are quieter and thus also reduce noise pollution — have been championed as a way of cutting carbon emissions. But EVs bring their own set of problems: What should be done with the battery waste they generate?

EVs put on the road, in 2019 alone, produced 500,000 tonnes of battery waste, according to *Eco-Business*. Most of these batteries' components are currently

recycled, but a key one — lithium — is generally not. Lithium is often left out of the recycling process because extracting it and then purifying it for reuse is extremely complicated and expensive. Without an alternative, most battery manufacturers end up mining more lithium instead of recycling the lithium from batteries. This spells doom for sustainability efforts, as mining lithium has been shown to harm the environment in many ways. For instance, it is a tremendously resource-intensive process: approximately 2.2 million litres of water is needed to produce one tonne of lithium. And extracting that amount of lithium from the earth puts 15 tonnes of carbon dioxide into the air.

Enter NEU Battery Materials, a startup making waves in the recycling space by championing the use of electricity to extract lithium from used batteries, specifically those known as Lithium Iron Phosphate (LFP) batteries. This technology, which was first developed at the University in 2017, has a positive impact on the environment as it reduces the amount of water and chemicals



(From left) Mr Palmer and Mr Oh competing at The Liveability Challenge, a competition supported by Temasek Foundation.

needed to extract lithium. Its co-founders, Mr Bryan Oh, 28, and Mr Kenneth Palmer, 27, who met at the University, are driven by a passion for sustainability. "We hope that beyond making an impact on recycling in the EV industry, we can also educate the wider community on recycling," Mr Oh explains. "In absolute terms, waste generated in Singapore is smaller than in larger countries. But we want to help build a country where the waste that goes to our landfill is minimised."

How did you learn about lithium recycling technology?

BRYAN OH (BO): We learnt about the lithium mining process and how this new technology could recycle lithium, at GRIP MAKE, an initiative by the NUS Graduate Research Innovation Programme (GRIP). GRIP MAKE enables fresh NUS graduates to develop commercially viable ideas based on the University's intellectual property. It builds on the GRIP programme, which helps researchers and postgraduate students to commercialise their technologies on their own or through partnerships with other NUS students and alumni.

Why were you keen to take up the challenge of commercialising it?

BO: Recycling has to be done right, and it has to be financially viable. Otherwise, it is not sustainable in the long term. We believe that entrepreneurship is the best way to tackle issues like these and were keen to take up the challenge of making lithium battery recycling a profitable venture for all parties involved.

KENNETH PALMER (KP): If we had to sum it up, our goal with NEU Battery Materials is to make the process of lithium extraction cleaner,

less polluting, more efficient in terms of scaling up and, ultimately, more affordable. We want lithium recycling to be a sustainable endeavour.

Has it been challenging to convince businesses to use NEU Battery Materials' technology?

KP: In some ways, it is a challenge because we recycle a specific kind of battery that nobody is currently recycling. So we do have to demonstrate to businesses that our technology is the solution they have been looking for. But on the other hand, it is also easier to convince businesses because they have been hankering for a solution like this.

BO: You can also get a sense of the industry's readiness for a solution like this from the funding and support we have received from partners like Temasek Foundation, which gave us a grant to pilot our solution. Once that was successful, we expanded to have our own battery recycling facility in Jurong alongside our R&D lab in Bukit Batok.

What are your plans for NEU Battery Materials?

BO: We envision that one day, if you see a battery manufacturing facility — be it in China, Europe or the United States — you'll see a NEU Battery Materials recycling plant nearby to help service the end-of-life management of these batteries. On this front, partnerships are extremely valuable. It is impossible to service the entire world alone. So, the partnerships we forge with battery manufacturers and lithium users will be valuable.

KP: Being a homegrown company, we also want to support the recycling of all batteries in Singapore. The problems of lithium mining may not be apparent where we are from, but we will certainly see the effects of battery waste as the number of EVs plying our roads grows. **A**



GREEN IS THE GOAL

Ask Mr Oh and Mr Palmer what their goal is for a greener Singapore, and they say in unison, "A circular economy mentality". Explains Mr Oh, "This means that we must adopt the mindset of making things last

longer and finding ways to reuse what we already have."

To Mr Palmer, this also means shaking off the mindset that a device or tech tool needs to be upgraded every time there is a new version out. "But if

you do have to upgrade, please dispose of your used electronics properly by leaving them at e-waste collection points," he says. "Simple acts like that go a long way towards preserving resources."



The problems of lithium mining may not be apparent where we are from, but we will certainly see the effects of battery waste as the number of EVs plying our roads grows.

MR KENNETH PALMER (RIGHT)



A renewed senior leadership team at NUS

Meet the key individuals who have been tasked to further propel NUS as a leading university shaping the future.

N US HAS ANNOUNCED CHANGES TO ITS SENIOR LEADERSHIP TEAM WITH THREE NEW APPOINTMENTS:

Professor Aaron Thean as Deputy President (Academic Affairs) and Provost, Professor Chen Tsuhan as Deputy President (Innovation and Enterprise) and Professor Liu Bin (Science (PhD) '01) as Deputy President (Research and Technology).

Together with NUS President Professor Tan Eng Chye (Science '85) and Deputy President (Administration) Mr Clarence Ti,

they represent a renewed senior leadership team that seeks to further propel NUS as a leading global university shaping the future.

The changes follow the announcement of the impending departure of Senior Deputy President and Provost Professor Ho Teck Hua (Engineering '85), who will be heading to Nanyang Technological University (NTU). Prof Ho, who has oversight of academic, research and enterprise matters at NUS in his current role, will become NTU's fifth President on 24 April 2023.

The renewed senior leadership team at NUS comprises (left to right): Mr Clarence Ti (Deputy President, Administration), Prof Liu Bin (Deputy President, Research and Technology from 1 April), President Prof Tan Eng Chye, Prof Aaron Thean (Deputy President, Academic Affairs and Provost from 1 April) and Prof Chen Tsuhan (Deputy President, Innovation and Enterprise from 1 April).

The latest changes to the senior leadership team at NUS take effect from 1 April 2023. Prof Ho, who will leave NUS on 23 April 2023, has been working with the senior leadership team on a smooth transition before his departure.

"With these new appointments, NUS is poised to move forward with a robust and dynamic senior leadership team that will spearhead the University's continued commitment to academic and research excellence, innovation and enterprise, and solid administration and governance," said Prof Tan. "Together, we look forward to building on the University's legacy of empowering our students, faculty, staff and partners to shape the future of our country and region."

NEW NAMES HELMING EDUCATION, INNOVATION AND ENTERPRISE, & RESEARCH AND TECHNOLOGY

TAKING NUS EDUCATION TO GREATER HEIGHTS

Leading the slate of changes in the senior leadership team is Prof Aaron Thean's appointment as the University's new Deputy President (Academic Affairs) and Provost, effective 1 April 2023. Prof Thean, the incumbent Dean of the NUS College of Design and Engineering (CDE), assumes leadership of academic matters in NUS.

A distinguished scientist, technologist and inventor in the field of microelectronics, Prof Thean has received multiple accolades in recognition of his research excellence, including the 2014 Compound Semiconductor Industry Innovation Award for his research group's breakthrough work in III-V finFETs and the 2001 Gregory Stillman Semiconductor Research Award for his PhD work. In 2016, he was also awarded the National Research Foundation's (NRF) Returning Singaporean Scientist Award. At NUS, he was the founding Director of the NUS-Applied Materials Corporate Laboratory, and the NRF Mid-Sized Centre for Singapore Next-Generation Micro-Electronics in 2019.

Prof Thean's body of work in research and innovation is complemented by extensive industry experience, spanning two decades, in the semiconductor industry, where he worked at major tech companies including IBM, Qualcomm and IMEC. Known for his translational research in cutting-edge semiconductor technologies, he holds more than 50 US patents and has published extensively in the areas of Micro- and Nano-Electronics.

As CDE Dean, Prof Thean has overseen innovative interdisciplinary

educational initiatives that offer students a broad intellectual foundation augmented by greater industrial relevance.

"Aaron's appointment attests to his dedication as a leader who continually seeks to enhance the ways in which we teach and learn," said Prof Tan. "With his extensive academic and industrial experience, as well as inventive spirit, he is well-positioned to lead the University's academic affairs and forge a new chapter of academic excellence and innovation at NUS."

Reflecting on his appointment, Prof Thean said, "Prof Ho Teck Hua is an exceptional and passionate leader who has made a real difference in setting the University apart in the global higher education

arena — our faculty, researchers and students today are among the best in Singapore and the world.

"I'm honoured to have the opportunity to build on Prof Ho's legacy and look forward to working with NUS President Prof Tan Eng Chye, my colleagues, students, our industry, government and academic partners to take the NUS educational experience to greater heights. I will miss Prof Ho as a mentor and colleague at NUS. I wish him the very best in his journey ahead and I look forward to future opportunities for collaborations."

With Prof Thean's appointment, CDE Deputy Dean Professor Teo Kie Leong (Science '92) will assume the position of Acting Dean of the college, while the University convenes a search for a new dean.

I'm honoured to have the opportunity to build on [Prof Ho Teck Hua's] legacy and look forward to working with NUS President Prof Tan Eng Chye, my colleagues, students, our industry, government and academic partners to take the NUS educational experience to greater heights.

Professor Aaron Thean will serve as the University's new Deputy President (Academic Affairs) and Provost from 1 April 2023.





I look forward to working with innovative and entrepreneurial-minded faculty, researchers, students, staff and partners to invigorate the spirit of innovation and enterprise among our brightest minds in Singapore and around the world.

Professor Chen Tsuhan will take over as Deputy President (Innovation & Enterprise) on 1 April 2023.

LEADING INNOVATION AND ENTERPRISE

Prof Chen Tsuhan will assume the role of Deputy President (Innovation & Enterprise) on 1 April 2023. Prof Chen was previously Deputy President (Research & Technology) at NUS, a role he took on in June 2018.

The Chief Scientist of AI Singapore, Prof Chen is a highly respected artificial intelligence expert specialising in pattern recognition, computer vision and machine learning. He has been instrumental in nurturing the University's research footprint in such critical fields as materials research, health innovation, and sustainability and urban solutions.

Prof Chen has driven efforts at strategising NUS research, mentoring researchers, and increasing NUS' competitive research funding, which has risen by about 30 per cent over five years. A strong proponent of collaborative research, he also launched the Reimagine Research Initiative in 2021. The initiative — which provides seed funding for interdisciplinary project ideas — seeks to encourage researchers to work across diverse fields of expertise to find solutions to the most pressing problems of our time.

"Tsuhan has been instrumental in pioneering initiatives that champion innovation and research excellence," said Prof Tan. "With his wealth of experience in collaborative research and strong relationships with industry partners, I am confident that his leadership and vision will elevate our efforts to remain at the forefront of the innovation and enterprise ecosystem in Singapore and the region."

Prof Chen shared that he was honoured to take on this important role of leading innovation and enterprise in NUS. "We were among the first universities in the world to create a formal entrepreneurship education programme for undergraduates, in addition to many other exciting innovations," he said, adding that the University has also helped to nurture some of Asia's biggest start-up founders from within its community.

"I look forward to working with innovative and entrepreneurial-minded faculty, researchers, students, staff and partners to invigorate the spirit of innovation and enterprise among our brightest minds in Singapore and around the world," said Prof Chen.

As Deputy President (Innovation and Enterprise), Prof Chen will oversee the Innovation and Enterprise cluster or NUS Enterprise. This comprises the NUS Enterprise Academy (including the



NUS Overseas Colleges programme); local and overseas ecosystem builder programmes (including the Graduate Research Innovation Programme, and BLOCK71); as well as technology transfer, translation and commercialisation in the University.

BUILDING WORLD-LEADING PEAKS OF RESEARCH EXCELLENCE

Internationally-acclaimed researcher Prof Liu Bin will serve as Deputy President (Research and Technology) from 1 April 2023.

An NUS Distinguished Professor and the University's highest-ranking woman leader, Prof Liu is a top researcher in the field of functional materials, and has been internationally recognised for her contributions to the applications of organic nanomaterials in biomedical, environmental and energy research. She is the recipient of multiple accolades, including the President's Technology Award (2016) and the Royal Society of Chemistry's Centenary Prize (2021), and ranks among the World's Most

Influential Scientific Minds and the top one per cent Highly Cited Researchers by Clarivate, with over 450 publications and 30 patents to her name. She is an international member of the US National Academy of Engineering.

Prof Liu joined NUS as Assistant Professor in 2005. Promoted to full professorship in 2016, she was subsequently appointed Vice President (Research and Technology) from 2019 to 2021.



Among Prof Liu's notable work at NUS is the development of vibrant innovation clusters across colleges, faculties and schools, including the NUS Sustainability Cluster, as well as the strengthening of efforts to build up and develop the University's talent pool.

"I am honoured to take on this new role in Singapore's top research and innovation university. Research at NUS is multi-faceted, dynamic, and — most importantly — impactful," said Prof Liu. "I look forward to working with our talented researchers and partners to reach new peaks of research excellence that are truly world-leading for the University, and produce solutions that bring lasting impact to Singapore and the world."

I am honoured to take on this new role in Singapore's top research and innovation university. Research at NUS is multi-faceted, dynamic, and — most importantly — impactful.

Prof Liu Bin will assume the role of Deputy President (Research and Technology) on 1 April 2023.

"Prof Liu's outstanding contributions to research and innovation — as well as her passion for nurturing the next generation of research leaders — will pave the way for NUS to continually advance the frontiers of knowledge and social impact," said Prof Tan.

CHANGES IN MANAGEMENT RESPONSIBILITIES

The University concurrently announced adjustments made to the roles of two members of NUS management effective from 1 April 2023:

- **Professor Chee Yeow Meng**, currently NUS Vice Provost (Technology-Enhanced and Experiential Learning) and Director of the NUS Overseas Colleges programme will become Vice President (Innovation & Enterprise). In this role, he will relinquish all duties in the Office of the Senior Deputy President and Provost and focus on assisting Prof Chen in the management of the Innovation & Enterprise cluster, while overseeing the NUS Enterprise Academy.
- **Professor Peter Ho** (Science '96), who is currently Vice Provost (Undergraduate Education) at NUS, will take on the additional responsibility for technology-enhanced and experiential learning. As Vice Provost (Undergraduate Studies & Technology-Enhanced Learning), Prof Ho will assist Prof Thean in the University's efforts to enhance teaching and learning with the innovative use of technology. **A**

LIKE MOST MUSICIANS, PROFESSOR PETER TORNQUIST DEVELOPED A LOVE FOR

MUSIC AT A VERY YOUNG AGE. “The idea of just listening to music, going to concerts or even going to church, singing and playing instruments, had been one of my biggest inspirations,” the Dean of the Yong Siew Toh Conservatory of Music (YST) says.

But his decision to pursue a career in music came relatively late while he was exploring university degree options at 17. He started his pre-college education in architecture before switching to music. “Architecture is very similar to music as it’s also a lot of technical stuff,” Prof Tornquist, 59, says. “Like architecture, music requires you to know your materials and to have skills, although music is also an aesthetic sensation and experience.”

A graduate of London’s Royal College of Music, Prof Tornquist has been awarded Honorary Fellowships by the Guildhall School of Music and Drama and the Royal Northern College of Music for his services to music. An important lesson that stuck with him is that nothing in life or the arts is one-dimensional. “So when you pursue learning, you have to look at it from different angles because there are always different perspectives,” he adds.

As a top music composer and educator, Prof Tornquist also attempts to break down the walls between the creative and thinking processes and the execution of music, so these become more interconnected. Speaking from his experience as a composer, he shares, “Traditionally, the role of the composer has been to provide performers with something to play while the performers make this come alive to the audience,”



Turning up the tempo

Professor Peter Tornquist, Dean of the Yong Siew Toh Conservatory of Music, shares his vision to move the school from being excellent to exceptional.

he explains. “But it creates a silo, even though both roles are necessary to create the musical experience.”

He hopes musicians can be empowered to take full ownership in realising their artistic voices — a philosophy he also applies to his teaching and leadership roles. “It’s not about what I know as a teacher, professor or dean,” he says. “It’s to what degree I can make my students, staff and faculty own their ideas, so they transmit them more wholeheartedly.”

As a man constantly seeking a lyrical adventure, Prof Tornquist decided to leave Norway — where he was the Principal of the Norwegian Academy of Music from 2013 to 2021 — for Singapore when the opportunity at YST arose. “The centre of the world used to be somewhere between the United States and Europe. But that has

slowly changed, and the world is now moving eastward,” notes Prof Tornquist, whose compositions have been performed by the Oslo Philharmonic Orchestra, Tokyo Symphony Orchestra and London Sinfonietta.

MAKING THE RIGHT TRANSITIONS

In the digital era, Prof Tornquist notes that a successful musician needs multiple skill sets. He or she should be good in at least three areas of music-making and be world-class in two other areas. For instance, one could be a good performer, composer or producer, while also excelling in teaching, social media or entrepreneurship.

“We see these multiple skill sets within and beyond music as a trait of successful young professionals today,” he says. “Building on our foundation of excellence in music-making, we are

strengthening this drive towards interdisciplinary education and giving our students the space to develop several skills at the same time.”

While he thinks Singapore has a vibrant and healthy music scene, some gaps must still be bridged. “For example, a good portion of the high talent playing musical instruments from a young age choose not to study music, and study medicine, engineering or law instead,” says Prof Tornquist. “There is still some resistance to making music your choice of education. We

need to make sure the music talent pipeline from YST into Singapore can become stronger, and we are working on this.”

Prof Tornquist also wants the arts to be more present in the academic lives of NUS students. Music, after all, can enhance our learning and cognitive capabilities. For example, playing music with

others in a pop band can boost our communication and negotiation skills. “Developing that passion for music translates into a skill set that makes them better future professionals, and more fulfilled individuals.”

TUNING IN TO A BROADER TALENT POOL

Since taking up his new role at YST in February 2022, Prof Tornquist has enjoyed meeting many passionate people with an innovative mindset and a “can-do” spirit. “I’m enjoying how vibrant this city-nation is and how international the community at NUS and especially YST is,” he says.

As YST celebrates its 20th anniversary this year, Prof Tornquist says it is vital for the school to leverage its strong faculty and be

We also need to cater for exceptional talent and cast a wider net in our recruitment drive, regardless of their cultural or stylistic background.

responsive to the changes in the global music scene. “My vision is for us to move from being excellent to exceptional,” he says. “To shape the future, we need to educate musicians that bring something else to the mix other than simply being very good at playing an instrument. We also need to cater for exceptional talent and cast a wider net in our recruitment drive, regardless of their cultural or stylistic background.”

When he is not working, Prof Tornquist enjoys reading non-fiction books on history and philosophy. He also enjoys running and taking long walks in the Green Corridor, Southern Ridges and MacRitchie Reservoir. “I also love food, so once a month, I invite my faculty and younger staff to show me their favourite hawker centres,” says Prof Tornquist, who has tried the standard chicken rice to more exotic items like pig’s brain.

“The food in Singapore is such an interesting representation of the nation’s cultural diversity with its mix of influences resulting in a slightly different version of Indian, Malay, Chinese, Japanese and Korean food,” he adds. “There’s a Singaporean flavour to everything, and that’s also what I see in the people and the culture here.” **A**

→ THE BEAT GOES ON

The packed calendar of musical events, held in celebration of YST’s 20th anniversary, was a music lover’s dream come true.

1 Kicking things off last August was the week-long “Looking back, Moving Forward” festival. This was a showcase of illustrious international musicians, including the Calefax Quintet, a reed-playing ensemble from the Netherlands, and the Boston Brass from the United States, backed by the YST Orchestral Institute and performing epic film scores from blockbusters such as *Jurassic Park* and *Star Wars*.

2 After a long absence of four years due to COVID-19, the Voyage Festival returned, bringing

together YST alumni for a special homecoming. In five concerts over two days, the talented musicians and singers shared the spotlight as they played a diverse selection of music.

3 On 8 April 2023 at the YST Conservatory Concert Hall, the gala concert, “Orchestral Institute x YST Chamber Singers and Voice Majors: A Gala for Creation”, brought to life the timeless

music of Austrian composer Franz Joseph Haydn’s 1798 oratorio, *Die Schöpfung* (*The Creation*).

4 In September, the Conservatory will hold its fundraising gala dinner.

On 28 October 2023, YST will premiere the Southeast Asian Golden Age Symphony, a fresh new commission by seven young composers across Southeast Asia.



Science Alumni-Student Mentorship Programme



13 January 2023



The inaugural Science Alumni-Student Mentorship programme was launched in July 2022 to create a shared community for strengthening bonds between students and alumni. Through this mutually beneficial programme, Science students acquire industry-relevant insights and career guidance, better preparing them for life and work after graduation. The alumni mentors,

in turn, contribute meaningfully to student development by coaching them.

The programme successfully paired 25 mentors with 56 mentees in its inaugural run. The first round of the mentorship programme concluded with an appreciation ceremony and networking dinner on 13 January, where the mentors and mentees shared learning experiences. Here's what they had to say about their experience:

"I AM SO THANKFUL FOR MS SERENE ONG'S GUIDANCE OVER THE PAST FEW MONTHS, AND FOR PREPARING THE SESSIONS AND HAVING A CLEAR AGENDA, DESPITE A HECTIC SCHEDULE. I REALLY APPRECIATE THE TIME AND EFFORT SHE TOOK TO GUIDE EACH OF US. I HAVE LEARNT SO MUCH ABOUT LEADERSHIP AND GOT TO KNOW MYSELF BETTER. I HOPE SHE CONTINUES TO GUIDE OTHER STUDENTS LIKE ME AND EMPOWER OTHER WOMEN LEADERS!"

Ms Deborah Yow, mentee

"AN EXCELLENT PROGRAMME FOR MENTORS AND MENTEES TO LEARN FROM ONE ANOTHER, AS MENTORING IS DEFINITELY NOT A ONE-WAY CHANNEL!"

Ms Serene Ong (Science '04), mentor

NOC Alumni CNY Reunion 2023



1 February 2023

The NUS Overseas Colleges (NOC) Alumni community held its annual Chinese New Year reunion gathering on the 11th day of the Chinese lunar calendar, at BLOCK71. As Singapore's first and currently largest start-up ecosystem, BLOCK71 holds a special place in the hearts of many of our alumni, who took their first steps into entrepreneurship here.

More than 145 alumni attended the gathering, representing

different batches and colleges, including those from the NOC Silicon Valley, Stockholm, Beijing and Southeast Asia programmes. Also in attendance were the current Vice Provost (Technology-Enhanced and Experiential Learning) and Director of the NUS Overseas Colleges programme, Professor Chee Yeow Meng.

Prof Chee kicked off the evening by sharing his experiences from the past year and wishing everyone a



prosperous new year. Afterwards, everyone took part in the colourful and joyful *lo hei* tradition, exchanging meaningful well-wishes to welcome greater abundance and prosperity in the coming year. At the end of the evening, the alumni had a simple dinner and networking session, where some reconnected while others met new peers.

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SAVE THE DATE.
AT 12 NOON ON 1 JULY 2023,
SOMETHING NEW IS COMING HOME.



Office of
Alumni Relations

Alumni Sing-Along Chinese New Year Celebration 2023



1 February 2023

The first day of February dawned bright and beautiful — a welcome change, considering the almost-wintery January Singapore had been experiencing since the first day of Chinese New Year. Ahead of the celebration, the NUS Alumni Sing-Along (ASA) Committee and volunteer helpers met to prepare the function room at Saffron, Shaw Foundation Alumni House, for the year's first major social gathering.

The activities included setting the tables for the *lo hei* and buffet, and decorating the venue with cheerful red paper cuttings of good luck couplets, firecrackers and adorable bunny wall hangings befitting the Year of the Rabbit. Meanwhile, the group's entertainers and eager musicians tuned their instruments and adjusted the sound system.

The prompt arrival of alumni members and guests soon filled the room with lively chatter and happy laughter with a high note of anticipation for the activities to come. The welcome from ASA Chairperson Ms Joanna Loo (Science '71) to all participants was followed by a rousing rendition of *Gong Xi, Gong Xi* among the friends gathered as they mingled and greeted one another.

Next, Mr Lim Wee Bin (Arts and Social Sciences '93) led the traditional well-wishes



for good luck, good health and prosperity. Ringing out loud and boisterous, the voices were accompanied by nimble chopsticks tossing the *yu sheng* topsy-turvy, higher and higher. As no celebration is complete without great food, everyone then made a determined beeline for the sumptuous buffet. There was something delicious to pique and satisfy every distinctive taste bud. The mouth-watering array of dishes included spicy chicken winglets, prawn fritters, Hong Kong noodles and more. After tucking in, everyone was ready to entertain and be entertained.



"Abracadabra! A Magic Show" by guest Mr Roger Lim kept guests on their toes, trying to solve the numerical puzzles and little tricks. Led by Mr Lim Chee Kiang (Engineering '83), the Line Dancers' agile, simple-to-follow routine inspired calls from the audience to organise follow-up dance sessions! A rousing performance of *Cai Shen Dao* (财神到) by Mr Johnny Chor (Engineering '88) was followed by the catchy final performance, *Huan Le Jin Xiao* (欢乐今宵), which brought everyone to their feet to dance their hearts out.

With a new spring in our step, let us "hop" into the Rabbit Year with its symbolism of quiet and gentle thoughtfulness. Thanks to everyone present and the prize donors for making the festive occasion a wonderful success.

A series of stirring performances enthralled the audience, including a violin solo performed by Mr Su Allin (Engineering '73). Amid the energetic songs, there was a poignant ukulele duet performance by Ms Joanna Loo and Mr Lim Thou Tin (Business '81) titled *The Descendants of the Dragon*. "A Musical Quiz" hosted by Dr Thomas Sim (Medicine '65) and Ms Elaine Sim (Arts '66) gave all present the opportunity to rack their brains, trying to remember song and movie titles, singers and composers, to win table and individual prizes.



BRINGING US TOGETHER

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NUS Alumni Melbourne Chapter Lunar New Year Dinner 2023



4 February 2023

Following months of planning and organisation, members of the NUS Alumni Melbourne Chapter gathered for a long-awaited Lunar New Year dinner at the Yummy Duck restaurant in Melbourne to welcome the Year of the Rabbit.

After two years of COVID-disrupted plans, 70 alumni celebrated the year's biggest event with delicious food, camaraderie, entertainment and lucky draw prizes. It was incredibly heartening to know that the attendees represented so many faculties (Medicine, Dentistry, Engineering, Science, Business, Arts, Law, etc.), with graduates from 1970 to 2017.

The event kickstarted with a joyous and long *yum seng* session, led by Secretary Dr Cecilia Xiao (Science '10), that prompted other curious diners in the restaurant to join in. Spirits were high, and guests enjoyed drinks with the *lo hei yu sheng* starter and prosperity wishes from Dr Raymond Wong (Architecture '81). Chairperson Dr Edna Yeo (Science '93) introduced special guest Professor Teo Choo Soo (Dentistry '73) – the



"THANKS, EDNA, AUDREY, CECILIA AND THE ORGANISING COMMUNITY. THE FOOD WAS GREAT, BUT THE COMPANY AND LAUGHTER WERE SIMPLY AWESOME. THANKS, RAYMOND, CATHERINE AND ARUL, FOR THE GREAT MUSIC AND SONGS. HUAT AH! AND THANKS TO THE WONDERFUL NUS FAMILY!"

Mr Philip Chan (Engineering '92)

former Director of NUS Office of Alumni Relations (OAR), who had set up the Melbourne and Sydney Chapters. He kindly brought NUS souvenirs to thank the committee members – third-generation Chairperson Dr Yeo; Vice Chair and Treasurer Ms Audrey Sim (Arts and Social Sciences '96); Dr Xiao; and Senior Adviser Dr Woo Sin Ang (Dentistry '68) for their contributions to the Chapter over the years.



The dinner continued with Peking duck rolls, lobster noodles and steamed barramundi, among other dishes. Excitement ensued with many lucky draw prizes, including limited-edition, engraved NUS golf balls for golfers and four hampers that went to lucky attendees – Mr Li Yang (Architecture '97), Mr Michael Wong (Law '62), Mr John Matthew,

"THANKS, EDNA, AND THE ORGANISING COMMITTEE, FOR THE LOVELY EVENING LAST NIGHT. AND TO RAYMOND, ARUL AND COMPANY, FOR THE ENTERTAINMENT."

Mrs Juliette Koh-Romary (Arts and Social Sciences '73)



"THANKS TO EDNA, THE COMMITTEE AND THE VOLUNTEERS FOR THE EFFORT IN ORGANISING A GREAT EVENT."

Mr Peter Koh (Science '87)

Dr Alan Kian Ho (Dentistry '68) and Mr Peter Koh (Science '87).

The Chapter would like to thank Dr Raymond Wong and Mr Arul Earnest (Arts and Social Sciences '97), who took over the entertainment segment. They sang familiar karaoke songs, including *Peng You* and *Can't Help Falling in Love*, displaying their hidden talent and multilingual abilities. A special nod also goes out to Dr Wong, who loaned the use of his audio system, and to Mrs Catherine Wong, who managed the speakers.

The Chapter is very appreciative of OAR's funding, which allowed alumni to catch up with each other after two years of COVID-19 lockdowns and restrictions. Without a doubt, the members look forward to more events in the future.



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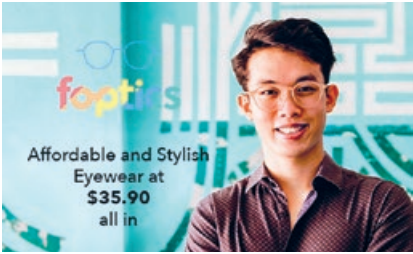
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Geography Majors Tea 17 February 2023

The Majors Tea is a key student outreach event in NUS Geography's calendar. Three alumni returned to the department to share their experiences navigating the job market as recent graduates. The invited guests were Mr Gordon Oh (Arts and Social Sciences '21), a Nature-based Solution Analyst at Adatos.AI; Ms Kamarunnisa Ismail (Arts and Social Sciences '20), a Planner in Strategic Research, Urban Redevelopment Authority; and Mr Nadi Chan (Arts and Social Sciences '18), the Co-Founder and Director of Foreword Coffee Roasters.

Drawing on experiences spanning the public sector, private enterprise and entrepreneurship, the alumni shared about the value of gaining various work experiences through short-term assignments, the benefits of doing extracurricular activities, and how a Geography degree enabled them to synthesise different types of knowledge. Students attending the event asked how Geography has helped alumni respond to the increased emphasis on sustainability in different sectors, and the myths regarding Geography graduates in the job market.

A new component at the event also focused on the significance of doing an honours thesis and embarking on geographical research, allowing the alumni speakers to share their personal experiences of these aspects. The segment was particularly inspiring as Mr Oh had won the Tan Huat Neo Best Thesis Prize and Outstanding Undergraduate Researcher Award in 2021.



Mr Gordon Oh,
Nature-based
Solution Analyst
at Adatos.AI



Mr Nadi Chan,
Co-Founder and
Director of Foreword
Coffee Roasters



Ms Kamarunnisa Ismail,
Planner in Strategic
Research, Urban
Redevelopment Authority

Attended by 42 people, the Majors Tea included prize-winning activities, such as a quiz on the alumni speakers and a lucky draw. Since the late 1990s, NUS Geography has invited outstanding alumni to share their experiences with current students at this annual event. "It's good to be back at NUS to share my experiences with the department," said Ms Kamarunnisa. "I found similar sessions helpful as an undergraduate, and I hope that the current batch gains a better understanding of the various options and career paths available to them."

This year's Majors Tea was particularly notable, as an undergraduate commented, "It was very heart-warming to see everyone interact and spend time together after COVID-19! The event also allowed alumni to provide us greater insights and valuable knowledge about the working world." A big thank you to the alumni for being so generous with their time and supporting this event. Many thanks to the Special Projects Committee of the NUS Geographical Society for their help in organising yet another successful Majors Tea.

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