

ENTERPRISE sparks

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Enterprise

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DEPUTY PRESIDENT'S Message

Dear readers,

We are now past the mid-year mark, and the past six months have been exciting. We have been hard at work building the innovation ecosystem, enriching entrepreneurial education, and bringing more ideas from lab to market. This has all been possible thanks to our vibrant community of innovators, investors, and researchers at NUS and beyond.

In this edition of Enterprise SPARKS, we celebrate the success of our record-breaking **InnovFest 2024**. This year's event was our biggest ever, with about 5,500 attendees and 200 start-ups from across Asia. With participation from 10 countries and 17 Institutes of Higher Learning, it was also our most global gathering to date. Furthermore, it was the most inclusive, with the conference boasting a diverse and impressive lineup of 65 brilliant minds. There was a commendable gender mix of speakers, contributing and enriching the dialogue with their valuable perspectives and expertise. We were honoured to have Mr Tan Kiat How, Senior Minister of State, Ministry of Communications and Information, as our Guest-of-Honour. His visit to our start-ups from NUS and other universities' entrepreneurial arms including Lingosnap and PaperLux highlighted the vibrant and dynamic innovation ecosystem in Asia.

Shifting our focus to cybersecurity, a critical area for innovation, we collaborated with ISTARI, a cybersecurity firm (subsidiary of Temasek Holdings), with support from the Cyber Security Agency of Singapore (CSA), to host the inaugural **ISTARI CHARTER APAC Congress**. This event, aimed at driving innovation in the regional cyber landscape, took place this March in Singapore. It was a key outcome of the partnership between the NUS-CSA CyberSG Talent, Innovation and Growth (TIG) Collaboration Centre and ISTARI, established last year.

These milestones reflect the strong support and collaborative spirit of our NUS innovation and enterprise community. On this note, I am delighted to congratulate **Associate Professor Benjamin Tee** on his new appointment as NUS Vice President (Ecosystem Building).

As a serial entrepreneur and accomplished researcher, Assoc Prof Tee brings a wealth of experience and vision that are essential for the continued growth and success of our initiatives. This issue features his inspiring journey and the motivations that shape his professional and personal life.

We also highlight some inspiring stories from our start-up community, featuring innovative companies like **Cellivate Technologies** and **Forte Biotech**. Cellivate Technologies is revolutionising the biotech field with sustainable cell technologies aimed at providing alternatives to animal slaughter. On the other hand, Forte Biotech has made significant strides with their RAPID test kits, designed to pre-emptively detect diseases in agricultural settings, driven by a passion to empower rural farmers.

Reflecting on these past months, it is clear that the diversity of our community is a powerful catalyst for innovation and entrepreneurship. We look forward to continuing this journey, driven by our shared passion and commitment to making a meaningful impact.



Prof Chen Tsuhan

Deputy President
(Innovation and Enterprise)



red hot

Innov 2024 Fest

**A record-breaking success as
Asia's biggest, most global and
most inclusive start-up showcase**

NUS Enterprise, the entrepreneurial arm of the National University of Singapore (NUS), successfully hosted Asia's largest university start-up showcase, InnovFest x Elevating Founders 2024, from 29 to 31 May 2024. Partnering with Informa Tech, InnovFest is the official start-up event of Asia Tech x Singapore (ATxSG).



red hot



Guest of honour at the InnovFest, Mr Tan Kiat How, Senior Minister of State, Ministry of Communications and Information (left), engaged several start-up founders, including Mr Luciano Lizana, co-founder and CEO of PaperLux whose innovative technology transforms any screen – such as a home TV or a computer – into a touch screen with a pen.

This year marked the biggest and most global edition to date, with unparalleled diversity and breadth of innovation on display:

INNOVFEST: RECORD-BREAKING EVENT

BIGGEST

5,500

attendees from across Asia

200

start-ups showcasing innovations in: Generative AI; Sustainability; Industry 5.0; Food Tech; Health Tech; Edu Tech/Future of Work

MOST GLOBAL

10

countries

17

Institutes of Higher Learning

MOST INCLUSIVE

65

local and international speakers

50%

of the speakers were female visionaries

MOST EXCITING

22

stage sessions covering three key themes: AI and Digitalisation; Sustainability and Environment; and Future of Healthcare, Work and Education





FOSTERING ENTREPRENEURSHIP THROUGH GLOBAL COLLABORATION

PROFESSOR TAN ENG CHYE, NUS PRESIDENT
in his welcome address

“InnovFest is more than a gathering of conversations; it is where the future starts. Through partnerships with universities and industry leaders, pitching sessions and networking opportunities, we are empowering start-ups to succeed.”



Professor Tan Eng Chye highlighted InnovFest as a valuable platform where entrepreneurs can forge new partnerships, connections and gain inspiration, propelling them forward in their entrepreneurial pursuits.



To nurture the changemakers of tomorrow NUS partnered impact-driven companies which have experience in addressing some of the most pressing global issues.



NUS also formalised partnerships with several Indonesian universities and companies to support the growth of Indonesian start-ups and strengthen Indonesia's innovation ecosystem.

NEW PARTNERSHIPS FORGED DURING INNOVFEST 2024 INCLUDE:



TO NURTURE CHANGEMAKERS OF TOMORROW – SINGAPORE RED CROSS SOCIETY, STACS ESGPEDIA AND WORLD WIDE FUND FOR NATURE (SINGAPORE)

Selected NUS Overseas Colleges (NOC) students will intern with these organisations to tackle some of the most pressing global issues such as conservation, humanitarian aid and sustainability. They will also receive mentorship from the Philip Yeo Initiative as part of the Discoverer Programme



TO NURTURE ENTREPRENEURIAL TALENTS AND SUPPORT THE GROWTH OF START-UPS IN INDONESIA - INSTITUT TEKNOLOGI BANDUNG AND UNIVERSITAS INDONESIA

Aspiring entrepreneurs enrolled in the two universities will be able to tap on scholarships to join the NUS Enterprise Summer Programme in Entrepreneurship. NUS also organises a Winter Programme in Entrepreneurship for more Indonesian universities and partners.

Additionally, BLOCK71 Indonesia and Universitas Indonesia will create a structured acceleration programme to incubate start-ups in Indonesia.



TO STRENGTHEN INDONESIA'S INNOVATION ECOSYSTEM – INNOVATION FACTORY AND UNIVERSITAS GADJAH MADA

BLOCK71 Indonesia will partner with Innovation Factory, the innovation arm of Salim Group, to strengthen Indonesia's innovation ecosystem. BLOCK71 Yogyakarta will also relocate to UGM's new student and innovation hub, bringing resources closer to student entrepreneurs.



red hot



(From left) Mr Tom Cuthell, Vice President of Global Festivals, Informa Tech; Associate Professor Benjamin Tee, NUS Vice President (Ecosystem Building); Professor Chee Yeow Meng; Mr Tan Kiat How; Professor Chen Tsuhan, NUS Deputy President (Innovation and Enterprise); Ms Jennifer Toh, Deputy Director, Marketing & Communications, NUS Enterprise; and Kiren Kumar, Deputy Chief Executive, Development, Infocomm Media Development Authority (IMDA).

SINGAPORE AND ASIA EMERGING AS VIBRANT HUBS FOR TECHNOLOGY AND INNOVATION

Through events like InnovFest and the collective efforts of the government, industry and Institutes of Higher Learning, Singapore's dedication to nurturing innovation and entrepreneurship is clear. Guest-of-Honour Mr Tan Kiat How, Senior Minister of State, Ministry of Communications and Information, highlighted Singapore and Asia's roles as vibrant tech hubs, impacting the global start-up scene.

Commenting on the success of InnovFest 2024, Professor Chee Yeow Meng, Chair of the InnovFest Organising Committee and NUS Vice President (Innovation and Enterprise) said "As Asia's biggest

“

MR TAN KIAT HOW

This year, InnovFest aims to boost innovation and support talent development in AI and sustainability, aligning with Singapore's longstanding recognition of the importance of innovation and entrepreneurship for driving economic growth and sustainable development.

”

showcase for university start-ups, InnovFest 2024 brought together promising ventures and entrepreneurs from across the region. This year's event is indeed the biggest, most global and most inclusive ever. The event not only supported participating start-ups but also strengthened Singapore's start-up ecosystem and empowered the larger entrepreneurial community across Asia.”



UNLOCKING THE POTENTIAL OF AI FOR GLOBAL GOOD

At InnovFest's opening keynote, "Harnessing AI for Global Good", Professor Mohan Kankanhalli, Director of the NUS AI Institute, discussed the transformative power of AI, highlighting its potential in healthcare to enhance primary care for common diseases in Singapore such as high cholesterol, high blood pressure and diabetes.



Keynote address by Professor Mohan Kankanhalli, Director of the NUS AI Institute



GROWING GENERATIVE AI START-UPS ACROSS ASIA

Recognising AI's immense potential, NUS Enterprise is actively supporting Generative AI start-ups through strategic partnerships with tech giant Microsoft and leveraging the BLOCK71 platform.

The NUS-Microsoft Generative AI Demo Day, a highlight of InnovFest, showcased innovations from ten pioneering start-ups from the region including Addlly AI, ARA App, ConnectingDNA, FollowTrade, HealthBridge.AI, Ledgerowl, Librarian, Lingosnap, Pebblely, Raijin.AI.



Mr Tan Kiat How, Senior Minister of State, Ministry of Communications and Information (left) met Mr Phang Wei Jun, Co-founder of Gen AI start-up Lingosnap (right), who demonstrated their visual-based language learning app.



Esther Wee
IP Consultant
RHTLaw Asia



Guan Dian
Co-founder & APAC GM
Patsnap



Bryan Low
Associate Professor
NUS



Associate Professor Bryan Low (extreme right), NUS Computer Science and Director of AI Research at AI Singapore, discusses how data privacy can be improved with technology in the panel, Navigating data privacy in the age of AI.

TECHNOLOGY AND AI FOR A SUSTAINABLE FUTURE

A panel discussion on “Protecting Your Innovations in an AI-Enabled World,” explored AI’s impact on intellectual property and strategies for safeguarding data privacy while keeping digital solutions accessible and safe for all. Ms Guan Dian, Co-founder of PatSnap, an NUS-supported unicorn, highlighted the trade-offs between data privacy and convenience from a consumer perspective.



MS GUAN DIAN
CO-FOUNDER OF PATSNAP

If we want absolute privacy, we would not be enjoying the conveniences of e-commerce or the targeted YouTube videos we enjoy. However, as a business, it’s our responsibility to let users, who are the producers of the data, have a say on how they want their data to be used.





SUSTAINABILITY IN THE MARITIME INDUSTRY

NUS Enterprise and the Maritime and Port Authority of Singapore (MPA) launched the Smart Port Challenge (SPC) 2024 to address key issues in areas such as Maritime Green Technologies, Smart Shipping, Next Generation Ports, and Digitalisation. The event, organised by PIER71™ and graced by Dr Amy Khor, Senior Minister of State for the Ministry of Transport and the Ministry of Sustainability and the Environment, marked the expansion of this annual innovation competition to global start-ups.



Dr Amy Khor expressed a strong commitment to nurturing the maritime ecosystem in Singapore and beyond.

For a more sustainable maritime sector, it is imperative to embrace new technologies and strengthen partnerships. In the panel discussion, “Navigating Innovation: Global Collaboration and Maritime Opportunities”, Dr Hanson Lee, CEO and Co-founder of Green COP, discussed sustainable biofuel production from biowaste, noting technological barriers that might slow down progress. He also discussed how combining biofuels with other types of green energy could lead to new sustainable solutions.



Panel: Navigating Innovation - Global Collaboration and Maritime Opportunities



**Moderator
Calvin Chu**
Managing Partner,
Eden Strategy Institute



**Panelist
Ann Carpenter**
CEO,
Braid Theory



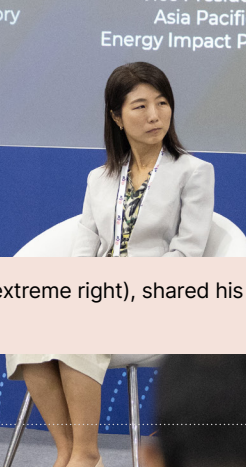
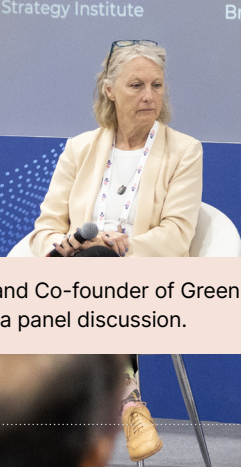
**Panelist
Miho Kurosaki**
Vice President,
Asia Pacific,
Energy Impact Partners



**Panelist
Collin Ng**
CTO,
Equatorial Marine
Fuels Management
Services



**Panelist
Dr. Hanson Lee**
CEO,
Green COP
PIER71 Start-up



Dr Hanson Lee, CEO and Co-founder of Green COP (extreme right), shared his experiences with sustainable biofuel production from biowaste during a panel discussion.



red hot

ISTARI
CHARTER

Capella Hotel, Singapore

NUS, ISTARI and CSA drive cybersecurity innovation

at inaugural ISTARI CHARTER APAC Congress 2024

NUS and cybersecurity firm ISTARI (subsidiary of Temasek Holdings), with support from the Cyber Security Agency of Singapore (CSA), held the inaugural ISTARI CHARTER APAC Congress that aims to catalyse innovation in the regional cyber landscape on 20 March 2024 at the Capella Hotel, Sentosa. The milestone event is a key outcome of the partnership between the NUS-CSA CyberSG Talent, Innovation and Growth (TIG) Collaboration Centre and ISTARI established last year.

Bringing together over 200 participants, including Chief Information Security Officers as well as representatives from government agencies, academia and start-ups, the invitation-only congress highlighted the critical role of cybersecurity in ensuring economic resilience, national security and societal well-being. The congress featured insightful discussions, including keynote presentations,

panel discussions and an Innovation Showcase spotlighting leading cybersecurity start-ups, including several supported by NUS.

Professor Chen Tsuhan, NUS Deputy President (Innovation and Enterprise), remarked, "As Asia becomes a global economic powerhouse, the key to strengthening cyber resilience lies in building a strong cybersecurity ecosystem driven by innovation and talent. Our partnership with ISTARI on the CHARTER initiative marks a significant step, gathering cyber professionals in the APAC region to address strategic challenges."



Gathering cyber professionals from across the Asia Pacific region, the inaugural ISTARI CHARTER APAC Congress sought to address strategic challenges related to strengthening cyber resilience.



In her speech, Guest-of-Honour Mrs Josephine Teo, Minister for Communications and Information and Minister-in-charge of Smart Nation and Cybersecurity, underscored the importance of a whole-of-ecosystem effort that includes partnerships with the industry and academia to sustain trust within the digital domains.

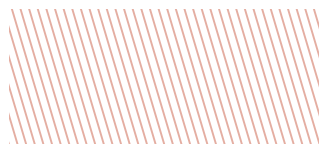


STRENGTHENING CYBER RESILIENCE: A GLOBAL IMPERATIVE

In her opening remarks, Mrs Josephine Teo, Minister for Communications and Information and Minister-in-charge of Smart Nation and Cybersecurity, emphasised the significance of cybersecurity and highlighted a “whole-of ecosystem” effort needed to build and maintain trust in the digital realm.

“By now, cybersecurity has become a global imperative. In every aspect of our lives where there is a digital dimension, there will also be concerns about cyber risks. Likewise in Singapore, where digital developments are relatively advanced, we have learnt to value cybersecurity and to prioritise the development of strong capabilities.

– MRS JOSEPHINE TEO



NAVIGATING STRATEGIC CHALLENGES IN THE CYBERSECURITY LANDSCAPE

Cybersecurity professionals face a complex and ever-evolving cyber landscape, influenced by global economic pressures and geopolitical differences. The fireside chat, featuring Mr Bilahari Kausikan, Chairman of the Middle East Institute at NUS, and moderated by Mr James Astill, Asia Editor of The Economist, provided insights into navigating these challenges. One suggestion was the potential for forming coalitions among like-minded countries to tackle specific cybersecurity issues collaboratively.



Mr James Astill, Asia Editor of The Economist and Mr Bilahari Kausikan, Chairman of the Middle East Institute at NUS (right), discussed some of the most significant strategic challenges facing the Asia Pacific region in the 21st century.

BUILDING A THRIVING CYBER ECOSYSTEM

What makes a cyber ecosystem thrive? Is it about nurturing a skilled workforce? Or does it also involve strategic investments to fuel the growth of innovative solutions and start-ups? These questions were explored in-depth during a panel discussion titled “Building a Thriving Cyber Ecosystem” moderated by Professor Simon Chesterman, NUS Vice Provost (Educational Innovation).

The panel of cyber experts from government agencies, academia, and the industry discussed the three elements essential for building a thriving cyber ecosystem — talent, capital and innovation.

LEADING INNOVATION WITH CYBERSG TIG COLLABORATION CENTRE

At the Innovation Showcase, the CyberSG TIG Collaboration Centre team shared insights on various Talent, Innovation and Growth initiatives aimed at growing the cybersecurity ecosystem. This includes supporting cybersecurity companies to expand their reach

beyond Singapore. Notably, it was announced by Mrs Josephine Teo at the congress that the CyberSG TIG Collaboration Centre will be leading a delegation of Singapore cybersecurity companies to London in June 2024 to understand common cybersecurity problems, forge connections and broaden their business reach.

Additionally, two NUS-supported cybersecurity start-ups, GuardRails and Protos Labs, presented their innovative solutions at the showcase. GuardRails demonstrated its continuous application security verification platform, empowering developers to address security vulnerabilities in both web and mobile applications. On the other hand, Protos Labs showcased how its holistic, real-time risk management tools enable enterprises to make informed cyber risk decisions.



Harnessing Efficiencies: From Childhood Play to Start-Up Success

INSIGHTS FROM ASSOCIATE PROFESSOR BENJAMIN TEE ON INNOVATION AND ECOSYSTEM BUILDING

From a young age, Associate Professor Benjamin Tee, now NUS Vice President (Ecosystem Building), embraced efficiency. As a child, he was always fascinated with the idea of maximising his time and effort. “I always liked to do things faster, so I had more time to play,” he recalls.

This desire to optimise his playtime led him to devise creative ways to complete tasks quickly. For instance, he would group repetitive tasks together to complete them in one go, such as folding and cutting paper all at once. This early knack for efficiency was not just about play; it laid the groundwork for his future endeavours.

FOUNDATIONS OF INNOVATION

Assoc Prof Tee’s academic journey mirrored this drive for efficiency and innovation. Excelling in mathematics and science, he earned scholarship offers from the Public Service Commission (PSC) and the Firefly Scholarship scheme from the Economic Development Board (EDB). He ultimately pursued

electrical engineering at the University of Michigan-Ann Arbor. With a love for computers and programming, he explored frontier technologies in flexible electronics, igniting his passion for research and innovation. This passion carried him to Stanford University, where he completed his Master’s and PhD in electrical engineering, focusing on AI, robotics, and healthcare technologies under the National Science Scholarship PhD award.

“I really enjoy coming up with new ideas, seeing them come to life in the lab and then be used in real-life,” he says. Blending creativity and practicality has been a hallmark of his career, shaping both his research and entrepreneurship journey.





This philosophy has led to numerous innovations, including over 10 patents, and one of his proudest achievements: his team's revolutionary project, HOPES (Home Eye Pressure E-skin Sensor), which won the James Dyson Innovation Award in 2021.

"It was a major milestone, being the first team from Singapore to win in its 17-year history," he says. This achievement underscores his belief that innovation must be practical and impactful.

"By connecting start-ups with global venture funds and experienced advisors, we ensure they have the support needed to grow efficiently,"

ENTREPRENEURIAL VENTURES AND ECOSYSTEM BUILDING

Assoc Prof Tee's entrepreneurial journey includes co-founding Hannah Life Technologies, a company addressing fertility issues efficiently. "Going through Y Combinator taught us to focus on creating solutions that people will actually use," he explains. Scaling the company to serve tens of thousands globally reinforced his commitment to making a practical impact.

Overseeing the growth and development of the NUS Innovation and Enterprise ecosystem, Assoc Prof Tee assumed the role of Vice President (Ecosystem Building) in April this year. Prior to this, Assoc Prof Tee was Associate Vice President of NUS Enterprise, and Vice-Dean (Research) at the College of Design and Engineering.

As part of his role at NUS Enterprise, he aims to reduce friction for start-ups to grow. "Early-stage start-ups are swimming in unknown waters with very limited resources. It's a high friction environment that's very challenging as these companies are trying to bring an idea from zero-to-one. My focus is on helping them remove some of these friction points and create an environment for aspiring entrepreneurs to thrive with the right training."

Initiatives like BLOCK71 and GRIP 2.0 provide start-ups with the necessary resources, mentorship, and funding to scale efficiently.

ENHANCING GLOBAL CONNECTIVITY

Assoc Prof Tee emphasises the importance of global connectivity for start-ups. "We're always

looking to expand our BLOCK71 global ecosystem," he says. This includes the launch of our innovation hub — BLOCK71 Silicon Valley at San Mateo, and establishing new nodes in Japan. Each incubation node supports entrepreneurship development between its location and Singapore, facilitating market entry for start-ups and promoting greater access to innovation programmes in both countries.

Under his leadership, several initiatives were launched to grow Singapore's deep tech innovation and venture ecosystem.

This includes the S\$10 million Innovation and Venture Creation Awards to spur research commercialisation. Additionally, the

enhanced Graduate Research Innovation Programme (GRIP 2.0) has significantly boosted funding, offering up to S\$250,000 to successful teams - 2.5 times more than the initial funding. It also leverages NUS' extensive alumni network and strategic partnerships with major venture capital firms like Legend Capital, SOSV Investments LLC, and Vertex Holdings. Besides this, the collaborative effort with NTU and Temasek with a S\$75 million commitment would further help accelerate the commercialisation of deep tech ventures, streamline IP licensing and offer a robust support for start-ups.



Assoc Prof Tee enjoying a meal at a restaurant

BALANCING WORK AND LIFE

Despite his busy schedule, Assoc Prof Tee finds balance by switching modes and being efficient. "Outside of work, I focus on being a father, which is also incredibly fulfilling," he shares. He also enjoys exercising and learning new things, keeping him energised and inspired.

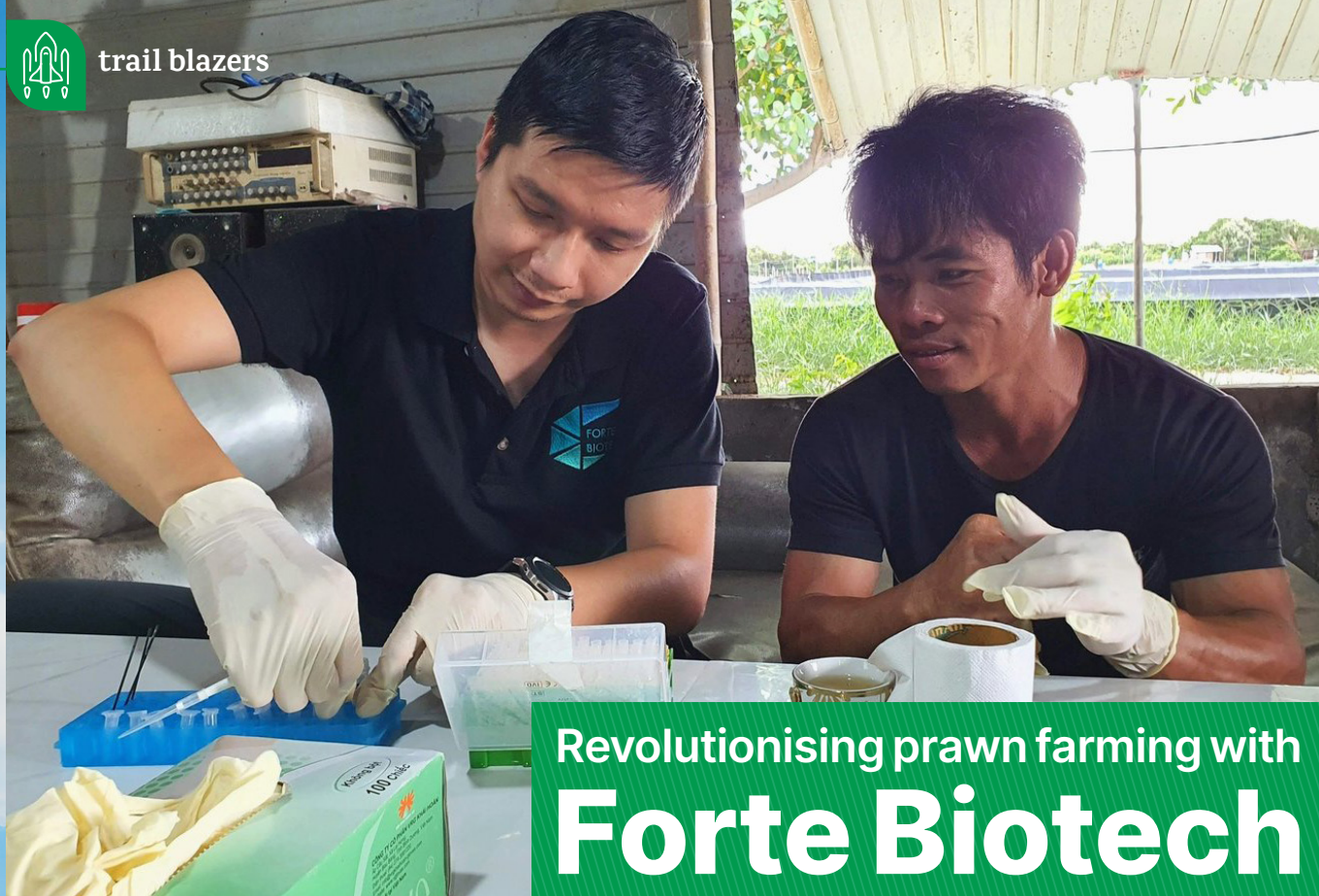
This love for continuous learning and new experiences is evident even in his hypothetical scenarios. When asked if given the chance to swap lives with anyone, he cheekily responded that he would choose to be a Michelin-starred chef. "I've always been curious about what it takes to create exquisite dishes and run a top-tier kitchen, but more importantly, I've always wondered why we have to pay so much for so

little food!" he quipped, reflecting his deep-seated curiosity and lifelong passion for exploring new skills.

Assoc Prof Tee's journey from an efficiency-driven child to a leading figure in innovation and entrepreneurship underscores the importance of practical impact and global connectivity for successful entrepreneurship. His work at NUS Enterprise continues to foster an ecosystem where innovative ideas can thrive and scale. As Assoc Prof Tee aptly sums it up, "It's all about creating an environment where dreams can take flight and ideas can change the world."



trail blazers



Revolutionising prawn farming with **Forte Biotech**

Forte Biotech, founded by Kit Yong and Michael Nguyen in 2021, draws its inspiration from their firsthand experiences in rural communities and a passion for empowering farmers. Their groundbreaking on-site test kit, RAPID (Really Accurate Prawn Infection Detector), is designed to detect diseases in prawns before they become a threat. Forte Biotech's mission is simple: provide farmers with the tools for sustainable farming, enhance resilience, and ultimately uplift livelihoods.

Their journey into entrepreneurship was sparked by a profound event — the widespread outbreak of the White Spot Syndrome Virus (WSSV) in the early 2000s. This crisis resulted in the bankruptcy of a close family friend of Kit's, who was involved in prawn farming. It highlighted the significant risks associated with prawn farming and sparked the idea for the RAPID test kit. Inspired by COVID-19 PCR swab tests, the RAPID test kit aims to revolutionise disease detection in agriculture. Unlike conventional methods, it enables early detection, empowering farmers to proactively manage risks and protect crop health. With an accuracy rate of around 90%, farmers can identify the presence of disease in their prawns within a 10,000m² pond using just a 20-litre water sample.





Commenting on the speed of the test kit, Kit remarked, “If you can cook instant noodles, you can do one of our tests!” In 2022, Forte Biotech conducted field trials with two farming partners, successfully detecting the white spot syndrome virus (WSSV) and the disease-causing parasite, *Enterocytozoon hepatopenaei* (EHP), in the water. With swift and easy detection procedures in place, the farmer who identified WSSV chose to harvest the prawns early for profit, while the farm dealing with EHP implemented more water changes to prevent the onset of diseases.

Kit added, “A friend and partner, Mr Phuoc, used to rely heavily on antibiotics on his farm. Now, he only resorts to antibiotics when our test kits detect a disease. He has managed to reduce antibiotic usage by nearly 80%, resulting in much better, tastier, and healthier prawns.” With each success story, Forte Biotech reaffirms its commitment to empowering farmers and promoting sustainable practices.



Forte Biotech takes its name from Kit's parents' business, “Kit Forte”. Their logo, a clever arrangement of triangles in various sizes forming a prawn, perfectly captures the essence of their product and its mission.

Forte Biotech also participated in the NUS Graduate Research Innovation Programme (GRIP), which connected the founders with

seasoned industry experts. With a track record of innovation and a steadfast commitment to quality, Forte Biotech secured S\$200,000 in grant funding from the Net Zero Challenge 2023, boosting their efforts to revolutionise agriculture and promote sustainability on a larger scale.

Looking ahead, Forte Biotech remains dedicated to empowering farmers and promoting sustainability. They plan to grow their product range and influence, making an impact in Southeast Asia, where a significant portion of the world's prawns are produced.



“ I have learnt a lot over the past few years, and I am grateful for the support we have received from NUS and all the mentors and partners at the NUS Agritech Centre. Interacting with the other start-ups such as Singrow and Polybee has been invaluable for my personal and professional growth, as well as for the development of our company.

– KIT YONG



Find out more about
Forte Biotech at:
fortebio.tech



Providing cell-based solutions to replace the slaughter of animals with Cellivate Technologies

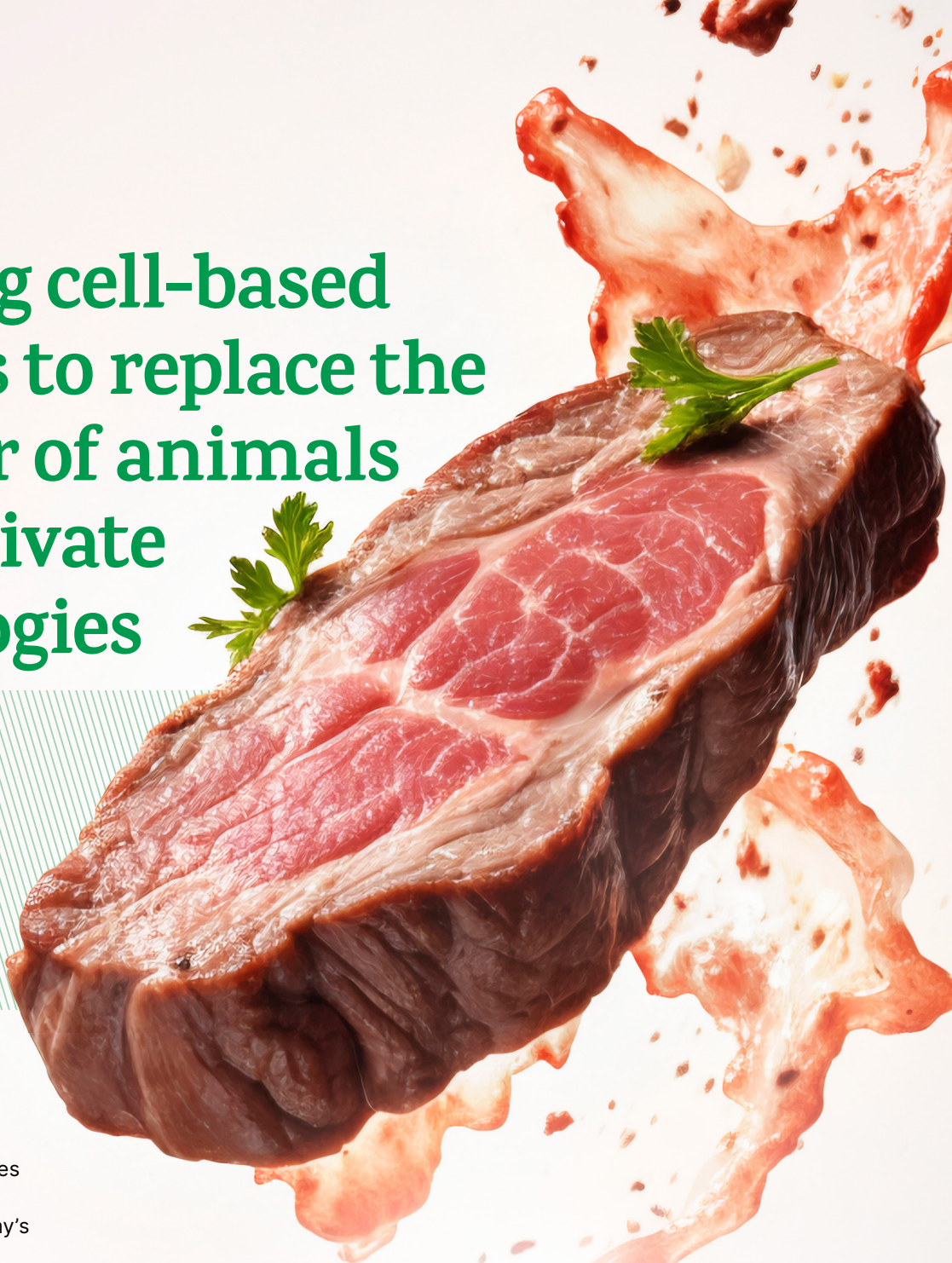


The name Cellivate Technologies is derived from a wordplay on “salivate” to reflect the company’s focus on food alternatives, and “cells” to represent the core focus of their technology. While their logo now integrates elements of electrons and chemical structures within the letter “C” of Cellivate, with “technologies” serving as a clear descriptor, the original concept actually revolved around a cell riding a bicycle. Dr Viknish recalls being inspired by a talk by Steve Jobs, where he likened the Macintosh to a bicycle for humans, enhancing efficiency in movement. Similarly, Dr Viknish envisioned their technology

platform as a “bicycle” for cell applications, aiming to boost efficiency in cell-related processes.

“ Back then, I was exploring different options since our lab had developed technologies that could significantly benefit different biotech industries, especially in the area of cell growth,

said Dr Viknish Krishnan-Kutty, Founder and CEO of Cellivate Technologies. The final push he needed came when he discovered the newly launched NUS Graduate Research Innovation Programme (GRIP) in 2018. Driven by his passion for ethical meat consumption, he founded Cellivate Technologies in 2019 and decided to leave his position as a research scientist at NUS in 2020.





PRODUCING CULTIVATED MEAT USING SLAUGHTER-FREE CELLS ACQUIRED FROM ANIMAL BIOPSY

From a young age, Dr. Viknish has been keenly aware of the ethical considerations surrounding meat rearing, which has influenced his dietary preferences. According to the Food and Agriculture Organisation of the United Nations, animal farming is responsible for more than 14.5% of the world's greenhouse gas emissions. With cultivated meat, however, there is potential for big changes. This technology could disrupt the industry by letting us grow meat from just a few cells taken from animals. That means we could produce meat without having to slaughter as many animals, which would be better for the environment and possibly more affordable too.



EXPANDING INTO THE SKINCARE AND COSMETICS SPACE

Cellivate Technologies' journey into cultivated meat is nothing short of remarkable. They dedicated significant time and effort to perfecting their technology during the early stages. Encouraged by mentors who recognised the potential of their innovation, they ventured into other industries working with cells, given the inherent risks and novelty of the cultivated meat sector. Dr Viknish explained, "Around this time, we started pilot projects with a skincare company, which yielded

promising results. Soon after, they became regular clients, and that was how our skincare division came about. Then, another founder of a leather company wanted to explore cultivated leather. We realised it was feasible and secured a contract with them."

Currently, their primary revenue stream stems from collaborations with skincare partners, which comes as no surprise considering the projected growth of the skincare and cosmetics market, estimated to reach US\$77.4 billion by 2028. Viknish further explained their focus on this sector, "If you look at the whole skincare space, there are a large number of companies that use either synthetic or plant-based ingredients, and then you have a large number of companies using components coming from animals. Within the companies that use components coming from animals, there is a subset using the cells of the animal, so that is the sector we are focusing on."

CREATING ENVIRONMENTALLY FRIENDLY AND SUSTAINABLE CULTIVATED LEATHER

Cellivate Technologies' innovative approach extends beyond skincare into the realm of cultivated leather, showcasing their commitment to sustainable alternatives. Through a collaboration with award-winning handbag designer Adrian Furstenburg, ProjectEx emerged as a fusion of expertise between luxury leather craftsmanship and advanced skin development technology. Adrian Furstenburg's deep knowledge of luxury leather complements Cellivate's expertise in skin development, creating a synergy that addresses the limitations of traditional animal-derived leather. Unlike bovine leather, which is often a byproduct of the meat industry, exotic animal hides are typically

sourced through specific breeding or hunting practices, driving up costs. With limited existing methods for culturing these premium leathers, Cellivate Technologies sees an opportunity to leverage their technology and expertise to overcome these barriers.

"In that way, we are unique because we tailor our solutions to fit the specific needs of each industry,

— DR VIKNISH

This aligns perfectly with his advice for aspiring entrepreneurs, which is to understand the problem you are solving and the impact you are creating. He emphasised the importance of building a strong team and committing to continuous learning as essential ingredients for success.



Find out more about Cellivate Technologies at: cellivatetech.com



bright ideas



Paving the way for the future of healthcare

In a world where change is constant, these medical start-ups are leading the charge towards a healthier and brighter tomorrow. They are breaking boundaries and transforming healthcare for the better.

Sunbird Bio

Pushing boundaries of early diagnosis and treatment for neurological disorders and early-stage cancer, Sunbird Bio is a biotechnology company developing a protein-based platform to improve standards of care for many diseases.

Sunbird Bio is expanding their portfolio of blood-based tests in neurological disorders such as Alzheimer's Disease and Parkinson's Disease. Alzheimer's disease currently impacts 60% to 80% of the 50 million patients globally who are suffering from dementia.

Their APEX diagnostic platforms can detect low levels of disease-specific proteins in the patient's blood, hence allowing for early-detection. Meanwhile, their Glympse platform analyses the activity of specific proteases in the blood to predict the presence and progression of disease. These platforms help to increase the cases of early diagnosis which will allow patients to get better-informed and catered treatments.



PharLyfe+

Say goodbye to the discomfort of bitter and difficult to swallow medications, injections or awkward rectal insertions. PharLyfe+ has created a hassle-free and painless way of efficient drug delivery — an oral film product that enables patients a painless, efficient and discreet form of drug administration through a thin film placed on the inside of their cheeks.



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With their innovative approach, their drug delivery method is now ready to be commercialised with the support of NUS Graduate Research Innovation Programme (NUS GRIP). From easing the burden on caregivers of the elderly to providing relief for parents with young children, their film-like medication is safe, efficient and eco-friendly, redefining the standards of patient-centric and personalised medication. It will also help to reduce the chance of needle-stick injuries in nurses and medical waste produced in routine patient care.

Emerstat

Every year, four million lives are lost to traumatic accidents with severe blood loss being

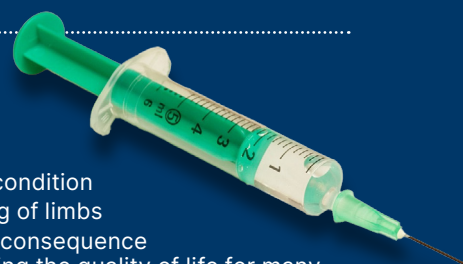
the cause. EmerStat is a game-changer in cases of emergencies and accidents, as it is the very first non-adherent drug-free hemostatic device that helps to clot blood in minutes. The current commercial gauzes absorb too much blood before clotting and adhere to the wound, which could lead to complications when treating the wound and impact the healing process.

With Emersta's cutting-edge superhydrophobic hemostatic solution, their gauze helps to expedite the clotting by 88% and simplifies the removal because of their non fibre structure. They are pushing boundaries and delivering a solution that has the potential to minimise secondary bleeding and prevent risk of infections with the help of the excellent biocompatibility, making all the difference in the deciding factor of life and death.

CycloMeds

Chronic conditions can often be debilitating and isolating. Lymphedema is a condition characterised by the swelling of limbs often emerging as a lifelong consequence of cancer treatments, affecting the quality of life for many. There is no cure and conventional therapies offer limited relief for patients.

This is where CycloMeds comes in, with their innovative solution LIPITRAP. Unlike other existing resources, LIPITRAP does not just mask symptoms but help to tackle the root of the problem by enhancing lymphatic drainage and preceding the progression of the disease. This solution serves as a beacon of innovation and compassion for lymphedema patients worldwide, offering not just a cure treatment but a lifeline.



EMERSTAT
STOP THE BLEED. SAVE A LIFE

NEWSFEED



Patsnap achieved a major milestone by surpassing US\$100 million in Annual Recurring Revenue (ARR), solidifying its status as a global leader in IP and R&D intelligence. The significant growth is attributed to its key AI focus, developing tools

such as the new **Patsnap Eureka** platform which helps teams analyse extensive data to recognise patterns and identify novel solutions. This achievement is highlighted by a substantial increase of 20% year-over-year growth in 2023. Patsnap plans to leverage this success for further development to expand its market reach.



Singapore-headquartered **SWAT Mobility** has raised an additional US\$3.8 million of funding as it aims to expand its AI-powered transportation platform across Asia. This extends its total capital raised this round to US\$7.2 million. Since its founding in 2015, it has also developed a bus boarding and alighting data analysis system, a delivery system for logistics companies, and an on-demand transportation system. It operates in Singapore, Thailand, and the Philippines, as well as its biggest market of Japan, where at least 50 companies and local government units use its models.



Two of our NUS Graduate Research Innovation Programme (GRIP) start-ups, **Green COP** and **tHEMEat**, were shortlisted for their innovative solutions on sustainable biofuels and alternative proteins respectively at The Liveability Challenge on 17 April 2024. Well done! Presented by Temasek Foundation and organised by Eco-Business, TLC is a global crowdsourcing platform that identifies and helps innovative solutions to scale sustainably.

Qoala secured US\$47 million in its latest funding round, co-led by PayPal Ventures and MassMutual Ventures. Founded in 2018, Qoala has quickly gained recognition in the insurance sector by offering diverse products sourced from various insurers and employing an innovative distribution model

through partnerships with marketers and e-commerce platforms. The funding with fuel **Qoala's** expansion of product offering, technological capabilities, and market presence domestically and internationally.



Congratulations to **Enlipsisium**, our NUS Graduate Research Innovation Programme (GRIP) start-up, for being selected as one of the nine finalists in the deep tech category at the Future of Capitalism Competition held on 8 February 2024 at the Shard, London. They have also been chosen as one of the 10 start-ups to participate in round seven of the Luminate Accelerator programme. They will receive an initial investment of \$100,000 and will have the chance to compete for up to \$2 million in follow-on funding upon completion of the accelerator programme in New York.



The **NUS Agritech Centre (NAC)** leads urban farming innovation with advanced tools and controls for agricultural advancement. Leveraging this innovative sandpit, the **NUS Environmental Research Institute (NERI)** and **L'Oréal Singapore** have teamed up to enhance the yield and health of vital crops used in cosmetics and skincare through greener methods. They have established a 50 sqm joint grow zone and a 30 sqm precision climate chamber within the NAC, providing scientists with a controlled environment to optimise the growth conditions of selected plant varieties, particularly those yielding high-value phytochemicals essential for cosmetics and skincare products.

Mr Brian Koh, Director of Ecosystem Development at NUS Enterprise which manages the NAC, said, "Our Agritech Centre with its state-of-the-art controlled-environment facilities and automation systems will allow researchers from L'Oréal Singapore and NUS to identify optimal growing conditions for high-value crops, thereby maximising yield and minimising resource use. We hope this will help pave the way for urban farms to become not just viable, but economically thriving contributors to our city's food security and sustainability."

To recap past NUS Enterprise events and stay apprised of those upcoming, please refer to the following QR code.





From swipes to matches: How Tinder gamified the dating experience

In today's world, it is becoming increasingly common to hear stories of couples meeting through dating apps rather than a chance encounter on the street or introductions through friends. Have you wondered when that shift began? Tinder was released in April 2012 and has since become the most downloaded dating app worldwide. With over 4.4 million downloads as of February 2024, it is safe to say that Tinder has revolutionised the dating industry.

THE EVOLUTION OF ONLINE DATING

Back before smart phones and computers were invented and communication methods were limited, personal ads were placed in newspapers in a dedicated section for individuals looking for love. This evolved into

video dating in the late 1980s and 1990s, when Video Home System (VHS) tapes were available for potential matches to watch in a private booth or home.



MATRIMONY—Widow, 44, Southerner, stranger, own home, West End, would like the heartstone of her heart swept, and the cobwebs brushed away; matrimony. Address W 100, Post-Dispatch.

I AM 27, employed by the government, have small but reasonable salary, will make some poor working girl, from 18 to 25, a good husband and a happy home; must be Protestant; no dancers, flirt or street-walkers need answer. Object matrimony. Write P 71, Allegheny Press Office. 911wp

AM 30, WEALTHY, lost mother, for whom I sacrificed youth, dread a lonely future, seek husband and true companion. Orphan, care Berger, 124 E. 25th St., New York.

PERSONAL—An old bachelor returning from the mines finds his old sweetheart married and old acquaintances scattered, desires lady acquaintance; object, marriage. Address C 6, Tribune.

BRUNETTE lady, 38, desires hear from good natured gentleman owning automobile; object matrimony. Write P 92.





This method paved the way for online dating with one of the first dating sites Match.com, launching in 1995.

Compared to the past, online communication on such platforms is now instant, making the search for companionship much easier and more efficient.

LOVE AT FIRST SWIPE

Founded by Jonathan Badeen, Sean Rad, Joe Munoz, Justin Mateen, Chris Gylczynski, Dinesh Moorjani and Whitney Wolfe, the concept of Tinder stemmed from the theory that individuals would be more comfortable approaching someone once interest between the two was established. The original founders Sean Rad and Jad Munoz had won a hackathon with their innovative idea and were initially named in Matchbox. Marketing to college students attributed to their rise to success, their primary user demographic consists of individuals aged 18 to 24, closely followed by those aged 25 to 34.

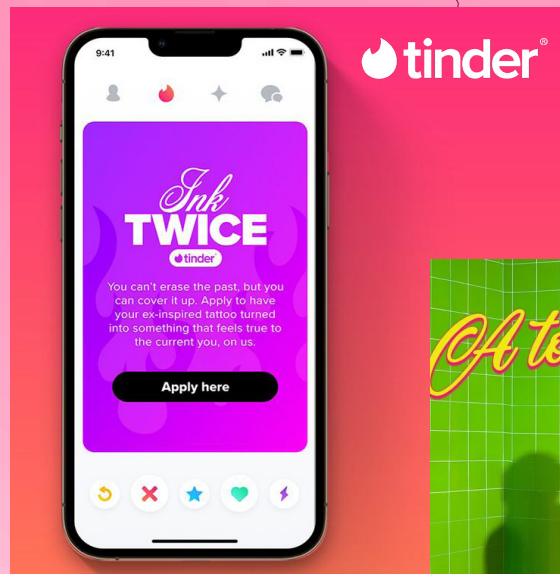
As Tinder's influence grew, it reshaped the modern dating scene, shifting the focus from traditional methods to digital platforms. Tinder's intuitive swiping mechanism and easy-to-use user interface made for a great unique selling point and contributed to their competitive edge against their existing competition. The simplicity of swiping right to express interests or left to pass helped to foster a more engaging and efficient dating experience whilst helping to take pressure off users in finding the right match.

NEVER ENDING IMPROVEMENTS

Tinder's success did not stop with its initial release; they continuously improved its software to enhance user experience and stay ahead of the curve in the competitive online dating market. They started monetisation in 2015 by with new features like Tinder Plus and Tinder Gold, which introduced subscription models offering additional perks such as unlimited swipes, passport to swipe in different locations, and the ability to

see who likes you before swiping.

Their most recent addition, Tinder Matchmaker, allows users to invite up to 15 family members or friends to recommend them to potential matches. Allowing users to leverage their social circles to facilitate more personalised connections, further enhances the matchmaking experience on Tinder. This evolution showcases Tinder's commitment to adapt to their user's changing preferences and needs while maintaining their core mission of facilitating meaningful connections.



BRAND IMPRESSION

Tinder has also successfully crafted a fun and relatable brand image to resonate with their target demographic, Gen Zs and Millennials. This can be seen through their digital marketing efforts. A standout initiative is called "Ink Twice", an initiative that offers free tattoo cover-ups for individuals who regretted getting matching tattoos with their ex-partners. This initiative showcases Tinder's understanding of modern dating dynamics and their commitment to empower their users to embrace change and move forward, forming a more genuine connection between the brand and its consumers.

Furthermore, Tinder's "It Starts with a

Swipe" initiative acts as a compelling storytelling with heartwarming anecdotes from couples who found love on the app. Through highlighting their success stories, they are able to humanise the platform and reinforce their mission statement, successfully diminishing the stereotype that online apps are only for superficial hook-ups and surface level companionships.

NOT JUST BUSINESS, BUT CONNECTION

Tinder also embraces their user demographic's interest such as collaborating with popular celebrities

like Young Gravy, reaching out to influencers with similar target demographic as talents and embracing astrology and horoscope compatibility on their app and their social media communication efforts.



By allowing users to identify with the brand as a whole and adding another layer of engagement to its brand, they are able to stand out amongst the crowd.

Overall, their combination of experiential marketing, storytelling and cultural relevance has successfully allowed Tinder to stay on top of newer competition over the past 12 years and positioned themselves as a lifestyle brand that celebrates love, individuality and connection. Tinder sets a powerful example for businesses and start-ups looking to build meaningful relationships with their audience and thrive in a competitive market.

Ready to join our NUS Enterprise entrepreneurship ecosystem?

NUS Enterprise, the entrepreneurial arm of the National University of Singapore (NUS), plays a pivotal role in advancing innovation and entrepreneurship at NUS and beyond.

We actively promote entrepreneurship and cultivate global mind-sets and talents through the synergies of experiential learning, active industry partnerships, holistic entrepreneurship support and catalytic entrepreneurship outreach. Our initiatives and global connections support a range of entrepreneurial journeys and foster ecosystem building in new markets. We provide expertise and connections to create successful spin-offs and translate innovations into the marketplace through industry collaboration. These initiatives augment and complement the University's academic programmes and act as a unique bridge to industries well beyond Singapore's shores.

Learn more about how we can support you in your entrepreneurial journey.



Find out more



Join our events

If you are an entrepreneur affiliated with NUS Enterprise, find out how you can:



Give back to the community



Have a question or a suggestion? Reach out to us at enterprise@nus.edu.sg.

