ENTERPRISE
SPARKS

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Kindling Innovation

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FEATURES

Editor's note

This installment of Enterprise SPARKS, themed "Kindling Innovation", resonates with NUS Enterprise's pursuit in forging connections, forming collaborations and igniting ideas and innovations that have impact to industries, businesses and society.

Aligned with this ambition, NUS Enterprise and unbound jointly organised Innovfest unbound, Asia's largest innovation festival, for the fourth time. The event presented a marketplace for start-ups, corporates, academics, investors and government agencies to meet, learn and gain insights into the latest developments and trends. This success was replicated at Innovfest Suzhou two weeks later.

The many connections and exchanges we have with corporates and other overseas higher education institutions are critical to our ecosystem growth. With Nikkei, we organised a digitalisation forum focusing on the healthcare sector. Similarly, a symposium to promote a deeper understanding of end of life issues was held with Yale-NUS College and Singapore Hospice Council. An immersive start-up exchange was also organised with Tsinghua University in China.

To continually inject an entrepreneurial mindset, we had the opportunity to be up close and personal with Mr Philip Yeo, one of Singapore's pioneering economic architects. Stories of our start-ups deploying artificial intelligence in business and the challenges they face are also covered in this edition.

NUS Enterprise presses on to do its best for a thriving entrepreneurial community.

Enjoy the read!

On cover: Dental Anaesthesia Simulation AR technology, developed by the Keio - NUS CUTE Center

NUS Senior Deputy President & Provost, Prof Ho Teck Hua, highlighting the immense power of AI

2018's Innovfest unbound played host to a whopping 13,000 delegates from across 80 nations at Marina Bay Sands Convention Centre from 5-6 June

Students engrossed in an exciting game tournament of "From Molecules to Medicine", organised by Bayer Pharmaceuticals

INNOVFEST UNBOUND 2018 RETURNS WITH A BIG BANG

(2nd from right) Guest-of-Honour, Mr S Iswaran, Minister for Communications and Information, giving a hearty round of applause for the presenters on stage

The launch of PIER71, a joint initiative by NUS Enterprise and MPA Singapore to grow Singapore's maritime Innovation ecosystem

Highlights:

13,000+
registered delegates

Delegates from
80
countries

380
start-ups and
technology exhibits

23
Kopi chats

7
bars at
Urban Experience

Innovfest unbound – Southeast Asia's largest and most exciting innovation festival – returned for the fourth year on 5-6 June 2018 at Marina Bay Sands Expo and Convention Centre. Organised by NUS Enterprise and unbound, in partnership with the Info-communications Media Development Authority of Singapore, the event saw over 13,000 delegates from 80 countries worldwide.

This year's Innovfest unbound broke records on the number of attendees, speakers and exhibitors. The atmosphere was buzzing with energy as representatives from academia, corporates, government, start-ups, investors and media came together to discuss the latest trends, with various stages and workshops happening concurrently over the two-day event. Here are some of the highlights:

On the main stage, NUS Senior Deputy President & Provost Prof Ho Teck Hua shared how AI can dramatically impact the way we live and work, such as in drug discovery, talent search as well as in robotics.

Senior Director of the NUS Entrepreneurship Centre, Prof Wong Poh Kam, unveiled his research insights on the changing dynamics of the start-up ecosystem at LaunchPad@ One-North, while Dr Lily Chan, CEO of NUS Enterprise, moderated a panel session on "The Start-Up Conglomerate".

NUS curated a series of 16 sessions at the Futurenow stage, with a focus on technologies being researched or applied in universities, corporations and the start-up space. As AI and deep-tech hardware trends gain momentum, speakers at

Futurenow explored the current and upcoming by-products of these phenomena. Developments like personalised healthcare, autonomous vehicles and fintech were thoroughly discussed.

In the spirit of encouraging innovation and supporting budding entrepreneurs, the event also bore witness to the start of corporate partnerships between NUS and large players in the engineering and maritime industries. The MOU signing between the NUS Industry Liaison Office (ILO) and ST

Futurenow Stage: Experts sharing about how smart wear for seniors can enhance the experience of ageing

Engineering's Innosparks serves to co-create a tech incubation and acceleration programme for NUS graduates and spin-off companies, to experience the innovation approach and engineering ecosystem at Innosparks. ILO also signed an MOU with Gardens by the Bay to test-bed NUS autonomous scooters on the Garden's premises, in an effort to enhance the visitor experience of those who are elderly or disabled.

PIER71 – Port Innovation Ecosystem Reimagined @ Block71 – was launched on the second day of Innovfest unbound by Dr Lam Pin Min, Senior Minister of State, Ministry of Transport and Ministry of Health. Partnerships were also inked with Innospace, Rainmaking Innovation, Wärtsilä and Wilhelmsen to provide start-ups with more opportunities and access to resources.

Ten teams pitched their innovative solutions for the shipping and maritime industry at the finale of the Ocean of Opportunities Challenge, a collaboration between Symphony Creative Solutions, Ocean Network Express and NUS Enterprise. The winners of the challenge – Workato, Numenorae and Brightree – walked away with cash prizes of SGD5,000, SGD2,000, and SGD1,000 respectively.

Over at the Start-up Bazaar, 380 exciting start-ups, technologies and exhibitors – including some 170 from NUS and its partners – showcased cutting-edge innovations. These include Probicient – which is developing the world's first probiotic beer, and Team Bumblebee – a project to develop Autonomous Surface Vessels (ASVs) and Autonomous Underwater Vehicles (AUVs) that can navigate the oceans independently, both on the surface and underwater. Start-ups from our BLOCK71 community were also out in full force, with many having travelled from BLOCK71's global locations in Jakarta, San Francisco and Suzhou.

A huge advocate for promising start-ups and progressive disruption, Prince Andrew, The Duke of York graced the event and hosted the first ASEAN edition of Pitch@ Palace, a series of pitch competitions founded by The Duke himself to support early-stage entrepreneurs. NUS Enterprise supported start-up Alchemy Foodtech managed to clinch the runner-up position, out of 19 start-ups from across ASEAN.

Held at Ann Siang Hill, the Urban Experience pub crawl networking after-party was an unforgettable experience, with streets along the area closed to traffic and a lion dance performance to give international delegates a taste of local culture and heritage. Delegates unwound and mingled at the at seven F&B outlets hosted by various partners including Cisco, Singtel and Huawei.

To explore a collaboration for Innovfest unbound 2019, get in touch with us at innovfestunbound@nus.edu.sg

The start-up bazaar, featuring over 380 start-ups, attracted a huge crowd with eye-catching prototypes and innovative products
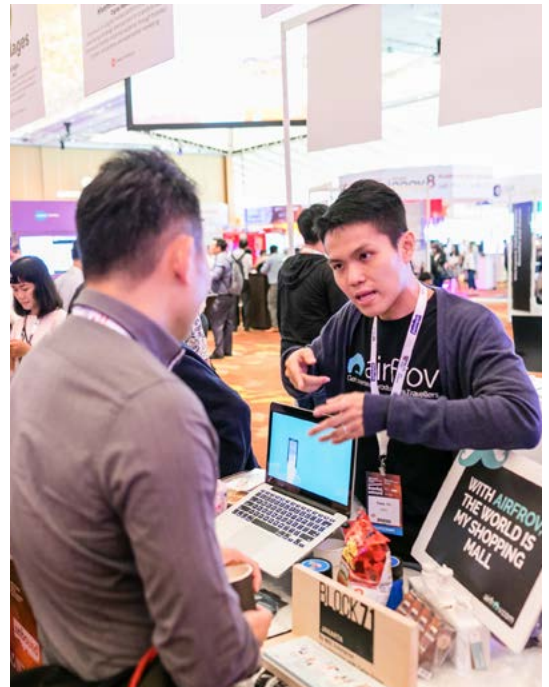
Airfrov, a Singapore start-up based at BLOCK71 Jakarta, demonstrating their peer-to-peer marketplace for overseas products

NUS start-up Bumblebee Autonomous Systems with their prototype designed to navigate across the oceans independently

Participants of the Ocean of Opportunities Pitch Challenge – an initiative jointly organised by NUS Enterprise, Symphony Creative Solutions and Ocean Network Express

Student ambassadors conducted 23 mini Kopi Chats with global market leaders, including (3rd from left) Axton Salim, Executive Director at Salim Group

(L) Ms Peggy Chong, Deputy Chief Executive Officer of Gardens By The Bay, with NUS ILO's Director, Mr Sean Patrick Flanigan, signed an MOU for a collaboration involving the test-bedding of NUS Autonomous Scooters at the Garden's premises

NIKKEI X NUS ENTERPRISE
DIGITALIZATION FORUM

The NIKKEI X NUS Enterprise Digitalization Forum took place on 8 May 2018, with some 230 attendees from industries such as digital investment and R&D. Themed 'AI X Robotics Solutions for Service Innovation', the forum aimed to encourage innovation and collaboration between Japanese and Singaporean entrepreneurs. Experts from both countries shared their experiences and knowledge on trends in the field.

Mr Yosuke Okada, CEO of ABEJA – the first venture company in Japan which develops AI business solutions using deep learning – delivered the keynote address on how deep learning, big data and IoT can be combined to enable businesses in various industries to carry out sophisticated analyses.

Other notable speakers at the forum included Professor Ooi Beng Chin, NUS Distinguished Professor of

They demonstrated their flexible sensor insole prototype as a solution to tackle diabetic foot ulcers. Through measuring the amount of pressure diabetic patients are putting on their feet, users can document their activity through an app, and know when they should take a break to rest the affected areas.

Guest of Honour Dr Amy Khor, Senior Minister of State for Ministry of the Environment and Water Resources and Ministry of Health, addressed the crowd. "These innovations reflect our efforts to explore how best to leverage technological advancements to address real-world problems. We can leverage one another's capabilities and harness the opportunities that AI has to offer, to co-create meaningful solutions to advance medical technology and improve our productivity in healthcare, to meet the future healthcare needs of our population."

↑ Guest-of-honour, Dr Amy Khor, Senior Minister of State for Ministry of Environment and Water Resources viewing a flexible sensor insole, an invention by NUS start-up, Flexosense

Professor Wong Poh Kam, Senior Director of the NUS Entrepreneurship Centre, gave the welcome address, noting that the start-up ecosystem under NUS Enterprise has "already started to see the emergence of start-ups using AI to solve problems" in sectors like e-commerce, healthcare and hospitality.

Computer Science; Mr. Akira Fujibayashi, General Manager of the Research & Development Centre at Hitachi Asia; and Mr Laurence Liew, Director of AI Industry Innovation at AI Singapore.

Flexosense, a Modern Aging start-up developed on technology invented by NUS Biomedical Engineering, was one of the start-ups that exhibited.

CHINA · SINGAPORE
国际科技交流与创新大会
TFI-NUS PLUM 暨淡马锡国际基金会-新国大大学领袖论坛

innovfest
SUZHOU · 2018

Group photo of invited guests, including NUS President Prof. Tan Eng Chye (8th from left), NUS Enterprise CEO Dr Lily Chan (4th from right), Guest-of-Honour Dr. Chen Deming (10th from left), Former Minister of Commerce of China with delegates from Jiangsu provincial government agencies

INNOVFEST SUZHOU
A RESOUNDING SUCCESS

Promoting Innovation and Market Opportunities between China's "Belt and Road Initiative" & ASEAN Nations

InnovFest Suzhou 2018 was held at the NUS Suzhou Research Institute (NUSRI) from 20 to 21 June 2018, connecting over 1,000 entrepreneurs, corporates, investors, technology start-ups, professionals, academics, and government agencies from around the world to share and exchange insights on China's latest innovations and entrepreneurship developments. Co-organised by NUSRI, BLOCK71 Suzhou and NUS Enterprise, the annual event aims to build a key cross-border platform to link Chinese companies with innovations overseas, especially innovations from Singapore and beyond.

Coinciding with Singapore's ASEAN presidency this year, and in partnership with the Jiangsu provincial government agencies, InnovFest Suzhou 2018 held a series of talks and showcased technologies, innovative products and services that are geared towards market opportunities at China's "Belt and Road

Initiative". This year's event acts as a platform to create greater synergy between the China and ASEAN innovation and entrepreneurship ecosystems and to promote innovation and market opportunities between the two regions.

Focusing on four key themes: Artificial Intelligence, Biomedical and Health, Smart Green Cities, and Technology Commercialisation, the event featured innovation keynotes, forums, project roadshows, product showcases, investment pitching, talent dialogues, and industry visits. More than 100 cutting-edge technology projects from over 10 countries and regions including Singapore, Indonesia, Thailand, Malaysia, North America and Europe, also exhibited at the festival.

At the opening address, NUS President Prof. Tan Eng Chye said; "We hope that InnovFest Suzhou can play a pivotal role in linking the real economy and innovative technologies, the government and

enterprises; building bridges between China and overseas to further raise and deepen the bilateral cooperation between China and Singapore."

The "Belt and Road" China-ASEAN International University Innovation and Entrepreneurship Forum was also held at InnovFest Suzhou. Professionals and academics from the world's top ranking universities, such as Tsinghua University, Peking University, Fudan University, Shanghai Jiao Tong University, National University of Singapore, Nanyang Technological University, the Hong Kong Polytechnic University, Singapore University of Technology and Design, Oxford University, University of Science Malaysia, Chulalongkorn University, De La Salle University, Xiamen University, and Shenzhen University, gathered together to promote innovation exchange between China and countries along the "Belt and Road", as well to create more opportunities for cross-border cooperation in innovation and market access.

一路" 中国-东盟国际高校科技创新论坛
高峰对话

Panel Discussion: Academic Ses
on Innovation and Tech Tran

or 主持人: Panelists 论坛嘉宾:

n WONG
nstitute for
urship at The Hong
chnic University

学企业发展院院长

Mr. Sean P. FLANIGAN
Director of NUS Industry Liaison
Office; Past President of ATTP

新加坡国立大学知识产权管理及
工商联络处处长、前世界技术转
移经理联盟主席

Dr. Diana SARI
Director of Center of Business
Incubator, Universitas
Padjadjaran

印 查查兰大学创业孵化中

Dr. Ma. Louise Antonette
N. De Las Peñas
Associate Dean for Research and
Creative Work, Ateneo de Manila
University

宾 拉雅典耀大学研究与创

Dr. ZHANG Zh
Director of AITRI S
Research Departm
Shanghai Jiao Tong
CEO of Shanghai n
Venture Capital

上海交通大学先进
究院战略研究部主
号湾创业投资有

Panel discussion on Belt and Road University Innovation and Tech Transfer, with
(From left to right) Dr. Alwin Wong, The Hong Kong Polytechnic University; Mr. Sean
P. Flanigan, National University of Singapore; Dr. Diana Sari, Universitas Padjadjaran;
Dr. Ma. Louise Antonette N. De Las Peñas, Ateneo de Manila University and Dr.
Zhang Zhigang, Shanghai Jiao Tong University

One of the 100+ cutting-edge technology projects on show at InnovFest Suzhou

More than 1000 guests attended the event

NUS President Prof Tan Eng Chye
delivered the Opening Address

INNOVATING
FOR THE END
OF LIFE

How can we challenge cultural taboos surrounding end of life issues in Singapore? This was the aim of the Purposeful Aging | Meaningful Endings Symposium on 11 April 2018, organised by Yale-NUS College, Singapore Hospice Council and Modern Aging Singapore (a joint programme of NUS Enterprise and ACCESS Health International). As part of the symposium, a Modern Aging Mini Seminar on "Business and Innovation for the End of Life" brought together four speakers to discuss how businesses can support individuals to prepare well for the end of life, and the opportunities in this industry.

OCBC's Chief Marketing Officer of the Group Consumer Financial Services Goh Theng Kiat shared three key findings from OCBC's market research about modern consumers aged 55 and above, regarding their financial planning towards end of life preparation. Firstly, while seniors may be financially ready, they require greater support in building emotional readiness. Secondly, they are less financially conservative than often perceived to be; older consumers do have a risk appetite and are receptive to a slightly riskier approach in investments and insurance. Lastly, they are surprisingly digitally savvy, and welcome initiatives such as iBanking and mobile apps.

Kat Neo, co-founder of local start-up Timeliss, mentioned that the fragmented end of life planning landscape can be overwhelming for individuals involved, with a myriad of companies providing services

such as legacy sharing, digital vaults, elder care and will writing. Hence, Timeliss is creating a cohesive network of end of life planning services, to enable individuals to be better equipped to take action.

As one of the rare few women in Singapore's funeral profession, Ang Jolie Mei, Managing Director of The Life Celebrant, shared the challenges she faced and her drive to modernise the funeral industry. With her philosophy that "a funeral is not a day in a lifetime; it is a lifetime in a day", she departed from traditional industry practices by encouraging open conversations about death, and providing customised and meaningful funeral services.

Drawing from her personal experiences, Melissa Chan – founder and CEO of Project We Forgot – highlighted the struggles faced by young dementia caregivers, and her inspiration to build a community network of support and services for this group. She shared the importance of taking time to understand the customer problem, and how to use online channels such as social media to reach out to young caregivers.

The panellists unanimously agreed that more can be done to spur productive discourse on death. While the government can spearhead a larger national dialogue, businesses can also work to empower older adults, their family and caregivers, to improve end of life experiences for all.

(L to R) Ms Melissa Chan, Founder & CEO of Project We Forgot; Ms Ang Jolie Mei, MD of The Life Celebrant; Ms Kat Neo, Co-founder of Timeliss and Mr Goh Theng Kiat, CMO of Group Consumer Financial Services at OCBC Bank discussed how businesses are innovating to improve end of life experiences.

INJECTING THE MAD COW SPIRIT

Up close with Mr Philip Yeo, one of Singapore's economic architects

To celebrate five fulfilling years of the Philip Yeo Initiative (PYI), a programme managed by NUS Enterprise, we invited Mr Philip Yeo for a Kopi Chat titled "Neither Civil Nor Servant". On 13 April 2018, over 500 attendees filled the University Town Auditorium to hear from the man himself, who candidly shared his valuable insights and unconventional experiences with young budding entrepreneurs.

One of Singapore's most colourful, competent and controversial bureaucrats, Mr Yeo, is a living, breathing legend. Having single-handedly paved the way for the economic sector in Singapore since the 1980s, he has been behind various government organisations and statutory boards such as SPRING Singapore, EDB, A*STAR and NCB. Undertaking an aberrant approach to problems, combined with his frivolous attitude towards what others perceive of him, Mr Yeo is a true embodiment of an innovative problem-solver, an errant hustler and a true visionary.

The Philip Yeo Initiative is a ground up movement, managed by NUS Enterprise, that was set up to honour Mr Yeo's contributions and to create a platform for him to continue to develop young people and talent. Embodying the MAD COW Spirit — "Make a Difference, Change our World", the programme aims to nurture a next generation of mission-driven leaders to create change in our economy.

Dr Lily Chan, CEO of NUS Enterprise, moderated the panel discussion. The audience was fully engaged as Mr Yeo touched on a wide spectrum of issues ranging from the feasibility of China's 'One Belt One Road' Initiative, to giving young entrepreneurs advice on how local start-ups can stay relevant in today's economy. In addition, he shared useful tips such as who best to hire, what one should look out for in a mentor as well as how one should face adversities head-strong as they come their way.

To learn more about the Philip Yeo Initiative, do visit
Website: www.philipyeoinitiative.sg
Facebook: @Philip Yeo Initiative

Mr Yeo with Shahri Samsi, founder of Shogun Fight Gym who has expanded into providing adaptive sports for the special needs sector

NUS INNOVATION & ENTREPRENEURSHIP EXCHANGE WITH TSINGHUA X-LAB

An immersive experience in the vibrant start-up hubs of Beijing and Singapore

From 3–9 June, we welcomed a start-up delegation from Tsinghua University for the NUS Innovation & Entrepreneurship Exchange with Tsinghua x-lab. With a group of NUS-supported start-ups having visited Beijing from 25–31 March 2018, a reciprocal seven teams from Tsinghua University visited Singapore for the second leg of the week-long exchange. Seven new NUS start-ups were selected to participate in the Singapore leg of the exchange.

Through company visits, networking and pitching sessions, participants learnt and exchanged knowledge of starting and growing new business ventures to commercialise innovations, and explored market access opportunities, connections and collaborations. They also gained a deeper understanding of the start-up ecosystems of the respective cities—Beijing and Singapore, and valuable network connections to grow their ventures.

Participating teams came from varied technology and social development fields such as data analytics, cybersecurity,

NUS Enterprise start-ups at TusPark, an abbreviation of Tsinghua University Science Park, which has over 400 enterprises and institutions

PitchSpot co-founders Goh See Ting and Ryan Chong making a presentation at Plug and Play Beijing

fintech, digital media, healthcare, smart hardware, intelligent manufacturing, and social innovation.

The NUS-Tsinghua Innovation & Entrepreneurship Exchange is jointly organised and hosted by NUS Enterprise and Tsinghua x-lab, supported by the Ng Teng Fong Charitable Foundation (Hong Kong).

Tsinghua x-lab start-ups on a company visit to ShopBack

INAUGURAL CYBERSECURITY TRACK FOR LEAN LAUNCHPAD SINGAPORE

To enhance the pipeline of commercialisable cybersecurity solutions, Lean LaunchPad Singapore launched a track targeted at early stage cybersecurity technologies. Open to teams from Institutes of Higher Learning, research institutes, and young cyber-security start-ups, the Cybersecurity track serves to strengthen the local innovatioin ecosystem, and support efforts to boost Singapore's cyber defences against rising global cyber threats.

Five teams were shortlisted to participate in the programme, which ran from 25 April to 25 June 2018. Learn more about their products and solutions on the right!

For more information on upcoming runs of Lean LaunchPad Singapore, visit: leanlaunchpad.nus.edu.sg

We see the new cybersecurity track in the Lean LaunchPad Singapore Programme as a move to strengthen the University's ability to further nurture home-grown competencies and start-ups in the cybersecurity space."

Dr Lily Chan, CEO of NUS Enterprise
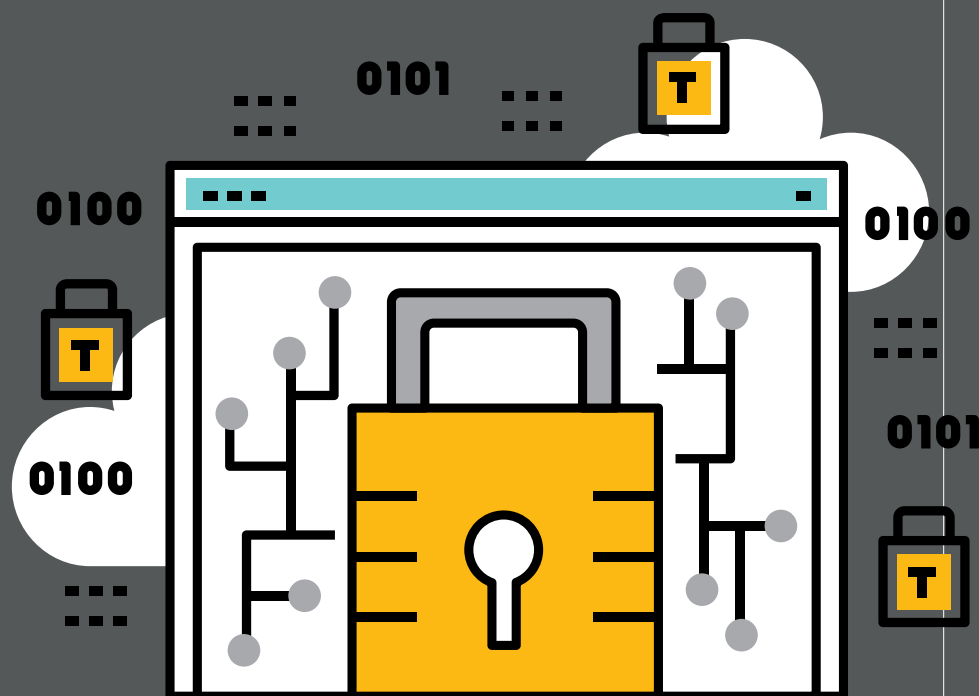
Cloak

Cloak is a start-up that enables training of AI Models without data leakage. By providing a secure data sharing environment within, for example, a hospital's server, external data scientists can train AI models without direct access to sensitive raw data of patients.

CyberSAGE

CyberSAGE is an integrative security assessment tool for critical infrastructure systems, such as power grids and metros. It is developed by the Advanced Digital Sciences Center, a collaboration between A*STAR Singapore and the University of Illinois at Urbana-Champaign.

IoT365

IoT365 has a solution for securing and improving the reliability of IoT systems, a result of years of fuzz testing research at the NUS School of Computing. Through automating test input generation, IoT365 can uncover vulnerabilities in widely-used IoT devices such as smart locks.

Scantist

Scantist is a start-up that provides simplified vulnerability management for application source codes and binaries. This helps organisations uncover potential vulnerabilities during their software development life-cycle, reducing cyber-risk and improving time-to-market.

STRAIT

Security and privacy of sensory data that is captured on cameras like CCTV, body-worn cameras and webcams is a major concern. Developed by the NTU School of Computer Science and Engineering, STRAIT is a lightweight hardware security module to protect and authenticate high-res camera feeds.

THE PHOENIX THAT BECAME A ROCKET

The conception of BLOCK71 is a quintessential start-up narrative; the story of a good idea, perseverance, opportunities seized and a touch of luck. Less than a decade ago, BLK71 was an ageing building in the Ayer Rajah industrial estate slated for demolition. What some saw as run-down and deserted, visionary minds recognised as ideal for an experiment in co-location dynamics. NUS Enterprise, Singtel Innov8 and the Media Development Authority collaborated to save the building from the bulldozers and in 2011, established a hub to physically cluster together Singapore's tech start-up community.

By now, the success of the experiment is well-documented. From a single block, the entrepreneurship enclave in Ayer Rajah has expanded to seven blocks, collectively known as LaunchPad@one-north. In a keynote delivered at Innovfest unbound 2018, Prof Wong Poh Kam, Senior Director of NUS Entrepreneurship Centre, revealed that around one-fifth to a quarter of active tech start-ups in Singapore are or have been located in the LaunchPad.

What exactly is the LaunchPad? It has been variously represented as a complex, a hub and a cluster. The LaunchPad is all of this and more. It is an ecosystem; a community of interdependent actors that interact with the business environment and with each other for entrepreneurship to take place. These actors – the entrepreneurs, investors, incubators, among others – are central to maintaining the health of the ecosystem.

How healthy is the LaunchPad ecosystem? Prof Wong explained that the LaunchPad boasts of three characteristics that attest to its dynamism.

01 Diversity

The LaunchPad is by design home to a multiplicity of players. Other than start-ups, there are 60 ecosystem enablers, comprising investors, incubators and accelerators, as well as facilitating organisations such as ACE and other supporting service providers. This mix creates the dynamics for self-sustainability. The start-ups in the LaunchPad are also diverse in age, industry and technology focus, creating fertile ground for innovators to cross-pollinate ideas. Diversity makes the LaunchPad attractive to a wide range of potential stakeholders, including customers and investors. A number of large companies have chosen to locate their corporate accelerator programmes and corporate venture arms in the LaunchPad. Examples include Startup Autobahn, ICE71 and PIER71.

02 Density of Connectivity

A healthy ecosystem generates connections and networks that are essential to start-up growth. In 2016, almost half of entrepreneurial connections in Singapore were generated by the LaunchPad, although only 23% of

entrepreneurs were located there. LaunchPad entrepreneurs held a distinct edge in investment linkages over their non-LaunchPad counterparts.

Over 90% of start-ups in the LaunchPad are formally connected to other ecosystem players such as mentors, incubators and investors. Comparably, ecosystem engagement among start-ups outside the LaunchPad is only at 51%. LaunchPad start-ups are also more internationalised in their networks, deriving more than a third of revenues from overseas markets and with 62% having established overseas operations.

03 Evolution and Growth

It almost goes without saying that the number of incorporated start-ups in the LaunchPad has multiplied over the years. According to data collated by TechSG, the LaunchPad housed 216 start-ups in November 2015. By April 2018, this figure has more than doubled to 439 start-ups. The more interesting story behind the figures is the degree of churn. The expansion of the LaunchPad is not simply about more start-ups entering the ecosystem. It is the result of high exit rates and even higher entry rates. Start-ups scale-up and move away, and a small proportion cease operations entirely. Their spaces are taken up by new start-ups. This virtuous cycle of churn and renewal

ensures that the LaunchPad keeps ahead of the curve. The industry profile of the LaunchPad reflects this, with newer entrants more likely to be in cutting edge fields and deep-tech sectors.
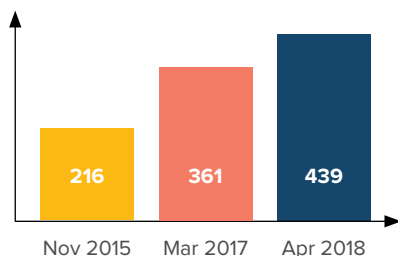
The profile of LaunchPad entrepreneurs is evolving as the LaunchPad grows in numbers. Among newer start-ups, entrepreneurs are becoming younger and increasingly more likely to be Singaporean. Encouragingly, the share of female founders is rising, but remains low at under 10%.

Growth in the LaunchPad is demonstrated in other ways, including the traditional measures of employment and revenue. LaunchPad start-ups are found to employ more people and to record faster sales growth. There are also proportionally more high-growth "gazelles" among LaunchPad start-ups.

The figures cited in this article are drawn from multiple research projects conducted by NUS Enterprise. Please visit LaunchPad.techsg.io for full citations and to download a copy of the summary research findings.

JTC LaunchPad@one-north

LAUNCHPAD ECOSYSTEM IN NUMBERS

Numbers of start-ups

Nov 2015	Mar 2017	Apr 2018
216	361	439

Annual churn (2017/18)

Entry Rate **41%** → LaunchPad Start-ups in 2017/18 → Exit Rate **33%**

	LAUNCHPAD	NOT IN LAUNCHPAD
Average number of entrepreneurial connections	6 per entrepreneur	3 per entrepreneur
% of Start-ups with Overseas Operations	61.6%	48.6%
% of start-ups engaged in ecosystem	90%	51%
% of Start-ups with funding from VCS or Business Angels	65%	26%
Average number of employees (in 2016)	17 per start-up	11 per start-up
Share of revenues from overseas	35%	25%
Annual sales growth (average 2014-2016)	70% per annum	40% per annum
% of Start-ups that are Gazelles	19%	12%

VERSAFLEET SET TO EXPAND ACROSS ASIA AND BOOST AI CAPABILITIES
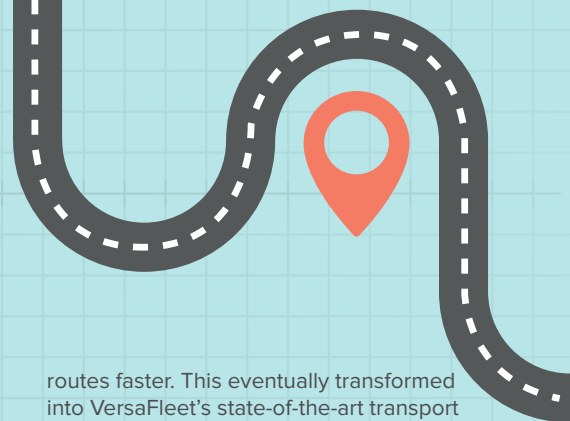
In May 2018, VersaFleet successfully raised SGD2.8 million, led by Prestellar Ventures. This investment will be used to expand operations across Asia, as well as to boost AI capabilities for the company's transport management SaaS offering. Currently, VersaFleet automates logistic operations and allocates drivers' route plans more efficiently, for some 100 companies, including Fortune 500 brands. Further R&D of VersaFleet's AI capabilities will result in improved product features and enable the company to scale faster.

"Over the past three years, VersaFleet has been seeing strong growth, with our annual revenue increasing 350% year-on-year. With this new injection of funds and the additional expertise from our investors,

we aim to double the size of our team and serve beyond 5,000 drivers worldwide. We are also looking to expand regional operations within Malaysia and Indonesia," said Shamir Rahim, Founder & CEO of VersaFleet. "While our automation software helps business owners win new contracts and increase profits, I am most proud of the difference it makes to drivers. They personally thank us for enabling them to do their jobs more efficiently, which allows them to get home in time for dinner!"

Shamir's entrepreneurial interest was sparked during the NUS Overseas Colleges (Bio Valley) programme. Upon his graduation, he worked in a couple of start-up companies, before founding VersaFleet in 2012. The idea for the company came about when Shamir was helping his family's logistics business. He wrote a simple program to plan drivers'

routes faster. This eventually transformed into VersaFleet's state-of-the-art transport management system that can schedule, assign and dispatch jobs in seconds, handle e-signatures to confirm deliveries, provide instant notifications and track delivery statuses in real-time. Incubated by NUS Enterprise, VersaFleet began operations on NUS campus, before moving to the LaunchPad@one-north area, and now to its own office in Henderson Industrial Park.

"VersaFleet's ability to incorporate artificial intelligence with human planning is critical in transforming the logistics industry roadmap. We see this as the future of logistics and are delighted to work together with Shamir and his team as they expand VersaFleet across Asia, helping more logistic operators to become more productive and efficient," said Rabindra Shrestha, Managing Partner, Prestellar Ventures.

Shamir Rahim (to the immediate right of the banner) and his team at VersaFleet

IMPRESS.AI TIES UP WITH DBS TO LAUNCH SOUTHEAST ASIA'S FIRST VIRTUAL BANK RECRUITER

Impress.ai, a start-up incubating at NUS Enterprise@ Singapore Science Park, is taking a leap in helping the banking sector in the area of wealth management.

They have joined forces with DBS to launch Southeast Asia's first virtual bank recruiter, Jim, to help DBS recruiters hire wealth planning managers more efficiently. In pilot since April this year, Jim has assisted recruiters to review resumes, collect applicants' responses for the pre-screening questions and conduct psychometric profiling assessments on candidates. By automating the pre-screening process, Jim will help save some 40 man-hours a month. This process allows these recruiters to focus on other time-sensitive and important tasks, leaving the repetitive candidate qualifications tasks to Jim. With Jim, candidates can also benefit from a faster, more streamlined process, with real-time interaction available 24/7.

We speak to Impress.ai to find out more about this exciting collaboration!

So, what is Impress.ai?

Founded in 2016, Impress.ai is an intelligent productivity enhancement tool for recruiters to screen, interview and shortlist talent in real-time. The company's conversational Artificial Intelligent (AI) bot leverages on AI technologies, machine learning and natural language processing. The AI bot is able to qualify candidates based on competencies required, as well as answer candidates' commonly-asked questions about the job. The AI bot can also assist in reviewing and shortlisting top candidates. Impress.ai saves recruiters time, with customers reporting increased efficiency in the screening process by some 70%.

Impress.ai was created with a key purpose: to remove bias from the hiring process. Hiring decisions made on Impress.ai are based only on competencies required for the job. Information such as name, gender, etc. are hidden.

How was the idea for the collaboration birthed? Was there a major problem that needed a solution?

While working on our previous product — Ideatory.co — we worked with several large companies and noticed similar problems across their talent acquisition. Most candidates wouldn't hear back soon enough to have a good experience with the employer brand. DBS was unique in the way that it was ready to act to fix this. When we shared our plans and an early prototype for Impress.ai, they knew that they found the solution to their problem. They were ready to roll-up their sleeves and work with us to further develop the product to solve it.

What were some of the challenges that had to be worked through, from the ideation process to its fruition? How did you go about these challenges?

The biggest challenge was to overcome the resistance of using a young local start-up's product as a pivotal way for key hiring. DBS is a respected, large regional brand. It was very hard work for our small team to deliver their high-expectations, integrating with enterprise systems and then passing strict cybersecurity tests on the product. However, this was the only way to make Impress.ai a world-class, robust, enterprise AI product. Going through this experience and getting the opportunity to collaborate with the best of the best in DBS, was the best thing we ever did for our company.

During this developmental stage, how did you deal with negative feedback?

It was definitely stressful for the team. But we agreed that acting on negative feedback is the only way to improve the product. A close and friendly relationship with the DBS team was necessary. We developed a safe space for everyone to share feedback frankly and in a well-intentioned way. Mentally, we always had to stay close to the mission of launching a major advancement in the field of recruitment AI together as a DBS + Impress.ai team.

So now, where do you see this technology moving into - in the next few years? Which space do you think it will revolutionise?

The field of recruitment has so many opportunities for AI to play a transformative role. We see the technology moving from today's candidate qualification role to a candidate advisory role. The capability is already there. But good execution is everything. We focus heavily on getting execution right. We see AI revolutionising the entire human resource management and planning field. So many complex human resource allocation decisions are made by humans today based on sparse data. We imagine a future where AI learns from performance patterns of people and condenses those patterns into criteria for hiring.

CHALLENGED!
SOLUTIONS FOR SOCIAL INJUSTICES

Three of our NUS Overseas Colleges Silicon Valley students participated in the BroncoHack hackathon, winning the third prize with their product KODO, an interactive platform to tackle a fundamental human issue – loneliness. We speak to the team to find out more!

Organised by OMIS Student Network, BroncoHack is Santa Clara University's annual hackathon – encouraging students from Bay Area universities to examine the social injustices present in our world and to try their hand at reversing them through the power of applied technology and programming.

Loneliness is a real problem. Being connected to others socially is widely considered a basic human need—crucial to one's well-being and survival. Thus, when people experience a persistent lack of social interaction, it can be as damaging as any other physical illness e.g. obesity.

Their product – KODO, (Japanese for heartbeat, create a positive change) aims to alleviate this problem by providing a platform for people to interact with a chatbot that speaks and acts like a human.

KODO is able to make people feel better, offer advice and ultimately serve as a bridge to connect them to real people who can understand their needs.

As with many other products trying to incorporate EQ into their technologies, questions on the credibility of having a chatbot converse with a vulnerable customer base were raised.

The team came up with different ideas by exploring different problems in the world – from anti-rape to bullying and loneliness. They chose to adopt the issue of loneliness because it solved a social problem with impact, feasible on both technical and business fronts.

The product they envisioned required a chatbot. To make the chatbot KODO,

they had to work with Google's natural language processing API, Dialogflow. This posed a challenge as they did not have any prior experience with this software – and they had to teach KODO to interact, just as a human would. This involved predicting how an individual in a lonely state of mind would behave and respond. With their set of predictions, they were then able to integrate KODO with Dialogflow, creating a meaningful and understanding chatbot that people could go to in times of loneliness.

They had to also face the task of devising a 'loneliness index' – a key indicator for KODO to determine steps of action while interacting with the users. With the help of research papers, they were able to translate the information into meaningful numbers that the algorithms could understand and process. This loneliness index was crucial to determining the severity of loneliness the person was currently in, which would essentially allow the bot to provide relevant advice to help ease their condition.

When asked to divulge their greatest takeaway from this experience, Ong Wei Kang said, "It is not always in your best interest to follow the crowd/majority. NOC allowed us to see how the founders of our internship companies met with many obstacles and naysayers along their journey, but ultimately pushed through because they believed in their product more than what someone else had to say about it."
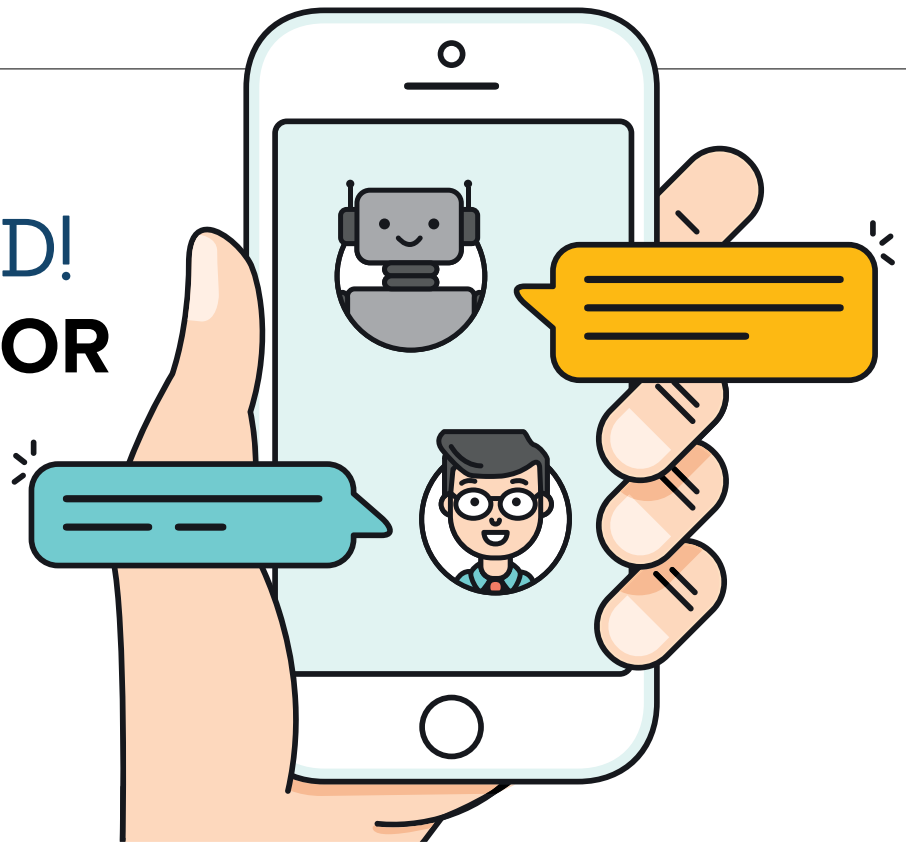
From left to right: Ong Wei Kang, Oh Jia Zhen, Wang Xien Dong at the BroncoHack event at Santa Clara University, 21-22 April 2018

NUS Enterprise Events & Activities

APR - JUN 2018

Stay updated on our upcoming events at:
enterprise.nus.edu.sg/events

APR

02	**Lean LaunchPad Singapore Final Presentation Day**
03	**Modern Aging Mini Seminar: Designing Better For Older Adults**
07	**Yale-NUS Pitch Competition**
07	**NOC 101 for Friends of NOC**
11	**Purposeful Aging//Meaningful Endings: Art, Science and Innovation**
11	**Wicked Wednesdays at N-House! Pitch Night!**
13	**Kopi Chat with Philip Yeo: Neither Civil Nor Servant**
17	**Ocean of Opportunities Roadshow**
18	**MAD Talk 1: Philip Yeo Innovation Fellows Programme**
25	**MAD Talk 2: Philip Yeo Innovation Fellows Programme**
26	**Secure-IOT: Safeguarding Connected Things**
26	**Entrepreneurial Link: Singapore x Brazil**
26	**Kopi Chat: What does it take to build a successful cybersecurity company?**

MAY

03	**Next Generation Sequencing: The Future of Diagnostics**
05	**Modern Aging Symposium: Aging Unlimited**
07	**Entrepreneurial Link: Singapore x China**
08	**Kopi Chat: Incubents VS Challengers: Who will define the future of Fintech and Banking?**
08	**NIKKEI x NUS Enterprise Digitalization Forum**
08	**Ocean of Opportunities Roadshow**
14	**The Social Oven 2018**
17	**Industry Roundtable Series: Green Materials**

JUN

05	**Innovfest unbound 2018**
06	**Innovfest unbound 2018**
07	**CISO Perspectives Series: On Policy & Compliance; Investigations & Forensics**
20	**Innovfest Suzhou 2018**
21	**Innovfest Suzhou 2018**
22	**Modern Aging Open Day**
25	**Lean LaunchPad Cybersecurity Run Final Presentation Day**
26	**Enterprise Blockchain Seminar**
28	**PIER71 - Explore an evening with the shipping giants**

CYBERSECURITY 101
FOR START-UPS

ICE71 is an initiative jointly organised by NUS Enterprise and Singtel Innov8. Supported by the Cyber Security Agency of Singapore (CSA) and the Infocommunications and Media Development Authority (IMDA), ICE71 is Singapore's first cybersecurity start-up hub, working with various stakeholders to create an ecosystem of start-ups, professionals and mentors in the cybersecurity field.

Recently, BLOCK71 hosted its first ever ICE71 Kopi Chat session on cybersecurity, with Mahendra Ramsinghani, Founder of Secure Octane and Advisor to Singtel Innov8, shedding some light on the current trends and challenges in the field. Also on the panel were Kara Sadybakasova, CEO and co-founder of IoTsploit, and Michael Francoise, Programme Director of CyLon.

01 The Evolution of Cybersecurity Threats

According to Verizon's Data Breach Investigations Report in 2017, Healthcare, Public Sector and Accommodation are the top three industries that fall prey to cyber-attacks. Hackers commonly make use of email malware, ransomware and even crypto-jacking, a process which compromises computers for bitcoin mining. As cybercrime attacks become bolder in execution, creative in approach and serve to debilitate online communities, we have to be alert about the various ways they can potentially take place, and strengthen our defenses against potential attacks with the aid of technologies such as Artificial Intelligence, Machine Learning and Blockchain.

02 Invest in your People

Some of the primary reasons why companies fail to defend themselves from cyberattacks is due to the shortage of skilled people (31%), lack of support from top management (19%) and too many vulnerabilities (11%).

Mahendra emphasised the importance of investing in the right people and constantly educating employees on cybersecurity trends. Top management must also be receptive to feedback and suggestions.

03 Worldwide Trends

Globally, businesses are pumping cash into cybersecurity companies and their products, creating new business and monetisation opportunities. Critical infrastructure industries such as oil and gas are facing a dramatically growing need for cybersecurity solutions, as much of currently deployed technology was not built with security in mind.

04 How to Grow your Cybersecurity Start-up

The key to a successful cybersecurity business is knowing your customers and their specific pain points. Having the right strategy, architecture, management and performance will play an important role towards how well your solution is received.

For more information on ICE71,
visit: www.ice71.sg