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The Sustainability Issue

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FEATURES

Editor's note

Although we have titled this "The Sustainability Issue," the importance of sustainability extends far beyond one newsletter. It is not a fad or one-off theme, but an issue and responsibility that must be considered by every entrepreneur, every organisation, and every consumer in the face of climate change and environmental degradation.

We hope that by bringing you a sample of the activity taking place in our community, we can enable greater understanding of the challenges and opportunities confronting us, as well as provide concrete examples of how innovation and entrepreneurship can play a role in protecting our planet, preserving our resources, and reducing waste.

We are therefore privileged in this issue of SPARKS to feature a contribution from Amy Ho, Director of the NUS Office of Environmental Sustainability (p. 9), illuminating the steps the university has taken to increase its sustainable practices, innovations it has adopted, as well as its strategies and goals looking forward to 2030.

Complementing this piece are profiles and interviews with the start-ups and spin-offs in our community that are encouraging sustainability within their respective fields, with representation from industries as diverse as manufacturing (p. 19), construction (p. 17), maritime (p. 13), food (p. 24), chemicals (p. 12), as well as retail and consumer goods (p. 14).

Finally, we also spotlight the new Launchpad on Innovation in Food and Environmental Sustainability, a recent initiative NUS Enterprise has commenced to provide increased support and encouragement for our start-ups in this field. (p. 3).

All photos used are either file photos, were taken pre-COVID, or were taken in accordance with the prevailing COVID regulations at the time.

NUS National University of Singapore
Enterprise

ENTERPRISE SPARKS
NUS Enterprise
21 Heng Mui Keng Terrace,
Level 5 Singapore 119613
enterprise@nus.edu.sg
www.enterprise.nus.edu.sg
Company Registration No:
200604346E

Editorial Team: Katherine Chinn
Contributors: Amy Ho; Deon Tan; NUS Industry Liaison Office; Priscilla Goh; Rebecca Koh; Shreya Nair; Marc Sima

A NEW LAUNCHPAD FOR FOOD SUSTAINABILITY START-UPS

RED HOT

Food lies at the heart of many of today's most pressing challenges: hunger and malnutrition, poverty, climate change, and inequality, amongst other issues. A growing global population has only highlighted how untenable the current food system is, with systemic changes needed in production, distribution, and waste management.

For start-ups interested in developing solutions to these opportunities, there is a new source of support: the **Launchpad on Innovation in Food and Environmental Sustainability (LIFES)** was launched on 15 April to drive transformational change in the sector, while encouraging and unlocking the entrepreneurial spirit of Singaporeans. Initiated by the Joint Initiative Social Systems Innovation (JISSI), a collaboration between NUS Enterprise and the Base of Pyramid (BOP) Hub, LIFES focuses on four main pillars: food waste, food security, food culture and food production.

Speaking at the launch, Tony Tan, Executive Director of the BOP Hub, noted the initiative will run several programmes and events in the next few months, including a nasi lemak breakdown challenge, innovation workshops, and a dialogue on reducing food waste.

Tan also announced the start of the LIFES Challenge, encouraging potential social entrepreneurs to send in their proposals. In June, shortlisted candidates will be invited to pitch their food sustainability solutions before an audience of venture capitalists, impact investors, and other stakeholders. Attractive prizes will be offered for the winners, with LIFES also providing support through access to funding and incubation.

BOP Hub Executive Director Tony Tan outlining LIFES' upcoming events.

Using technology for a better food future

As part of the LIFES launch event, Shen Ming Lee, author of *Hungry for Disruption: How Tech Innovations Will Nourish 10 Billion by 2050*, spoke on the complex factors related to food sustainability, including the challenge of increasing food production (and nutrition) in an increasingly resource-scarce future.

Her speech touched on key innovation opportunities, including digital and urban farming, novel food products and alternative proteins, food waste technology, agribusiness marketplaces and supply chain tools and traceability platforms. As one example, if food waste could be harnessed and redirected to feed the hungry, we could alleviate both carbon emissions and global hunger while promoting a more sustainable ecosystem.

To create a better food future therefore requires both

1. An overhaul in the way we think about food and agriculture

2. Technological and scientific transformation

As Lee emphasised, "Considering the wide-reaching impacts of our global food system, consumers like you and I must educate ourselves and do our part, because the decisions we make every day regarding the food we purchase and consume and what we dedicate our work to is perhaps one of the most important contributions we can make to reducing global warming and helping to ensure we can nourish, not just feed, 10 billion people by 2050."

RED HOT

32 START-UPS JOIN SEA BOOSTER PROGRAMME

Demo Day at BLOCK71 Saigon.
All local COVID restrictions were adhered to.

Tech start-ups operating in Southeast Asia navigate a fragmented market, meaning scaling requires the need to think regionally from Day 1.

Luckily, there is a new programme designed to equip pre-seed companies with the resources, skills and networks necessary for their success. In March 2021, NUS Enterprise launched the SEA Booster programme in collaboration with Salim Group's Innovation Factory and Becamex IDC.

Held concurrently across The HANGAR, BLOCK71 Indonesia and BLOCK71 Saigon, the structured incubation programme welcomed 32 high-impact teams from Singapore, Indonesia, Vietnam, Cambodia, Japan, India, Australia and USA to its inaugural cohort.

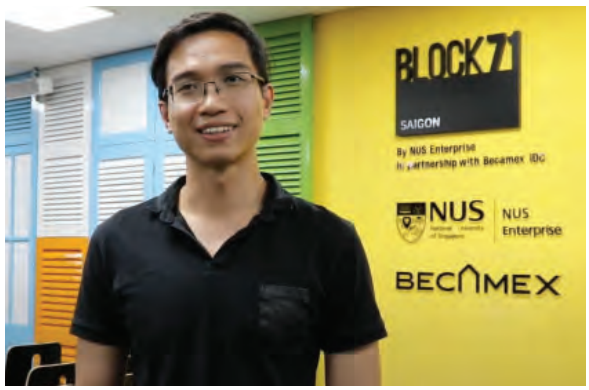
Over the course of March and April, founders received mentorship and guidance from industry mentors and experienced entrepreneurs, connected with potential business partners, pitched to top-tier investors, and plugged into a global community of fellow Asia-based tech founders.

Workshops with industry experts helped provide local and regional insights into pitching, funding, market validation, unit economics and growth hacking. In addition, small-group mentor consults, 1-1 diagnostics, pulse checks and Founders Circles enabled personalised support and peer learning opportunities.

Meet the Start-Ups

THE HANGAR	BLOCK71 SINGAPORE	BLOCK71 INDONESIA	BLOCK71 SAIGON
Carfixsg.co	AI Communis	Anidra	3km Food
Eden	BrainEnTech Neuroscience	Aplikasir	Fiahub
EzCompostr	InsureVite	Assist.id	IMI
Fresh Company	Outside Technologies	Ayoexport	Leng Keng Technology
Origin Agriculture	Quadusk	Belfarm	MoveUp
SGVenusFlytrip	SenzeHub	Bindcover	Otrafy
Uniphage	Tobu	Muvi	RYTLE
	Waffle	TinggalMasak	
		UICreative	
		Ummacademy	

> **When I applied to BLOCK71, I expected to connect with fellow founders in the Vietnam start-up ecosystem. And I got just that and more. It's been great being able to join workshops with fellow founders and local mentors weekly both online and in-person at BLOCK71 Saigon. We share stories, experiences and help each other out."**
>
> **Nhat Nguyen**
> **CEO and Co-Founder of Otrafy**



Nhat Nguyen of Otrafy

Demo Day Post Gathering, Saigon.
All local COVID restrictions were adhered to.

Trainers, mentors and panellists included the likes of:

- Achmad Zaky, Founding Partner, Init-6
- Valerie Vu, Investor, Venturra Capital
- Joel Leong, Co-Founder, Shopback
- Nikhil Kapur, Partner, STRIVE
- Binh Tran, Partner, 500 Startups
- Khanh Tran, Managing Partner, Touchstone Partners
  And more

Upcoming Programme

The second SEA Booster Programme will begin in June 2021. Focusing on Smart Cities, the programme will provide tailored support for start-ups in three verticals:

- Mobility Solutions: Transport and Logistics
- Sustainability
- Industry 4.0.

Participants will enjoy access to regional NUS Enterprise Tech Showcase Days, Innovfest and Smart China Expo, as well as continued year-round support in the areas of technology translation and commercialisation, hiring and talent development, market access, grants and funding, and access to office space across Asia.

RED HOT

A PIPELINE OF NEW ENTREPRENEURS

Teams from the engineering track with their mentors at LLP's Final Presentation Day.

Over the period of March-June 2021, more than 50 pre-start-up teams graduated from our various validation and venture creation programmes.

Here's a wrap-up of the events:

NUS Venture Building Programme (VB)

Launched in 2020 during the height of the COVID-19 pandemic and a difficult business climate, NUS' VB programme is a partnership between NUS Enterprise and Enterprise Singapore (ESG) to provide entrepreneurial training to aspiring founders. The three-month programme offers mentorship and access to NUS technologies, as well as education in how to analyse market opportunities, develop business models, and make professional pitches.

Run 2 of the programme concluded on 31 March, with 30 teams pitching during the Demo Day event. The cohort included several teams focused on sustainability, with highlights including Urban Origins, which encourages the purchase of local produce and collaboration amongst local producers, and FloatingOn, which builds affordable, modular and sustainable floating homes.

VB team Urban Origins pitches their solution to the panel.

Lean Launchpad Singapore (LLP)

Modelled on the US National Science Foundation's (NSF) I-Corps programme, LLP was launched in 2013 by NUS Enterprise to accelerate the commercialisation of academic research through education on agile engineering and business model design. The programme pairs researchers with business students to form entrepreneurial teams, encouraging participants to get out of the lab and conduct customer discovery and market validation. In 2017, the programme was expanded to a national level, with NUS serving as the central node.

NUS' ninth LLP run concluded with a Final Presentation Day on 5 April, with 11 medtech and engineering teams showcasing their 10-week learning journeys to a panel of industry experts and mentors. Solutions ranged from a photoactivable biomimetic gel to accelerate wound closure of diabetic foot ulcers to a modular floating platform for the generation of solar energy, amongst others.

NUS Graduate Research Innovation Programme (GRIP)

In October 2018, NUS launched GRIP, a flagship translational programme with the aim to significantly increase the commercialisation of NUS technologies and generate up to 250 deep technology start-ups over five years. The year-long programme consists of a three-month Venture Hothouse, nine months of incubation, gated seed funding of up to S$100,000 for each venture, as well as access to experienced business and technical mentors.

Run 5 of the programme culminated in Lift-Off Day on 3 June, with 15 teams presenting their scalable and investible deep-tech solutions. A virtual audience of 500 investors, corporates, and various institutions caught a glimpse of next-generation solutions related to battery recycling, waste-water treatment, and lab-grade diagnostics for rural farmers, among others. To date, more than 100 teams have participated in the programme, resulting in 56 incorporated companies which have secured a total of more than S$11 million in external funding.

RED HOT

BOOST FOR MARITIME INNOVATION

PIER71 welcomed a group of VIPs comprising Mr Niam Chiang Meng (Chairman, MPA), Ms Quah Ley Hoon (Chief Executive, MPA), Her Excellency Ms Anita Nergaad (Norwegian Ambassador, Royal Norwegian Embassy), Her Excellency Ms Sandra Jensen Landi (Denmark Ambassador to Singapore and Brunei, Kingdom of Denmark), Ms Caroline Yang (President, Singapore Shipping Association), Mr Ted Tan (Deputy CEO, Enterprise Singapore) and Dr Sanjay Kuttan (Executive Director, Singapore Maritime Institute).

Organised by the Maritime and Port Authority of Singapore (MPA), the Singapore Maritime Technology Conference (SMTC) 2021 was the anchor event of Singapore Maritime Week.

Held as a hybrid event from 19 – 22 April, SMTC 2021 offered two days of on-site engagement at Marina Bay Sands, as well as a virtual platform for access to the live sessions and networking over four days. As an official partner, PIER71, a joint collaboration between MPA and NUS Enterprise, was present as an exhibitor to share some of its programmes with delegates.

Five Smart Port Challenge (SPC) alumni exhibited at the event– Claritecs, mVizn, Optimization Analytics Technology, Portcast and SkyLab. An additional three – Delvify, Kanda and Threatspan- exhibited on the virtual platform.

Programme Director Dr Mark Lim also moderated an Innovators' Roundtable to discuss the way forward for the industry from a digitalisation and innovation perspective. He was joined by Tong Hsien-Hui (Executive Director, Venture Investing, SG Innovate), Chua Chye Poh (Founder, ShipsFocus), James Tan (Managing Partner, Quest Ventures) and Haymon Sinapius (Investment Manager, Asia, INNOPORT, the Schulte Group).

Throughout the week, leaders in the maritime space shared thought-provoking insights across a broad range of topics from digitalisation, decarbonisation, port and ship operations optimisation, to supply chain and cyber resilience, and more. Several announcements made by MPA signal a stronger focus on driving innovation and closer collaboration between the public and private sectors.

MPA has set aside S$10 million from the Maritime Innovation and Technology (MINT) Fund to support the growth and development of maritime technology start-ups in Singapore. Under this expanded effort, MPA will also develop a digital technology marketplace and a start-up playbook. The marketplace will connect maritime and venture capital companies with start-ups and facilitate the discovery of solutions. The start-up playbook serves as a comprehensive guide for start-ups to springboard into Singapore and tap on schemes and support programmes relating to talent, capital and R&D resources.

> **"A new grant scheme called MINT-STARTUP will allow start-ups that have completed the PIER71 or relevant maritime acceleration programmes in Singapore to apply for a grant of up to S$50,000 to pilot their projects."**

Promising start-ups looking to scale up can also apply for a project grant of up to S$100,000. To provide a conducive space to test-bed and develop drone technologies for maritime applications, a Maritime Drone Estate located near the Marina South Pier was launched on 20 April by Mr Chee Hong Tat, Senior Minister of State for Transport. Another significant initiative is the establishment of a S$120 million fund for a maritime decarbonisation centre in Singapore through a Memorandum of Cooperation between MPA and six industry partners – BW Group, Sembcorp Marine, Eastern Pacific Shipping, Ocean Network Express, Foundation Det Norske Veritas and BHP.

RED HOT

NOC ALUMNI MEET AGAIN

On 25 March 2021, after a long hiatus due to the pandemic, the NUS Overseas Colleges (NOC) programme hosted its first Alumni Homecoming since 2019. The gathering was held at the newly minted i-Cube Level 2 auditorium, which boasts hybrid event and live broadcasting capabilities.

More than 100 alumni participated in the Homecoming, including established figures such as Kelly Choo, co-founder of Neeuro; Audrey Tan, co-founder of PlayMoolah and Angels of Impact; and Vanessa Tan, Director of Marketing at Xiaomi. Old friends, ex-housemates, business associates, mentors and mentees, all of them NOC alumni, greeted each other as they finally got to catch up face-to-face after more than a year.

The event was kicked off by Professor Chee Yeow Meng, NUS Associate Vice President (Innovation & Enterprise) and Director of the NOC programme. In his opening speech, he detailed how students were recalled and internships cut short in 2020 when the spread of COVID-19 accelerated across the world. NOC alumni stepped up to support their fellow juniors by offering and calling for internship positions through their established business networks, enabling the students to continue on their learning journeys.

Prof Chee having a chat with NOC alumni.

In April, when it became apparent that the graduating cohort would be entering a difficult job market, NOC alumni once again rallied to provide support: over 20 companies from the NUS Enterprise network, most of them NOC alumni-founded companies, pulled together more than 200 traineeship and full-time positions for NUS' graduating students. These stories encapsulate the essence of the NOC community, a close-knit network of like-minded innovators and entrepreneurs that is happy to step in to collaborate with and support other alumni. More than 75%

Early arrivals enjoying a toast together.

of NOC alumni are currently involved in the start-up and innovation ecosystem, and many NOC alumni are also investors in and mentors to their juniors.

The rest of the event highlighted various NUS entrepreneurship programmes and initiatives that the alumni can tap on. NOC Alumni Engagement Manager Loh Weiren also shared new NOC-specific initiatives, including the NOC Alumni Bursary, which supports underprivileged students who embark on the NOC programme; new ways to stay connected as a community; the new common space at i-Cube Level 2; more talks and speaking opportunities for NOC alumni; and brand new NOC Masterclasses for knowledge sharing and exchange.

The event concluded with a content-packed "sneak preview" of the NOC Masterclass series, where NOC Silicon Valley alumnus Julian Low shared tips on how to approach funding for better success, knowledge he has garnered through his years of experience working in venture capitalist firms. It was a fantastic experience to see all these familiar faces, and we hope the NOC alumni community continues to stay connected and supportive of past and future generations!

Greetings from (some) of the attendees.

BRIGHT IDEAS

NUS' SUSTAINABILITY EFFORTS

University Town - an example of a sustainably designed, built and operated precinct.

In February 2021, the Singapore government unveiled its Green Plan 2030, a nationwide effort to advance the country's agenda on sustainable development. The plan charts Singapore's green targets over the next 10 years and features five key pillars: City in Nature, Sustainable Living, Energy Reset, Green Economy, and Resilient Future. The plan also strengthens Singapore's commitments under the United Nations' 2030 Sustainable Development Agenda and Paris Agreement.

The National University of Singapore (NUS) is poised to support and build on the momentum of these national and global commitments, having formally started its campus sustainability journey with the institutional pledge in 2008 to reduce its carbon emissions by 23% below Business-As-Usual by 2020. It has since met/exceeded this target and has also incorporated goals of reducing energy and water usage intensities, as well as increasing waste minimisation and recycling, the number of BCA GreenMark buildings and green spaces in buildings in its NUS Sustainability Strategic Plan 2017-2020.

What is less mentioned is the unique position that university campuses are in as "mini-cities" or municipalities in terms of population, facilities and activities. For example, NUS has 42,000 students and 12,000 staff; we have teaching, research and office buildings, student and staff residences, sports facilities and food and beverage amenities – a microcosm of a society. As such, university grounds provide excellent opportunities to test early-stage technologies and advance innovative solutions at scale.

Sustainable and Innovative Solutions at Scale

The University Town (UTown) precinct at Kent Ridge - a 16 ha site for co-locating various teaching, research and residential facilities for a new and more holistic learning experience – was an opportunity to incorporate sustainable design and innovative features. It is home to the first district cooling plant for a tertiary institution, due to the scale of the development as opposed to individual cooling facilities for one or a few buildings. Major circulation areas within and between buildings were designed to be naturally ventilated as far as possible, without sacrificing human comfort in the tropical heat and humidity. UTown also introduced an interior network of sheltered walkways and dedicated bicycle lanes to the campus. A covered link bridge connects UTown to the main campus, allowing students to walk or bike between the campuses. A pay-per-use scheme for air conditioning was also implemented at the residential colleges in UTown, contributing to lower electricity usage. It was also a way of forming and shaping sustainable behavioural norms of the students.

With the lessons learnt from UTown, sustainability considerations and innovations featured heavily in subsequent campus development and rejuvenation. SDE4 at the School of Design and Environment, Singapore's first purpose-built net zero energy building and the first for an institution of higher learning here, was completed and launched in 2019. More than 1,200 solar photovoltaic panels have been installed on the rooftop of SDE4. It is also a living laboratory to explore the impact of buildings on human health and well-being, and is home to several corporate laboratories working on smart green buildings and indoor air quality. Plans are underway to develop the other existing SDE buildings to create a super low-energy and low-carbon precinct, with active participation of the School's faculty members and researchers.

Technology-Enabled Solutions for a Green Campus

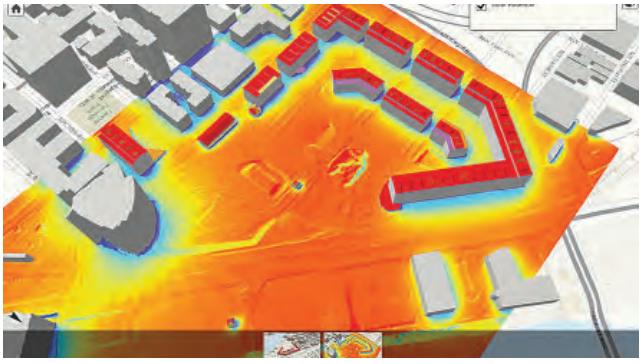
To realise its aspirations of a green campus, NUS uses three-dimensional visualisation tools to provide virtual environmental simulations and analysis for more effective campus planning and operations. NUS has also been engaging with researchers and companies on technology-enabled solutions for utilities and space optimisation, within a broader framework of smart facilities management. Smart building management systems are being piloted to provide energy and equipment performance monitoring, advanced fault detection and diagnostics to enable timely remedial action, as well as targeted reduction and prevention measures.

On shaping behavioural habits, the student residential colleges, starting with Ridge View Residential College (RVRC), are test-beds for research involving a smart shower meter system to reduce water usage. Jointly conducted by researchers from the Institute of Water Policy, under the Lee Kuan Yew School of Public Policy at NUS, and NUS Economics and in collaboration with PUB Singapore, the study saw meters placed into 70 showers in RVRC, where LED lights would indicate the amount of water being used. This allowed the researchers to investigate if real-time feedback would have an impact on water usage. At the end of the four-month trial in 2018, water savings of about five litres per person on average was observed. The smart shower meter systems are now also installed in selected residential colleges in UTown.

SDE4 is Singapore's first purpose-built net zero energy building.

The Road Ahead

NUS is building on this foundation and accelerating sustainability efforts with the Climate Action Plan 2030 comprising signature programmes Cool NUS (by 4°C), Carbon Neutral Campus and Towards a Zero-Waste NUS. These programmes will leverage smart solutions to reduce solar gain and heat load generated through operations, tree planting to cool the environment as well as to sequester carbon, as well as shape behaviour for increased recycling, as the University aspires to be a greener campus by 2030. And in a small way, contribute to a greener Singapore.



Solar radiation maps based on terrain elevation, slope, seasonal shifts of sun angle and effects of shadows cast by surrounding topography can be calculated and visualised in three-dimensional models of buildings. Photo: esri.com

Contributed by Amy Ho, Director of the NUS Office of Environmental Sustainability

TRAIL BLAZERS

RECYCLED READS

(L to R): Thryft co-founders Eddie Lim, Damien Poh, Tan Ye Kai and Choy Jia Yu. File photo.

Founded in 2019 by a group of Yale-NUS and NUS students, Thryft is Singapore's first sustainable bookstore. The start-up enables readers to buy or trade-in used titles via their e-commerce platform and monthly book fairs, helping to extend the shelf life of each book while championing second-hand as a first choice.

We speak to co-founder Eddie Lim to learn more.

Tell us about Thryft.

We don't believe that books should only be read once, or sit on the same bookshelf for their entire life. Thryft grew out of an observation of the locked-up supplies of books in households — the average Singaporean household has 52 books each. Many of these books are either kept in storage for long periods of time, or worst, thrown out after some time, all while readers continue to buy new titles to add to their shelves. We seek to create a sustainable alternative to meet the demand for books without producing more waste, and hence all our books are second-hand — traded-in or donated by our users. Buying second-hand sometimes get a bad rep for being troublesome and unreliable, which we seek to change with our centralised platform and consistent algorithm-based pricing mechanism.

We encourage readers to trade-in their books so that they can spend the credits on other books that they want from the Thryft store. This way, readers are giving their old books a new home while filling their bookshelves with other second-hand books, building a circular economy with minimal wastage.

How do you incorporate sustainability into your business in ways that other used bookstores don't?

Our unique trade-in model and online platform increases the accessibility and viability of second-hand book buyers and/or those looking to trade-in or donate their books! Over 20,000 books have been traded-in or donated with Thryft since the start of last year.

Other sustainable initiatives we practice include:

- **Avoiding unnecessary packaging waste as much as possible.** We practise plastic-free packaging: all books are individually wrapped with care using only repurposed or recycled paper and twine. Many readers have gone on to upcycle our packaging further, such as turning it into a bookmark.
- **Contributing part of our profits towards sustainable initiatives.** For Q4 2020, we donated to WWF-Singapore's For Nature For Us community and recovery programme.
- **Donating or responsibly recycling books** we receive that do not meet our quality standards. So far, we have donated over 1200 books and recycled 1532 kg of books with our recycling partner, saving an equivalent of 29 trees, 642 gallons of oil, 11,821 gallons of water, and more.

What are your long-term plans?

We envision an ecosystem that embraces both brick-and-mortar bookstores and online platforms in tandem where users get to enjoy their full benefits. I hope to work with our local second-hand stores who have played an important role in the ecosystem of second-hand books in Singapore, to create such an ecosystem in the near future.

We are also looking to expand in the Southeast Asia region.

What books would you recommend for those interested in learning more about sustainability?

The Uninhabitable Earth: Life After Warming by David Wallace-Wells, and *This Changes Everything: Capitalism vs. the Climate* by Naomi Klein.

They are out-of-stock at the moment at Thryft, but users can sign up to be notified when they're back in stock!

TRAIL BLAZERS

SEPPURE: SUSTAINABLE CHEMICAL SEPARATION

Chemical separation is used extensively in the food, pharmaceutical and petrochemical industries. However, conventional methods are costly, energy intensive and unfriendly to the environment, accounting for up to 15% of the world's entire energy consumption.

Recognising the opportunity to bring about positive change to industries and make a difference to the global climate crisis, Dr Mohammad Farahani set out to find a sustainable chemical separation solution while doing his PhD in membrane technology at the National University of Singapore (NUS).

The Problem with Conventional Chemical Separation Methods

"For chemicals to separate, they often need to be changed from a liquid to a gaseous state, then back again. This process not only calls for the use of huge amounts of water, it also emits tonnes of carbon dioxide," Dr Farahani explained. "That was when I asked the hard question: Can I still get the job done without using any heat?"

Water purification and membrane technologies are not new in Singapore. Membranes for water purification are well established and have been used in the Republic for over 40 years. In comparison, the chemical industry does not have any efficient solution for chemical separation.

"You might think: Why not just use the same membrane used in water separation for chemical separation? But the reality is more complex than that—the same membrane runs the risk of being dissolved or just not performing the job as necessary. Therefore, we cannot just use any membrane—we need a membrane that is chemical resistant," said Dr Farahani.

Solution and Opportunity

Eventually, Dr Farahani and his team found the solution in a chemical-resistant nanofiltration membrane. With pores smaller than one nanometre, chemical separations can be done at a molecular level without the traditional use of heat. Its high thermal and solvent stability also makes it suitable for a variety of applications with extreme pHs. The result? 90% less energy consumption and GHG emissions and 30-50% lower operating costs.

The potential implication of the technology is huge. This sustainable alternative can potentially conserve billions of gallons of water, eliminate millions of tonnes of volatile organic compound emissions and greatly reduce billions of tonnes of carbon dioxide emissions entering the atmosphere globally each year. In numbers, this translates into approximately US$3 trillion savings on energy expenditures annually.

Adding on, Dr Farahani elaborated, "Our nanofiltration membrane also makes a great business case. To give an example—a low-margin industry like vegetable oil refining can easily enjoy increased profit margins of three times or more, working out to about US$7 billion savings a year, industry-wide. And if that is not compelling enough, businesses will love to know that the return on investment for using our nanofiltration membrane is generally less than a year."

On the Horizon

Spun-off from NUS in 2019, the company has secured US$2.55 million in seed capital led by SOSV, as well as CA$1.8 million in funding from Emissions Reduction Alberta for the application of is technology in vegetable oil refining. Dr Farahani has also received numerous awards related to his work, including being named to MIT Technology Review's "Innovators Under 35 Asia Pacific" list, as well as the title of "Founder of the Year" at the Origin Innovation Awards 2020.

SEPPURE's technology is currently being commercialised and is at the pilot stage of testing with their early customers. Within the next five years, the company seeks to launch its first few products and roll out globally to different markets and clientele across different industries.

> **"Well aligned to the United Nations Sustainable Development Goals (UN SDGs), our technology offers not only environmental benefits, but also economic ones—to businesses, industries and countries."**
>
> Dr Mohammad Farahani
> Founder, CEO & CTO

TRAIL BLAZERS

ADVANCED COMBUSTION CONDITIONING FOR CLEANER FUEL CHOICES

Contributed by Marc Sima, CEO of FUELSAVE. FUELSAVE was the runner-up at PIER71's Smart Port Challenge 2020.

As shipping continues its decarbonisation journey, the industry faces heightened expectations. In addition to the International Maritime Organization's (IMO) greenhouse gas (GHG) emissions targets, the European Union (EU) has set its own ambitions. The recent change in US leadership has triggered a further significant change in headwinds, as President Biden looks to spearhead and redouble international action to fight climate change.

With pressure building around shipping, the industry itself has yet to agree on its preferred route to achieve the IMO's 2030 and 2050 targets.

Clean fuels – cost reduction & enhancement

One of the key pillars of the transition to green shipping is clean fuel alternatives. A new report by the World Bank and University Maritime Advisory Services (UMAS) recently identified ammonia and hydrogen as the most promising zero-carbon bunker fuels. However, biofuels such as biomethane and biomethanol, as well as synthetic carbon-based fuels and especially also green methanol, remain credible alternatives.

What ship owners and operators do need throughout the clean-fuel transition is the flexibility to adopt the most appropriate choice for their vessels, and to do so at the most affordable cost. Flexibility can be achieved through Internal Combustion Engines (ICEs), a long established and well proven technology used across international shipping that is capable of burning liquid and gaseous fuels with limited modifications. When it comes to cost, the higher price of cleaner fuels can be reduced using advanced combustion conditioning (such as with FS MARINE+ from German firm FUELSAVE GmbH), which also supports a leaner and cleaner burn to address remaining emission deficits in the cleaner fuel choices of tomorrow.

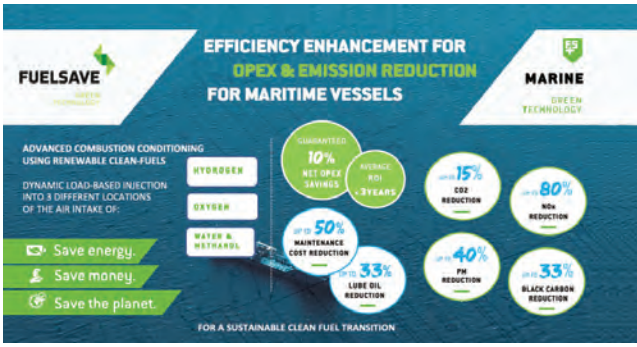
Advanced combustion conditioning provides new means for owners and operators to adjust the engine and emission performance for different current and upcoming types of fuels and operating environments. It involves injecting dynamically hydrogen, oxygen, water and methanol into the combustion process via the air intake in an easy to retrofit package, to help condition and enhance the combustion - providing a leaner and cleaner, more thorough, and more efficient burn at a better stoichiometric mix throughout the operating range, substituting some of the dirty primary fuels with clean fuel alternatives, at higher thermal and volumetric efficiency of the engine.

New Applications

Most recently, the world's leading dredging firm, Van Oord, has selected FS MARINE+ to be installed on its DP3 subsea rock installation vessel MV Bravenes. The project is part of Van Oord's commitment to becoming carbon neutral by 2050, with the technology significantly contributing to substantial carbon dioxide (CO2), nitrogen oxide (NOx), particulate matter (PM) and black carbon (BC) reduction on Van Oord's existing offshore vessels.

Having been successfully field and lab-proven, and validated for four-stroke engines, the next important step is to adapt and scale up the tech for two-stroke engines - the engine of choice for the largest fuel consumers and emission producers of the merchant fleet, including container/cargo ships, dry bulk carriers, and tankers/VLCCs. The project is being funded under the 3 Mio "CleanerShip" project from the European Maritime and Fisheries Fund (EMFF). FUELSAVE also has a testbench slot with one of the world's largest engine manufacturers for early 2022, when FS MARINE+ will be tested on a modern 2-stroke dual-fuel engine before being deployed in a pilot project for an around 70MW 2 stroke slow-speed main engine for propulsion.

With the path to decarbonisation towards net zero in shipping still fraught with unknowns, a key value proposition and differentiator for solutions is the ability to work flexibly and at scale to reduce emissions at its source. FS MARINE+ is a good example of this as its dynamic hydrogen and methanol injections not only treat a symptom in an aftertreatment process, but also provide new levels of flexibility to adjust to future fuels and optimise the engine performance and emission balance. The technology also complements other technical and operational measures to maximise energy efficiency and emissions reduction in a sustainable and economical viable way.



TRAIL BLAZERS

SUSTAINABLE FASHION: GREEN IS THE NEW BLACK

Mycotech is developing a sustainable alternative to leather using mushrooms.

The fashion industry has a sustainability problem. Driven largely by fast fashion cycles that rely on high volumes, ever-changing styles, and cheap fabrics and labour, clothing production has approximately doubled since 2000.[1] But affordability and accessibility for consumers have come at the cost of quality and longevity: while we are buying more than ever, the average number of times an article of clothing is worn before being discarded is at its lowest.[2]

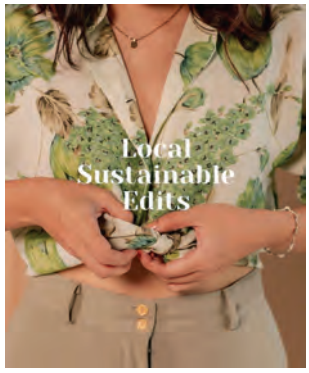
All of this overproduction, consumption and disposal exacts an environmental, economic and social toll. As McKinsey reports, "for every five garments produced, the equivalent of three end up in a landfill or incinerated each year," with the amount of greenhouse gas emissions from textile production exceeding "those emitted by all international flights and maritime ships combined." [3]

How can entrepreneurs push fashion in a more sustainable direction? We take a look at some trends within the industry that are helping to turn the tide, as well as the NUS Enterprise-affiliated start-ups whose innovative approaches to business models, supply chains and material choices are making a difference.

1. Rewear, resell & recirculate

One of the simplest ways to combat a culture of throwaway fashion is to extend the lifetime of existing garments by keeping them in circulation: by purchasing clothes that are already part of the ecosystem, no further resources (excepting transport and packaging) are expended, and less textile waste ends up in our landfills.

One start-up making this option easily accessible to women is **The Kint Story**, an online thrift store created "with a sole mission to reduce the ecological footprint the fashion industry has on our environment." Founded by NUS Overseas Colleges (NOC) New York alumnae Elisa Goh and Huang Yushu, the start-up focuses on providing



The Kint Story celebrates the value and beauty in second-hand clothes. (Instagram: The Kint Story)

a curated selection of high-quality pre-loved clothing that is both trendy and feminine. To date, the company has "rescued" more than 900 garments, while also providing a marketplace for users to sell their previously worn pieces.

Other start-ups in our ecosystem making used fashion finds convenient to buy include **Carousell**, a marketplace platform aimed at "making secondhand the first choice," and **Style Tribute**, a former BLOCK71 Singapore incubatee that resells authenticated luxury items.

2. Material Innovation

The environmental impact of the fashion industry extends beyond clothing production and disposal, however. Consider this: more than 500,000 tons of plastic microfibres—the equivalent of 50 billion plastic bottles—are released into the ocean each year through the act of washing clothes.[4]

But what if we could use advanced technologies to improve the durability of our clothing, therefore reducing the amount of times they need to be washed and mitigating our carbon footprint in the process?

This is exactly what apparel start-up **Man's Best Friend (MBF)** is doing. Founded by Yale-NUS students Johann Wah (NOC Silicon Valley), Glen Ang, Hwy Kim, and Keith Wo, the B2B sustainable procurement service provider specialises in sustainably-sourced apparel that blends

1 Ellen MacArthur Foundation. "A new textiles economy: Redesigning fashion's future." (2017). p.18
2 Ibid; p. 18
3 Magnin, Clarisse, and Saskia Hedrich. "Refashioning Clothing's Environmental Impact." McKinsey & Company. 25 July 2019. https://www.mckinsey.com/business-functions/sustainability/our-insights/sustainability-blog/refashioning-clothings-environmental-impact
4 Ellen MacArthur Foundation. "A new textiles economy: Redesigning fashion's future." (2017). p.21

Man's Best Friend has created apparel that is sweat-proof, stain-proof and waterproof.

nanotechnology with alternative fabrics such as bamboo, tencel and recycled polyester to greatly enhance the fabrics' natural properties. The result? Garments that have extreme anti-bacterial and anti-odour characteristics that can last for days without washing, despite heavy activity and sweating. The apparel has helped MBF's clients to greatly improve comfort and functionality for their employees, especially those who work long hours. Most importantly, the clothing can save the equivalent of 26% of carbon emissions and over 3500 litres of water per outfit, as compared to traditional cotton apparel.

Most recently, the start-up partnered with security firm AETOS to create new training kits for the company's recruits. As Johann states, "We found these users to react extremely well to the fitness/lifestyle verticals of our products. Now, we are actively looking for more companies who would also be interested in partnering with us to significantly decrease their carbon footprints as well as improve the functionality of their apparel."

3. Plant-Based Alternatives

Leather forms the basis for many of our jackets, shoes, and bags. But the livestock industry from which it is derived is a large contributor to deforestation and climate change. The tanning process itself, which frequently uses chromium salts, can also have devastating environmental and public health consequences if not managed properly.

Petroleum-based alternatives fare no better, with PVC labeled by Greenpeace as "the most environmentally damaging of all plastics." [5]

Mycotech's mushroom leather has been used in shoes, watches and wallets, among other applications.

5 "PVC: The Poison Plastic." Greenpeace. 18 Aug. 2003. https://www.greenpeace.org/usa/wp-content/uploads/legacy/Global/usa/report/2009/4/pvc-the-poison-plastic.html

One potential solution: mushrooms. BLOCK71 Bandung incubatee **Mycotech** is binding mushroom mycelium with agricultural waste, such as sugarcane or sawdust, to grow a strong, pliable and durable material that has been used as a leather substitute in everything from watches and wallets, to shoes and furniture. The product is not only superior in terms of its smaller environmental impact, but also more efficient: compared to the years and resources it takes to rear one cow, Mycotech's mushrooms can be grown in 60 days. Even better: the company sources its raw materials from local mushroom farmers, helping to provide them with additional income.

Photo credit: Mycotech

4. "Buy Less, Buy Better"

Clothing lifespans are being artificially shortened by companies which cater to the consumer wish for novelty and immediacy: where there used to be two seasons in fashion, brands like Zara are reported to now launch more than 20 collections a year.[6]

This not only cheapens the value we place on clothes, but encourages consumers to continuously refresh and replace items they already own. For businesses, this can also mean excess inventory and financial waste, as manufacturers overproduce items in advance in anticipation and hope that they will sell.

Slow fashion is the antithesis of this: clothes are produced in small batches, with emphasis on quality and craftsmanship. While this can translate into higher prices for consumers,

6 Remy, Nathalie, Eveline Speelman, and Steven Swartz. "Style That's Sustainable: A New Fast-fashion Formula." McKinsey & Company. 20 Oct. 2016. https://www.mckinsey.com/business-functions/sustainability/our-insights/style-thats-sustainable-a-new-fast-fashion-formula#

the investment more than pays off: because better materials are used, the resulting garments are also meant to be more enduring and last for years, if not a lifetime. Importantly, the movement encourages consumers to take a more mindful approach to shopping: by valuing and loving the items we purchase and the work behind them, we are less likely to consider clothes as easily disposable.

One brand embracing this ethos is menswear line **Stòffa**, based in New York City and founded by NOC Silicon Valley alumnus Agyesh Madan. The company's made-to-measure and made-to-order approach to fashion provides its clients with customised, unique-to-them garments (think: peached cotton trousers and suede flight jackets), while reducing waste in the production cycle by manufacturing only what has been ordered. Materials and styles are also developed and prototyped for years before their release, with items remaining in Stòffa's collection season after season. To further extend the lifecycle of its products, the company also offers lifetime repair, encouraging customers to mend, rather than throw away, clothes that are still wearable.

Ultimately, both the fashion industry and consumers have a role to play. As Agyesh states, "A more environmentally sustainable future is truly only possible if the responsibility is equally shared by every maker and consumer today. Even the smallest consumption choice we make is indicative of our support of a system. We need to inform ourselves about the impact of our choices and have discussions about them more often."

Stoffa's custom approach has been labelled "the future of fashion" by GQ.

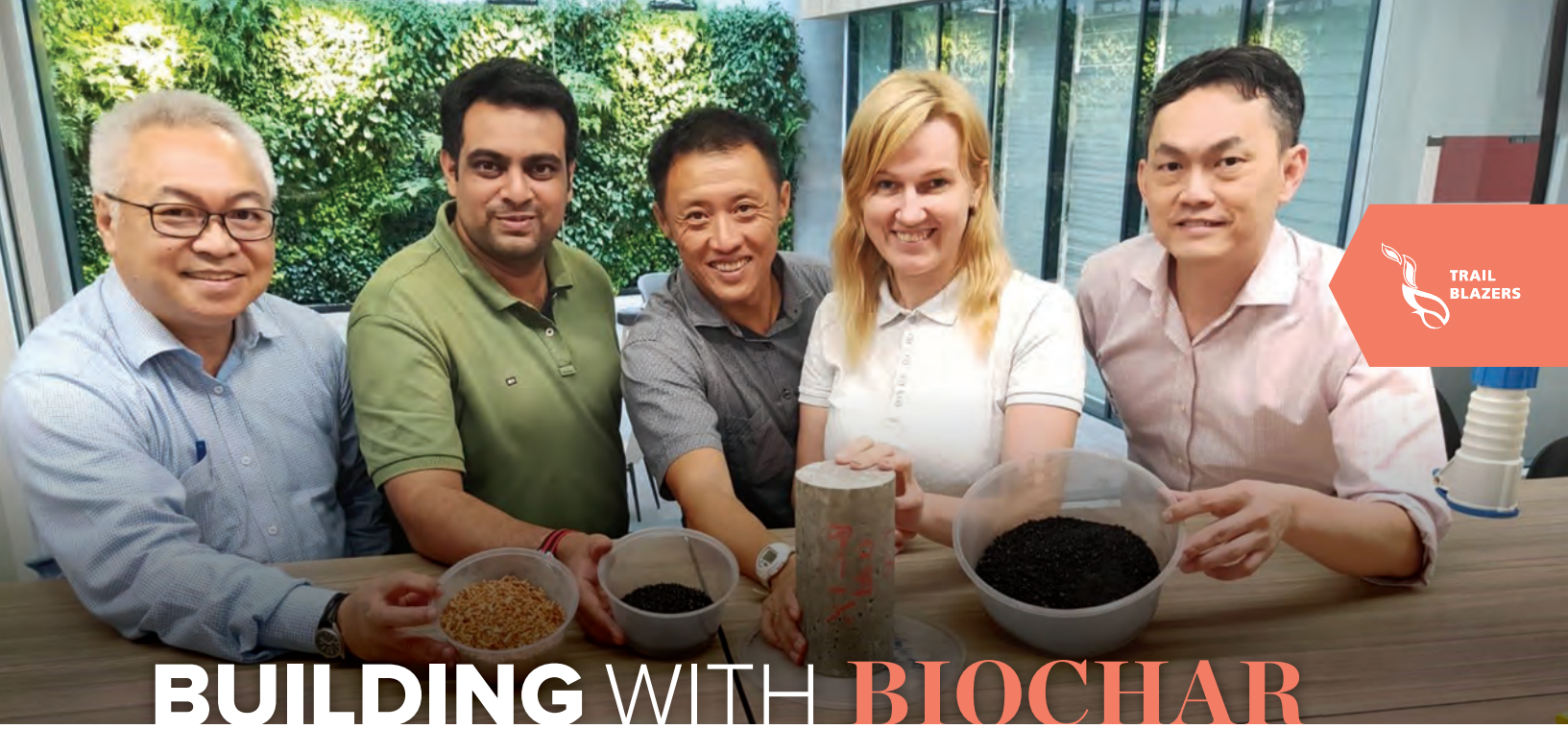
Photo credit: Mycotech

Beauty Brands to Know

Nail Deck, founded in 2011 by NOC alumnus Daryl Chew, initially began by importing foreign nail lacquer brands. 10 years later, Nail Deck has evolved to become Singapore's only custom nail label with three lacquer formulations that are vegan, cruelty-free and 9-free. With the ability to customise colours and help prevent buyers' remorse, Nail Deck also aims to contribute less waste and promote sustainability.

Nature Intended has five ready-to-launch products, including this Seaberry Timeless Potion.

Nature Intended, founded by Elizabeth Ong, with the help of Tiffany Ng and Raeann Teo, is a recent graduate of NUS' Venture Building programme. Their products are free of synthetic chemicals, with research-backed formulas made from naturally derived ingredients of plants and traditional remedies, and made especially for Asian skin. In addition, their products come in sustainable glass bottles, aluminium, and paper tube packaging, which are recyclable, reusable, and refillable. So they are not only safe for your skin but safe for the earth too.



TRAIL BLAZERS

BUILDING WITH BIOCHAR

(L to R) Mr Leong Siew Why, Business Advisor to BIPL; with BIPL co-founders Dr Souradeep Gupta, Director and Chief Executive Officer; Dr Kua Harn Wei, Associate Professor, Department of Building, NUS; Ms Kristina Razanskaite, Director and Chief Financial officer; and GRIP Venture Manager Jack So. File Photo.

SPARKS speaks to Biochar Innovations Pte Ltd (BIPL), a recent graduate of the NUS Graduate Research Innovation Programme (GRIP).

1. What is biochar and how can it be used as a sustainable building material?

Biochar is a carbon-rich solid produced by pyrolysis or gasification of biomass wastes, including agricultural wastes, forest wastes and food wastes. Due to its unique pore and surface structure, biochar can be used to replace part of cement or sand in concrete. This reduces the carbon footprint of concrete constructions and enables high-volume upcycling of local waste streams.

Biochar can also be applied as air-filters to improve indoor air quality in buildings and can be a potential alternative to more expensive filters of similar efficiency available in the market.

2. How did you decide to spin this off into a company?

BIPL's technologies are supported by intensive research that spanned six years before the spin-off was set up. The research was undertaken with the aim of providing a solution to the omnipresent crisis of waste disposal and low recycling rates across the world. It was not only about solving the waste crisis, but also providing a sustainable solution to the existing problems faced by the construction industry. These include concrete durability issues such as water seepage, low mechanical performance and dimensional instability.

Our research outcome, associated impacts and the magnitude of the problems motivated us to initiate the spin-off with the vision of "zero-waste" and a mission of delivering best-in-class concrete constructions. A spin-off would also provide a channel to scale up BIPL's technology, which, we believe, will have significant environmental and social impacts.

3. What does BIPL provide?

BIPL designs and produces various types of biochar-based admixtures, which can be applied for both structural and non-structural constructions. Some examples are high-strength concrete components, secondary roofs, claddings and lightweight constructions. Using BIPL's biochar in cement can substantially improve the performance of such constructions during their useful service life.

BIPL also designs and produces engineered biochar-based air-filters for capturing particulate matters (PM1, PM2.5 and PM10), that improves indoor air quality. These filters are customisable and easily installable as per conditions at site.

4. How has the NUS GRIP programme benefited the development of your start-up?

GRIP offered us the required training and resources to take off as entrepreneurs in the technology domain. The programme shaped our thought process to become technopreneurs and mitigated some of the initial monetary risks through funding support of S$100,000. Through this programme, BIPL also has access to NUS resources, including labs and prototyping support, and connection with Enterprise Singapore.

5. What's next for the company?

Our immediate plans are to get off-takers and more investments. Our mid-term goals are to bring biochar concrete and air filters to the market. Our long-term goals include growing our profits and expanding our business into new opportunities or business industries. We also want to reach our social goals; social goals can be described as the goals that create social values, affect lives, solve social problems, and/or protect the natural environment.

TRAIL BLAZERS

ÖKO: PLANET-FRIENDLY PLATES

At a farm in Dawei, Myanmar, fallen leaves from the areca nut tree are gathered. Once considered waste suitable only for the incinerator, the leaves are now finding new purpose as the basis for an eco-friendly and all-natural alternative to single-use plastic dinnerware.

The start-up behind the initiative is ÖKO, a recent graduate of NUS' Venture Building programme with a mission to bring a more sustainable option to the US$29 billion disposable tableware market. Using its proprietary hydraulic press machine, the company is manufacturing plates and bowls that are 100% home compostable, 100% biodegradable and 100% chemical-free.

In contrast to other biodegradable options such as bamboo or cornware, areca leaf plates are considered more affordable, both water and oil resistant, as well as microwave and oven safe.

Critically, because the material used is naturally shed from the areca palms, no trees are specifically grown to be felled in the process.

Fallen leaves from the areca nut tree are being turned into plates by ÖKO

As founder Inzali Oo explains, "We are addressing several UN Sustainability Goals. Not only are we encouraging responsible consumption and taking action to combat climate change, but we are providing farmers with a new source of income to help alleviate poverty and encourage economic growth."

Indeed, the budding social enterprise is exploring a business model that would provide machines and training to farmers across Myanmar and Indonesia, who will then produce the dinnerware for ÖKO's distribution.

"The Venture Building programme completely changed my mindset and helped me discover a number of new opportunities. Initially, my thinking was to establish a large factory in one location, but I realised I can make much more impact by supplying the farmers with the necessary equipment and knowledge," states Inzali.

Despite beginning production during the height of the COVID-19 pandemic, the start-up has already sold over 100,000 plates and bowls to clients such as the Yangon Zoological Gardens and large retail stores in Myanmar. In Singapore, ÖKO's products are sold via Carousell and Lazada, with the intent to target Isetan and FairPrice if production volumes can scale. Plans are also underway to diversify the range of products offered, with takeaway containers currently being tested.

To aid in its growth, the start-up has applied for the ASEAN Social Enterprise Development Programme to broaden their network and reach out to other farmers in ASEAN. It is also continuing to work closely with its Venture Building mentor, Yzhar Perry, who has introduced ÖKO to a number of potential investors.

When discussing the future, the start-up is clear about its ambitions and what it brings to the table: "Right now, we are looking for investors that are experienced in social enterprises and sustainability. Our vision is to become the #1 eco-friendly disposable tableware manufacturer in ASEAN before conquering the world."

ÖKO's plates are compostable, biodegradable and chemical-free.

FIRED UP

A DEEP DIVE INTO INNOVATION & SUSTAINABLE MANUFACTURING

As companies seek to optimise their manufacturing outputs while minimising environmental impact, the adoption of new technologies and innovation are key at every step of the production process: from choice of materials, use of natural resources, system design and supply chains to waste generation and disposal.

On 5 May, BLOCK71 Saigon hosted its first Kopi Chat Deep Dive session, focused on "The Impact of Innovation on Sustainable Manufacturing Practices in Asia," to address this subject, employing the United Nations Sustainable Development Goals (SDGs) as a guide to the discussion.

Here are three key takeaways:

1 / Awareness and Connections are Key

One of the ways to encourage sustainability within the manufacturing industry is to first educate industries as well as end-users. A lack of awareness about sustainability combined with little ecosystem support may discourage entrepreneurs from tackling these pressing issues, leading to an innovation drought within the economy. New Energy Nexus, an international non-profit that supports start-ups in the fields of clean energy and sustainability, is working to effect change by building a strong innovation culture and bridging the gap between start-ups and corporates.

2 / Build a Track Record

Corporates are often willing to pay a premium for a product from a well-established brand, rather than taking the risk of working with an early stage start-up. For entrepreneurs, this can translate into needing to initially bootstrap their companies, while also taking on pilot or project-based work or consultancies. This approach worked for HydroLeap: the Singapore-based start-up, which provides a chemical-free, cost-effective and environmentally-friendly solution to wastewater treatment for various industries, is now expanding within Southeast Asia.

3 / Know How and Who to Pitch To

As Long Hoang from FireVisor noted, the chain of implementation may mean that the decision-makers within a company reside in corporate headquarters, or a separate location, from the manufacturing line. This means start-ups need to know who to approach, as well as how to approach them: by focusing on the industry's goals and positioning the potential return on investment correctly, start-ups may be able to get their foot in the door. For instance, FireVisor's appeal lies in its use of AI to automate defect detection, enabling more efficient manufacturing and eliminating material wastage. The company is now applying its platform to solar cell manufacturing, with plans to also target the semiconductor and pharmaceutical industries.

Be sure to check out our Facebook page for the full recording of the Kopi Chat Deep Dive!
https://fb.watch/5jqtW9dgTc/

Need support in scaling your high-impact startup in Asia, or securing warm leads with government and corporates? Learn more or apply to our programme hubs in Singapore, Vietnam, Indonesia, Japan and China: block71.co

Clockwise from top left:
- Luong Nguyen, Head of Solution Mapping, UNDP Accelerator Labs (Moderator)
- Dr Mohammad Sherafatmand, CEO, HydroLeap
- Long Hoang, Chief Technical Officer, FireVisor
- Thao Tran, Programme Manager, New Energy Nexus

FIRE STARTER

PITCH NIGHT AT N-HOUSE

Held each semester, Pitch Night offers an opportunity for NUS' entrepreneurial students to pitch their ideas to a panel of seasoned judges in return for valuable feedback and advice, as well the chance to be awarded Green Lane access to pitch for the S$10,000 Practicum grant. The event provides a supportive platform for students to showcase their ideas, while offering a sneak preview of new and exciting start-ups in the community.

The most recent edition took place on 31 March, bringing together eight teams with innovative solutions to real-world challenges. Each team had five minutes to pitch their solutions, followed by three minutes of Q&A to answer all the judges' questions. In addition, each team received AWS credits worth S$5,000 for their participation.

Judges:

- Kenneth Lou, Co-Founder & CEO, Seedly
- Ajit Issac, Investment Manager, STRIVE Venture Capital
- Lauren Teo, Associate, Cocoon Capital
- Amir Nivy, Resident Mentor, N-House

Here are the top three teams emerging from the event:

1st Place:

EMERGENCE BY ARISE GAMES

L to R: Chang Jing Wen Celeste (Business, Marketing, Y4) and Yip Seng Yeun Alfred (Computer Science, Y4)

Out of an enthusiasm for games and a conviction to reinvent the way students learn through technology, ARISE Games is committed to developing a range of entertaining educational video games for students aged 7 to 12. In its first game, EMERGENCE, students play as a team of firefighters to overcome problems and rescue survivors before the building collapses—learning problem solving and teamwork skills in the process.

ARISE is in the midst of developing the MVP v0.1 of the game and is seeking beta testers to test the game and give critical feedback. If successful in securing funding, they hope to expand the team and onboard another game developer.

2nd Place:

LitFam

L to R: Sing Hui (Civil Engineering, Y3); Lum Wei Boon (Computer Science, Y3; NOC New York); Yap Zuo Ming (Chemical Engineering, Y3). File photo.

LitFam is the creator behind Litmus Box, an A.I. video journaling device for mental health patients that improves their mental well-being and aids in the work of medical professionals.

Currently, LitFam is working to improve their prototype and will be collaborating with NUS University Health Centre, as well as the Alice Lee Centre for Nursing Studies in a pilot project. The project will enable LitFam to gather more data and iterate its product to better suit the industry's needs.

Pitch Night is the flagship event of N-House, an entrepreneurship-themed residence managed by the NUS Overseas Colleges (NOC) Programme. By bringing like-minded students and alumni from NOC together in a stimulating and supportive entrepreneurial environment, N-House seeks to encourage new innovations and ideas from NUS students for the betterment of our community.

For more details on the **31 March event** and all of the teams, scan here:

3rd Place:

Crater

L to R: Tong Yi Xuan (Communications and New Media, Y3) and Marcus Yeo Chong Ern (Computing, Y3, NOC SG) with merchandise from their first collection, Fur-iend in Need. 100% of proceeds go to the Animal Lovers League! File photo.

Crater is an end-to-end platform for local creators and artists to monetise and build their brands through merchandise sales. Users can design their own merchandise (e.g. tote bags, coasters, hats, sticks and more) while Crater handles production, marketing, fulfilment, and even customer service!

Moving forward, Crater will be launching campaigns for student creators and organising offline events, such as pop-up booths at NUS! Crater is also expanding their team, so feel free to contact them if you are keen to join!

https://www.instagram.com/cratersg/

https://www.cratermerch.com/collections/all

NEWSFEED

In April, 10 NUS Enterprise-related entrepreneurs- including NOC alumni, GRIP alumni, and former incubatees- were honoured on the Forbes 30 Under 30 Asia list for 2021.

Congrats to: Marilyn Chew (Eterate Calligraphy); Grace Ciao (Grace Ciao Studio); Sazzad Hossain (SDI Academy); Ng Jun Kai (Janio Asia); Shawn Li (E3A Healthcare); Rendria Labde (Magalarva); Vyasaraj Manakari & Gururaj Parande (Magloy Tech); and Vishvesh Suriyanarayanan & Dylan Tan (Split)!

(Photo: Forbes)

In May, Breathonix's 60-second COVID-19 breath test, the BreFence™ Go COVID-19 Breath Test System, received provisional approval by the Health Sciences Authority (HSA) - a first for a breath analysis system in Singapore.

Jonathan Ng of SinFooTech was the only Singaporean named to the 50 Next list, an inaugural list of "the people shaping the future of gastronomy." The NUS spin-off and former Hangar incubatee is focused on upcycling soy whey into an alchoholic beverage, Saachi.

(Photo: 50 Next)

In May, it was announced that 37 projects had been awarded funding under the first SG Eco Fund grant call, launched by the Ministry of Sustainability and the Environment. Included amongst the awardees were NUS Enterprise-related start-ups Thryft and Ground-Up Innovation.

(File Photo: Thryft)

Reported funding for NUS Enterprise-affiliated companies:

- **Ajaib Technologies** - Series A extension; US$65 million
- **Andalin** - Series A; undisclosed
- **Atomionics** - Pre-Series A; SG$2.5 million
- **BunkerEx** - Acquired
- **Cyble** - Seed funding; US$4 million
- **dltledgers** - Series A; US$7 million
- **FairDee** - Acquired
- **Fatberry** - Pre-Series A; RM2.5 million
- **Glints**- Series C; US$22.5 million
- **Impress.Ai**- Pre-Series A; US$3 million
- **Itemku** - Acquired
- **Sirclo** - Series B3; US$45 million
- **Unbox Robotics** - Pre-Series A; US$1.2 million

All info based on public news sources.

FLASH BACK

NUS ENTERPRISE EVENTS & ACTIVITIES: APR - JUN 2021

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

APR

01	Meet the VC (featuring Genesia Ventures)
05	LLP Run 9 Final Presentation Day
06	NUS Enterprise@Singapore Science Park - Curie Connect
06	BLOCK71 SEA Booster Programme (W3 Workshop) - Pitching
07-08	NUS Enterprise Virtual Office Hours
13	BLOCK71 SEA Booster Programme (W4 Workshop) - Product Development
13	Virtual Dabao & Connect: Smart City Solutions with Aichi, Japan
15	Hungry for Disruption: Opportunities for a Better Food Future
16	BLOCK71 SEA Booster Programme Founders Circle: Hiring, Team Dynamics
20	BLOCK71 SEA Booster Programme (W5 Workshop) - Funding
20	Innovators' Roundtable: Accelerating Digitalisation and Innovation Efforts in the New Normal for the Maritime Sector
24	Fireside Chat x SDG Ideas Competition Launch
29	BLOCK71 SEA Booster Programme: Demo Day

MAY

05	Kopi Chat Deep Dive: Innovation's Impact on Sustainable Manufacturing in Asia
11	[ICE71] Live Webcast: Resilience, Reinvention & Returns – Learnings as Cybersecurity Funding Hits Record High
11	The Business of Sustainability - Why the UN SDGs Matter
17	Ask Me Anything: SEA Booster Programme
19	Kopi Chat Deep Dive: Finding Light - The Dark Side of AI in Cybersecurity
19	TAP Roadshow
26	UX and Bagels: Going with the (User) Flow
27	Virtual Fintech Forum 2021 Systems Innovation
27	Workshop: Reflexive Thinking Applied to the Singapore Food System
28	#FridayLearnings Episode 5 with Valerie Chow: How to Create a Marketing Campaign
28	SIA AppChallenge 2021 Roadshow: AppChallenge 2020 Finalists' Insights

JUN

01	NUS Enterprise@Singapore Science Park- Curie Connect
03	NUS GRIP Run 5 Lift-Off Day
04	SIA AppChallenge 2021 Roadshow: Challenge Statements Briefing Session #1
09	Unlocking Circular Economy
11	SIA AppChallenge 2021 Roadshow: Challenge Statements Briefing Session #2
18	PIER71 Smart Port Challenge 2021 Launch
18	Hello Tomorrow: Asia Pacific Challenge 2021
25	SIA AppChallenge 2021: NUS Enterprise Innovation Roundtable
29	SIA AppChallenge 2021: Student Track Virtual Roadshow #1, Digital Innovation and Singapore Airlines

USEFUL TINDER

WASTE NOT, WANT NOT: FOODTECH AND SUSTAINABILITY

NUS spin-off Kosmode has transformed spent barley grains into W0W™ noodles

When it comes to food supply, the world exists in the paradoxical state of having too much and not enough. According to the Food and Agriculture Organization (FAO) of the United Nations, an estimated 1.3 billion tonnes of food are wasted per year. And yet, there is an expected 56% shortfall in the amount of food produced today and that required to nourish the expected global population in 2050. Combined with climate change, the diabetes epidemic, a growing hunger crisis, and concerns over global supply chains, food insecurity is challenging governments, producers, and consumers to make systemic changes.

On 5 March 2021, NUS Enterprise organised its latest Industry Roundtable Series, "Sustainability in Foodtech: Waste Valorisation," to discuss the role technology can play in reducing food waste, specifically through its transformation into new products. Here are three novel ways our entrepreneurs and academics are contributing to a more sustainable world:

Participants:

- Florence Leong, Director of Kosmode Health
- Sew Shu Wen, Research Assistant at the NUS Food Science and Technology Department
- Phua Jun Wei, Chief Technology Officer of Insectta
- Lim Jie Ai, Ecosystem Developer at NUS Enterprise (Moderator)

1. Converting food side streams into functional food sources

More than 75 tonnes of spent barley grains are generated in Singapore per year as a by-product of the brewing industry, most of which end up in landfills. Rather than letting the protein and fibre-rich grains go to waste, however, NUS spin-off Kosmode Health is using its extraction technology to transform them into W0W™ noodles, a zero-waste and functional food product. What's more, the noodles are completely starchless and have no glycemic response- filing a market gap by providing a healthy staple alternative for diabetics.

The potential impact? If all of Singapore's spent barley grains were able to be converted, more than 650 million servings of W0W™ noodles could be produced, making a substantial contribution to Singapore's nutritional needs from what would otherwise have been wasted.

2. Using insects to valorise food waste

Black soldier fly farming is becoming popular throughout the world due to the larvae's ability to process organic waste into fertiliser, as well as its ability to serve as a high-protein alternative to fishmeal and livestock feed. Where Lotus-NUS Fund recipient Insectta differs from other insect farms, however, is in its proprietary biorefinery process that can extract chitosan, melanin, protein and probiotics from the larvae—highly valuable biomaterials with applications in pharmaceuticals, cosmetics and semiconductors, among others. Moreover, by using the byproducts of insect farming as the raw materials for its extraction process, Insectta is helping to create a circular economy within the insect farming industry while upcycling food waste.

3. Turning surplus bread into probiotic beverages

Supermarkets attract their customers in part through the visual display of stocked shelves. But maintaining this appearance of abundance also leads to greater waste: looking at the bread aisle alone, 28 tonnes of bread is wasted each month in Singapore. What is the alternative? A research group headed by Prof Liu Shao Quan at NUS' Food Science and Technology Department is exploring whether surplus bread can be biovalorised into a probiotic zero-waste beverage, enabling a functional food to be added back into the food supply chain and providing a non-dairy alternative to the market.

The NUS Industry Roundtable Series is a platform for exchange of knowledge amongst start-ups, researchers, and industry experts. Centred on a series of topics, the Industry Roundtable harnesses the university's innovation resources to uncover new trends and opportunities. Check out the NUS Enterprise website for more updates on future events.