ENTERPRISE
SPARKS
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Reimagining Maritime

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FEATURES

RED HOT — SPARKS interest with the latest in the start-up and entrepreneur scene within our community

TRAIL BLAZERS — SPARKS action with fireside chats and tips from experienced entrepreneurs

BRIGHT IDEAS — SPARKS ideas with different thoughts and perspectives

FIRED UP — SPARKS partnerships with industry and market leaders

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FLASH BACK — SPARKS interest in past events and activities

USEFUL TINDER — SPARKS food-for-thought

Editor's note

The COVID-19 pandemic has brought "The Great Pause" in more ways than one. While the impact has been broad and significant, it presents a chance for us to take stock and reassess the future; to identify what works and what requires modification as we reshape the way we live in the new normal.

The entrepreneurial and innovation ecosystem at NUS Enterprise has had to grapple with the pandemic's effects. We have chosen to embrace the uncertainty with optimism, rolling out various initiatives to help start-ups and innovators stay positive, and encouraging them to turn current challenges into opportunities. This issue of SPARKS brings stories that demonstrate the resilience and tenacity of our passionate entrepreneurs from various quarters.

The crisis has highlighted the necessity of digital transformation across industries, a key one being maritime. Themed "Reimaging Maritime," this instalment captures an array of PIER71's (Port Innovation Ecosystem Reimagined at BLOCK71) start-ups and activities, showcasing the initiative's bold effort in aggregating various stakeholders to digitalise the maritime industry. To provide opportunities to graduates facing a difficult job market, NUS has launched the Resilience & Growth (R&G) Initiative. NUS Enterprise will play a key role in the R&G by offering entrepreneurship traineeships which provide hands-on venture creation experience. The NUS Industry Liaison Office (ILO) has also introduced GRIP MAKE (Market Analysis, Knowledge Experimentation), aimed at enabling recent graduates to transform NUS research into deep-tech start-ups. NUS start-up companies have also stepped up to offer jobs and traineeships to the graduating class.

Two other accelerator programmes, ICE71 (Innovation Cybersecurity Ecosystem at BLOCK71) Accelerate and Lean LaunchPad Singapore, conducted virtual finales and events to keep their communities connected and engaged. Safelight, a deep-tech start-up from the NUS Graduate Research Innovation Programme (GRIP), also shared a timely discovery involving a novel visible light technology that can kill a variety of microorganisms continuously and safely.

As the adage goes; tough times don't last, tough people do – let's stand united and emerge stronger on the other side.

NUS National University of Singapore

NUS 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: Bhawani Balakrishnan (Lead), Katherine Chinn
Contributors: Thaveesha Diluni Thenuwara, Rebecca Koh, Priscilla Goh

RED HOT

OPPORTUNITIES TO REIMAGINE SOLUTIONS FOR THE MARITIME INDUSTRY

On 4th June, PIER71, a collaboration between the Maritime and Port Authority of Singapore (MPA) and NUS Enterprise, launched Smart Port Challenge (SPC) 2020, an annual competition for tech start-ups to reimagine their solutions for the maritime sector.

More on the Smart Port Challenge 2020

This year's challenge features 17 innovation opportunities, co-created with 15 maritime corporates and other partners. In addition to access to expert knowledge, available data and test-bedding support for their solutions, start-ups who are selected for PIER71 Accelerate, a six-week market and business model validation programme, will also have the chance to apply for an MPA grant of up to SGD50,000 to fast-track their prototype development and test-bedding. PIER71 Accelerate prepares the participating start-ups for meaningful collaborations with the corporates via a specially curated programme which includes masterclasses and workshops conducted by industry veterans and domain experts on key topics like product design and market validation.

The Launch Event

This year, despite the global pandemic putting a dampener on several events worldwide, the launch of SPC 2020 proceeded with a change in format. Unlike previous years, the event took to the virtual stage of Facebook Live, which meant a wider global audience. The event line-up included a wide range of speakers, including maritime corporates and veterans, past SPC finalists and representatives of MPA, NUS Enterprise and PIER71.

Thank you for joining us for the launch of Smart Port Challenge 2020.

Here are some highlights:

Ms. Quah Ley Hoon, Chief Executive of MPA, on three key messages in light of COVID-19

- The importance of finding room for greater collaboration and partnerships that are both local and international
- The need to seize the opportunity to accelerate digitalisation
- The value of being nimble and creative in developing business resilience

Professor Freddy Boey, Deputy President (Innovation and Enterprise) of NUS, on

- The continued relevance of the maritime sector amidst the pandemic in terms of aiding with the movement of essential goods to supporting trade and supply chains
- Commendable efforts of local start-ups who have scaled up measures to help the community cope with COVID-19, from helping local businesses shift online, providing internships or transporting critical medical supplies
- The key role of SPC in helping to address real problems in the maritime sector, as identified by the maritime corporates who are ready and able to adopt the viable solutions arising from the challenge

RED HOT

- **Mr. Kenneth Lim**, CTO, Innovation, Technology and Talent Development of MPA, on the reasons why start-ups should invest in the maritime industry
  - The vibrancy of the maritime ecosystem with players from government agencies, Institutes of Higher Learning and corporates as well as access to funding, R&D technologies and manpower
  - MPA's support with the digitalisation journey of start-ups
  - Access to Next Generation Tuas Port as a Living Lab with access to relevant technologies

- **Mr. Oh Bee Lock**, Managing Director of Ports & Logistics Navigators
  - Digitalisation efforts of the container shipping sector focused on 4 areas: digital connectivity; robotics and automation; smart systems; and process automation and platforms
  - Shift in focus areas resulting from COVID-19
  - Thoughts on the likely tech trends going forward

- **Mr. Nir Gartzman**, Co-founder of the DOCK, who tuned in from Israel to touch on collaboration across borders
  - The continued functionality of the international supply chain, despite the challenges of the pandemic
  - The increased value of collaboration with international partners, not limited to those in the maritime ecosystem, to allow for easy sharing of solutions, intelligence and resources to better cope with COVID-19 as a global front

Which start-ups should join?

- Start-ups at any stage of the development journey, from ideation to implementation
- Local as well as overseas start-ups with the intent of basing operations in Singapore after the programme
- Start-ups from any industry with solutions that can be reimagined for maritime

Why join Smart Port Challenge?

The maritime industry is on a digital transformation journey and PIER71's corporate partners are ready and committed to collaborating with start-ups with innovative solutions that can address their business challenges. During the launch event, we heard from Asiatic Lloyd Shipmanagement, Bernhard Schulte and Singapore Shipping Association on the need for robust testing and monitoring of drinking water quality on-board vessels. That's just one of the 17 innovation opportunities. The types of solutions that these maritime corporates are seeking range from data and vision analytics, business optimisation, automation, green technology and more. Start-ups can visit the PIER71 website to learn more about these.

We also heard from two alumnae on their experience participating in Smart Port Challenge. The sharing was from Ms. Kristina Lynge, CEO and Co-founder of C-LOG, a company that leverages blockchain and artificial intelligence (AI) to digitise crew documentation, and Ms. Nidhi Gupta, CEO and Co-founder of Portcast, a start-up that uses machine learning, AI and external data to predict the arrival times of cargo into ports to help make supply chains more dynamic and resilient.

Some key insights:

- The value of the programme in helping Kristina and her team as a start-up initially based in Denmark
- The large range of dedicated mentors and the inclusion of masterclasses conducted by expert industry players with a first-hand understanding of the marketplace
- The continued support of the alumni network, even after the end of the programme, with support ranging from sourcing of interns or full-time staff, to marketing boosts

For more details on Smart Port Challenge 2020, visit pier71.sg/smart-port-challenge/smart-port-challenge-2020. The closing date for submissions is ***10 August 2020***.

Recordings of the launch event are available on our Facebook page and YouTube channel.

Facebook page

YouTube channel

PIER71

Port Innovation Ecosystem Reimagined at BLOCK71

SMART PORT CHALLENGE 2020

Calling all **tech entrepreneurs** with ambition to **reimagine** your solutions for **maritime**

- 16 **innovation opportunities** based on real business challenges put forth by **maritime** corporates and 1 on **maritime decarbonisation**
- Exclusive 6-week **market validation** and **customer discovery** programme with **mentorship**
- Privileged access to maritime corporates, industry veterans, domain experts, VC partners, workshops and masterclassess
- Eligibility for grant applications of up to **S$50,000**
- Cash prizes of **S$10,000**, **S$5,000** and **S$3,000** for top 3 winning teams
- Ongoing support for all Smart Port Challenge alumni

Submission Deadline
10 AUGUST

SIGN UP NOW

For details, visit
pier71.sg/smart-port-challenge

Innovation opportunities co-created with:

alpha ori · AL · Bernhard Schulte · Eastern Pacific Shipping · ECOLABS Centre of Innovation for Energy · Jurong Port · Klaveness Digital · ONE Ocean Network Express · Oil Spill Response · PIL · PSA Marine · PSA Unboxed · SSA Navigating the Future · Symphony Creative Solutions · Uniteam Marine · Yusen Logistics

Organised by: MPA Singapore · NUS National University of Singapore / NUS Enterprise · TNB Ventures

Supported by: Enterprise Singapore · SSA Navigating the Future

Part of: Maritime Singapore

NUS LAUNCHES RESILIENCE & GROWTH INITIATIVE

The COVID-19 pandemic has upended economies, weakening the job market and resulting in increased unemployment around the globe. To aid its young graduates in kick-starting their careers during this unprecedented and difficult time, NUS has launched the Resilience & Growth (R&G) initiative, providing

1. 1,000 full-time salaried positions and paid traineeships in diverse professional roles in multiple fields;
2. A comprehensive suite of courses and programmes to sharpen graduates' competencies.

Traineeships will run up to 12 months and fall into four categories: (1) executive and professional, (2) education, (3) research, and (4) entrepreneurship.

NUS Enterprise will play a direct role in the effort by overseeing up to 80 entrepreneurship trainees and providing them with hands-on venture creation experience. These trainees will work in teams of 3-4 to turn their ideas or technologies into a business. They will be guided by faculty members, venture managers, commercial champions, and/or entrepreneurs who will provide the knowledge and mentorship necessary to build a start-up.

For interested graduates who want to be a part of the programme, but don't have their own idea or technology, the Industry Liaison Office has also developed GRIP MAKE (Market Analysis, Knowledge Experimentation). The initiative will guide recent graduates to transform NUS research into deep-tech ventures through the process of identifying business opportunities, prototype development, market validation and business plan development. Successful GRIP MAKE teams may also apply for GRIP support, with potential investment of up to SGD100,000 in their ventures.

Companies in the NUS start-up ecosystem have also stepped forward to offer close to 300 positions for recent NUS graduates:

- 2359 Media
- 99.co
- Acumen Research Laboratories
- Augmentus
- BeeX
- Carousell
- Circles.Life
- Digify
- Essilor
- Iota Medtech
- Jaga-Me
- MindFi
- MoneySmart
- Patsnap
- PigeonHole Live
- Point Star
- ShopBack
- SMT
- StaffAny
- Stendard
- Taidii
- The Oddle Company
- Trabble
- Visenze
- Workato Singapore

RED HOT

ICE71 DIGITAL CONFERENCE

In this unprecedented time of COVID-19, ICE71 (Innovation Cybersecurity Ecosystem at BLOCK71) organised a half-day conference titled "Cybersecurity in the light of COVID-19: Now & next" on 28 May 2020. It comprised a series of webcasts on both current and new cybersecurity challenges that have emerged globally as more people work and study from home. There were over 200 attendees from more than 5 countries across the world, including the US, Australia, and India.

Industry experts shared their views on three key areas;

- Remote working: The need for speed and security
- The human element of cybersecurity
- IoT security: Are we ready?

(Top: L to R) Shamane Tan, Lim Quan Heng, (Bottom: L to R) Allan Watanabe and Magda Chelly sharing on the need for speed and security in remote working.

Allan Watanabe, Managing Director of Pipeline Security; Magda Chelly, Managing Director of Responsible Cyber; Lim Quan Heng , Country Manager, Southeast Asia at Privasec; and Shamane Tan, Founder of Cyber Risk Meetup and APAC Executive Advisor at Privasec, focused on how IT infrastructure supports this inevitable shift into a different way of working as more employees are working remotely. Issues surrounding security management, remote access and the 5G future which poses more attack vectors were delved into.

In their discussion on the human element of cybersecurity, Mohd Noordin, CISO at Circles.Life; Kopal Agarwal, VP of Business Development at Uniken; Jean-Luc Khaou, Chief Business Officer at eShard; Shaily Shah, Founder & CEO at Blue Phish; and Sharon Ko, Global Black Belt specialist in Advanced Security Analytics at Microsoft, focused on data privacy and security challenges that arise from the increased usage of COVID-19 related and consumer apps and the rise of phishing scams.

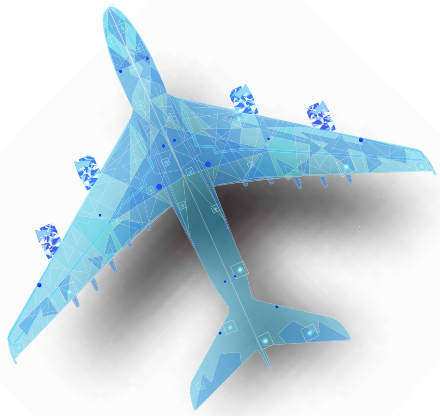
With more people using IoT technologies amidst COVID-19, experts shed light on relevant security needs and arising challenges, what happens if these remote technologies are tampered with and how to mitigate cybersecurity threats. These experts are Solo Kombani, COO at Aiculus; Sumanta Bose, Founder & CEO at Datakrew; Kunal Sehgal, Cyber Evangelist & Director at a Global Bank; and Albert Kuo, President at Asia Pacific Business Consulting.

To get the latest news and happening on ICE71, visit: ice71.sg

SINGAPORE AIRLINES

AppChallenge

The leading digital innovation challenge for aviation



Redefine the travel experience with Singapore Airlines

Start-up Track | **Submissions Closing: 12 July 2020**

Are you ready to take the aviation industry to the next level?

This challenge is an opportunity for start-ups at the forefront of innovation to work with the world's leading airline and be part of the driving force in changing the way we travel.

With 10 Challenge statements featured this year, we are calling out to start-ups from all over the world to join forces with us to lead the change.

Up to 5 Finalists will be selected to develop proof of concepts through the SIA Accelerator Programme.

Submit your solutions now at: https://appchallenge.singaporeair.com/startup

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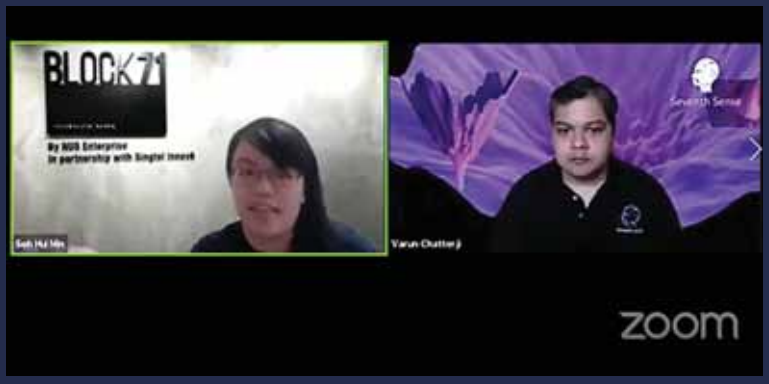
A SERIAL TECH ENTREPRENEUR'S CHALLENGES & OPPORTUNITIES

TRAIL BLAZERS

For our Kopi Chat Da Bao session on 6 May, we invited Varun Chatterji, a three-time serial entrepreneur to share with us the most salient takeaways he's gleaned from his decade-long experience as a start-up founder. Varun, an NOC alumnus, is currently the co-founder and chief software architect of Seventh Sense AI, an edge computer vision and AI company.



Soh Hui Min (left) of NUS Enterprise with Varun Chatterji, co-founder of Seventh Sense AI.

01
Starting up is not as easy as it seems

There is often a misconception that an entrepreneur only has to formulate an idea, get investments and take on the leadership role in a start-up. In reality, Varun has to work with his team on almost everything that needs to be done, including coding, UI and UX work. He thinks of his role in Seventh Sense AI as a facilitator that helps the team in whatever way he can.

02
Validate first

While having a brilliant idea forms the base of a business, it is only sustainable and profitable if it has received validation. As Varun mentioned, it is easy to be self-convinced that your idea will work, only to find out that there is no market-fit for it. Starting a company only takes 15 minutes, so don't rush into it. If you validate the idea before setting up a company, the runway for your business will be a lot longer.

03
Financial woes are top of entrepreneurs' minds

Entrepreneurship is often accompanied by financial instability, especially at a company's early stages. Varun was just a fresh graduate when he started his first company, tenCube, with his two co-founders. He recalled the three of them deciding what to eat at a hawker centre with just SGD300 left in their bank accounts. Luckily, they persevered and further funding came along before tenCube was acquired by McAfee.

04
Prioritisation is key

Resources are limited for a start-up, so it is impossible to pursue all of the opportunities offered to you. At the same time, an entrepreneur can't be completely blind to opportunity too. Thus, a successful entrepreneur needs to be able to prioritise and focus on the company's needs.

05
Don't forget about corporate social responsibility

A pointer that Varun took away from the ongoing COVID-19 situation is that the opportunity to exercise his company's social responsibility will not be wasted. Seventh Sense AI has put its other projects on hold to develop covert temperature screening technology using machine learning and facial recognition, which has since brought about more opportunities for the start-up.

MARITIME LOGISTICS SHARING PLATFORM TAKES OFF

Ship Supplies Direct (SSD) is a start-up focused on using technology to improve marine logistics and supply chain. Its Maritime Logistics Sharing Platform, SimpFleet, helps reduce delivery costs by 20 - 30% and waiting time by up to 60%.

Founded in 2018, Singapore

Eric Chean	**Chin Rui Chew**
CEO & Co-founder	CTO & Co-founder

The Journey So Far

With 10 years of working in offshore and marine, oil and gas, as well as running his own businesses, Eric Chean is no stranger to the maritime industry. His interactions from his first two start-ups (a ship-broking business and a digital marketplace for ships) led him to the realisation that he could channel his interest in digitalisation towards optimising the maritime supplies space. This was how SSD was founded.

When PIER71 launched Smart Port Challenge in 2018, one of the innovation opportunities matched very closely with the problem that SSD was aiming to solve. As the company did not have a full-fledged solution at that time, Smart Port Challenge offered SSD the ideal platform for getting a deeper understanding of the problem and getting market validation. As one of the selected finalists, SSD also received a S$50,000 grant from the Maritime and Port Authority of Singapore (MPA). This allowed them to fully develop their application and embark on a pilot project with PIER71's corporate partners including PSA International, Wilhelmsen and Wärtsilä post - Smart Port Challenge. More than a year later, they are continuing to make steady progress by focusing on quality and delivering tangible value to customers. PSA unboXed, the external innovation and corporate venture capital arm of PSA International, has also invested in SSD as a result.

Key Results

In addition to solving the problems of multiple parties with a single app, SimpFleet has also shown tangible progress as part of the pilot project with PSA International. All this even before the solution has reached maturity.

- up to 30% reduction in delivery costs
- up to 3 hours less waiting time per delivery

Looking Forward

By moving up the value chain to include warehousing and customs clearance, SSD is becoming more like a digital freight forwarder for the marine supplies industry. As they continue to refine their platform, SSD plans to raise a seed round of SGD1 million to grow their capacity and warehouse space, as well as extend their presence to support clients outside of Singapore, particularly in Korea, Dubai and Europe.

> **"PIER71 provides a platform for start-ups to work and engage with maritime corporates. It opens up an honest conversation, allowing us to build relationships and think deeper about real challenges."**
>
> **Eric Chean, CEO & Co-founder**

VOICES FROM MARITIME START-UPS

TRAIL BLAZERS

PIER71 is the gateway to the maritime industry in Singapore. With its vast repository of corporate partners, we were able to validate our ideas and quicken product development. Support is always available, with friendly staff and an encouraging community of maritime start-ups at PIER71."

Dr Vivek Premanadhan
CEO & Founder, Dravam

With PIER71, our capabilities and solutions are propelled into the spotlight of clients who need them most. PIER71's network extends beyond geographical boundaries and industries, providing resources for everything a start-up needs, from working space, mentoring to funding possibilities."

Keith Ng
CEO & Co-Founder, Performance Rotors

PIER71 is an excellent platform for the maritime industry to share challenges, problem statements and innovative solutions as we harness each other's strengths to build a more efficient maritime ecosystem. Through PIER71, Jurong Port has significantly strengthened our partnerships with start-ups to test-bed solutions for our waterfront transformation."

Ho Kong Meng
Senior Manager, Digital Operations,
Jurong Port

The immersion in the port ecosystem of Singapore literally launched our business. We validated both our technology and the business case. Being part of the PIER71 Smart Port Challenge opened doors, coaching was great. Winning the third prize is the icing on the cake; it put Teqplay on the map in Asia."

Léon Gommans
CEO, Teqplay

Being part of PIER71 has helped us immensely in building up a relevant network and creating a stable foundation in Singapore. It provided access to world-class mentors as well as a network of other start-ups. PIER71 has been an integral part of our efforts in building a maritime portfolio and getting those first crucial projects."

Kristian Andreasen
CEO, Kanda

Participation in PIER71 opened up the maritime industry to us, and the runner-up recognition quickly took us to countries across the world. Additionally, the mentorship received at PIER71 was invaluable and today we are able to use those lessons to chart our journey through 4 continents and 10 countries."

Ashutosh Prasad
CEO, KoiReader Technologies

TRAIL BLAZERS

NUS START-UPS DOING GOOD FOR COVID-19

Over several months, the world has seen the unravelling of a global pandemic which turned the financial market on its head, sent several countries into lockdown and took the lives of many. However, amidst the crisis, we hear stories of unsung heroes who are doing their part to alleviate the dire circumstances and among them are a few start-ups that NUS is proud to call our own. From making test kits more accessible to helping fellow businesses, start-ups hail from NUS Enterprise and NUS Industry Liaison Office's various programmes, such as the NUS Graduate Research Innovation Programme (GRIP).

I Testing Made Effective and Accessible

Safe and effective specimen collection

Tusense, an NUS GRIP MedTech start-up, has created the DewEasy™ series, patented non-invasive cough-based specimen collection devices to test for bacterial and viral infections causing pneumonia. Targeted at lower respiratory infections, all patients must do is place the device at their mouth when they cough, and the device will capture the cough droplets for further lab tests.

Currently in clinical trials, this method will be easier to perform and does not cause physical discomfort as compared to the existing nasal swab method. Perhaps even simple enough for the collection to be done by the patients in their own home, the idea is for collection to be done remotely with assistance from clinicians over a video call, with test samples safely delivered to the diagnostic labs for processing. This method can reduce physical contact between all parties, significantly reducing the risk of exposure to the virus.

Making medical equipment and test kits more accessible

Today, specimen collection is typically done via Nasopharyngeal Swabs inserted into a patient's nasal cavity. However, to keep up with the exponential increase in demand for these swabs, Structo, a 3D printer solution provider and former NUS Enterprise incubatee, has allocated 3D printing resources for the mass production of these swabs. The Structo-manufactured swabs are listed under the FDA and the Health Sciences Authority, Singapore, ascertaining their quality. Apart from manufacturing the swabs, Structo has also made available

Structo, a 3D printer solution provider and former NUS Enterprise incubatee, has made accessible digital files with instructions on how to 3D print face shields at home or at facilities.

the digital files containing instructions on 3D printing face shields at home or at facilities. These shields cover the wearer's entire face, including the eyes, and can be worn on top of a face mask. They can be an effective alternative to face masks or simply an added precautionary measure.

II Supporting the Frontliners

Our frontliners have been working tirelessly to help manage this unprecedented outbreak, oftentimes putting their safety at risk. As a symbol of solidarity and appreciation, many companies and start-ups have diverted resources and attention to helping these essential workers.

Helping to identify potential virus carriers

Biofourmis, a former incubatee from THE HANGAR, has agreed to help the University of Hong Kong with remotely monitoring 50 patients tested positive for the virus and 150 others under quarantine orders. Biofourmis's Everion is a biosensor that is to be worn on the upper arm of the study's participants for 24 hours.

It collects important data like heart rate and blood oxygen levels and sends it to a cloud-based system for further analysis. One of the biggest concerns is that infected patients may only exhibit mild symptoms, and only after several days. Therefore, remote monitoring systems like Biofourmis's Biovitals Sentinel could be the solution to faster and more accurate identification of virus carriers and by extension, allow for timely intervention.

Using AI to ease the workload of frontliners

Local medical start-up BotMD, in collaboration with NUHS, has unveiled the NUHS-Bot MD AI assistant that enables clinicians to easily obtain hospital information through free text messages. Centralising information on a single interface saves time for these healthcare workers who would otherwise have to search the web for protocols or make phone calls to pharmacies to obtain the relevant facts and details. NUHS has also been using the bot to broadcast the latest COVID-19 directives and key protocols to the frontliners in real-time.

BotMD utilising AI vai their mobile app to provide instant support to frontline medical staff in their native language.

Continuing their collaboration with NUHS, the start-up also introduced SGDormBot to assist with the care of migrant workers in their dormitories, where medical coverage is not 24/7. Via WhatsApp, regular messages are sent in the workers' native tongue, to remind them to monitor their vitals like body temperature and heart rate. Abnormalities will be immediately notified to NUHS clinicians. This bot is currently used at 6 dormitories in Singapore.

III Helping Society Tide Through

Keeping our migrant workers safe

Just like BotMD, many other non-profit organisations are also helping the migrant worker community during this time of crisis, part. One such example is THE HANGAR's former incubatee SDI Academy, a social enterprise championing the welfare of migrant workers in Singapore. By joining hands with former BLOCK71 Singapore incubatee FundedHere, SDI Academy has raised close to SGD26,000 to donate hygiene kits and essential food items like rice and oil to the workers. This amount was more than double the expected SGD10,000 and was garnered in a matter of 10 days. Given that for every thousand dollars raised, 100 workers received a hygiene pack, the impact of this initiative on the local migrant worker community was significant.

Businesses helping businesses

A number of Singapore-based start-ups have also stepped up to assist their counterparts. Carousell, a web-based buying and selling platform headquartered in Singapore, is collaborating with delivery service providers like uParcel and blu to offer affordable contactless delivery options to SMEs with verified Carousell accounts. The start-up has also launched a new local Food and Beverage (F&B) category for local hawkers whose operations have been disrupted, helping to keep their sales numbers stable. Carousell is also collaborating with the Singapore Brand Office to launch a #supportlocal campaign — MADE in SG — to support creative professionals whose incomes have been affected by COVID-19.

As if that's not enough, Carousell has also launched its CarouBiz Booster Package, an initiative to provide 1000 help packages to heartland retailers and service merchants to help move their businesses online. The package is a six-month CarouBiz subscription with various tools and services to help businesses raise sales.

Carousell's CarouBiz Booster Package, an initiative to help fellow businesses brave the pandemic.

It is indeed heartening to see our start-ups helping one another as well as the society at large. What better way to brave a pandemic that knows no national boundaries, than by having the world-wide start-up community rally together to cushion the blow?

BRIGHT IDEAS

KEEP IT SANITISED, KEEP IT SAFE

COVID-19 has made an unprecedented impact on businesses. This impact has been felt not only across borders but perhaps more disturbingly, across sectors. Businesses that did not typically perceive themselves to be hygiene-sensitive, such as public transport, have had to prioritise hygiene. And even those that did, like healthcare and F&B, have had to re-evaluate their hygiene strategies. A part of this re-evaluation stems from the fact that these businesses have traditionally deployed several measures to keep germ counts low. Yet, despite these measures, the current pandemic has ground their activities to a halt.

It is well-known that infection most commonly spreads through contaminated surfaces. 'High touch' surfaces - surfaces that come into contact with human hands more frequently - typically pose the highest risk of transmitting infection. Different environments can have different 'high touch' surfaces. For example, within a shopping mall, ATM keypads, escalator handrails and shopping trolley handles are all 'high touch surfaces. Likewise, in a typical office, keyboards, elevator buttons and telephones get contaminated very easily.

Insufficiency of Episodic Disinfection

Currently, the typical way that these surfaces are disinfected is via manual cleaning with chemicals, ultraviolet (UV) light and hydrogen peroxide vapours (in a hospital setting) or ozone vapours (within the food industry). However, these disinfection methods are either unsafe to be used around human presence or impractical for businesses to implement continuously. Hence, they end up being 'episodic' affairs.

Unfortunately, high touch surfaces become re-contaminated very easily - almost immediately after the last episodic cleaning takes place. All it takes is contact with an unclean hand, or even a slight breeze, to introduce more germs. Because of this, episodic cleaning is insufficient to keep surfaces sanitised.

The Future: Continuous Disinfection?

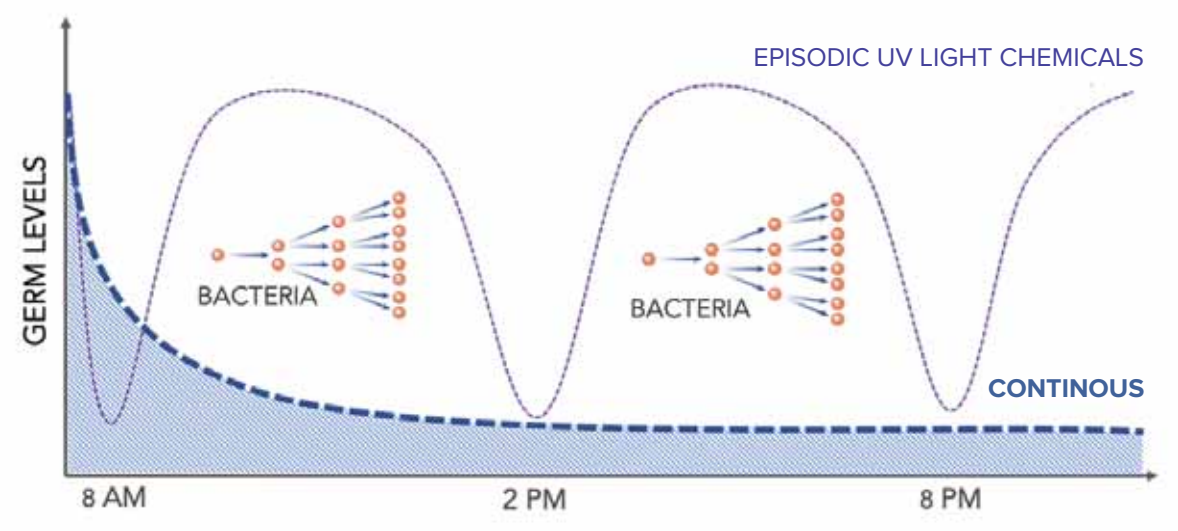
An emerging category of disinfection technologies is continuous disinfection, which is designed to supplement existing episodic methods to reduce infection risk. Continuous disinfection technologies work slowly and steadily round-the-clock to keep surfaces clean, effectively ensuring that once a surface is sanitised, it stays sanitised.

At the National University of Singapore, we have developed a novel visible light technology that can kill a variety of microorganisms continuously and safely.

This technology is based on the scientific principle of photodynamic inactivation (PDI), which targets light sensitive compounds that are naturally present inside microbial cells. Once excited by the right kind of light, these compounds trigger a series of toxic reactions inside these cells and eventually cause their death.
PDI opens up the possibility of continuous disinfection because the antimicrobial action can be achieved using visible light, which is perfectly safe for humans. This is in stark contrast to the more commonly used UV light, whose associated health risks render it unsuitable for continuous use.

We started working on this technology several years ago under the guidance of Dr. Hyun-Gyun Yuk and Professor Zhou Weibiao, and have now spun off

COMPARISON OF DISINFECTION APPROACHES



BRIGHT IDEAS

a company, SafeLight, that aims to use this technology to make a difference in the real world.

In this endeavour, we have been ably supported by NUS Enterprise through the Lean LaunchPad Programme and the NUS Graduate Research Innovation Programme.

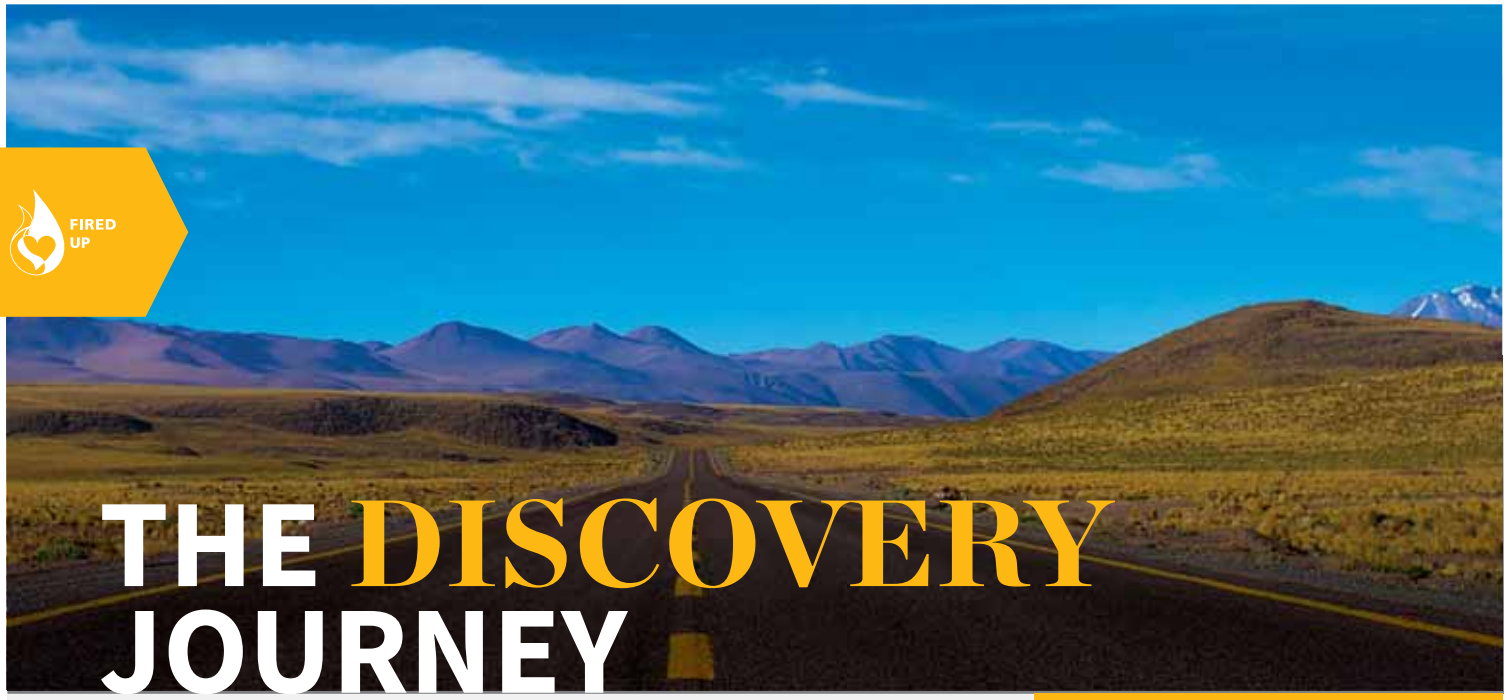
We are currently developing PDI-based devices that will help businesses enhance hygiene in their operations. These devices will enable continuous disinfection of surfaces within facilities, helping businesses reduce chances of contamination in their products. Depending on the business, this could lead to benefits such as lower re-hospitalisation rates (healthcare), longer product shelf-life (food processing) and enhanced brand reputation (hospitality).

Food processing is definitely one sector that stands to benefit from continuous disinfection. The above pictures show how a tomato illuminated with SafeLight (left) can avoid spoilage when contaminated with mould, whereas a tomato that is simply refrigerated (right) cannot.

Continuous disinfection processes are still in their infancy and some more work needs to be done to verify their value. Pilot projects performed in diverse environments will go a long way in this endeavour. In some of these environments such as food processing, the effect of light on the food material is likely to be an important factor influencing technology adoption.

Which continuous disinfection technologies find a place in tomorrow's world remains to be seen. But one thing seems certain. Given how COVID-19 has highlighted the limitations of episodic methods, it is a matter of when, not if, continuous disinfection will be the new standard.

By Dr Vinayak Ghate, Research Fellow, NUS



THE DISCOVERY JOURNEY

Launched in 2013, the Lean LaunchPad Programme (LLP) Singapore is the first-ever entrepreneurial education platform for researchers. It aims to assist them in the commercialisation of their technologies out of academic research through a 10-week market validation and customer discovery programme. After a gruelling 10-weeks, every LLP run ends with the Final Presentation Day, which serves as a platform for the researchers to showcase their products and progress. As such, the concluding event for the 7th LLP round took place over 6-7 April 2020, only this time, it was virtual!

In light of the COVID-19 pandemic, the 7th cohort faced unprecedented and out-of-the-blue challenges, especially in terms of conducting market validation and customer outreach. However, our teams managed to swiftly adapt by resorting to alternative means of gathering customer data, such as through online communication platforms like Zoom, Skype and WeChat. The situation warranted the teams to be flexible and quick on their feet, and unsurprisingly, each of them delivered in a manner nothing short of exceptional.

These adaptations and pivots were just some of the many areas covered during the Final Presentation Day, which took place over Zoom. From as early as 9am on the first day of the event, panellists, mentors, organisers and audience members gathered online as the researchers walked them through their product development journey.

The two-day event covered three tracks (MedTech, AgriFood Tech, and Engineering), showcasing a total of 15 teams comprising 140 participants. The session ended with a rigorous Q&A by the teams and panellists.

Panellists' Views

> Glad to see that COVID-19 has not dampened the entrepreneur spirit of the LLP participants, it actually makes the "better prepared" teams standout MORE!!
>
> **SC Cheong**
> *Director, AgriTech Instructor, Mdesign Solutions Pte Ltd*

> I have been engaging the start-up ecosystem for many years and the LLP programme is always one that gets me excited. The participating teams all have great ideas backed by solid science / technology, but what truly stood out was their ability to constantly evolve and iterate their business plan as they receive new information.
>
> **Malcom Chua**
> *Senior Manager, Sumitomo Corporation*

Our graduating cohort of LLP teams did not disappoint. Despite the trying circumstances, we are glad to see that the pandemic did not hold any of the teams back. If anything, it magnified their resilience and entrepreneurial drive. We wish our graduates all the best as they keep this passion alive and seek greater heights in the not-so-distant future.

Participating Teams:

MedTech Track

LILOSS - A health-promoting vegetable extract that blocks dietary fat absorption and regulates lipid levels

PROSPEED - An AI auto-graded digital processing speed test that pre-screens for cognitive impairment through data-driven medicine

MELVIN - A digital conversational learning platform that leverages clinical and genomic data in precision oncology to help clinicians improve evidence-based healthcare delivery

SMART AORTICc PHANTOM - A patient-specific 3D model that enables surgeons with realistic training of complex aortic-centric surgeries to improve patient outcomes

AgriFood Tech Track

DEME TECH - A smart ecosystem (Self-Service Modified Atmosphere Packaging with Artificial Intelligence) to manage the maturity, shelf life and food security of fresh produce(s)

ALTERPACKS - Provides a waste-to-worth integrated solution that delivers fresh produce in any space and at any time

REMEATS - Ethical lab-grown steak - integrated solutions from multi-cell culture to texture

POCT - Provides home-based rapid and user-friendly health monitoring solutions for the veterinary sector

INTEGRATED URBAN FARMING SYSTEM - Reprogramming urban agriculture through innovative solutions for sustainable future foods

ME-NOODLES - Enabling creation of novel noodles with personalised nutrition and optimised textures

Engineering Track

NANO TECH - Our Focused Proton & Ion Beam system with sub-10nm resolution will revolutionise: Nanolithography, Ion Implantation & 3D Imaging for Failure Analysis

MANTA - A low cost, clog-resistant, high-performance filter for industrial applications, inspired by the Manta Ray FiberTune - An innovative design to deliver affordable, user-friendly, and alignment-free tunable green & red laser for research and industrial applications

STATIC WARRIORS - Customisable high-performance novel non-charging material for total elimination of electrostatic charge generation at source to prevent product loss and increase work productivity

BTO (Barium Titanate Optoelectronics) - Patented Barium Titanate material that will disrupt how electro-optic modulators are made

NOC START-UPS RISE TO THE OCCASION

In the current unprecedented time, the university has stepped up efforts in supporting recent graduands through the NUS Resilience and Growth Initiatives that have been rolled out. It was extremely heartening when some of our NOC companies responded to the call by offering to take on multiple graduands each, to provide opportunities to learn and acquire skills and experiences that could potentially prepare them for better career prospects when the economy improves. Here we gathered some views from the companies in our ecosystem to find out how they are positioning themselves for resilience and growth as well as contributing back to the NUS community.

99.co

We set our sight on the future. You can see this as a threat or an opportunity - the truth is it's both - how to have an opportunity-focused mindset is going to determine who the winners and losers will be.

Darius Cheung, Founder & CEO

ShopBack

ShopBack has implemented measures to ensure that it emerges from this crisis stronger, and remains focused and committed to bringing value for users and merchants during this unprecedented time.

Joel Leong, Co-Founder

Carousell

In this unprecedented time, our focus is on helping local businesses, talents and the marginalised. We hope that by riding through the storm together, we'll all emerge from it stronger.

Marcus Tan, Co-Founder

StaffAny

It's not what you have done, but responding to the new normal that will create the greatest impact. Let's work towards transforming the future of hourly work!

Janson Seah, Co-Founder

NEWSFEED

01

In April, ICE71 Accelerate launched its fourth (and first virtual) run, with nine participating teams from around the world. The programme concluded in June 2020.

02

In April, several NUS Enterprise-related individuals and companies were included on this year's Forbes 30 Under 30 Asia list:

- **Ajaib** (former BLOCK71 incubatee)
- **Aruna** (Alipay-NUS Social Innovation Challenge Winner)
- **Gush** (awardee of our Practicum grant)
- Kai Chit (Angus) Luk, co-founder, **EventXtra** (former BLOCK71 incubatee)
- **SinFooTech** (NUS spin-off)
- **Shannon Lee Chaluangco**, Director, MDI Ventures (NOC alumna)

03

In May, NUS Enterprise and MPA announced that 12 companies which had participated in the Smart Port Challenge 2019 have each been awarded SGD50,000 in grant funding to conduct prototype development and test-bed their near market-ready solutions.

04

In May, NOC students Ryan De Souza, Xavier Liew, Marcus Ong and Chester Sim won the Razer Fintech Digital Hackathon.

Their team, Money Move$, developed a prototype app which provides a personalised and curated experience for millennials to save and allocate funds for their lifestyle.

05

New funding and M&A announcements:

- **Insectta** - Seed
- **Split** - Seed
- **Tinvio** - Seed
- **Hoow Foods** - Pre-Series A
- **PSLove** - Pre-Series A
- **Wiz.AI** - Pre-Series A
- **Holmusk** - Series A
- **Qoala** - Series A
- **Workstream Technologies** - Series A
- **Endofotonics** - Series B
- **Nium** - Series C
- **Cashlez** - IPO
- **Secucial** - Acquired
- **Tokocrypto** - Acquired
- **Sirclo** - Merger

FLASH BACK

NUS ENTERPRISE EVENTS & ACTIVITIES: APR - JUN 2020

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

APR

- 01 Kopi Chat Da Bao with Eezee
- 06 Lean LaunchPad Singapore e-Final Presentation Day
- 7-23 ICE71 Accelerate
- 14-15 NUS Enterprise Virtual Office Hours
- 18 Kopi Chat Deep Dive into Women in Tech to Impact
- 21 Business Clinic: BLOCK71 Jakarta x Advoshield
- 24 Startup Weekend Singapore 2020: Fight for the Future
- 27 ICE71 Investor Series: Investing in Cybersecurity Startups
- 27 Startup KongKow x RB Consulting: Marketing Strategy in Times of Difficulty
- 29 i360 : Edutech in Times of Crisis
- 30 Meet The VCs Vol. 4 with Gobi Partners

MAY

- 04 IF Academy Vol. 2 Online Class: Marketing Strategy After Eid Mubarak
- 06 Kopi Chat Da Bao with Seventh Sense's Varun Chatterji
- 06 ICE71 X SGTech | Doing business during COVID-19: Winning behind the screens
- 06 Startup Kongkow with Prixa.ai: The Role of Healthtech in COVID-19
- 12-21 Ocean of Opportunities Closed Door Roadshows
- 12 Startup Kongkow with Qlue "Understading AI & Big Data"
- 13 Founders Circle
- 14 Meet the VCs Vol. 5
- 14 ICE71 Expert Series: The pdf that could cost you a million dollars
- 20 Meet the VCs Vol. 6
- 26 The Future Workforce: How We Can Prepare For The Inevitable
- 27-28 NUS Industry Roundtable Series - Explain My Research: Drug Delivery & Precision Medicine
- 28 GRIP MAKE Info Session 1
- 28 ICE71 Digital Conference| Cybersecurity in the light of COVID-19: Now & Next

JUN

- 01 GRIP MAKE Info Session 2
- 03 NUS Enterprise DaBao & Connect Session with Japanese Corporate and Investors: E-Commerce & the Digital Economy (via Invite-Only)
- 03 Wonder Women of APAC: Session 2 – Live Interview with Irma Surya of Plato
- 04 Kopi Chat Da Bao with Jennifer Zhang, Co-Founder and CEO of Wiz.Ai
- 04 PIER71 Smart Port Challenge 2020 Launch (Live Stream)
- 04 JUMPStart MarketStart Series: Cracking the Australian Market: The Importance of Building Clinical Bridges
- 04 GRIP MAKE Info Session 3
- 05 Kopi Chat Deep Dive: A focus on agritech- innovation bearing fruits
- 09 i360 Edutech "Mapping the EdTech Investment Landscape in Southeast Asia"
- 09 GRIP MAKE Info Session 4
- 10 Wonder Women of APAC: Session 3- Live Interview with Yuliya Sergina of Aplace
- 10 BLOCK71 x AWS: Workshop on Modern Applications
- 10-11 NUS Enterprise Virtual Office Hours (alumni edition)
- 11 Ask The Expert Series 1 with Indogen Capital "Black Swan" Event
- 12 SIA AppChallenge 2020 Virtual Roadshow- Featuring Vim.AI
- 12 GRIP MAKE Info Session 5
- 13 IF Academy Vol. 4 "Digital Marketing Fundamentals"
- 17 Wonder Women of APAC: Session 4- Live Interview with Camilla Cooke of Xinja
- 18 PIER71 SPC2020 Roadshow
- 19 SIA AppChallenge 2020 Virtual Roadshow- Featuring Dreamworld AR
- 20 IF Academy "Business Data Analytics"
- 22 Leading and Making a Difference in times of Crisis
- 24 Wonder Women of APAC: Session 4- Live Interview with Wei Shuan Chang of Womany
- 25 PIER71 SPC2020 Roadshow
- 25 ICE71 Accelerate 4 Demo Day
- 26 FoodTech Event with IPI
- 29 NUS Enterprise Innovation Roundtable- Uncover opportunities when travel restarts

USEFUL TINDER

GRAPHENE - EXPLORING POSSIBILITIES

(L to R) Ning Png, PIER71 Programme Manager, 2DM's Application Development Specialist Foo Chwan Chieh and Co-Founder & CTO Dr Ricardo Oliveira.

On 26 March, PIER71 hosted 2DM's Co-Founder & CTO Dr Ricardo Oliveira and Application Development Specialist Foo Chwan Chieh via a live webcast* to share their experience and insights about the "wonder material" graphene and its application for the maritime industry.

Overcoming the cost-price barrier of producing high quality graphene, 2DM's ability to reap economies of scale suggests an opportunity for interested stakeholders to incorporate the material into their products at affordable prices. Here are snippets of the session:

> The Building Block of Graphite

Stronger than steel yet lighter than paper, the 2D material graphene was discovered from pencil lead. Well-reputed for its strength and thinness, it is also known for being an excellent conductor of heat and electricity.

> Graphene in Everyday Lives

Owing to its transformative power when added to other materials, the use of graphene has already been embedded in our daily lives via our mobile phones, shoes and clothing. Chwan Chieh illustrates an example of combining graphene into rubber in car tyres to improve the durability and strength of the original material.

> Graphene and Maritime

Notably, 2DM's first foray into the success of graphene was evident in its anti-fouling properties in paint coatings for maritime applications. Besides increasing the lifespan of their client's product from 3 to 7 years, 2DM estimates that their graphene technology could offer potential savings of USD6 million per ship every 5 years.

> 'Infinite' possibilities

2DM emphasises that there is endless potential to the benefits graphene could bring as an industrial additive to enhance properties of industrial materials. Other proposed contributions within the maritime sector includes ballistic protection for ships, marine batteries and weight reduction for vessels.

*You can access the webcast here:
https://www.facebook.com/PortInnovationEcosystemReimagined/videos/204843820777626/