

connecting  
enterprises to  
innovation



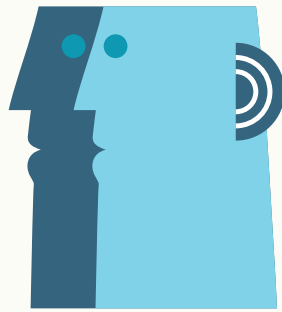


# CONNECTING ENTERPRISES TO INNOVATION

## About IPI

IPI catalyses and enables enterprises to grow their businesses through technology and innovation. An affiliate of Enterprise Singapore, IPI promotes open innovation, and works with enterprises to source for technologies locally and abroad. In addition, it facilitates technology partnerships to bring new and innovative products and services to the market.

Connected to a global network of technology partners, including the Enterprise Europe Network (EEN), IPI is well-positioned to facilitate connections between technology seekers and providers, driving growth and innovation opportunities for Singapore enterprises.



# YEAR IN REVIEW 2018/19

## Contents

Messages from IPI Management	4
The Year in Numbers	8
In Conversation with our SMEs	10
Key Highlights from 2018/19	14
Success Stories	18
Hear from our Industry and Technology Partners	24

# Driving technology collaboration

Our success is possible only with the support from our partners in the innovation and enterprise community.

IPI marked its eighth anniversary by continuing on its growth and reached several new milestones last year. In 2018/19, we completed 84 technology matches and assessment projects. TechInnovation, our flagship technology brokerage event, continued to grow in scale and attracted over 4,900 participants from more than 55 countries. Over two days during the Singapore Week of Innovation and Technology, we hosted 165 innovative technology providers that showcased 400 technologies.

IPI also signed two Memorandums of Understanding (MOU) in September 2018, which will pave the way for home-grown companies to work with innovators around the world. The MOU signed with RB, a leading global consumer health company, seeks solutions in several consumer health areas, while the MOU with Innovate UK will promote technology transfer and R&D collaboration between Singapore and the UK.

Helping enterprises to grow through technology and innovation collaborations remains our core mission. To complement our online technology marketplace, IPI launched TechExpert, a one-stop matching platform ([techexpert.ipi-singapore.org](http://techexpert.ipi-singapore.org)). Through this, enterprises

can engage technical experts from different industry sectors at various stages of their innovation cycle.

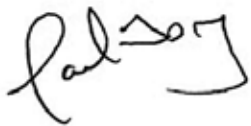
Technical experts on the platform are curated by IPI and support sectors such as Chemicals, Electronics, Energy, Healthcare, Infocomm, Manufacturing and Materials, among others. Similarly, the experts can tap into the platform to search for new collaborations, promote their expertise and boost their visibility. The pilot has gained some traction and we welcome those seeking or offering technical expertise to join this growing community.

We are constantly inspired by the enterprises that count on us to seek new technology partners to further propel their businesses to greater heights. Through our open innovation platforms, we are pleased to have facilitated matches that have resulted in new or improved products and services to the market.

In the new fiscal year, IPI will be supporting the Innovation Agent Programme developed by Enterprise Singapore to help companies better capture innovation opportunities. Innovation agents will support local

enterprises and serve as mentors and connectors to market, technology and capability development opportunities.

Our success is possible only with the support from our partners in the innovation and enterprise community. We look forward to another year of exciting opportunities as we continue to nurture partnerships that will help SMEs drive business transformation through open innovation.



**Professor Lam Khin Yong**  
Executive Director, IPI



# Advocate of open innovation

Guided by our core values – Service, Passion, Innovativeness, Resourcefulness, Integrity and Teamwork – we will further enhance our programmes and services to better serve enterprises in their innovation journeys.

2018/19 was yet another fruitful year during which IPI held a slew of events to promote open innovation and partnerships.

The Innovation and Enterprise (IEO) Forum has grown to be a lively platform for IEOs to share, discuss and learn the best practices from each other since its launch two years ago.

The forum owes its success to the strong support and commitment from the IEOs, which take turns to chair the event each year. We appreciate the efforts of Dr Lim Jui, CEO of NTUitive Pte Ltd, who co-chaired the first forum with IPI. We would also like to thank Mr Sean Flanigan, former Director of NUS Industry Liaison Office, and Mr Samuel Ang, Director Innovation and Entrepreneurship of Temasek Polytechnic, for co-chairing the forum in its second year.

Dr Wong Woon Kwong, Director of the Office of Technology and Enterprise Management from the Singapore University of Technology and Design, and Ms Regina Ng, Director of Technology Development and Innovation from Ngee Ann Polytechnic, are co-chairs this year.

IPI will continue to drive greater engagement between industry and government, as well as boost IEO knowledge and capabilities development.

Together with Enterprise Singapore and various corporate partners, we launched the inaugural IoT Innovation Challenge in November 2018. It seeks innovators keen to develop their own minimum viable product around a set of problem statements from industry leaders Aztech and Singtel. The response has been warm and the participants stand to receive funds to prototype and develop their products as well as access test-bedding opportunities.

Over the last year, IPI also co-organised several emerging technology forums and technology matching events with local and international partners. One such event was the Finnish Smart Building Technology Matchmaking Event held in October 2018 with the Helsinki Business Hub. It brought together enterprises from Singapore and Finland in the smart building sector.

A successful match was made between Wall Robotics, a Finnish company that develops innovative window-

cleaning robots, and Singapore SME Terra Sol. Read about their partnership on page 20.

Beyond technology, people play a critical role. Guided by our core values – Service, Passion, Innovativeness, Resourcefulness, Integrity and Teamwork – we will further enhance our programmes and services to better serve enterprises in their innovation journeys.



**Dr Sze Tiam Lin**  
Senior Director, IPI



# THE YEAR IN NUMBERS

## OUTREACH

**420**  
technology offers posted



**86** technology needs posted



**25,000**  
TechAlert subscribers



**9** events organised/supported



## INDUSTRY ENGAGEMENT

**216** Singapore-based companies newly engaged



**135** active negotiations facilitated





## TECHINNOVATION 2018

4,900   
participants

400   
technologies  
showcased

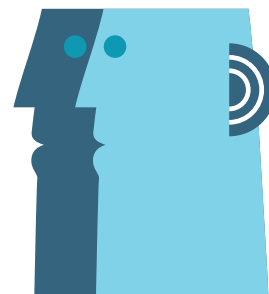
165   
exhibitors

55  
participating  
countries



88   
speakers

84 successful technology  
matches and  
assessment projects



# To survive and thrive, innovation is key

As a 40-year-old brand, Nipo International, which manufactures bitumen-based protective coatings, knew it had to transform to stay relevant and thrive in the increasingly volatile business landscape. Director Amanda Khoo shares how innovation drives growth at Nipo.



### Could you tell me more about the work that Nipo does?

Nipo started off in the 80s as a manufacturer of bitumen-based protective coatings. We use this crude oil by-product to make specialised liquid-applied coatings for the construction industry, mainly for waterproofing applications on roofs, wet areas and walls.

We have expanded our product line to include applications beyond waterproofing, such as anti-corrosion, sound and vibration insulation, adhesion, air-conditioning insulation and rubberised flooring. We have also developed a core competency in original design manufacturing. Now, we have the capability to scale up inventions developed in research labs and bring them to the market.

### How does Nipo, a company of almost four decades, stay relevant in today's landscape?

Our bituminous coatings were the core of Nipo's business. We have had to diversify our business in order to stay relevant. Every day is a turning point. Every product has its own lifecycle, and we recognised this fact early on. If we do not update or create new ones, the company would stagnate.

Thus, we started working with scientists and researchers to bring new innovative products to the market. We would also partner experts in totally unrelated fields, just to see if their research had any potential for our business. Such collaborations have resulted in new solutions, such as a breakthrough heat reflective paint that can cool roofs and walls by more than 13 degrees Celsius.

### What convinced Nipo that open innovation was the way to go?

As an SME, we need to continuously bring new products to the market to survive. If we create only me-too products that are similar to what is already out there in the market, it will only spark a price war.

Innovation allows us to differentiate ourselves. And open innovation is the way to go for smaller companies with fewer resources for R&D – it allows us to source for talent, collaborate with new partners and run multiple projects at once. Gone are the days when you have to house all R&D in

secret silos within the company – it's just poor resource management. By working with partners such as the institutes of higher learning and research organisations, we can tap on researchers with deep expertise across various fields, and explore new frontiers which we wouldn't have ventured into on our own.

“ As an SME, we need to continuously bring new products to the market to survive. If we create only me-too products that are similar to what is already out there in the market, it will only spark a price war. ”

### What was Nipo looking for when it reached out to IPI?

When we first embarked on open innovation, it was a hit-and-miss situation as we had to figure out which agency or department to talk to and partner with for projects, to give us an innovative edge. Over time, we managed to strike up a conversation with IPI and they have opened doors to new collaborations. To us, IPI is a matchmaker, linking us to local and overseas technology partners.

### What is the most important lesson Nipo has learnt about innovation?

We realised that we can't stay still – otherwise we become yesterday's news. Innovation has to be a part of our company's DNA. It is not just the purview of researchers. Innovation can come from anywhere, even from our production colleagues. The company culture has to change too.

# Bringing customised IoT solutions to the industry masses

For many companies, designing an Internet of Things (IoT) solution from scratch can be a time-consuming process, but an off-the-shelf solution is often too pricey. Lynxemi's plug-and-play modular platform strikes a balance between the two. Its Chief Executive Officer, Paymon Rasekhy, discusses the importance of open innovation.

## What is Lynxemi all about?

Lynxemi is an IoT hardware design and manufacturing company focusing on the industrial market. We partner software analytics and system integrator companies to create custom hardware solutions for our partners at a very low, even near zero, development cost. This will help our partners push their products out to the market faster, while differentiating themselves from their competitors. We also offer our customers services under the HaaS (hardware as a service) leasing model.

## What are some challenges that Lynxemi faces as a company?

We often encounter customers who are not sure what they want exactly. Many organisations want to add IoT to their buildings and factories, but they don't know where to start. As such, it could sometimes be difficult to get things going.

Also, IoT works by helping users reduce cost by increasing system efficiency, improving customer experience and satisfaction, and preventing breakdowns in production lines. The benefits of IoT are both tangible and intangible. This is where IoT differs from other business expenses, where Return on Investment (ROI) targets are set based on direct revenue generated from capital investments.

## Why is it important for companies to embrace a mindset of collaboration and open innovation? How does Lynxemi foster a culture of open innovation?

This is the age of collaboration – the age of competition has long past. In order to survive, we need to collaborate

to be relevant. One benefit of collaboration is that companies are able to stay lean while maximising profitability. This is achieved by focusing on core strengths and eliminating peripheral and non-core jobs by engaging others who are better at them.

Other benefits include companies getting their products out to the market faster, and reducing developmental costs as the cost is shared between them and their collaborators. Collaboration also allows all partners to learn from the shared experience.

“ We partner software analytics and system integrator companies to create custom hardware solutions for our partners at a very low, even near zero, development cost. ”

## Could you share more about Lynxemi's participation and experience in TechInnovation? What are the benefits of participating in TechInnovation?

TechInnovation is an excellent platform for Lynxemi to share its plug-and-play modular IoT platform and services with the wider world. TechInnovation always impresses me with its forward-thinking attitude towards bringing benefits to their participants.

One such example is the technology matching activity that I first learned of when taking part at TechInnovation. IPI takes effort to facilitate partnerships between exhibitors and potential collaborators. The management and staff of TechInnovation truly put the interest of their partners ahead of their own.

**How do you see IPI's role in helping Lynxemi grow as a company?**

Lynxemi participates in various exhibitions, but TechInnovation is the one that has provided valuable insights, and connected us with potential customers. TechInnovation is set up in a way that encourages dynamic interaction between technology seekers and providers. For instance, it added food tech to the event last year. This allowed the electronics industry to become acquainted with the food tech sector. Such cross-industry relationships are precious opportunities that are hard to come by.



# KEY HIGHLIGHTS 2018/19

APRIL 2018



## Best Practices in Managing Open Innovation for SMEs Shared at ASEAN Meeting

IPI was invited to present best practices at the fifth ASEAN Coordinating Committee on Micro, Small and Medium Enterprises (ACCMSME) meeting in Laos on 5 April 2018. IPI shared its multi-prong approach to catalyse technology adoption by SMEs through open innovation.

MAY 2018



## Driving Business Growth: IPI Promotes Open Innovation at ASME Seminar

In today's innovation driven-economy, emerging technologies are opening up new opportunities to enterprises across industries. On the flipside, the same developments pose significant challenges to other businesses. IPI was pleased to share with participating SMEs how they could pursue a strategy of growth through open innovation at the Blueprinting the SMART Future seminar organised by the Association of Small and Medium Enterprises (ASME) on 9 May 2018.

SEPTEMBER 2018

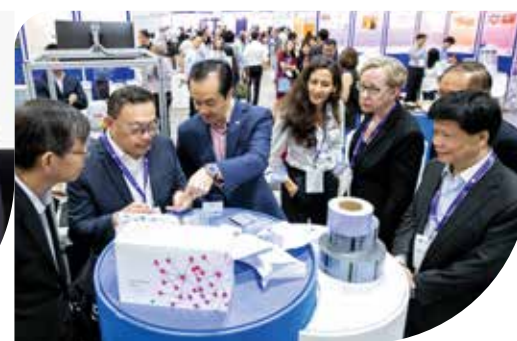


## IPI Inks MOUs with RB Health and Innovate UK

Two Memorandums of Understanding (MOU) were signed at the opening of TechInnovation. RB, a global leading consumer health company is partnering IPI to find solutions in a number of future consumer health areas. This is RB's first private-public partnership in Singapore and the start of a wider global partnership drive by the healthcare giant that will see it set up innovation hubs in collaboration with health innovators around the world.

A second MOU was signed between IPI and Innovate UK, to promote UK-Singapore technology transfer and R&D collaboration, through the exchange of technology profiles as well as participation and support in mutual events. Innovate UK is a part of UK Research and Innovation, an organisation that champions research and innovation in the United Kingdom.

SEPTEMBER 2018



## TechInnovation Continues to Build a Vibrant Innovation Ecosystem in Singapore

The seventh edition of Singapore's premier technology-industry brokerage event, TechInnovation concluded successfully, with over 4,900 participants from more than 55 countries in attendance, a 25% increase from last year's turnout. The annual two-day technology marketplace brought together technology providers and seekers to explore collaboration opportunities through open innovation.

MAY 2018



JUNE 2018



JUNE 2018



### IPI Presents at International Forum on Open Innovation 2018 in Thailand

IPI was invited to share its open innovation approach to catalyse SMEs' adoption of technology at the International Forum on Open Innovation, an event held as part of the opening ceremony programme of the Northern Science Park (NSP) in Chiang Mai, Thailand on 25 May 2018.



### Engaging Innovators and Business Leaders at Innovfest Unbound 2018

Exhibiting at Innovfest Unbound on 5 and 6 June 2018 at the Marina Bay Sands, IPI connected with budding entrepreneurs, ambitious start-ups and leading corporates seeking new technology partnership opportunities. It shared how it supports enterprises in achieving their innovation objectives for product and service development through open innovation.



### Reaching Out to the Asian Start-up Community at Echelon Asia Summit 2018

IPI exhibited at Echelon Asia Summit 2018 held at the Singapore Expo from 28 to 29 June 2018. It shared how start-ups can leverage its services to connect and collaborate with its global network of technology partners to grow their businesses through open innovation. Over the two days, IPI engaged in conversations with start-ups, SMEs, corporates, and government agencies from across Asia to explore partnership opportunities.



SEPTEMBER 2018



JULY 2018



JULY 2018



### Connecting with IP Experts at IP Week @ SG 2018

IPI participated in IP Week @ SG 2018 on 4 and 5 September 2018 where it shared with delegates how it assists enterprises to source and use technology and Intellectual Property (IP) to grow their businesses. The attendees also got a better understanding of how IPI helps facilitate technology collaborations between companies through its different platforms.



### Korea Institute of Advancement of Technology (KIAT) and IPI Ink MOU

A Memorandum of Understanding (MOU) between the Korea Institute for Advancement of Technology (KIAT) and IPI was signed on 12 July 2018. The agreement aims to promote Korea-Singapore technology transfer and R&D collaboration, through the exchange of technology profiles as well as participation and support in mutual events.



### IPI Co-organises Tech-Matching Events with EEN Partners at the Singapore International Water Week 2018

Together with its partners from the Enterprise Europe Network, IPI co-organised two technology matching events – the Dutch Water and Circular Economy matchmaking event and a roundtable session, during the Singapore International Water Week in July 2018. Held in conjunction with the World Cities Summit, the integrated expo provided an opportune setting to reach out to international industry players focussed on water, urban and environment solutions.



OCTOBER 2018



### Emerging Technologies Forum on Printable Cold Plasma

Cold plasma, a non-thermal technology has garnered considerable interest for its potential applications in surface modification, decontamination and even wound treatment. In a recent Emerging Technologies Forum on Printable Cold Plasma organised by IPI on 5 October 2018, participants had the opportunity to gain a better understanding of this upcoming technology. Dr Min Kwan Kim, a lecturer in Astronautics from the University of Southampton, was the guest speaker at the forum.

OCTOBER 2018



### Introducing Singapore's Open Innovation Platforms at the Enterprise Europe Network (EEN) Annual Conference 2018

A partner of the Enterprise Europe Network (EEN) Singapore, IPI presented its best practices in using open innovation platforms to catalyse the adoption of technology by SMEs at the annual EEN Conference held in Vienna, Austria on 23 October 2018.

OCTOBER 2018



### Singapore SMEs and Finnish Smart Building Companies Explore Partnership Opportunities

The Finnish smart building technology matchmaking event on 29 October 2018 co-organised by IPI and the Helsinki Business Hub brought together Singapore enterprises and Finland's innovative companies operating in the smart building sector for an afternoon of insight sharing and networking. 10 Finnish companies introduced the latest trends and technologies focusing on smart buildings, energy efficiency and digitalisation for the construction industry to the event participants.

FEBRUARY 2019



### Reducing Product-to-Market Time in Personal Care Product Development

To support businesses in accelerating their innovations to market through collaboration, IPI put together a technology forum on Innovations in Personal Care on 28 February 2019. Sim Kung Kiat, Deputy Director from IPI, shared an overview of the trends and developments in personal care innovations, and highlighted that enterprises today can gain access to technology providers, industry players and experts from across the personal care value chain at any stage of their product development process. Industry experts from Ngee Ann Polytechnic, A\*STAR, NUSmetec, Wellness GPS and Cambridge Consultants were part of the line-up.

FEBRUARY 2019



### IPI and IMDA Bring Together Technology Providers to Co-develop Innovative Infocomm Media Solutions

As a partner of Infocomm Media Development Authority's (IMDA) 2nd Open Innovation Platform Call, IPI was invited to share about its open innovation services at Innovation Thursday on 14 February 2019. At this session, problem solvers were encouraged to explore engaging in technology partnerships with each other, to address the more challenging problem statements put up by the problem owners. Jonathan Tan, Senior Technology Manager from IPI, explained how technology providers can leverage IPI's open innovation platforms such as its Online Marketplace to reach out to a wider network of potential collaborators in the ICM sector. Selected companies also pitched their innovations for co-creation opportunities.

KEY HIGHLIGHTS 2018/19 (CONTINUED)



NOVEMBER 2018



### Canadian Cleantech Companies and Singapore Enterprises Discuss Partnership Opportunities

The High Commission of Canada, together with IPI and Enterprise Singapore held a networking session on 15 November 2018 to create and promote new opportunities for technology and business collaboration between Canadian cleantech companies and Singapore enterprises.

NOVEMBER 2018



### IPI Shares Open Innovation Practices for IP Creation

IPI was invited to present at the Intangible Assets Workshop organised by IP ValueLab on 16 November 2018. Targeted at in-house employees working with Intellectual Property (IP) assets, the session aimed to equip participants with a basic understanding of identifying, auditing and managing intangible assets to drive business value and growth.

NOVEMBER 2018



### Flexible Thin-film Fast Charge Battery Technology Sharing at Roundtable Session

With the rise of Internet of Things and wearables, batteries have taken on new form factors to meet the different market requirements such as power, flexibility and thinness. At a technology roundtable organised by IPI on 27 November 2018, EJ Shin, Strategic Planning Director of Jenax Inc., presented its latest flexible thin-film fast-charge battery technology solutions to a small group of Singapore-based enterprises.



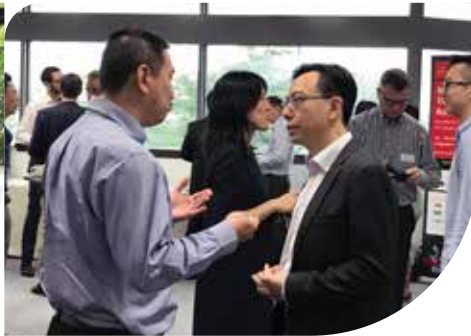
JANUARY 2019



### Connecting Start-ups to Technical Experts via TechExpert

JTC organised GET SOAP-D! (Smooth Out and Accelerate your Product Development), an industry sharing session on 25 January 2019. It was part of its efforts to engage the hardware and engineering start-ups in Singapore to enhance their product development capabilities. Lee Ya Ling, Technology Manager from IPI, shared how IPI and its open innovation platforms such as TechExpert, could connect start-ups with industry-specific technical experts for their innovation challenges. By engaging these experts, start-ups can potentially look at a shorter idea-to-market time.

JANUARY 2019



### Introducing Open Innovation Services to German Enterprises

The Singapore Economic Development Board organised an outreach event targeted at German SMEs or Mittelstand in the advanced manufacturing sector on 18 January 2019 to share opportunities and programmes that these Singapore-based companies can tap on to grow their businesses. To promote co-innovation between Singapore and German enterprises, Lim Ming Khai, Deputy Director of IPI, shared with the participants how they could benefit from technology partnerships through IPI's open innovation platforms and its strong connection to the local innovation ecosystem and access to global innovation nodes.

NOVEMBER 2018



### IPI Collaborates with HDB on Cool Ideas Enterprise Initiative

The Cool Ideas Enterprise, an open innovation programme targeted at aspiring entrepreneurs and enterprises with solutions that improve the living environment was announced at the inaugural Housing & Development Board (HDB) Innovation Festival on 28 November 2018. HDB in partnership with Enterprise Singapore, and supported by Action Community for Entrepreneurship and IPI, will provide innovators with mentorship, funding, test-bedding and pilot implementation opportunities.

# Tasty buns that are also good for health

Driven by its appetite for innovation, home-grown company Lim Kee Food Manufacturing has teamed up with a foodtech firm to improve its popular steamed buns.

As one of Singapore's leading Chinese pau (steamed bun) makers, Lim Kee Food Manufacturing has always embodied a zest for transformation.

When demand for their steamed buns started to rise in the 1990s, the company wasted no time in expanding from one to three production units.

To boost efficiency, the company moved from Ang Mo Kio to its current premises in Woodlands in 2004 to house its administrative and production operations under one roof.

So it came as no surprise in 2017 when the home-grown brand decided to embark on a new initiative, and its boldest one yet: to create a healthier variant of steamed buns without compromising on the familiar taste that customers have come to love.

"Our company is constantly seeking new opportunities and areas to increase value for both our partners and customers," said Ang Khim Wee, head of business development at Lim Kee Food Manufacturing.

This was how the company thought up the idea to create healthier and more nutritious products.

But Lim Kee knew it needed the right partner to get the steamed buns project off the ground. Khim Wee and his team began seeking out potential collaborators.

They found the right match at IPI's TechInnovation event in 2017, where they met Alchemy Foodtech, a start-up focussed on fighting diabetes through food innovations.

A specialist in producing food with lowered glycemic index (GI), Alchemy Foodtech had perfected the art of lowering the GI composition in refined carbohydrate staples like white rice, noodles and bread, without affecting the food's texture or taste.

Said Khim Wee: "Alchemy Foodtech's belief of researching and developing new offerings to appeal to consumers who prefer a 'familiar difference' was a strong value proposition."

For Lim Kee, the concept of 'familiar difference' was key.



**from left**  
**Alan Phua**, Master Builder and Co-founder, Alchemy Foodtech  
**Ang Khim Wee**, Head of Business Development, Lim Kee Food Manufacturing  
**Verleen Goh**, Chief Food Fighter and Co-founder, Alchemy Foodtech

As a food company, it knew that consumers are generally resistant to totally new tastes, even though they may be curious about new products.

Khim Wee added: "Consumers are keen to try products with incremental differences rather than radically different products."

For Alchemy Foodtech, the feeling was mutual.

"Khim Wee's vision of transforming steamed buns through food innovation resonated deeply with us and so we began work to develop a new range of lower GI buns," said Verleen Goh, co-founder at Alchemy Foodtech, who also goes by the title Chief Food Fighter.

But the journey towards creating buns with lower GI was a bumpy one.

For one, applying the right GI composition to the steamed buns proved difficult as the buns had to meet a specific height, size and shape requirement.

"In our first few trials, the buns were too flat," said Verleen, adding that the team had to keep tweaking with its formula till the buns reached an appropriate height.

It took several rounds of trial and error before the partners finally struck gold. Not only did the resulting buns have a lower GI composition, they also retained the same taste and texture as the regular buns. Consumers have reacted well to the change, Verleen shared. The company

had received positive feedback that the new buns had a softer crust compared to the regular buns.

The quality buns are the result of a successful partnership between Lim Kee and Alchemy Foodtech. The collaboration allowed them to push boundaries and explore new ideas.

# Teaming up to create smart solutions

When a Singapore company that distributes smart waste bins met a Finnish firm that produces wall robots that clean building exteriors at a technology matching event co-organised by IPI and the Helsinki Business Hub, the two were drawn to each other. Their focus on smart products meant they could collaborate on research and innovation.

The smart waste bin sends an email or text message alert to cleaners when it is full. Its internal compactor compacts rubbish, so it can handle up to eight times more trash than usual bins. It is energy efficient and runs on solar power.

Called Bigbelly bins, they are already deployed island-wide in Singapore – in shopping malls and commercial buildings – and are distributed here by local company Terra Sol.

“Cleaners no longer have to patrol bins to check for fullness. The compaction also increases its capacity to handle trash, so productivity increases,” said Joe Tan, Terra Sol’s director.

Given Singapore’s ageing population, it is difficult to find manpower for cleaning jobs, he added. “Here’s where the Internet of Things (IoT) can help with the problem. It makes sense here.”

Started in 2014, the company has two aims: to create smart solutions to improve productivity, leveraging automation to make up for manpower shortages for certain jobs; and to devise zero-waste solutions by converting waste into a new form to be reused in the

circular economy.

Terra Sol’s other products include a glass crusher that grinds empty bottles, jars and other glass containers into small particles of sand less than 1.5mm – or silica. The silica can then be reused for construction, for instance.

“Close to 60,000 tonnes of glass waste per annum are making its way into our landfills here,” said Joe. “The solution eliminates the amount of waste that we generate. We can achieve close to 100% recyclability for glass waste.”

It also has a composter machine that turns food waste into compost, which can be used for farming or greening.

Terra Sol’s two-pronged strategy has not only found traction in Singapore, but has also struck a chord with a company in Finland.

Called Wall Robotics, the two met at a Finnish smart building technology matchmaking event here last year, organised by IPI and the Helsinki Business Hub, which promotes collaboration between international agencies and Finnish talent.



**from left**  
**Jyri Lehtinen** Project Engineer, Wall Robotics  
**Joe Tan** Director, Terra Sol

The forum brought together Singapore enterprises and Finland's innovative companies operating in the smart building sector.

Wall Robotics produces Wall-R, a robot that cleans the windows and exterior surfaces of buildings.

Wall-R helps facility managers of shopping malls, hotels and commercial buildings tackle their facade cleaning jobs – not dissimilar to Terra Sol's work.

"It complements the product portfolio we already have and its line of work is closely related to what we do," said Joe. "We also have the client base here to help market their products."

The two have since teamed up, and one area of their collaboration is in research and development.

"Finland does not have many tall buildings so they have yet to validate their solution beyond 90 metres in Finland, which is the height of the tallest building you can find in the Helsinki area," Joe noted.

"In Singapore, our buildings frequently exceed 70 metres in height. So our clients here can provide their buildings for test-bedding and proof of concept so the height barrier for Wall-R can be increased to 200 metres and beyond," he added.

Beyond sharing ideas and research, the two companies are also business partners.

"We will represent Wall Robotics in Asia and help them find customers in Asia, including sharing the economic benefits," said Joe.

This will expand Wall Robotics' reach in this part of the world. As for Terra Sol, its product range will widen with the addition

of Wall Robotics' products.

The fruitful partnership is thanks to the match at IPI's technology matching event. The platform allows companies overseas to realise the potential applications of their work in Singapore. At the same time, Singapore companies can explore opportunities of technology and business collaboration with them.

# Pooling resources together to clean water

A water filtration membrane made of ceramic, and a water purification system the size of a suitcase. Liquinex's innovative water treatment solutions are capturing the attention of international companies – thanks to events like IPI's TechInnovation.

Most industrial factories produce some form of wastewater that has to be treated before being discharged into the sewers.

This is where Liquinex, a homegrown water treatment and recycling company, steps in to treat the industrial wastewater that typically contains dangerous and corrosive constituents like zinc – a regulated heavy metal.

What is unique about its treatment solution is the use of a ceramic filter. It is more durable and can withstand acid and high temperature.

The ceramic filter is as hard as stone, but porous and hydrophilic, and able to filter water thoroughly.

This is different from conventional wastewater treatments that use polymeric membranes and bacteria that eat away the harmful constituents. Such processes may be susceptible to damage and cannot withstand the corrosive nature of industrial wastewater.

“Industrial wastewater is an entirely different animal, and traditional water treatment may not be sufficient,” said Bashir Ahmad, chief executive of Liquinex.

The company also has another innovative product – a suitcase-sized water purification system that is solar operated and small enough to be portable.

It is used mainly for humanitarian purposes, offering remote, rural areas hit by natural disasters, access to clean water. During such crises, people tend to take water from the ground that may be contaminated with heavy metals, like arsenic, lead and iron.

The suitcase's water filtration is able to get rid of these heavy contaminants.

“This was used by the Red Cross and other humanitarian aid agencies in areas hit by floods last year, such as Laos and Kerala, India. It was also used by a local aid agency in disaster relief in Sulawesi, Indonesia during the 2018 earthquake,” shared Bashir.





**from left**  
**Peter Holme Jensen** CEO, Aquaporin  
**Bashir Ahmad** CEO and Technical Director, Liquinex Group  
**Dr Kiran Manga** Engineering Manager, Grafoid Inc

Liquinex is not alone on its mission to treat water.

In 2017, it participated in IPI's TechInnovation, a technology brokerage event to showcase technological solutions to a diverse range of industries and explore collaboration through open innovation.

There, it met Grafoid, a graphene research, development and investment company from Canada.

At first glance, graphene may seem irrelevant to water treatment. After all, it is traditionally used in batteries to increase its efficiency at a fraction of the cost.

But Bashir believed graphene could also

be useful for water treatment. "It has great potential for elimination of bacteria and other contaminants," he explained. It was a perfect match between Grafoid and Liquinex.

"They found us and liked that we can use their solutions for water treatment. They wanted to diversify to water treatment too," he said.

"We clicked with them and they especially liked the suitcase. They had a soft spot for humanitarian solutions."

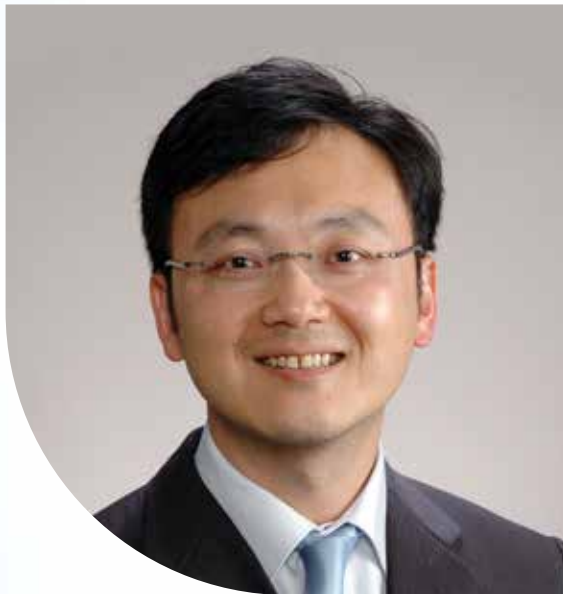
Today, Liquinex's water purification suitcase is supplemented with a cartridge from Grafoid that removes heavy metals like arsenic and lead found in groundwater.

Other companies that matched with Liquinex through IPI's TechInnovation include Sweden's LightLab and Denmark's Aquaporin.

LightLab's technology uses ultraviolet light rays to remove bacteria and viruses in water, while Aquaporin's solution is able to purify saltwater.

"Through the partnerships, I have sold more of our suitcase water purification systems. It's more business for us, and has also helped to expose us to bigger industries," noted Bashir.

# HEAR FROM OUR INDUSTRY AND TECHNOLOGY PARTNERS



**Dr Yang Kun-Lin**  
Associate Professor  
Department of Chemical and Biomolecular Engineering  
National University of Singapore

IPI provides a good technology matchmaking service between Institutes of Higher Learning and industries with a personal touch. They took a proactive approach to know my research interests and encouraged me to publish my university's technology on their online marketplace. When a potential industry partner showed interest, they arranged meetings for us, and followed up with us regularly. I have to thank IPI for connecting me to my industrial partners. **Without IPI, my current project will never fly.**



**Karolina Kasparova**  
Commercialisation Manager  
University of Pardubice

University of Pardubice greatly values the partnership with IPI, specifically the unique and user-friendly online marketplace and the global networking event TechInnovation. **Our technology transfer office benefits from IPI's expert feedback and technology assessment, which always helps to articulate the key value of our inventions.** IPI actively mediates the initial contact with major leads. I strongly believe that these interactions will soon result in many successful licensing opportunities or joint research collaboration with strong partners for us.







**Lim Eng Hann**

Outside Innovation Strategy Manager  
RB

The global health landscape is changing rapidly. Having the right partners to collaborate with is critical to finding consumer health solutions for today, tomorrow and the future. As a large MNC, we know that we can't innovate alone. Forging partnerships with specialists, innovators and entrepreneurs is critical to delivering real world solutions in health, whether they are products or services. **IPI has the potential to help us form win-win partnerships in the region, to allow us to bring health solutions to the market more quickly.**

**Dr Yashodhan Bhawe**

Technical Director  
GIIAVA

**IPI has been a great resource for us in reaching out to academics and companies that can offer us innovative solutions to problems we are facing.** Additionally, they have been a valuable contact point as far as the innovation space in Singapore is concerned.



**David Golding**

Deputy Chair EUREKA - UK Chairmanship  
Innovate UK

Innovate UK, the UK's national innovation agency, is pleased to have signed a Memorandum of Understanding with IPI at TechInnovation 2018. The MOU builds on the excellent relationship between our two organisations as we look to support businesses from both countries to grow and scale through seeking global opportunities. **The strong delivery-focussed attitude and the ability to make things happen means it is always a pleasure to work with IPI.** We look forward to doing more together in future.

# HEAR FROM OUR INDUSTRY AND TECHNOLOGY PARTNERS



**Heiko Bender**  
Head of Innovation  
Evonik

IPI has become an invaluable resource for Evonik's technology scouting and open innovation activities. An increasing number of our businesses are benefitting from gaining access to latest developments and technologies through IPI's online technology marketplace. We found the Technology Round Table sessions, which complement the platform, are particularly useful as these sessions provide us the opportunity to interact directly with the technology owner. **IPI's annual TechInnovation conference is now an integral part of Evonik's strategies to form partnerships with industry, academia and start-up players in the region.**

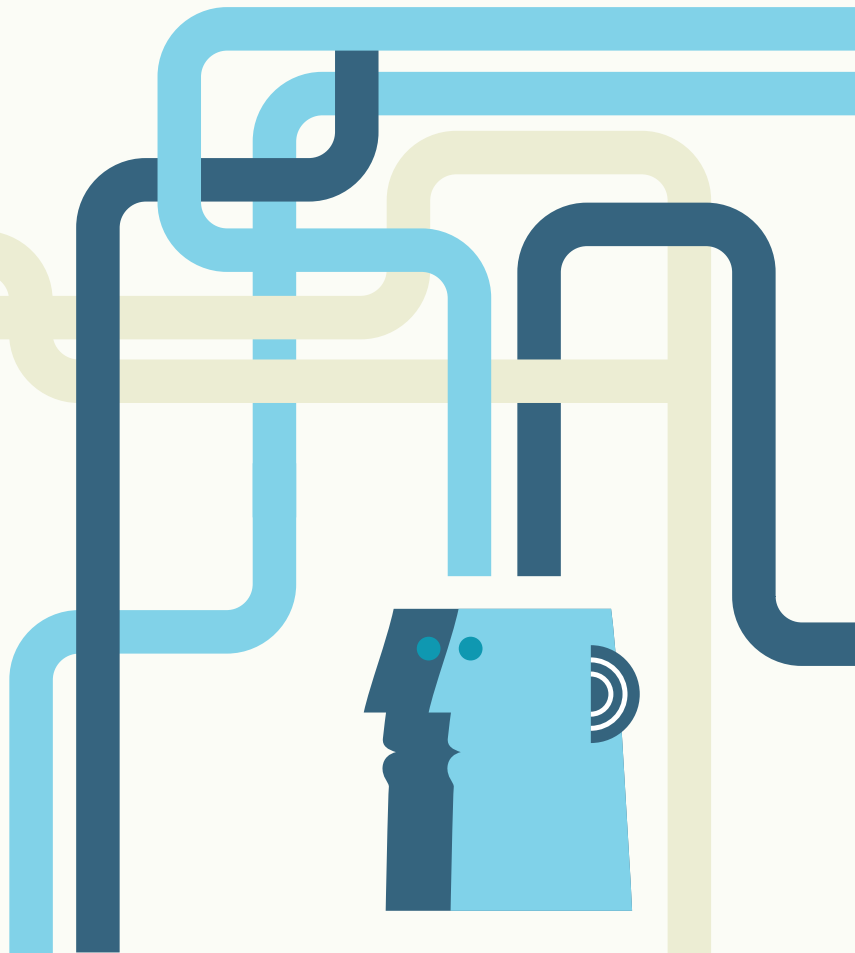
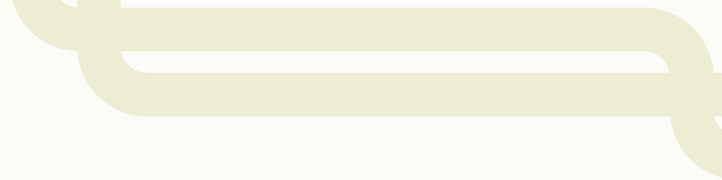
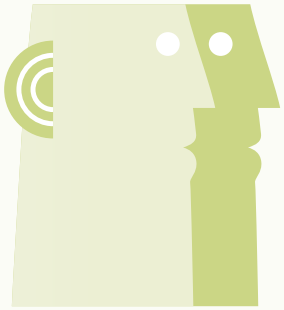


**Verleen Goh**  
Chief Food Fighter and Co-founder  
Alchemy Foodtech

Alchemy Foodtech has benefitted from our participation at TechInnovation 2017, and on IPI's online marketplace. Through these platforms, we were introduced to C-suite industry players with an innovative mindset. These included MNCs and local SMEs alike. **As the platforms by IPI are centred around technology, the partners we met are already interested in technology, and are looking for technologies to adopt.** This is particularly useful as it immediately sets the tone of our discussion. Instead of having to convince these partners of the use and importance of technology, we can go straight into how our technology can help improve their products. We are happy and grateful to have IPI's support.

**David Chai**  
Acting Director  
Department of Technology, Innovation and Enterprise  
Singapore Polytechnic

**IPI is our valuable partner that has brought us quality leads which have led to successful commercialisation of our technologies.** Through IPI's platforms, we were able to gain access to a wide network of companies, and generate interest for our innovations. IPI plays a pivotal role in matching us to the right commercialisation partners. We are grateful for their support, and look forward to deepening our partnership with IPI.



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