

# ASPIRE

An SUTD Publication Impactful Research Endeavors



# Content

Talent :: Opportunities :: Partnerships

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# Pushing Frontiers with AI & Computer Vision

**Article by: Jessica Sasayiah, Research Communications**

Chronic wounds are a major healthcare problem, causing one amputation every 30 seconds while incurring more than 100 billion dollars in medical costs worldwide every year according to Assoc Prof Cheung, who is from SUTD's Information Systems Technology and Design pillar.

Along with his team of researchers at SUTD, he developed a wound scanning technology that can diagnose and analyse chronic wounds just by using a smart phone.

His years of fundamental research in image processing, computer vision and artificial intelligence (AI) culminated in this technology which enables healthcare professionals to determine the conditions and severity of a diabetic wound without having to rely on manual and invasive assessments.

At the same time, it also significantly reduces the duration it takes to assess a wound from 30 minutes to just 30 seconds, allowing early detection and quicker intervention. Assoc Prof Cheung's postdoctoral student Dr Hossein Nejati, has since commercialized the technology under a SUTD start-up called KroniKare.

For their cutting-edge research, the team's work was recognised as one of the top 30 finalists at the 'Super AI Leader Award' - the highest honour at the World AI Conference in Shanghai in 2019. It was selected among 700 AI research projects worldwide including projects from Amazon, IBM, Tencent, Baidu and Shanghai Jiao Tong University. Some of the most influential AI scientists, entrepreneurs and government leaders such as Elon Musk (CEO, TESLA), Jack Ma (Co-Founder, Alibaba) and Raj Reddy (Winner of the Turing Award 2014) also attended the conference in 2019.

Closer to home, KroniKare was also featured as part of the 'National Artificial Intelligence Strategy' by Smart Nation Singapore, highlighting the technology's exemplary work on how Government, companies and researchers synergise to unlock AI's potential for greater societal impact. KroniKare has deployed its scanner in St. Andrew's Community Hospital and a nursing home at Kwong Wai Shiu Hospital.

## Transforming Healthcare through Technology & Design

The research behind this award-winning technology was spearheaded by Assoc Prof Cheung back in 2012, the principal investigator leading the work. He saw the potential in developing smartphone-based AI to make disease diagnosis quicker and more accessible.

His first project started off as a computer vision technology for skin cancer detection and it gained recognition for winning the 'Best Poster Award' at the IEEE Life Sciences Grand Challenges Conference. The technology was subsequently licensed for use in a system for the Australian market and the know-how gained from that project was then leveraged for his research on the wound scanning technology.

While Assoc Prof Cheung's research interest had always been in creating computer vision and AI algorithms, he was particularly keen in applying them in healthcare, an industry that concerned everyone. Therefore, developing AI-based technologies for skin cancer detection and wound scanning was naturally aligned with his research goals, but it did not come without challenges.

"In order for us to carry out our research, we needed clinical collaborators. But in 2012, the idea of using AI for disease diagnosis was somewhat new for many clinicians and they were very apprehensive towards this concept. My late colleague and co-PI of my first project, Dr Dawn Koh and I spent several months just trying to reach out and explain to clinicians on how the idea works. Eventually, we were able to get a few clinicians on board which gave us the opportunity to advance our research," shared Assoc Prof Cheung.



**Assoc Prof Cheung (left) with former postdoctoral student Dr Hossein Nejati (right).**



**A nurse conducting wound analysis using KroniKare.**

Contact Assoc Prof Cheung Ngai-Man at [ngaiman\\_cheung@sutd.edu.sg](mailto:ngaiman_cheung@sutd.edu.sg) & Jessica Sasayiah at [jessica\\_sasayiah@sutd.edu.sg](mailto:jessica_sasayiah@sutd.edu.sg)

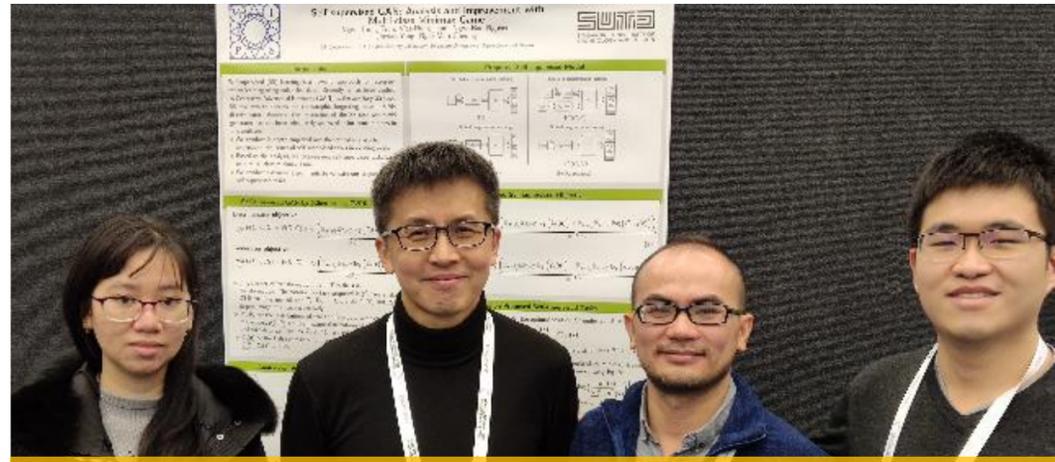
**Peering into the Future with Computer Vision**

More recently, Assoc Prof Cheung has been working on 3D computer vision technologies which are known to have many real-world applications. In the case of driverless cars, 3D computer vision enables these autonomous vehicles to understand their environments better and localize themselves. This technology can also be used across several industrial applications such as visual geo-localization, which allows localization using images in lieu of GPS, robotics and in computer-aided design, an important technology among engineers and architects.

Over the years, his research in image processing and computer vision has led to 14 US patents, several best paper awards and nominations as well as a 'Excellence in Research' Award by SUTD in 2018.

Meanwhile in 2019, his work on tackling a fundamental research issue on robust point cloud registration using an unconventional approach was awarded 'Best Paper Finalist' at the IEEE Conference on Computer Vision and Pattern Recognition (CVPR), a premier conference in Computer Vision and one of the best venues in Computer Science. The conference received over 5000 submissions and more than 9000 people attended.

However, as AI continues to rapidly revolutionise the way we live, work and play, Assoc Prof Cheung believes there is still much more to uncover and explore.



**Assoc Prof Cheung (second from left) and his research team at Vancouver presenting their work on Deep Generative Model at NeurIPS 2019, one of the most prestigious and competitive venues for AI research.**

**“ It is an honour to be part of the journey in advancing AI and computer vision while steering the path towards the improvement of lives ”**

“Currently, my research team and I are working on developing deep generative models which enable computers to create objects. Apart from researching on AI for healthcare and cyber security, we are also delving into areas such as deep learning with limited data, extremely compact deep neural networks for edge analytics and visual reasoning,” he said.

“With the continuous progress that the research community is making, it won't be long before we see AI-powered agents teaming with humans to tackle complex and challenging real-world tasks. It is an honour to be part of the journey in advancing AI and computer vision while steering the path towards the improvement of lives,” added Assoc Prof Cheung.



**About Cheung Ngai-Man**

Assoc Prof Cheung Ngai-Man received his PhD degree in Electrical Engineering from University of Southern California, Los Angeles, CA, in 2008. His PhD research focused on image and video coding and the work was supported in part by NASA-JPL. From 2009 - 2011, he was a postdoctoral researcher with the Image, Video and Multimedia Systems group at Stanford University, Stanford, CA.

In 2012 - 2018, Ngai-Man was an Assistant Professor with SUTD and is an Associate Professor since 2018. His research interests are Image and Signal Processing, Computer Vision, Artificial Intelligence and their applications to Healthcare and Cyber Security. In SUTD, he teaches a course in Computer Vision and is preparing a new course in AI for Healthcare.



## SUTD Explains Video Series

Watch our faculty members and researchers lead discussions on everyday topics and explain how their multi-disciplinary research impacts us. Click this [link](#).



Contact Assoc Prof Cheung Ngai-Man at [ngaiman\\_cheung@sutd.edu.sg](mailto:ngaiman_cheung@sutd.edu.sg) & Jessica Sasayiah at [jessica\\_sasayiah@sutd.edu.sg](mailto:jessica_sasayiah@sutd.edu.sg)

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**C**OLLABORATE. **T**O **I**NNOVATE

**2020**  
**22 JULY**

*Virtual*  
**2020**



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More information can  
be found [here](#)

**KEYNOTE SPEAKERS**



*"Co-Creating the Future of Power Together"*  
Dr Bicky Bhangu  
**President – SE Asia, Pacific & South Korea**  
Rolls-Royce



*"The Future Intelligent World Requires Closer  
Collaboration Between University And Industry"*  
Mr Nicholas Ma  
**Chief Executive Officer**  
Huawei International

**FORUM PANEL**

*"What Makes University-Industry Collaboration Succeed?"*



Mr Lim King Boon  
**General Manager**  
Partnership, Innovation  
& Enterprise  
SUTD



Dr James Ong  
**Co-Founder**  
Artificial Intelligence  
Industrial Institute



Mr Chong Chan Pin  
**Executive Vice President  
& General Manager**  
Kulicke & Soffa



Mr Dylan Ng  
**Chief Executive Officer**  
LionsBot International



Mr Brian San  
**Director**  
NTUC LearningHub

*We're  
going  
Virtual!*

Join us online as we share insights on  
Industry-University collaborations,  
research posters featuring innovative  
research by our scientists and  
students, as well as a virtual research  
centre showcase. Register to receive  
timely updates on our event.

**Register Now!**

# VIRTUAL PROGRAMME OUTLINE

## What to expect?

- 9.30am **Opening Address (LIVE!)**  
Professor Yeo Kiat Seng  
Associate Provost, Research & International Relations,  
Singapore University of Technology & Design
- 9.45am **Keynote Address (LIVE!)**  
Dr Bicky Bhangu  
President, South East Asia, Pacific & South Korea, Rolls-Royce
- 10.15am **Keynote Address (LIVE!)**  
Mr Nicholas Ma  
Chief Executive Officer, Huawei International Pte Ltd
- 10.45am **Forum Panel Discussion (LIVE!)**
- 12.00pm **Industry Spotlight (LIVE!)**
- 12.30pm **Lunch Break**
- 1.30pm **Research Competition / Poster Showcase (Website)**  
onwards **Research Centre / Lab Showcase (Website)**



More information can be found [here](#)

[Click here](#) to find out more!

## FIRST Industry Workshop 2020 Sponsors & Partners

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### About FIRST

The annual FIRST (Fostering Industrial Research Success Together) Industry Workshop brings together relevant high-level stakeholders from industry, academia and the Government while showcasing relevant SUTD graduate-level research capabilities.



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[linkedin.com/school/sutd](https://linkedin.com/school/sutd)

# Research News

## SUTD and Thales Collaborate in Smart Aviation Technology



SUTD and Thales have inked a Memorandum of Understanding for deeper collaboration to drive research and digital technologies such as Artificial Intelligence (AI), using industry-led use cases and data-driven insights. This collaboration builds on existing strategic partnerships between Thales and local academia, underscoring SUTD's design and technology expertise as well as Thales' commitment in supporting Singapore's Smart Nation ambitions.

More information can be found [here](#)



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## SUTD collaborates with Dairy Farm and Workers Union to help with Job Transitions



In October 2019, retailer Dairy Farm set up a jobs, skills and training committee with the Food, Drinks and Allied Workers Union to focus on staff working in retail outlets and warehouse operations, as these positions were more susceptible to digital disruption. As part of the project, LKYCIC will study how work in Dairy Farm can be changed to benefit both workers and the organisation.

Specifically, it will look at how to help workers transition into new job tasks, and how the company can respond to disruption while instilling confidence and commitment in its staff. Workers will then be able to attend training and development programmes identified by SUTD Academy.

More information can be found [here](#)



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## SUTD and ST Engineering Partner up to Advance Workplace Learning in Design Thinking



SUTD and ST Engineering signed an MOU on 13 January to co-develop courses and programmes to build workforce competencies in human-centric design and innovation as well as research. This MOU is built upon past collaborations between SUTD and ST Engineering which has seen some 400 employees benefit from its design innovation programmes over the last two years. The fully-sponsored design thinking and innovation courses are expected to benefit up to 1,000 ST Engineering employees, equipping them with design thinking skills to help them approach problem-solving through a user's lens, enabling new perspectives and creativity in developing effective solutions that better address customers' needs.

More information can be found [here](#)



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# Research News

## SUTD works with World Economic Forum on Transformation Maps



The World Economic Forum (WEF) partnered with LKYCIC to co-curate its Cities and Urbanization Transformation Map (click [here](#)).

The Cities and Urbanization Map is part of WEF's series of Transformation Maps – which they co-curate with invited experts worldwide – to help global leaders understand the issues and forces driving transformational change across economies, industries, global issues and the Forum's system initiatives.

LKYCIC contributed insights on Urban Resilience, Urban Diplomacy, Urban Environment and Resources, Urban Economies, Urban Governance, Urban Society, Urban Innovation, and Urban Infrastructure and Services. Prof Chan Heng Chee, Chairman of LKYCIC, also participated in a podcast sharing her views on the challenges and opportunities of urbanization.

More information can be found [here](#)



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## SingLit for Solidarity



HASS Senior Lecturer Dr Nazri Bahrawi is leading a pilot project which proposes and tests the validity of a new learning approach to social integration by way of the literary arts at the post-secondary level.

In particular, it will explore how an engagement with Singapore literature, through a series of reading and theatre workshops, can help local and foreign students in three Singapore-based post-secondary institutions learn and critically engage with issues of socio-cultural tensions in the Republic.

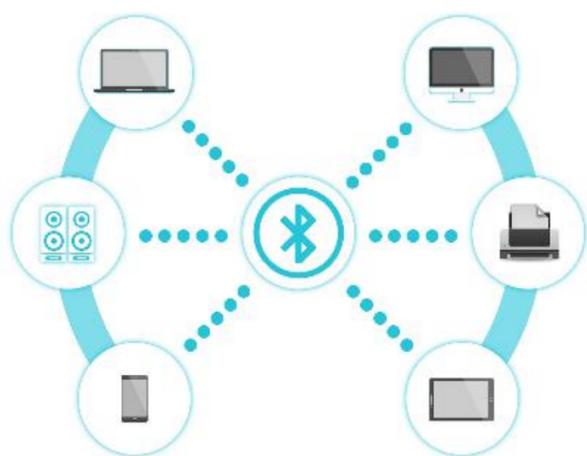
This 6-month project, which contributes to teaching and learning practices, is a collaboration between HASS and LKYCIC. It is funded by the National Integration Council.

More information can be found [here](#)



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## Researchers Discover Cyber Vulnerabilities Affecting Medical Devices



In a research project led by Asst Prof Sudipta Chattopadhyay from ISTD, a significant gap was discovered in ensuring the security of wireless protocol implementation.

The team designed and implemented a technology that could detect security vulnerabilities in Bluetooth enabled devices. This led to the discovery of SweynTooth – a critical set of vulnerabilities affecting a substantial number of internet of things, including medical devices, smart home devices, logistical products and wearables.

More information can be found [here](#)



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# Research News

## Urban Health Infrastructures and Urban Resilience in a Post-Covid World



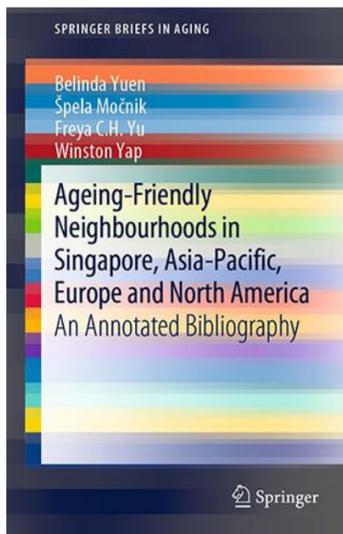
In a post-COVID world, the making of a “healthy city” is likely to become a policy priority, this research led by Dr Harvey Neo from LKYCIC at SUTD aims to map out viable pathways towards healthy cities in Southeast Asia through, amongst other things, a consideration of urban health infrastructures and urban resilience.

More information can be found [here](#)



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## Key Strategies to Support Ageing Societies



Dr Belinda Yuen from LKYCIC at SUTD co-authored a book titled ‘Ageing-Friendly Neighbourhoods in Singapore, Asia-Pacific, Europe and North America’. Published by Springer, this book provides a sense of the scope, issues and discourse on age-friendly neighbourhoods, the development of which is increasingly being recognised as a key strategy to support healthy ageing and enhance quality of life in aging societies.

More information can be found [here](#)



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## SUTD Designs Featured Alongside Iconic Landmarks



Designs from SUTD’s Architecture and Sustainable Design pillar were featured on Archdaily, one of the most visited Architecture websites.

In the article ‘Singapore Rising: Designing a New Future’, three buildings were highlighted, celebrating ASD’s contribution to Singapore’s sustainable and innovative architecture landscape.

Image: Ordinary Studios

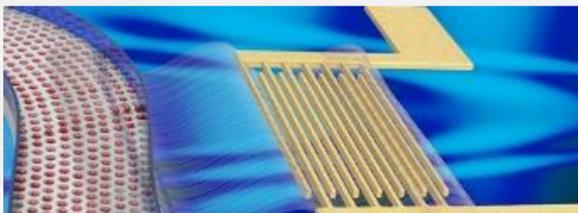
More information can be found [here](#)



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# Research Publications

## Development of Novel Acoustofluidic Technology that Isolates Submicron Particles in Nanocavities



A research team led by Assoc Prof Ye Ai developed a fast-processing and contact-free trapping system with the potential for widespread application in sorting, patterning and size-selective capture of sub-micron and nanoscale objects.

More information can be found [here](#)



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## SUTD Research shows Evidence that Bilingualism delays the Brain's Ageing Process



Assoc Prof Yow Wei Quin led a study that found that seniors who speak two languages actively tend to maintain specific executive control abilities against natural age-related declines.

More information can be found [here](#)



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## Future of Work in Singapore: Staying on Task



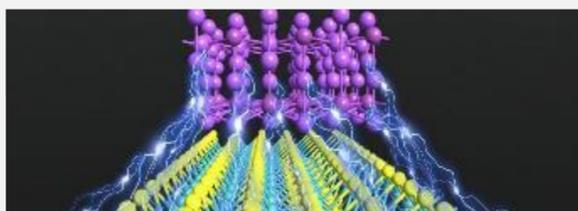
In 'Future of Work', LKYCIC researchers explore how society use tasks as building blocks to design human-centric jobs and uplift lives.

More information can be found [here](#)



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## Boosting Energy Efficiency of 2D Material Electronics



By performing a state-of-art density functional theory computational simulation, Prof Ricky Ang and team discovered that an ultrathin film of Na<sub>3</sub>Bi with just two atomic layers can be used as a metal contact for 2D semiconductors with ultralow contact resistance.

More information can be found [here](#)



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## Introducing the 21<sup>st</sup> Century's New Four Horsemen of the Coronapocalypse



An article by Asst Prof Cheong Kang Hao and Michael C. Jones describes the convergence of four broad conditions, or "four Horsemen", that are hurtling civilisation towards potential self-destruction in which a pandemic is only one of many possible triggers.

More information can be found [here](#)



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## General Descriptor Sparks Advancements in Dye Chemistry



Asst Prof Liu Xiaogang and his team collaborated with international researchers to move away from inefficient trial-and-error developments in dye chemistry to quantitatively design luminescent materials.

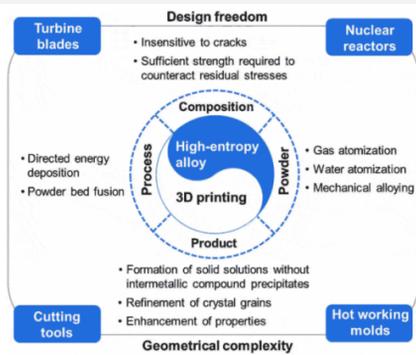
More information can be found [here](#)



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# Research Publications

## Researchers Review Advances in 3D Printing of High-Entropy Alloys

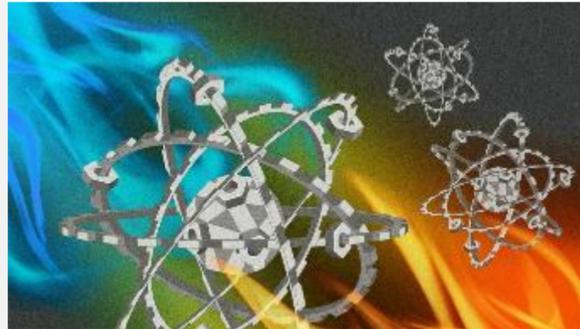


Prof Chua Chee Kai led a team of researchers to review and shine light on high-entropy alloys' manufacturing processes and inspire further research in this emerging field.



More information can be found [here](#)

## To Make an Atom-Sized Machine, You Need a Quantum Mechanic

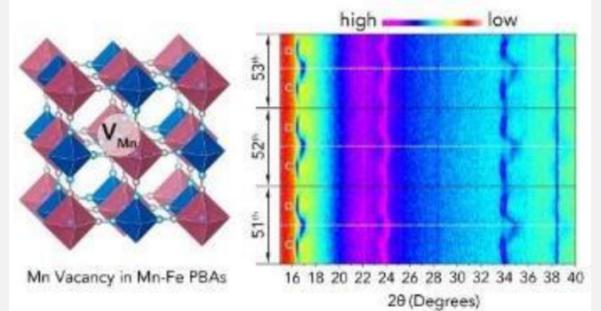


Assoc Prof Dario Poletti worked alongside researchers in Singapore to turn a single atom into a quantum engine and a quantum fridge so that they can be engineered into future computers and fuel cells to control energy flows.



More information can be found [here](#)

## SUTD-led Research Powers Longer Lasting Rechargeable Batteries



Assoc Prof Yang Hui Ying and team have developed a new material which directly addresses the shortage of lithium resources and high energy power supplies.



More information can be found [here](#)

## LKYCIC Research Paper Series - Politics of Housing: Prospects for Right to the City in Jakarta



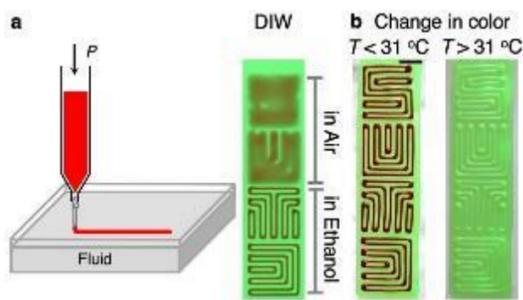
Using the case study of Jakarta, this exploratory paper seeks to understand the extent to which changing state-society relations help the marginalized claim their right to the city. It argues that everyday level state-society interactions between citizens, NGOs, and state actors, informed by differential notions of the housing issue, are crucial to increasing the welfare of these urban residents and their access to the city. However, there are limitations and implications as societal and state actors cope with the challenges of rapid urbanization. This research paper is authored by Irna Nurlina Masron, Research Associate, LKYCIC.



More information can be found [here](#)

# Research Publications

## Simple Method to Print Planar Microstructures of polysiloxane



Asst Prof Michinao Hashimoto and team have developed embedded ink writing (EIW) which enables the direct writing of polysiloxane. This in turn helps in the fabrication of microfluidic devices, flexible wearables and soft actuators.

More information can be found [here](#)



## iTrust Won Best Paper Award at the 6th ACM Cyber-Physical System Security Workshop

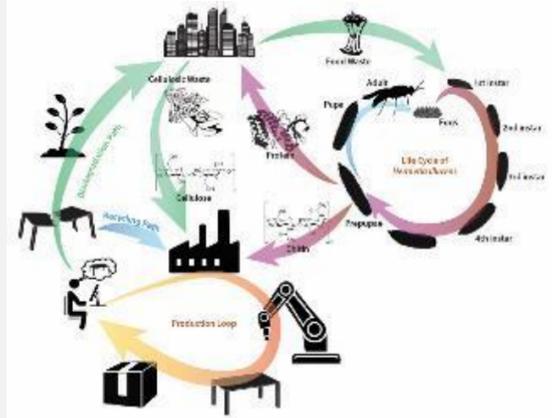
### iTrust Centre for Research in Cyber Security

A paper entitled “Challenges in Machine Learning based approaches for Real-Time Anomaly Detection in Industrial Control Systems,” co-authored by Dr Chuadhry Mujeeb Ahmed, Dr Gauthama Raman Mani Iyer Ramani and Prof Aditya Mathur received the best paper award at the 6<sup>th</sup> ACM CPSS 2020.

More information can be found [here](#)



## SUTD Develops Missing Link to Circular Economy While Tackling Global Waste



Principal Investigator Asst Prof Javier G. Fernandez, co-author Assoc Prof Stylianos Dritsas and research fellow Naresh Sanandiya have developed a process that allows for the production and degradation of almost any object within a circular economy using additive manufacturing and urban waste.

More information can be found [here](#)



## Skyline – Ageing and Social Capital



Academics, designers and policy makers came together in a seminal project to develop planning and design guidelines for ageing friendly neighbourhoods in Singapore. Dr Belinda Yuen led a seminal 18-month research project that started from July 2017, seeking to understand the connection between neighbourhoods’ built environments and older persons’ social, physical and mental health.

More information can be found [here](#)



# Fighting COVID-19

## Enhanced Respiratory Face Mask

Assoc Prof Low Hong Yee's initiative addresses the efficiency of particle removal in the membrane for a respiratory mask. The gold standard for a face mask is N95, which is mostly reserved for healthcare personnel. Recently her team has developed a membrane that shows an improved efficiency in aerosol nano-particle removal in comparison to N95.



Assoc Prof Low Hong Yee  
[hongyee\\_low@sutd.edu.sg](mailto:hongyee_low@sutd.edu.sg)

## 3D Printed Face Shield Mask, Nasal Swabs and Ventilators

Assoc Prof Arlindo Silva and team have developed a 3D printed face shield mask prototype, with capabilities to produce 36 face shields daily using NAMIC and DManD equipment at SUTD. Fabrication capabilities in SUTD could also help to fabricate nasal swabs, ventilators as well as custom ventilator parts.



Assoc Prof Arlindo Silva  
[arlindo\\_silva@sutd.edu.sg](mailto:arlindo_silva@sutd.edu.sg)

## Cell Sorting Technology for Antibody Treatment

The research team led by Assoc Prof Ye Ai is developing a new cell sorting technology to purify live peripheral blood mononuclear cells (PBMCs) from recovered Covid-19 patients, which will assist efforts in developing an antibody treatment for Covid-19.



Assoc Prof Ye Ai  
[ye\\_ai@sutd.edu.sg](mailto:ye_ai@sutd.edu.sg)

## BiPAP for COVID-19 Patients & Auto-disposal of Patients' Waste Output

### BiPAP for COVID-19 Patients

Asst Prof Tan U-Xuan and team have been exploring various configurations of the Bilevel Positive Airway Pressure machine (a non-invasive form of therapy for patients suffering from sleep apnea) to provide oxygen to Covid-19 patients.

### Auto-disposal of patients' waste output

Concurrently, the team is working on a robotic platform that drives items like a mobile commode, when after use by patients, will be sent to a disposal room for urine to be measured, faeces to be classified and then disposed off safely. This is useful for patients with toxic outputs or are infectious.



Asst Prof Tan U-Xuan  
[uxuan\\_tan@sutd.edu.sg](mailto:uxuan_tan@sutd.edu.sg)

## Contact Tracing at Elderly Homes

Assoc Prof Yuen Chau and team have implemented a contact tracing system at an elderly home, where their residents wear a card to keep track of their movements within the home.



Assoc Prof Yuen Chau  
[yuenchau@sutd.edu.sg](mailto:yuenchau@sutd.edu.sg)

# Fighting COVID-19

## Enhanced Worker Dormitories to Prevent Cross Contamination

Asst Prof Peter Ortner is collaborating with Zheng Kai and Andrew Lee to fight COVID-19 spread in migrant worker housing by studying hygienic ventilation, crowd movement and washing protocols. The study implements extensive ventilation simulation to understand how passive ventilation can provide fresh, clean air complemented by touch-point analysis to track the daily activities of residents.

### Transmissions in buildings

Zheng Kai completed a study on droplet dispersal and preliminary wind flow studies on migrant worker dormitories. His research highlights the potential for both intra-building (across different storeys) and inter-building transmissions based on preliminary wind flow studies.

### Enhancements to Migrant Dormitories

Andrew Lee's study delved into the importance of crowd monitoring and natural ventilation in migrant dormitories. He also proposed automated washing facilities to be part of the protocol before residents enter their dormitories, in addition to sterilization of foot wear air showers and water shower and the washing and drying of clothes with UV light.



Asst Prof Peter Ortner /  
Zheng Kai / Andrew Lee  
[peter\\_ortner@sutd.edu.sg](mailto:peter_ortner@sutd.edu.sg)

## HASS' Insights on the Pandemic

From the mysteries of toilet paper hoarding, to Internet access as a human right and the post Covid-19 considerations of urban planning, check out our Humanities, Arts and Social Sciences (HASS) faculty's commentaries and multidisciplinary insights on the various impacts of the pandemic.



Humanities, Arts and  
Social Sciences  
**HASS**

More info can be found [here](#).

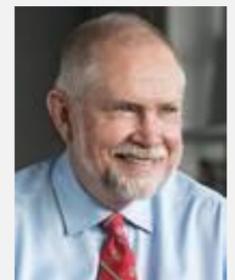
## Tool for Hospitals to Estimate Critical Resources

Prof Peter Jackson has been working closely with the Weill College of Medicine in New York City, US, on an easy-to-use tool to estimate the demand for critical resources in hospitals. The use of the tool was influential in the mid-March call for more ventilators for New York State. A number of hospital systems, such as Kaiser Permanente, also downloaded the tool and reported using it in their preparations for what was then an anticipated major surge in hospitalizations.

Click to learn more:

<https://esd.sutd.edu.sg/news-events/news/sutd-contributes-to-hospital-resource-planning-for-covid-19/>.

To experience a web-version of the C5V planning tool, go to <https://covid19.sjsu.edu>.



Prof Peter Jackson  
[peter\\_jackson@sutd.edu.sg](mailto:peter_jackson@sutd.edu.sg)

## Enhanced Respiratory Swab Design Rapid Test Screening & Point-of-care MRI Lung Scanner

### Enhanced Respiratory Swab Design Rapid Test Screening

Asst Prof Huang Shaoying aims to achieve microwave-based rapid screening (< 5 min) of Covid-19 using saliva fluid. This is based on the principle that the virus type has signature electrical property and paper electronics.

### Point-of-care MRI Lung Scanner

She is also exploring point-of-care MRI Lung Scanner, which is more suitable for mass screenings compared to the currently used computed tomography (CT) scans which require more space to operate in and has ionizing radiation.



Asst Prof Huang Shaoying  
[huangshaoying@sutd.edu.sg](mailto:huangshaoying@sutd.edu.sg)

# Fighting COVID-19

## Helping Displaced Workers in Disrupted Sectors Find Jobs

Mr Poon King Wang and team are re-purposing their AI-based task-skills database stack -- which was developed to help unions and companies chart job transitions for workers displaced by digital disruption -- into an AI-based “cross-sector jobs GPS”. This “cross-sector jobs GPS” will help workers in the COVID-19 disrupted sectors to quickly chart pathways to jobs in less affected sectors. The focus on tasks and integration to skills makes it possible to chart clear and concrete step-by-step pathways just like a GPS to identify, design, improve and accelerate training and job transitions.

### Efficient Targeted Testing Guided by Tracing Analytics

Dr Andy Zheng is working on a plug-and-play FluTrace data analytical engine based on contact tracing data from QR-code scans. This was first-deployed in taxis in three Chinese cities with over 20 million people on 10 February 2020. The FluTrace solution, with a key output of a ranked list of people for testing, is aimed at substantially increasing the efficiency of proactive testing in the community and effectively breaking infection chains by identifying asymptomatic infections in the network.

### Digital Societies

The Digital Societies project at LKYCIC has been undertaking a study into the lived experiences of on-demand gig work prior to Covid-19. Since Enhanced Circuit Breaker measures have come into effect, many Singaporeans who work in non-essential sectors have turned to food delivery to make up for lost income. Yet, these new entrants often face resentment from workers who have relied on food-delivery income before COVID-19.

Compounded with the health risks of high-contact work during COVID-19, our study also highlights the risks of digital platforms not carefully managing the markets and opportunities they seek to create for a wider workforce.



Lee Kuan Yew  
Centre for Innovative Cities

Mr Poon King Wang  
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Dr Andy Zheng  
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## Tool for Airports to Analyse Transmission Risk

Asst Prof Sam Conrad's research project uses digital tools for building managers, architects and airport managers to analyse disease transmission risks in airports and other large public areas, while providing minimally invasive design interventions steps to mitigate this.



Asst Prof Sam Conrad  
[sam\\_joyce@sutd.edu.sg](mailto:sam_joyce@sutd.edu.sg)

## Breath Sensor to Detect Covid-19

Assoc Prof Wu Ping is working on a breath sensor with external collaborators to detect Covid-19 using chemical gas sensing techniques embedded on a mobile phone.



Assoc Prof Wu Ping  
[wuping@sutd.edu.sg](mailto:wuping@sutd.edu.sg)

## More on Covid-19 Related Research

Find out more on how SUTD contributes to fighting COVID-19 with technology and design at [@weareSUTD Blog](#). The list of projects and research studies will be updated regularly to report on our human-centred solutions that not only serve societal needs, but meet the challenges of the uncertain future.

# Research Achievements

## Double Win for SUTD at the IEEE Communications Society



SUTD received the prestigious IEEE Communications Society Young Author Best Paper Award as well as the Stephen O. Rice Prize in 2020.

Prof Tony Quek and his PhD student, Dr Thinh Quang Dinh, who graduated in January 2020 were selected as the winners of the IEEE Communications Society Stephen O. Rice Prize for their excellent paper "Offloading in Mobile Edge Computing: Task Allocation and Computational Frequency Scaling", IEEE Transactions on Communications, Vol. 65, No. 8, pp. 3571-3584, August 2017.

More information can be found [here](#)



Dr Chen Zheng, visiting PhD student at ISTD who was supervised by Prof Tony Quek, won the IEEE Communications Society Young Author Best Paper Award for his joint work "Cooperative Caching and Transmission Design in Cluster-Centric Small Cell Networks", published in IEEE Transactions on Wireless Communications, Vol. 16, No. 5, pp. 3401-3415, May 2017.

More information can be found [here](#)



## Researcher Wins Praemium Erasmianum Foundation's Research Prize



Research Fellow Dr Thijs Willems from LKYCIC, SUTD won the Praemium Erasmianum Foundation's Research Prize for his dissertation on the ethnographic study of the Dutch railway system. This prize is awarded to young academic researchers who have written a PhD dissertation of outstanding quality in the fields of humanities, social sciences, and law. The Praemium Erasmianum Foundation, founded in 1958 by Prince Bernhard of the Netherlands, awards annual Erasmus Prizes for cultural and academic activities.

More information can be found [here](#)



## SUTD Faculty Elected to be Fellow of Institute of Physics



Prof Ricky Ang has been elected as a fellow of the Institute of Physics (IOP), recognising his position as a leading physics professional who is advancing the scientific domain of physics. Founded in 1874, IOP is a United Kingdom - based learned society and professional body that works to advance physics education, research and application.

More information can be found [here](#)



## SUTD Faculty Elected to be Fellow of Royal Society of Chemistry



Assoc Prof Yang Hui Ying has been elected as a fellow of the Royal Society of Chemistry. Fellowship of the Royal Society of Chemistry (FRSC) is an award conferred by the Royal Society of Chemistry (RSC) in the United Kingdom.

More information can be found [here](#)



# Research Achievements

## Bronze Medal for LKYCIC's Book



Sixteen Shades of Smart, a book published by LKYCIC at SUTD together with IMD Business School, was awarded the bronze medal under the Business Intelligence/Innovation category at the Axiom Business Book Awards 2020, the largest and most respected guidepost for business books in today's new world of publishing.

The book contains case studies of sixteen cities from different regions in the world, discussing how these cities are adopting smart technologies to deal with urban challenges. LKYCIC undertook the research and writing on the Asia-Pacific cities at SUTD.

More information can be found [here](#)



## Asst Prof Carlos Banon Awarded German Design Award 2020



Asst Professor Carlos Banon and his team from [AIRLAB at SUTD](#) have won the German Design Award 2020 - Winner in the Excellent Product Design category on their project 'AirTable'.

The German Design Awards is one of the most renowned design competitions worldwide and has an excellent reputation among industry experts.

More information can be found [here](#)



## SUTD Researcher shines at the InnovPlus Challenge 2020

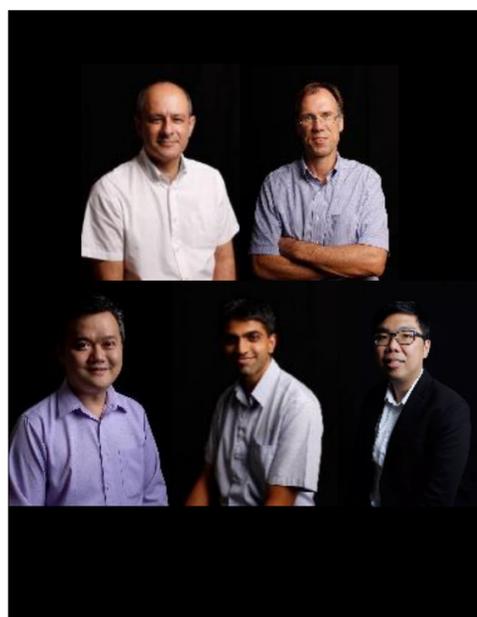


Dr Bina Rai, Senior Lecturer from SMT cluster led the winning SUTD team alongside three other winners at the InnovPlus Challenge June 2020. The team secured a \$200,000 grant to develop an Immersive Technology in a Training & Assessment Platform (I-TAP) prototype to trial with actual learners. Organized by IAL and SUSS, this half-yearly competition seeks to provide a platform for organizations, learning experts and technology partners to collaborate and present innovative, feasible and scalable solutions to real learning challenges faced by the industry.

More information can be found [here](#)



## \$15 million Funding for Additive Manufacturing Workflows



SUTD has received a grant funding of \$15 million in February for a programme on "Industrial Digital Design for Additive Manufacturing Workflows". The programme, led by SUTD, involves also IHPC, NUS, ARTC, IMRE and NMC, and aims to enable the industrialization of Additive Manufacturing (AM) in Singapore by developing an effective AM workflow so that design with production planning is fast, cost effective, and can scale up easily.

The programme will ultimately enable capability development and attract companies to collaborate and expand manufacturing and product innovation in Singapore supported by significant advances made in areas of Design, Modeling & Simulation and AM hardware-materials development. The SUTD team, led by Assoc Prof Arlindo Silva involves also Prof David Rosen, and Assoc Prof Soh Gim Song, Asst Prof Tan U-Xuan and Asst Prof Nagarajan Raghavan. DManD/NAMIC will host this programme at SUTD.

More information can be found [here](#)



# Research Achievements

## Assoc Prof Joel Yang Awarded \$3 million Funding to Advance Research on 3D Nanostructured Optics



Assoc Prof Joel Yang has been awarded \$3 million funding over five years under the Singapore National Research Foundation (NRF) - Investigatorship for his project “3D Nanostructured Optics with Designer Elements (NODE) to Shape and Control Light”. He is one of only six principal investigators awarded this year from all areas of science and technology in Singapore, and the first faculty member from SUTD to receive this prestigious grant.

More information can be found [here](#)



## Asst Prof Georgios Piliouras and Asst Prof Ioannis Panageas received joint NRF-ANR Grant



Asst Prof Georgios Piliouras (lead principal investigator, left) and Asst Prof Ioannis Panageas (co-principal investigator, right) have been awarded a joint NRF-ANR grant. This is a bilateral grant between the National Research Foundation (NRF), Prime Minister's Office, Singapore and Agence Nationale de la Recherche (ANR), France. It is a national level collaboration between Singapore and France for French-Singapore collaborative research projects

More information can be found [here](#)



## Prof Chan Heng Chee appointed 7<sup>th</sup> S R Nathan Fellow



Prof Chan Heng Chee, Chair of LKYCIC at SUTD, has been appointed the 7<sup>th</sup> S R Nathan Fellow for the Study of Singapore (Academic Year 2019/20). Prof Chan is also Ambassador-at-Large with the Ministry of Foreign Affairs and Chair of the Board of Trustees at the ISEAS-Yusof Ishak Institute of Southeast Asian Studies. Her latest IPS-Nathan lecture, which was moderated by [Mr Bilahari Kausikan](#), can be accessed [here](#). All other lectures can be found [here](#).

To recognize the contributions of the late Mr S R Nathan who dedicated his life to public service and the advancement of Singapore, the Institute of Policy Studies (IPS) established the S R Nathan Fellowship for the Study of Singapore in 2013.

Past S R Nathan Fellows include Prof Tan Tai Yong, President and Professor of Humanities (History) at Yale-NUS College, as well as Dr Cheong Koon Hean, CEO of the Housing and Development Board.

More information can be found [here](#)



## Asst Prof Malika Meghjani named World's 50 Most Renowned Women in Robotics



Asst Prof Malika Meghjani has been named one of the world's 50 most renowned women in robotics by Analytics Insight in its June 2020 special edition. The issue recognizes the top 50 dynamic women in the robotics industry who are leading their way to unprecedented excellence.

Analytics Insight is an influential platform dedicated to insights, trends and opinions from the world of data-driven technologies.

More information can be found [here](#)





# ASPIRE

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