

## MEDIA RELEASE

### 12 October 2021



**Ngee Ann Polytechnic (NP) launches Robotics Research & Innovation Centre (RRIC) to co-create customised robotics solutions with industry and develop talent pipeline for the growing sector**

*NP inks MOU with SingHealth Polyclinics to develop disinfection and safe management ambassador robot HIRO, one of the 10 use cases on display at its inaugural robotics e-symposium*

*RRIC will advance applied research in the field of robotics, provide learning opportunities for NP students and work with SGInnovate to nurture deep tech talent through new Specialist Diploma in Robotics Engineering*

**Singapore, 12 October 2021** – Companies looking to streamline their business processes can get greater access to customised robotics solutions to accelerate growth at Ngee Ann Polytechnic’s (NP) Robotics Research & Innovation Centre (RRIC).

The centre was officially launched today by Guest-of-Honour Mr Tung Meng Fai, Director (Ecosystem Development) at the National Robotics Programme. Located in NP’s TechSpace@8, RRIC brings together NP’s multidisciplinary expertise in infocomm technology, engineering, health and life sciences, to advance capabilities in the key areas of Service Robots, Autonomous Vehicles, Autonomous Underwater/Marine Vessels and Unmanned Aerial Vehicles.

The RRIC will provide a platform for industry players to share problem statements and collaborate with it to develop and trial new solutions. NP staff and students will also get opportunities to work

on deep tech projects. It underscores NP's commitment to nurture a strong pipeline of robotics talent, and ensure that staff stay abreast of industry needs, following the launch of the [Future City Programme](#) in 2019.

“As the COVID-19 pandemic has intensified the need for digital transformation and innovation, the RRIC is seeing an increased demand for tailor-made robotics solutions. With extensive experience in developing robotics solutions since 2014, NP is well positioned to partner our industry stakeholders to co-create and deploy innovative solutions. The launch of the RRIC is a testament to our commitment to prepare our graduates for the future and accelerate Singapore's digital transformation,” said Mr Lim Kok Kiang, Principal & CEO of NP.

He added: “The RRIC will bring industry and academia together to create an ecosystem for applied research in robotics, and allow our students and staff to work on real-life problem statements to deepen skills in this in-demand field.”

### **MOU with SingHealth Polyclinics**

In conjunction with the launch of the RRIC, NP signed a Memorandum of Understanding (MOU) with SingHealth Polyclinics today to develop a disinfection robot, *HIRO* (**H**ealthcare **A**ssistive **R**obot for Frontline Infection Control), that will soon be deployed at its polyclinics. Jointly developed by NP's School of Engineering, School of Health Sciences, School of Life Sciences & Chemical Technology and SingHealth Polyclinics, *HIRO* uses UV-C light – which can eliminate more than 99.9% of bacteria and viruses – to disinfect high-touch and hard-to-reach places remotely and independently.

In addition, the smart robot also doubles up as a safe management ambassador. It can detect visitors and patients who are not wearing masks or following safe distancing rules, record their temperature and display location information. It can even serve as a guide to show patients and visitors the way to the different service points in the polyclinic. These automated functions help the polyclinic to save manpower, and manage its facilities more efficiently and safely.

The robot is currently on trial at Tampines Polyclinic.

Clinical Associate Professor (Dr) Tan Ngiap Chuan, Director of Research at SingHealth Polyclinics and Vice-chair, Research, SingHealth-Duke NUS Family Medicine Academic Clinical Programme (FM ACP) said: “The *HIRO* robot is potentially a game-changer to mitigate infection risks in primary healthcare facilities, saving on manpower and enhancing safety to patients, visitors and staff. Due to the high patient load in the polyclinics, there is a need to disinfect the premises regularly without disrupting the clinical services, especially in this current COVID-19 pandemic. We are thankful for the opportunity to collaborate with NP and bring this innovation to our polyclinics.”

### **Co-develop New Specialist Diploma with SGInnovate**

To meet the anticipated demand for robotics engineers in the era of automation, NP will be partnering SGInnovate to launch a new [Specialist Diploma in Robotics Engineering](#). Aimed at equipping adult learners with essential skills and knowledge in machine learning, computer vision

and coding, learners will have the unique opportunity to participate in Power X Robotics, a nine-month traineeship programme. This part-time full-qualification course will start in April 2022.

“As we lean more heavily on robotics to address some of our biggest challenges in areas such as healthcare and manufacturing, we need to ensure that Singapore’s innovative start-ups are equipped with the right talent to scale,” said Ms Juliana Lim, Executive Director, Talent Networking, SGInnovate. “Collaborations with partners like NP will be critical to lowering the barrier of entry into Deep Tech careers, and encourage learners of all ages to pick up in-demand skills and continue to remain relevant.”

### **Inaugural Robotics e-Symposium**

To further seed interest in the growing field of robotics, the RRIC will also host a robotics e-symposium today. Titled *Robotics Solutions for the Pandemic Era*, the conference will bring together more than 12 partners and more than 300 participants, and explore how robotics applications can overcome challenges brought forth by the pandemic. It will also feature 10 robotics solutions that NP has developed over the years and how they have been deployed across various sectors. They include:

- Autonomous Campus Bus (MooVita)
- Bio-aerosol Containment Unit (Ng Teng Fong General Hospital)
- Concierge Robot ROSY (Ngee Ann Polytechnic)
- **HIRO (Healthcare Assistive Robot for Frontline Infection Control)** (SingHealth Polyclinics)
- Fish-ball Forming & You Tiao Processing System (Thong Siek Food Industry)
- Mozzie Drone (National Environment Agency)
- Park Patrol Robot (National Parks Board)
- Plant Health Monitoring Robot (National Parks Board)
- Smart Vending Machine (Cover Projects Pte Ltd)
- Teaching Assistant Robot CoDDiE (Coding buddy in Education) (Hougang Primary School)

Please refer to Annex A for more information on the projects.

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### **About Ngee Ann Polytechnic**

Ngee Ann Polytechnic started in 1963 and is today one of Singapore's leading institutions of higher learning with over 13,000 enrolled students in close to 40 disciplines. It seeks to develop students with a passion for learning, values for life, and competencies to thrive in a global workplace. The polytechnic also supports Continuing Education and Training (CET) through its CET Academy, which offers a wide range of part-time programmes and short courses. It works closely with industry partners to curate programmes for emerging skills, develop talent pipeline for the industries and help adult learners stay agile in today's rapidly changing global economy.

For more information, please visit [www.np.edu.sg](http://www.np.edu.sg).

## **Annex A**

### **Projects featured at the inaugural Robotics e-Symposium**

#### **1. Autonomous Campus Bus (MooVita)**

In collaboration with MooVita, a Singapore high-tech company specialising in developing autonomous vehicle solutions, NP's Robotics Research & Innovation Centre (RRIC) has jointly conducted several autonomous shuttle trials on the NP campus.

These trials have helped the project team to better anticipate future transport mobility needs, hone their understanding of the technology, and engage the wider NP community on the readiness and safety of the operation of autonomous shuttles.

#### **2. Bio-aerosol Containment Unit (Ng Teng Fong General Hospital)**

In collaboration with the Ng Teng Fong General Hospital (NTFGH), NP's RRIC developed a bio-aerosol containment unit (BCU) which functions as a portable individual biohazard safety cabinet to protect healthcare workers from infectious droplets during aerosol-generating procedures such as non-invasive ventilation or high-flow nasal cannula therapy.

The BCU mimics a negative pressure isolation room when it is connected to a negative pressure wall suction system that extracts air from the inside of the box. It can be mounted to a hospital bed to reduce the spread of infectious droplets during transfers of COVID-19 patients across facilities, such as from the Emergency Department to wards.

The transparent acrylic box has four hand holes to facilitate airway management and nursing care, and a clear plastic drape on the front to serve as an additional protective layer for the healthcare worker during close contact with the patient.

#### **3. Concierge Robot ROSY (Ngee Ann Polytechnic's Student Services & Visitors Centre)**

The RRIC developed a concierge robot to host and assist visitors to the Student Services & Visitors Centre located at the NP campus. Designed to interact with visitors using speech recognition technology, the Concierge Robot elevates the chatbot experience for them while increasing productivity for the staff manning the facility.

#### **4. HIRO (Healthcare Assistive Robot for Frontline Infection Control) (SingHealth Polyclinics)**

The Healthcare Assistive Robot for Frontline Infection Control, or HIRO, is co-developed by the NP School of Health Sciences (HS), School of Engineering (SOE) and School of Life Sciences and Technology (LSCT) and SingHealth Polyclinics. HIRO is designed to improve the infection control of healthcare settings such as polyclinics via UV-C light to reduce the spread of germs.

In addition, HIRO assists to remind visitors and patients to wear their masks and records their body temperature. HIRO is equipped with technology to allow its safe navigation through the passageways and can serve as an usher to direct visitors to the various services points in the precinct.

## **5. Fish-ball forming & You Tiao processing System (Thong Siek Food Industry)**

Commissioned by Thong Siek Food Industry, NP's RRIC provided a proof of concept solution to develop a Fish-ball forming device and *You Tiao* processing system. The spirals of the forming device are fabricated out of food-safe filaments used in 3D printing technology.

The *You Tiao* processing system is a close collaboration with Thong Siek Food Industry which started off as a Final-Year Project. This project was an eye-opener for the students in getting insights to the automation of food processing. Thong Siek Food Industry and RRIC forged forward in further development and improvement of the process.

Besides customising robotics solutions that make use of existing infrastructure for cost effectiveness, the RRIC's solutions help companies to meet requirements to reduce the number of staff on-site during the Covid-19 pandemic.

## **6. Mozzie Drone (National Environment Agency)**

Under Project Wolbachia-Singapore, the National Environment Agency (NEA) releases male Wolbachia-carrying *Aedes aegypti* mosquitoes as a vector control tool. When these male Wolbachia-carrying *Aedes aegypti* mosquitoes mate with female urban *Aedes aegypti* mosquitoes that do not carry Wolbachia, their eggs will not hatch, thus reducing the population of *Aedes aegypti* mosquitoes in the community.

In collaboration with the Environmental Health Institute (EHI) of NEA, NP's RRIC has developed a rapid release device for mosquitoes ('Mozzie Airlifter'), which is capable of carrying out the releases using an autonomous UAV. Attached to a drone, the Mozzie Airlifter can release the male Wolbachia-carrying *Aedes aegypti* mosquitoes in mid-air. Further development and tests will be needed to determine the potential and feasibility of using UAV technology for mosquito releases in the field.

## **7. Park Patrol Robot (National Parks Board)**

To safeguard the health of visitors during the Covid-19 pandemic, the National Parks Board (NParks) has put in place safe management measures across our parks, gardens and nature reserves. To complement the efforts by NParks staff to manage safe distancing and appropriate mask-wearing, NP's RRIC developed a Park Patrol Robot that helps to monitor these safe management measures.

The Park Patrol Robot is able to navigate independently around the gardens and detect visitors who breach safe management measures, such as individuals who are not wearing masks, or are gathering in large groups. It will send audio advisories to garden visitors and capture images of such incidents to alert NParks staff.

Equipped with chatbot and telepresence functions, garden visitors can also communicate verbally with the robot to get directions to garden facilities or seek help in an emergency.

Apart from enhancing the monitoring of safe management measures, the Park Patrol Robot can also detect incidents of smoking and illegal fishing in the Gardens. Upon detection, the robot will send an audio advisory to alert the offender and record the incident for documentation purposes.

## **8. Plant Health Monitoring Robot (National Parks Board)**

*Applications of Hyperspectral Imaging for Early Detection of Pests in Plants*

To mitigate the impact of climate change and maximise green spaces, interest in indoor horticulture, where plants can grow in controlled environments, has increased. Developed by the National Parks Board's (NParks) Plant Science & Health branch and NP's RRIC, the Plant Health Monitoring Robot will be able to monitor the growth of plants using cutting-edge hyperspectral imaging technology and automation for indoor horticulture. The robot will reduce the manpower required, minimise the need for close contact between staff who carry out such inspections, and enhance detection sensitivity beyond the capacity of the human eye.

## **9. Smart Vending System for Hotel Industry (Cover Projects Pte Ltd)**

With contactless transactions on the rise during the COVID-19 pandemic, NP's RRIC jointly developed the Smart Vending System for local budget hotel operator, Cover Projects Pte Ltd.

Designed to serve guests when they arrive at the hotel, the automated Smart Vending System dispenses card keys to the guests upon registration. In addition, the System also minimises the need for guests to interact with hotel staff or other guests by providing cafeteria services. Guests can order their meals through the hotel portal and use their card key to collect their food from the built-in lockers in the System.

## **10. Teaching Assistant Robot CoDDiE (Coding buddy in Education) (Hougang Primary School)**

NP's RRIC, in collaboration with a local primary school, has developed a teaching assistant robot aimed at making learning more interactive in the classroom. The robot has been deployed in an action research project to study its effectiveness in engaging and motivating students in the learning and reinforcement of Mathematical concepts.

The robot augments the teacher's lesson delivery by playing relevant video clips on the screen mounted on its body that can also be projected on a screen in the class. Designed for interactivity, the robot generates questions for students to attempt, allowing them to check their understanding in an engaging way. Teachers are also able to obtain real time feedback on the students' learning to guide them in their lesson design.

In socially distanced classrooms during the Covid-19 pandemic, the teaching assistant robot enhances, enlivens and enriches the students' learning experience in the classroom with strict safe management measures in place. Beyond the classroom, the school has also been able to deploy the robot as a campus hygiene ambassador to remind students to uphold their personal hygiene and maintain safe distancing in a fun way.

## **Quotes from NP students who have worked on robotics projects with the RRIC**

**Kevin Lim**

**Diploma in Engineering Science, Class of 2021**

“I was part of a team that developed the Park Patrol Robot’s sensory and navigational systems, which enable it to travel longer distances over hilly terrain and avoid water bodies, and programmed the robot’s mask-wearing detection and remote-control features. This challenging but rewarding experience has honed my ability to think on my feet and deepened my interest in using robotics to improve the lives of others.”

**Lee Xian Hui**

**Diploma in Engineering Science, Class of 2021**

“Developing the *HIRO* robot from scratch was not an easy feat. In fact, I had to learn several coding languages on my own to program the robot’s mask detection, UV-C light disinfection and concierge functions. I’m proud to see the project come to fruition, with *HIRO* now undergoing trials at Tampines Polyclinic. I hope that it will help to benefit public health and wellbeing, and boost productivity in the polyclinics.”