

I CAN ENGINEER SOLUTIONS FOR



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SP ENGINEERING SHOW | 2017

Editorial Team

Editor

Alvin Tay (MAE)

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Gillian Lam (EEE)

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Cheng Siew Fatt (MAE)

Tay Wee Pheng (EEE)

Acknowledgement

IDI Laser Services Pte Ltd

CO-CHAIRMEN'S MESSAGE



From Left to Right:

Mr Sng Hong Lian
Co-Chairman,
SP Engineering Show Steering Committee
Deputy Director,
School of Electrical and Electronics
Engineering

Mr Duncan Sih Wei Cheong
Co-Chairman,
SP Engineering Show Steering Committee
Senior Manager,
School of Mechanical and Aeronautical
Engineering

Dr Sepulveda Jose (Not in picture)
Co-Chairman,
SP Engineering Show Steering Committee
Centre Director,
TIE-Applied Research & Tech for Infocomm
Centre

Welcome to the SP Engineering Show 2017.

This annual exhibition provides an interactive platform for our final year students from six academic schools - School of Architecture & Built Environment, School of Chemical Life Sciences, School of Digital Media & Infocomm Technology, School of Electrical & Electronic Engineering, School of Mechanical & Aeronautical Engineering and the Singapore Maritime Academy - to present their engineering solutions to real-life problems, to share the challenges they faced with fellow poly-mates, and to receive feedback and advice from industry partners.

The SP Engineering Show 2017 features creative solutions under the themes of 'CleanTech & Built Environment', 'Healthcare & Wellness', 'Industrial & Automation', 'Infocomm & Media', and 'Transport & Mobility'. Industry-collaborated projects led by the

Department of Technology, Innovation and Enterprise (TIE) will be introduced through the 'SP Tech to Market' theme, with special mention of the SP Food Innovation Resource Centre's (FIRC's) ready-to-eat products and food automation projects.

For the first time, FabLab Singapore Polytechnic will participate in this exhibition to enhance awareness of its fabrication capabilities and the types of fabrication assistance it will make available to the next cohort of final year engineering students.

We would like to thank you for your presence and offer our congratulations to the organising committee, student clubs and staff who have contributed their time and effort in making the SP Engineering Show 2017 a memorable event.

SP ENGINEERING SHOW WORKING COMMITTEE



Back Row

(Left to Right):

Beh Hang Meng, Alvin Tay, Lui Siew Kwok, Jonathan Ng, Mark Wong, Handojo Djati Utomo

Middle Row

(Left to Right):

Fazlur Rahman, Chan Chin Loong, Tay Kheng Siong, Chua Poi Hui, Teo Kian Hun,
Peh Koon Heng Ronnie, Chiam Tow Ming

Front Row

(Left to Right):

Gillian Lam, Lynn Chhia, Cheung Kim Kwong, Sng Hong Lian, Duncan Sih Wei Cheong,
Seow Boon Chor, Esther Kang, Chua Hui Ching

Not in Picture

Sepulveda Jose, David Chai, Gabriel Soon, Tan Cher Hwee, Lee Yoke Ling, Frank Chua,
Matthew Choong, Francis Hong, Tan Liang Kiat, Lee Mei Lai, Lee Choon Sun, Tan Hai Su,
Thio-Tang Choy Yong, Victor Choo, Wan Kok How, Leong Mun Kin, Moon Sunghan

SP ENGINEERING SHOW STUDENT COMMITTEE



Row 6 (Top)

(Left to Right): Wallace Ng Zhen Guang, Muhammad Haziq Fitri Bin Baharin, Ang Liang You, Syakir Ariffin Bin Amran, Mirza Bin Mohamed Noor

Row 5

(Left to Right): PTM Nareen, Muhammad Ashraff Bin Rosli, Muhammad Haziq Bin Zulkarnai, Ahmad Haris Bin Abdul Rahman

Row 4

(Left to Right): Shi Barnley, Soh Guan Wei, Syaeerhan Ramadhan Bin Mohamed Fareez, Muhammad Syazwan Bin Shaiful, Hans Bin Elias

Row 3

(Left to Right): Sia Pei Xiang, Clynt Lee Asiatico Domingo, Shannon Tan Hui Shan, Racia Koh Wan Lin, Dillon Lim Jun Jie, Muhammad Rahimi Bin Rashid

Row 2

(Left to Right): Jamie Tan Jia Xin, Khew Wan Ling Aceline, Chai Hsueh Jing Cindy, Claudia Peck Jia Ying, Sheila Devi D/O Suppia

Row 1 (Front)

(Left to Right): Ong Qian Ying, Lim Qian Ying Gina, Denise Ng Rui Qi, Kam Jia Yu



CLEANTECH & BUILT ENVIRONMENT



These projects use technology which is environmentally friendly, is economically competitive and generates less waste. Students work on increased performance, productivity and efficiency by minimizing the negative effects on the environment.





Shallow-mixing Scheme For Excavated Soft Soil

In Singapore, the excavated soft soil from various construction sites is recycled as infilling material at reclamation sites resulting in thick and soft layers of soft soil. In order to prevent excessive settlement in the near future, ground treatment works are required. However, it is difficult for the heavy ground treatment machinery to access this soft ground. Thus, this study aims to develop a mixing scheme to strengthen the soft soil at a shallow depth. Various mix designs and mixing methods were investigated to obtain the desired rapid shear strength development as well as the uniformity of mixing.



Unconfined compression test.

Supervisor

Chan Chin Loong

Team Members

Wong Fu Huan, John Lim Keng En, Jan San Kai Ra, Toh Jun Wei

Industry Partner

National University of Singapore

The Green Energy From Our Infrastructures

Singapore has extremely limited natural resources, and in order to sustain a population of 5.54 million, the country depends heavily on the importing of energy from neighbouring countries, then turning gas into electricity. This project generated several ideas to salvage energy from different sources with the aim of helping Singapore be self-reliant in energy production. One of the methods is through the transportation infrastructure.



Sustainable Road Kerb.

Supervisor

Chua Yina

Team Members

Chen Sze Ming, Goh Yin Hui Erica, Teo Shu Min, Khan Shahzada Aqeel, Verasak Sia, Tan Jia Hao Alastair, Chua Aye Neng, Ong Lee Yen Celeftine



CLEANTECH &
BUILTEENVIRONMET



Green Asphalt For Flexible Pavement

This project aims to investigate the properties and heavy metal leachate issues of bituminous paving mixtures containing recycled materials. Laboratory samples will be prepared and tested to evaluate physical and performance properties of various bituminous paving mixtures incorporating recycled materials. Volumetric measurement and calculation of volumetric properties, sieve analysis of raw materials and paving mixtures will be a part of the mix design procedure. In addition to the evaluation of technical properties, crumb rubber bituminous mixture was also proven to be more environmentally friendly than current asphaltic bitumen due to less heavy metal leachate.



Students with their bitumen samples.

Supervisors

Handojo Djati Utomo, Tan Poh Seng

Team Members

Nur Azwanny Amat, Wayne Yip Bi Heng, Ranjitha D/o Sekaran, asper Kwok Jia Chen, Liaw Jian Wei, Gabriel Chua, Seo Wan Ying, Ong Jun Ren Clement, Alex Yeo Ming Yen, Shwe Yi Phyoe, Ng Jia Hao Jeff, Muhammad Bin Mohamad Fazil, Hoong Jing Han, Renjana Biju Shwetha, Guet Zong Lin Lucas, Chong Jia Way

Industry Partner

SamWoh Corporation Pte Ltd

Use Of Pulverized Fly Ash (PFA) In Flowable Concrete

Flowable concrete usually consists of water, pulverized fly ash (PFA), Portland cement and sometimes, coarse or fine aggregates, or both. It is an engineered, strength-controlled, fill material that is self-leveling, self-compacting and non-setting. This project aims to develop a flowable concrete mix containing PFA that satisfies the engineering properties. It shall involve laboratory tests to assess the most important physical characteristics, namely, strength development, flowability, hardening time, bleeding and drying shrinkage.



Process of producing flowable concrete with PFA.

Supervisor

Tan Poh Seng

Team Members

Wah Wah May Zaw, Chen Zhi You, Frank Sim, Gerrah Lei Montano Pamplona

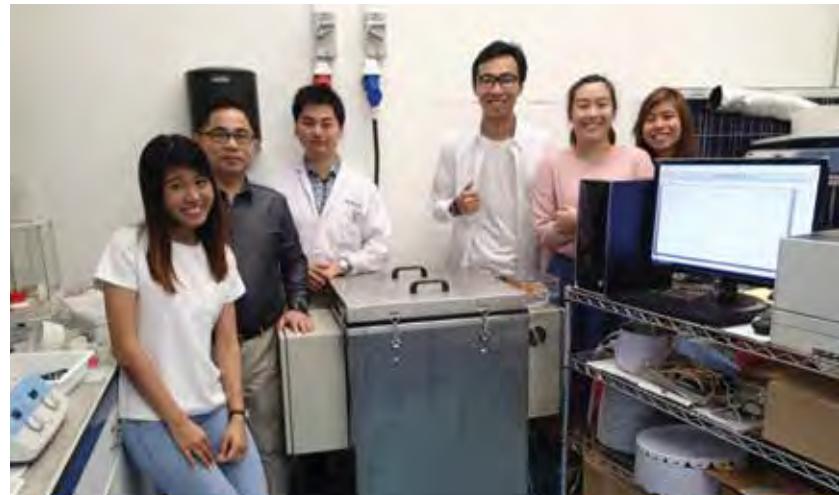
Industry Partner

SamWoh Corporation Pte Ltd



Study Of Adiabatic Temperature And Delayed Ettringite Formation In Concrete

The hydration reaction of cement during the setting and hardening processes in concrete results in the development of a large amount of heat, which in turn results in an increase in the concrete temperature. In tropical countries such as Singapore, hot weather conditions and high initial temperatures must be taken into account for concrete design as these may accentuate the temperature rise in concrete caused by the heat of hydration. The aim of this project is to study the amount of heat released during hydration and to understand what happens during hydration in mass concreting.



Supervisors and students with their prototype of Adiabatic Temperature Rise System.

Supervisor

Tao Nengfu

Team Members

He Xingran, Ng Guang Lyn Amanda, Shi Lei Ripley, Toh Fen Hui

Industry Partner

Admaterials Technologies Pte Ltd

Improving Soft Soil Properties For Industrial Applications

Soft soils such as marine clays are unwanted due to their high compressibility and weak shear strength. This project focuses on two areas: to improve the rate of consolidation of soft soils through the addition of magnesium sulphate and to increase the shear strength of soft soils by adding cement.

Supervisors

Teo Kian Hun, Chan Chin Loong

Team Members

Navarro Carl Gabriel Allado,
Chan Zhi Wei Justin, Koh Yi Zheng,
Aasiq Ahamed, Sun Yi Zhen,
Jazz Wong Ji Xin, Cheng Yutong,
Tan Li Jia Farron

Industry Partner

National University of Singapore

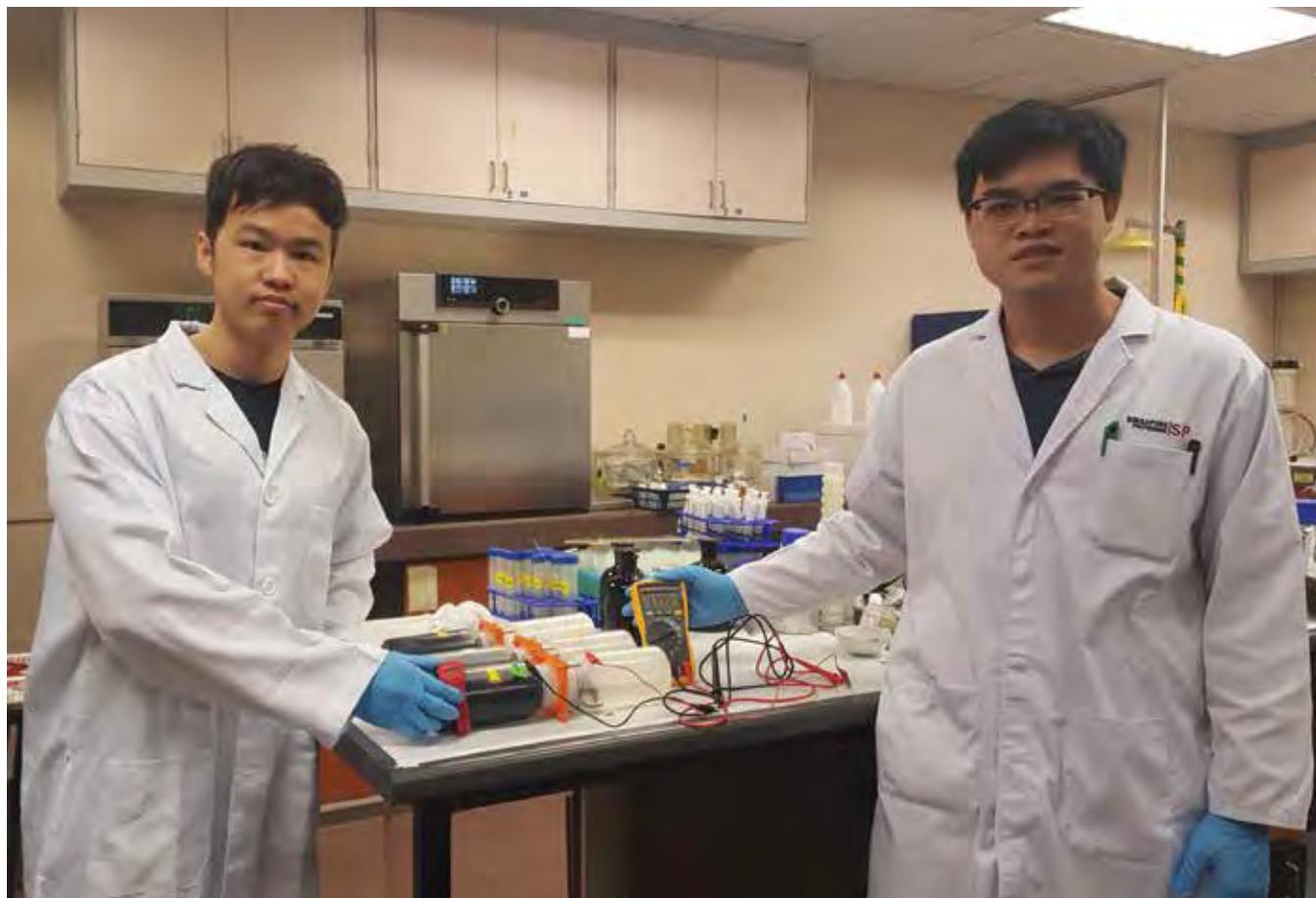


Students working in the NUS Geotechnical Laboratory.



CLEANTECH &
BUILTEENVIRONMET

Microbial Fuel Cell (MFC) Development For Bioelectricity Generation From Sewage Sludge



Students with the FMFC model.

The objective of this project is to modify a conventional Microbial Fuel Cell (MFC) containing sewage sludge into a Fabricated MFC (FMFC) model to multiply bioelectricity generation. The work was carried out to compare the effectiveness of using the FMFC and the MFC. Bacteria studies and identification was also carried out to gain a better understanding of the type of bacteria growing in the sludge. Microbial Fuel Cell is a feasible solution to generate bioelectricity out of sewage sludge.

Supervisor

Handojo Djati Utomo

Team Members

Ong Jie Jun, Daniel Choong Zhi Yi

Industry Partner

Nanyang Technological University, LKC School of Medicine



Evaluating The Effectiveness Of Fruit Peels In The Extraction Of Heavy Metals From Wastewater

Environmental pollution by toxic heavy metal ions in industrial wastewater is a perennial problem for maintaining the quality and hygiene of water. Conventionally, the techniques used to remove heavy metals are physical, chemical, biological treatments or their combinations. Biosorption is an eco-friendly treatment technique that has increasingly attracted the attention of researchers and gained industrial significance. This project investigates the effectiveness of a few types of easily available fruit peels in removing heavy metals from wastewater.



Untreated powdered fruit peels (from left to right: orange, banana, and lemon) used to adsorb heavy metals from wastewater.

Supervisor

Chua Poh Hui

Team Members

Liew Zheng Jie, Tan Zong Hong, Yjasmin Yvette Morales Naquila

Cultivation Of Chlorella Vulgaris To Treat Urban Runoff And Lipid Production

Urban run-off is a significant source of contamination in water. Chemicals from urban storm water run-off pose a potential threat to aquatic organisms. An integrated approach, which combines freshwater microalgae (*Chlorella Vulgaris*) cultivation with urban run-off treatment will be studied in this project. The factors affecting algal growth, lipid yield, and nutrient removal efficiency will be examined.



Experimental setup to investigate the effect of different light colours (different wavelengths) on the treatment efficacy of microalgae.

Supervisor

Ting Kok Eng

Team Members

Jason Yeo Thian Seng, Nur Rizahamizah Binte Ahsim, Arundhuti



CLEANTECH &
BUILTEENVIRONMET

Solar Car - SunSPEC



SunSPEC4 on Stuart Highway(Northern Territory of Australia)- (World Solar Challenge 2015), October 2015.

The aim of this project is to design and build a futuristic 2-seater fibre composite solar powered electric vehicle, SunSPEC5. The solar vehicle, SunSPEC4, participated in the World Solar Challenge 2015; SunSPEC5 will participate in the forthcoming World Solar Challenge 2017, an epic 3000km race across the Australian Outback. The solar car project is a showcase of science - engineering and technologies - and it aims to raise public awareness of renewable energy in sustainable transportations.

Supervisors

Leong Fai Choy, Foo Fang Siong, Dilip Battul, Lam Yee Ki, Than Keng Hwa, Kenny Chiang, Steven Chew Lai Teck, Erwin Wouterson

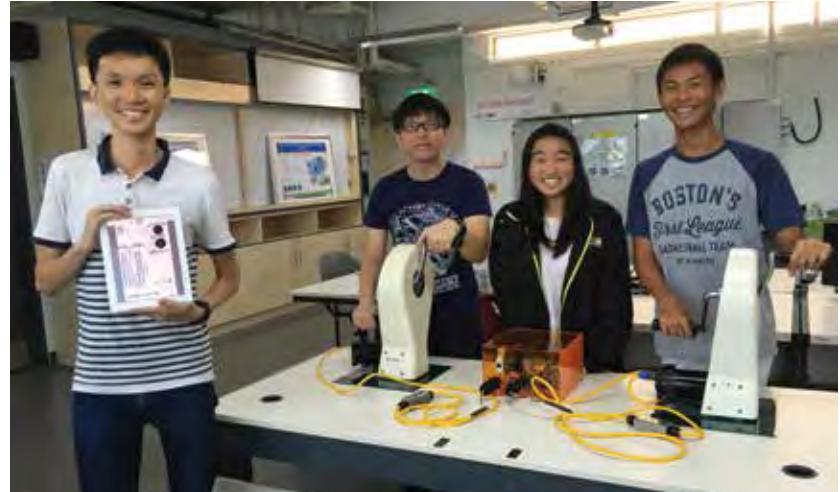
Team Members

Ian Tang Jia Ming, Fong Sebert, Ang Wei Xiang, Erwan Bin Zubir, Mohammad Khairullah Bin Ayob Khan, Andy Sim Wei Xiang, Dennis Low Bo Xiang, Keh Soon Heng, Phyto Min Han, Kyle Woo, Seow Jing Woon, Joel David Lim, Lim Jia Ren, Lim Zheng Yuan, Sheryl Choo Ching Yee, Krystal Wong Jie Ying, Ng Jian Rui, Shum Gaan Jie, Vincent Ng Guan Rui, Melissa Ng Hui Shi, Ng Wei Leong, Foo Chuan Li, Chiew Boon Meng, Ang Jian Yao, Rudy Hidayat Bin Ramli



Smart Energy Gaming And DC Microgrid

This project aims to harness and integrate clean and green energy through a modern DC Microgrid concept for high energy efficiency and reliability. With the development of a smart energy gaming system, individuals can play games, become fit and have their exercise energy harnessed to power up appliances. Thus, exercise energy is not wasted.



Smart Energy Gaming with DC Microgrid for Energy Integration.

Supervisors

Jiang Hao, Wang Huaqian

Team Members

Jalen Chng Heng-li, Muhammad Amin Setiawanggsa, Tan Teck Sem, Chou Hui Lin Vivien, Jodan Sng Yangyi, Chan Jia Luo

Industry Partner

SP PowerGrid Ltd

V.BAD (Vertical Ballistic Accelerator Device)

The objective of this project is to design, fabricate and test a rapid ascent vehicle (aka a rocket) that is propelled by common fluids without combustibles, pyrotechnics and electricity. Thus, user safety (low risk of fire) and stealth capability (low heat signature) are both enhanced. This innovative technology has potential applications in the Defence Science and Aerospace industries. The project can also be used for Engineering outreach programmes and as a teaching aid for modules like Fundamentals of Flight, Thermofluids and Mechanics offered under SP's School of Mechanical & Aeronautical Engineering (MAE).



Students getting ready for flight trial with V.BAD.

Supervisor

Leong Ying Wei

Team Members

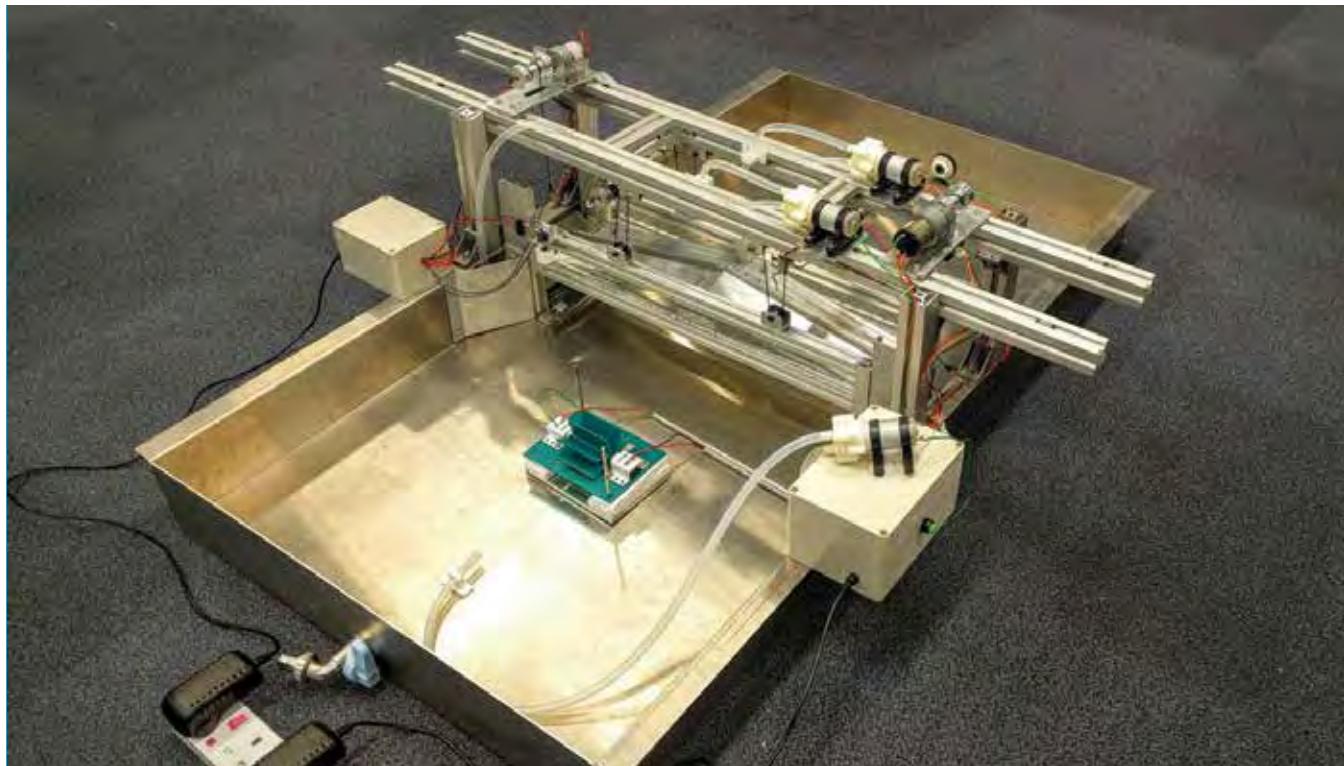
Lee Si Yuan, Cheng Chin Wee Darren, Goh Ee Liang, Hng Jian Zong Stantly, Geraldine Tan Wei Tian



CLEANTECH &
BUILTEENVIRONMET



Clean Canals



Assembled Prototype.

Singapore is known for being one of the cleanest countries in the world. However, there is a persistent problem that may pose a threat to her clean reputation - the problem of debris-filled canals. The aim of this project is to design and build a system that reduces the amount of waste/rubbish found in canals, thus beautifying the appearance of the canals and also benefitting the aquatic life within. The prototype incorporates smart technology and mechanical systems, making it the first concept of its kind.

Supervisor

Leong Teng Boon

Team Members

Lee Zhong Han, Bryan Leong Qi Wei, How Qiao Xin, Ng Tian Jun



HEALTHCARE & WELLNESS



These projects help maintain an optimal level of wellness which is crucial for living a high quality life. Students will develop tailor-made integrated solutions to make a difference in people's lives.





Formulation Of Bio-recycling Active Collagen For Cosmetic Applications

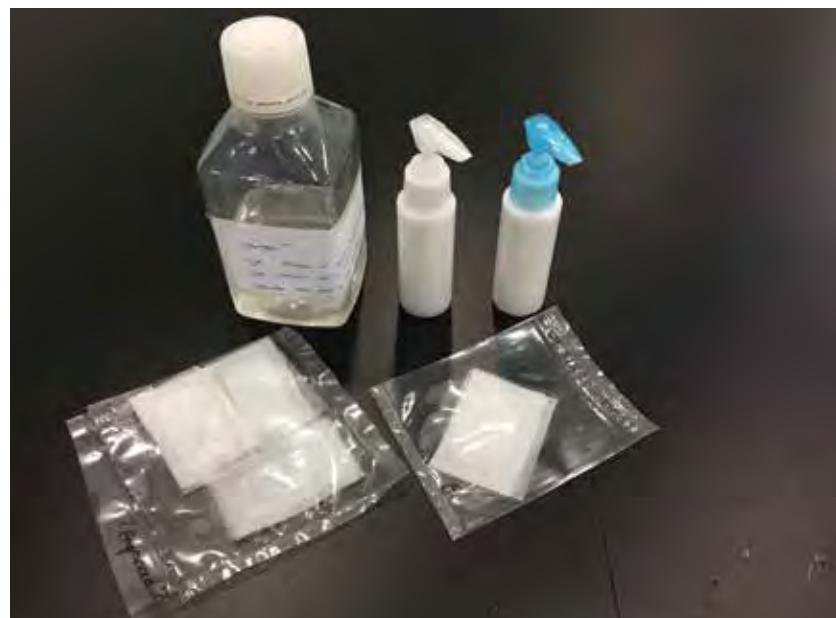
The project involves the formulation of moisturisers, sleeping masks and gel masks using the active ingredient, Collagreen (collagen). Collagen is said to promote beneficial skin effects such as healthy appearance, good hydration and elasticity of the skin. The formulations are created to harness the beneficial skin effects attributed by Collagreen. Evaluations of the prototypes were performed to ascertain the intended product efficacy and stability.

Supervisors

Lam Kok Seng, Low Bee Lee

Team Members

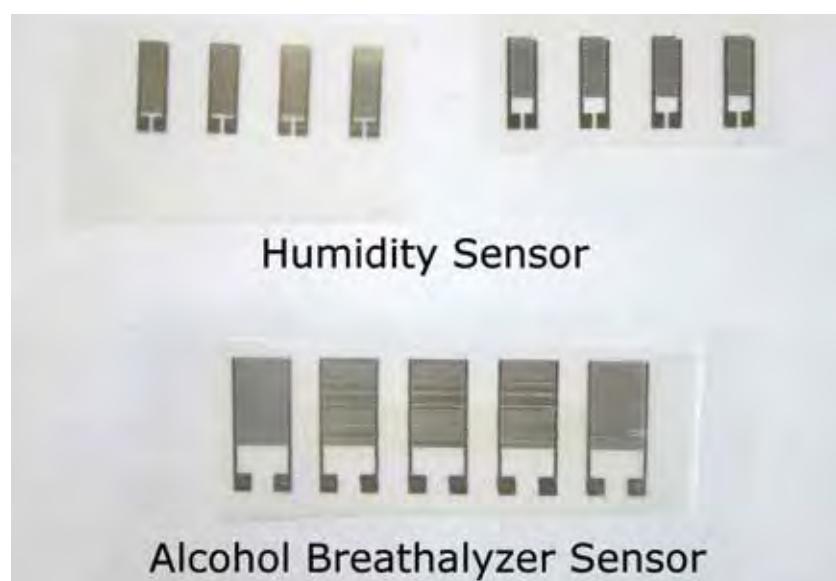
Brindha K Rajan, Tong Yudi



(Clockwise) Top (L): Collagreen, Moisturisers, Sleeping Masks, Gel Masks (Bottom).

Flexible Electronics

Flexible electronics is an emerging technology to develop applications on flexible substrates such as paper, plastic, etc. Typically, this is achieved by printing functional inks on flexible substrates. Some of its advantages include lightweight, portability, bendability or rollability. Students will be exploring applications such as sensors, origami printed electronics, etc. In these projects, students explore the development of humidity and alcohol breathalyser sensors by printing functional inks on flexible substrates. The humidity sensor is useful for humidity measurement in skincare applications while the alcohol breathalyser sensor is used to test alcohol in a driver's breath.



Humidity and alcohol breathalyzer sensors made by printing functional inks on flexible substrates.

Supervisors

Wong Weng Yew, Derrick Ting Lee Hou

Team Members

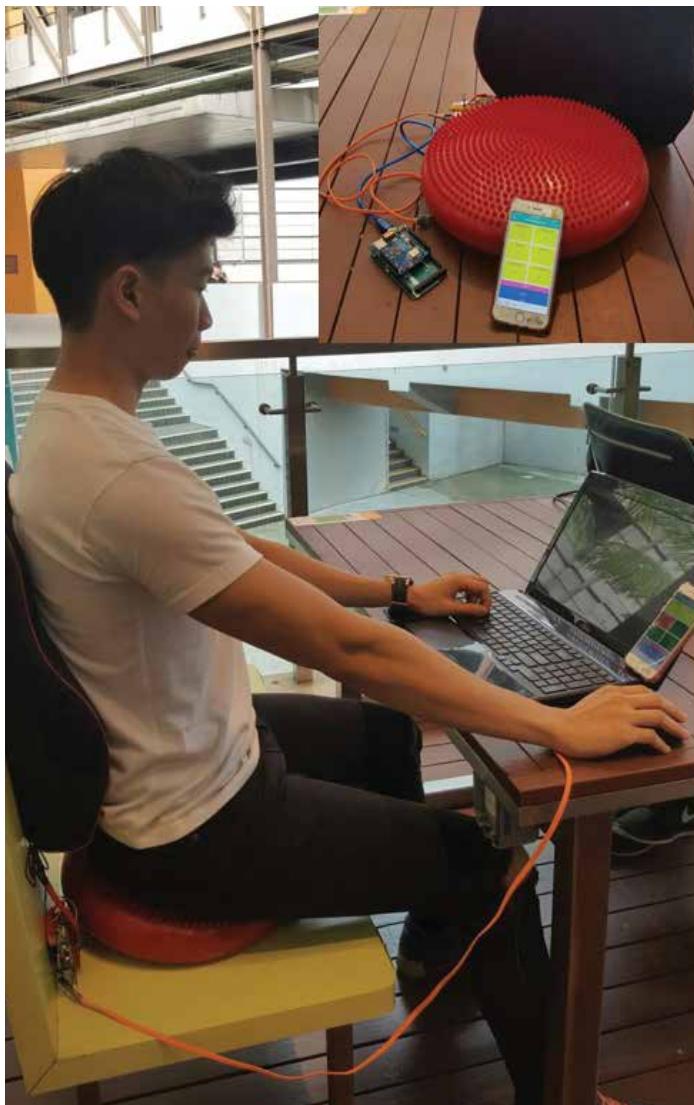
Yaman Bahadur Malla, Muhammad Haashir Bin Abdul Malik, Khoo Yao Teng Martyn, Deng Kaiming, Chang Pearlyn, Vernice Lee Jia Xuan

Industry Partner

Nanyang Technological University



Health Enhancement Alert System



Exercise disc balance cushion health alert system and low-cost wearable physical therapy device.

These projects focus on research aimed at enhancing an individual's health by designing exercise gadgets with health alert systems which are linked to bluetooth and/or smartphones. The first project uses an exercise disc balance cushion as a seat to allow the user to exercise while seated. This cushion is installed with a sensor to record the user's sitting behaviour. The second project uses a low-cost wearable EMG sensor with wireless capability to motivate patients to undergo repetitive exercises and serves as an assessment tool at both outpatient and in-clinical settings.

Supervisors

Roger Chiun Koon Yong, Sampath Kumar, Chia Soo Ping

Team Members

Sheena Chua Jia Yun, Chan Nicholas Jeremy Fugen, Soh Wen Hui, Mua Kim Meng, Sham Goh Cheng Hian, Seah Yaode Sean, Lur Jia Yi Amanda, Ang Li Yi, Wong Sian Liang

Industry Partner

Total Health Chiropractic Singapore



Urban Farming Kit

Farming in urban Singapore is a recent trend. Many housing estates are keen to apportion some land for residents to be involved in such a therapeutic hobby. In the context of land scarce Singapore, sustaining city farming activities is a challenge. It is, therefore, desirable to reduce current land usage by one-third while maintaining the current yield. This project aims to design and build a low-cost, user-friendly farming kit for gardeners suitable for use in HDB housing estates. The aim is to promote active citizenry and social integration among HDB dwellers.

Supervisor

Soh Kim Fai

Team Members

Tan Yi Xuan, Szeto Hao Xuan Louis,
Chua Yong Chuan, Tan Gim Yeow



Vertical farming framework.



Chairless Chair

The main objective of this project is to design and build a chair that allows the user to sit as and when desired so as to reduce fatigue or stress on legs after long hours of standing. The target users for this product would be commuters or employees who are required to stand for long hours. The chair has a human-centred design which is wearable, easy to use and aesthetically appealing.

Supervisor

Sharon Gan Sze Wei

Team Members

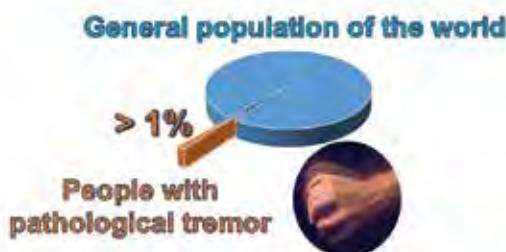
Ong Kai Le, Alexander Cheu Hao Wei,
Desmond Saw Yan Zhang, Ng Wen Xiu,
Tan Ze Xin Dylan



User wearing the Chairless Chair prototype.



Design And Development Of A Handheld Device For Tremor Compensation



Certain activities and tasks of these people are hampered by the hand tremor



A Handheld Tremor Compensation Device

To help these people to perform these activities



We developed a tremor compensation device

Compensation of tremor of the tool tip is achieved by

Detecting the device's motion

Finding out the tremor

Moving the tool tip in opposite direction to the tremor

Precision in tremor reduction is superior to the anti-shake spoon in the market



The Handheld Tremor Compensation Device.

Pathological hand tremors affect a small percentage of the world population. Affected individuals find it difficult to perform certain tasks and activities. To help such individuals perform these activities and tasks, a handheld tremor compensation device was designed and developed. The device can be used in many potential applications such as writing, drawing, soldering, manipulating tiny components and even performing delicate tasks like surgery.

Supervisor

Win Tun Latt

Team Members

Vedicherla Venkata Sai Kiran,
Muhammad Raihan Bin Roslan,
Muhammad Rusyaidi Arfan Bin Razali,
Muhammad Nazifi Bin Nazaruddin



Wireless Animatronic Glove

The Wireless Animatronic Glove allows remote control of a hand which is unable to move by itself. It aids in gripping or holding onto things thereby giving the user full control over the weakened hand, and allowing independent movement of the fingers. The Wireless Animatronic Glove benefits people with weakened hand functions, helping them to retain their sense of independence.

Supervisor

Lim Chun Wheng

Team Members

Fong Kai Min Sabrina, Koh Wenqian,
Alexander Quah Zhi Wei,
Yasmin Jamilah Shajahan



Overview of the sensor glove and actuation glove.

Advanced Material For Smart Biomedical Applications

Essential Tremor (ET) is a neurological disorder that is characterized by uncontrolled shaking or tremors on different parts of the body. This disorder can develop at any age and becomes increasingly common with advancing age. Currently, there are no medical tests to confirm the diagnosis of ET, other than taking a neurological evaluation. A diagnostic system that is able to provide more insight into patient condition is needed to prevent misdiagnoses at earlier stages of this disease.



Essential Tremor Diagnostic System.

Supervisor

Ngoh Shwu Lan

Team Members

Ong Xin Min, Sneha

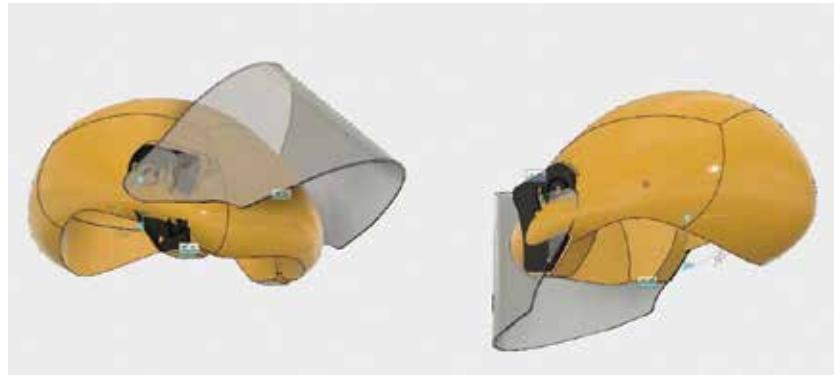
Industry Partner

National University of Singapore



ERF Safety Helmet (Engine Room Friendly)

Industrial safety helmets are primarily intended to provide protection to wearers against any falling object and consequential brain injury and skull fracture. The high accident rate on board vessels inspired the team to come up with the ERF Safety Helmet which improves safety and communication amongst marine engineers.



Design features of the safety helmet with Ear muffs, walkie-comm and visor.

Supervisor

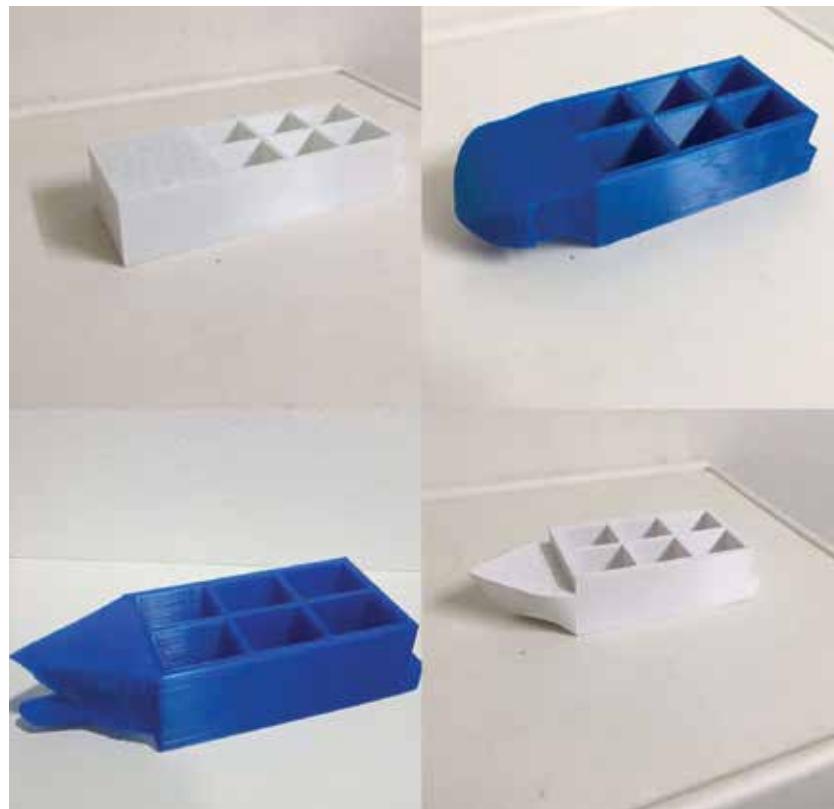
Leong Mun Kin

Team Members

Anthony Toh Chee Leong, Seah Zheng Nan, Lieu Jun Han, Lorens Kencono Panizales

Redesign Of Ambulance Vessel

The marine industry is one of the most dangerous industries with a high number of annual fatalities. Consequently, people are doubtful about joining this field. The project aims to redesign the ambulance vessel hull form so as to maximise its speed-to-aid rescue. With this vessel, casualties will receive medical attention in the shortest timespan, and their chances of survival will be significantly increased.



Prototype Designs of varying Hull forms.

Supervisor

Ng Guo Yi

Team Members

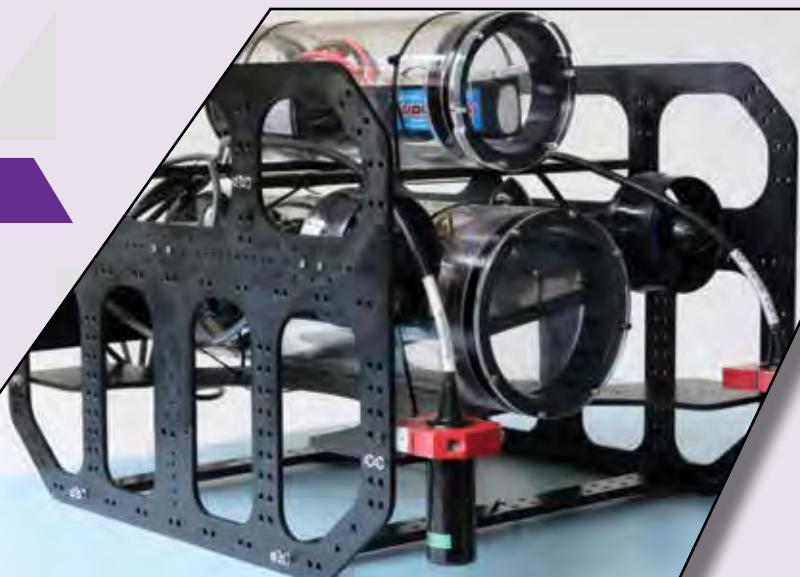
Elango Aravind, Chua Yong Jian Kenneth, Song Xin Yu Bryan Muhammad Amirul Haqeeem Bin Darus,

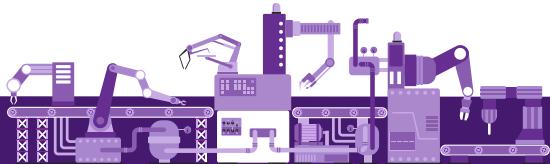


INDUSTRIAL & AUTOMATION



These projects provide control systems with processes that need to interact in real-time with other applications with significantly superior performance in terms of precision and speed.





Portable Cooler

The aim of this project is to provide a portable 12V DC silent air-cooler for a small room which can operate for up to 4 hours continuously. Known as iCool, the air-cooler allows for a fast setup time. The cooler is added with extra features - a dehumidifier, an air-filter and a remote control (through mobile phone).

Supervisor

Wong Chee Yong

Team Members

Dylan Woo Chun Hao, Jiang Xi,
Lee Zheng Chen



iCool Box.

Social Robots

Robots are popular solutions to perform monotonous, simple tasks or to be used for operation in dangerous environments. This team presents two social robots. Social robots are robots that help in tasks that require human interaction. The robots will demonstrate how robots can help with taking orders and serving drinks.

Supervisors

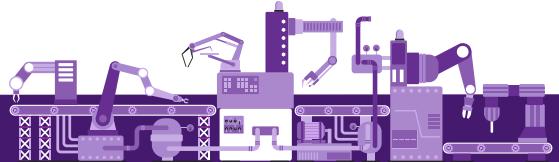
Carlos Acosta, Asadollah Norouzi

Team Members

Poh Boon Pin, Tai Wei Shen Wilson,
Xu Wenqin, Chiew Zu Yao Daniel,
Chan Wai Kit Dominic, Quak Jun Xian,
Muhammad Amirun Bin Abdul Halim,
Neo Kai Wen, Dinesdkumar Jaya Kumaran,
Pirakash Thavasekaran, Koh Jia Rong,
Low Xuan Hui, Siow Kee Tat, Keith,
Eric Goh Ee Fan, Tan Chee Wee



Social Robots and their builders.



Vision-based Coating Inspection For Marine And Offshore Industries

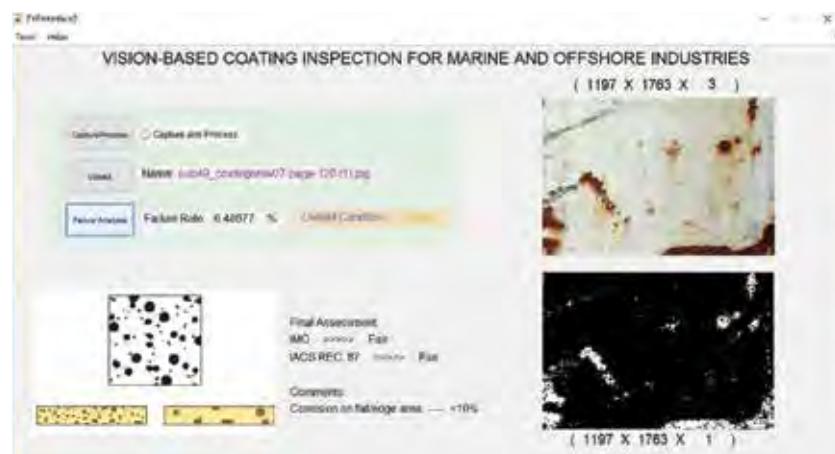
The aim of this project is to develop a vision-based system that uses image processing and analysis to do coating inspection automatically. The system is able to detect corrosion, extract identified features, and analyse coating failure rates in real time. This will greatly improve the work efficiency and reliability of coating inspection for surveyors in the marine and offshore industries.

Supervisor

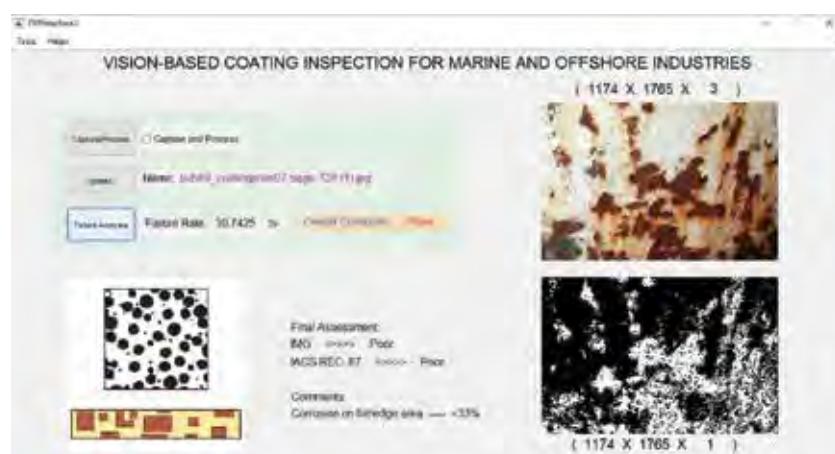
Cai Zhi Qiang

Team Members

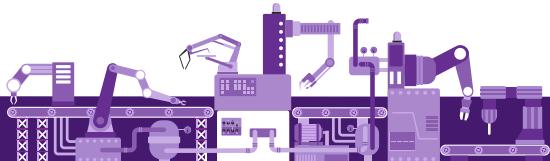
Duncan Goh Yitang, Yeo Eng Hoe Jason,
Lim Chee Quan Kelvin



Objective assessment in coating inspection result: Fair.



Objective assessment in coating inspection result: Poor.



IBoT For Social Services

The social robot Moshi-Moshi (meaning 'Hello' in Japanese) was designed with Singapore's rapidly ageing population in mind. It aims to aid working adults to care for their elderly. The robot can serve as a low-cost alternative to hiring a domestic helper. Moshi-Moshi's ultimate goal is to serve the needs of the elderly such as ensuring their safety, monitoring their daily activities and interacting with them. With the social robot, the elderly will feel less lonely staying at home and will experience lower anxiety and depression levels when their loved ones are away.

Supervisor

Phyo Kyaw Kyaw

Team Members

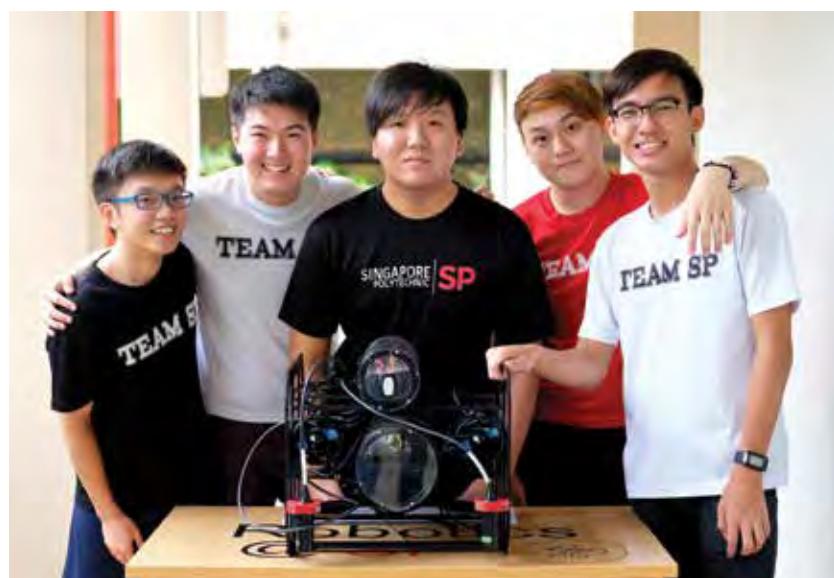
Ng Wei Siong, Joseph Phang Ban Teck,
Jeremy Lee Kian Kiat,
Muhamad Farhan Bin Mohamed Haryadi,
Kennard Chia Yun Long



IoT social service robot - Moshi Moshi.

Autonomous Underwater Vehicle

The aim of this project is to develop an autonomous underwater vehicle (AUV) that is able to navigate itself, perform underwater tasks and localise underwater signals without any human intervention. The AUV is equipped with state-of-the-art underwater sensors such as an inertial measurement unit, hydrophones and an altimeter to help in making complex decisions when underwater.



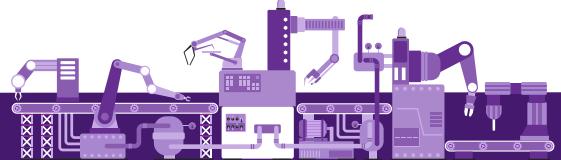
The Autonomous Underwater Vehicle and their creators.

Supervisor

Rubaina Khan

Team Members

Aryl Ng Shen Le, Leenayongwut Metarsit, Tan Wei Teck,
Lim Kian Voon, Ang Jiun Lock



Developing Simulation Platform For ICS/SCADA

This project aims to analyse cybersecurity problems in Industrial Control Systems (ICS) and Supervisory Control and Data Acquisition (SCADA) systems. A portable demonstration kit was built as a platform for showcasing cyber-attacks on ICS. In recent years, ICS has been integrated into the corporate networks of numerous companies, allowing for greater accessibility and ease-of-access by employees, and thus, increasing the efficiency of the overall system. The connectivity does, however, make ICS much more exposed to cyber-attacks. The demo kit simulates the operations of an industrial plant and exhibits possible attack scenarios on said industrial plant.



Simulation of coal power plant process.

Supervisor

Yang Zhizong

Team Members

Andrew Foo Biao Ming, Tan E-shen Jeremy, Lee Seng Ngee, Syed Mohammed Fahmie Bin Syed Nasir

User Experience Management in Smart Washroom

This exhibit showcases two projects that leverages on technology to better manage washrooms. Using a combination of sensor modules and users' and cleaners' feedback, the conditions of washrooms are monitored 24/7. Real-time data analytics is used to plan for effective deployment of cleaners and to activate instant notifications for fast response to emergencies or to replenish toilet supplies. In addition, cleaners can update their job log online and users may also view the occupancy levels of the washrooms to help them select the nearest one available. In all, these features result in cleaner washrooms, thus enhancing the users' experiences.



Project features include SMS notifications, sensor modules, web portal and user feedback system.

Supervisors

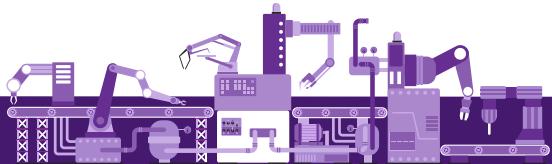
Fauziah Bte Othman, Zhu Bochun

Team Members

Soon Wei Sheng Gerald, Chng Jiun Siang Joydon, Ng Chun Kai, Cheang Zhe Sheng, Ooi Yuxuan, Arielyte Tsen Chung Ming

Industry Partner

Singtel, NCS Pte. Ltd.



Automated Storage System

Material inventory is an integral part of a manufacturing operation. It allows for incoming components to be stored and subsequently retrieved for use in the manufacturing process. The aim of this project is to design and build an automated material storage and retrieval system to improve process efficiency and reduce cycle time. Component types and quantities identified using vision system provide timely update and control of the inventory system to support the manufacturing process.

Supervisor

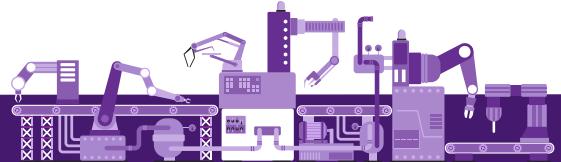
Tan Tuan Kiat

Team Members

Chua Jin Jun, Benjamin Ong Jian Ping,
Abdul Subahan Bin Mubarak Ali,
Lim Cehang Herman



Automated Storage System with wireless tablet.



Underwater Robot

The aim of this project is to design and develop an Underwater Robot with a prototype manipulator attached to it. The robot has a quick access panel to allow access to its internal circuitry. It also carries an onboard camera to allow the user to see streamed real-time videos so as to use the manipulator. These types of robots are seen in various industries around the world and are used on a regular basis. The long-term aim of this project is to meet such a demand.



Underwater Robot.

Supervisor

Thevaraja Ramu

Team Members

Tunay Johan Dave Bulos, David Chong Teik Wai,
Justin Kwek Zheng Ting, Norman Koh Wen Xuan

Oil Spill Containment Vessel

Major oil spills around the world damage a vast amount of marine life, bringing some to near extinction. Oil Spill Containment Vessel will clean waters affected by oil spills and store the oil. The main features of the vessel include:

- 1) An oil skimmer that can slide up and down with the water tide.
- 2) An oil tank that contains the oil which is recovered by a movable grooved drum skimmer.
- 3) A flapper on each side of the skimmer to guide the oil towards the skimmer and also to prevent the oil from spreading away when the skimmer boat is propelling forward.



Project members in intense discussion.

Supervisor

Foo Nan Cho

Team Members

Slyvester Wong Yu Jian, Regine Lee Di Jing, Goh Xue Zi,
Keane Keh Wei Jie, Aaron Ng Jian Xin



INFOCOMM & MEDIA



These projects deal with a digital technology base with new era of infocomm-enabled applications and digital media. These projects handle interactive applications involving infocomm technologies.





Residency Evaluation

SingHealth Residency has over 850 Residents enrolled in 34 programs. The Faculties, in the programme, come from a group of local and internationally renowned Clinician Educators who are passionate about teaching and nurturing the next generation of medical professionals, known as Residents, to be better than themselves. This project aims to increase the efficiency and convenience of the whole evaluation process for the Faculty members on the Residency programs through the enhancement of its current version of the mobile application as well as the website application.



Team during project showcase.

Supervisor

Magdalene Lim Seot Huang

Team Members

Ong Cheng Hong, Tan Jia Yu Grace, Mavies Tan Jia Yun, Sydnie Lee Sue Ni, Choo Jun Jie

InstAssist

InstAssist is an Android mobile app that is specially designed and developed for the staff of the Ministry of Social and Family Development (MSF). This all-in-one companion app provides MSF staff with continuous access to help either from the Police or their supervisor in times of crisis, even when they are out on field visits.

Supervisor

Dora Chua Heok Hoon

Team Members

Ronald Koh Yong Seng, Adeel Bin Kasban, Sangeetha Rajagopal, Frank Xiao Ji Ke



InstAssist's interface and features.



Phisher Hunter

Phishing happens every single second. With the need to secure critical public government sites, Phisher Hunter aims to position itself as a proactive system which actively “hunts” for public sites which pretend to be legitimate government sites. By using visual similarity algorithm, the stakeholders are able to identify and take down the domain in the shortest time possible to reduce cyber damage to citizens.

PHISHER HUNTER

COLLABORATED RESEARCH WITH GOVERNMENT TECHNOLOGY AGENCY

HUNT

Finding Potential Website
That is Impersonating Singapore
Government Website

VERIFY

Conduct Checks On
Suspicious Website to Gauge
Impersonation Level

REPORT

Reflect Detailed Findings To
Relevant Personnel For
Further Actions

Phisher Hunter.

Supervisor

Karl Kwan

Team Members

Fu Dai Fa, Dylan Yong Kenn Litt,
Wu Chujun, Lai Hak Yeung Jonathan,
Sim Chun Hoe

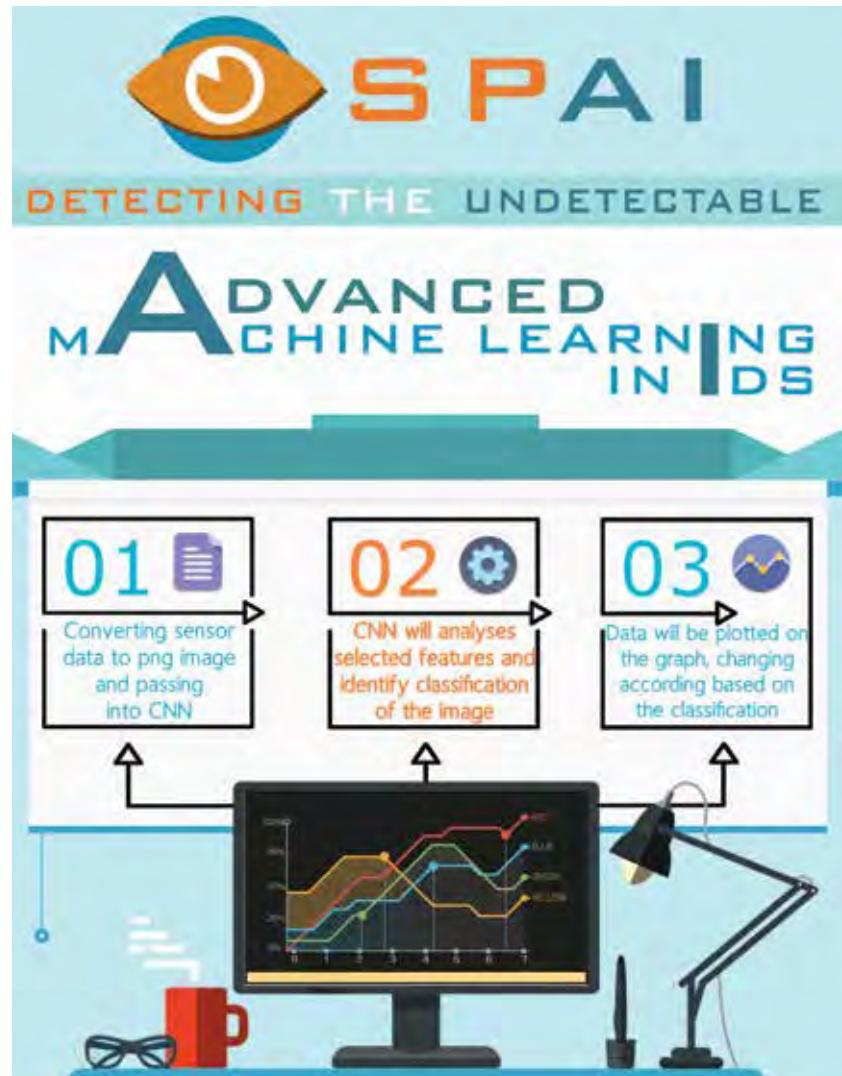
Industry Partner

Government Technology Agency of
Singapore (GovTech)



Advance Machine-learning

The purpose of this project is to develop a detection algorithm for Intrusion Detection Systems using advanced machine-learning methods. It aims to analyse live data to determine whether the data occurs under attack conditions or under normal conditions. This allows users to know when the system is being attacked.



Advance Machine-learning.

Supervisor

Lee Kay Beng

Team Members

Low Yu Sheng, Jeremy Li Jia Ming, Samuel Wee Wen Xuan,
Eugene Tan Wei Jie

Industry Partner

Singapore University of Technology and Design



Nyx

Nyx is an artificial intelligence (A.I) service that helps business owners to provide great customer service using chat for their events. Users simply provide key information of their event to Nyx and Nyx will automatically answer queries from event attendees. Nyx helps to reduce manpower needed to field customer service. Nyx can also provide flight information, transport, or lodging options with locale, currency, and language tailored to the enquirer's country and event dates. Nyx's A.I. is powered by natural language processing and can run independently on any preferred chat platform such as Skype or Telegram.

Better by chat

Discover how **NYX**

helps event organisers provide great customer service while improving customers satisfaction rate through chat.

Automated
Answer your customer's queries automatically. With Natural Language Processing, chat with Nyx just like how you normally would.

Great Customer Experience
Expect lightning-fast replies. Nyx works on your customer's preferred chat platform and provides tailored replies.

Cost benefits
Cut down your manpower cost by relying on Nyx, and only take over when you need to.

Scalable
Reach out to a wider audience through multiple platforms without a code overhaul.

Nyx.

Supervisor

Tan Hu-shien

Team Members

Lau Che Hoe, Azeem Arshad Vasanwala,
Soo Qi Xuan Ian, David Choo



Judgement Frame

In Judgement Frame, the player takes control of a giant mech. Viewing through the cockpit, players control the robot's movement and engage in combat using controllers. Play can be done using standard widescreens or via Virtual Reality (VR). The player has to defeat enemies that pose a threat to humanity. Judgement Frame was created for experimentation in the VR space. The team wanted to explore what the team can do in a learning environment. Through the project's development, the team explored things like having proper asset creation pipelines, VR-friendly user experiences and fun gameplay experiences.



Judgement Frame game.

Supervisor

Vincent Goh

Team Members

Lee Zhen Wei, Hardy Shein Nyein Chan, Chien Yong Qiang,
Aldo Chu Yu Zheng, Delon Lim Long Ting



Smart Bike

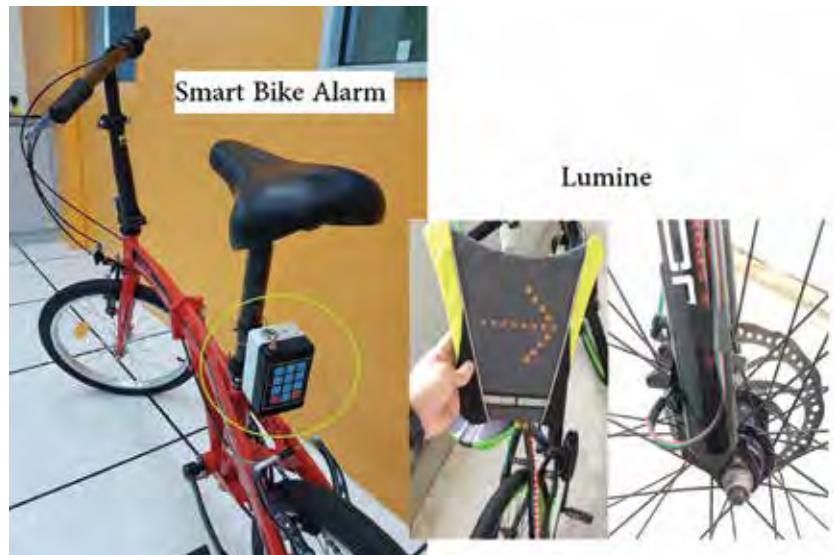
The Smart Bike Alarm secures the bicycle against theft with the use of a 3-axis sensor, a loud buzzer, a microcontroller, various wireless communication technologies (GPS, GSM, Bluetooth) and a mobile app. The Lumine is a sleek and an easy-to-use gadget to illuminate the bicycle and cycling vest as signals to other road users and comes with a buzzer for speeding.

Supervisors

Chong Siew Ping, Wong Kwee Yin

Team Members

Heng Yiren Jannai, Bernard Soh Ee Siang, Joshua Mathew, Sim Qing Quan Prosper, Daryl Ee Shaoming



Smart Bike Alarm + Lumine = Two smart gadgets to make it safer to ride/park a bike.

SmartShop

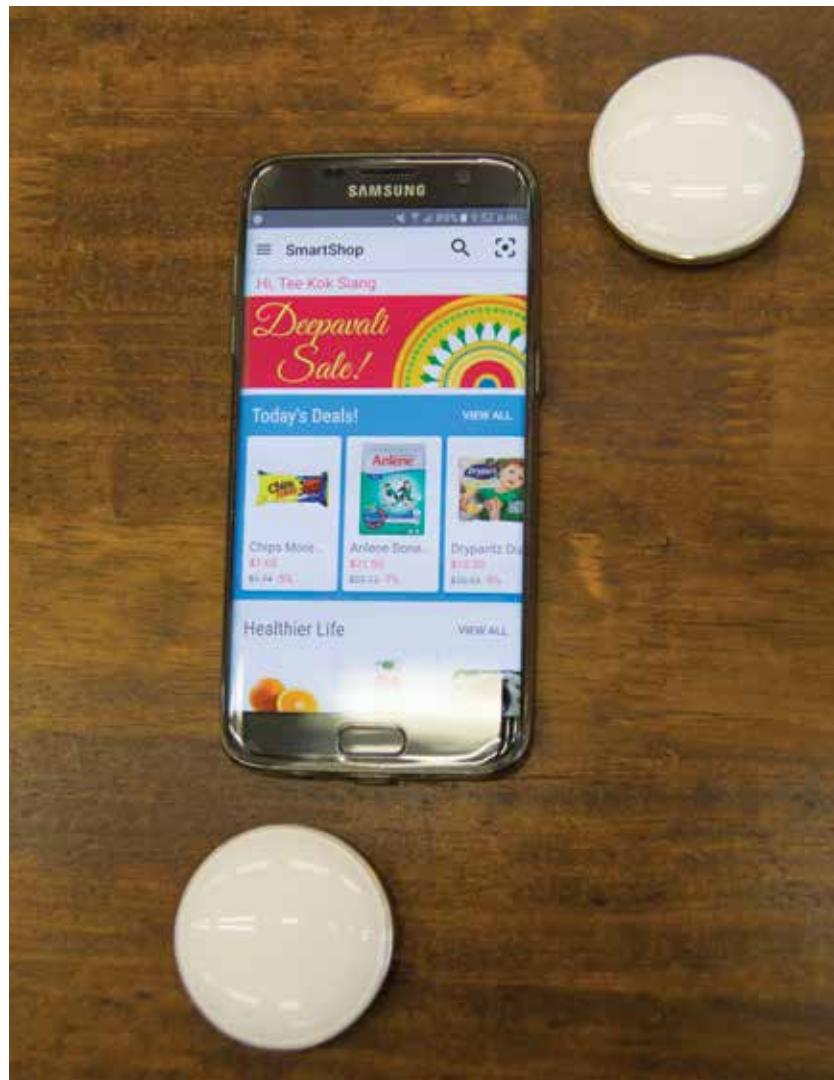
SmartShop is a concept that employs IT and sensors to empower shoppers and retailers to experience shopping at its fullest. It involves a mobile app development and Bluetooth iBeacons that empower retailers to analyse, engage, and reach out to customers. The app provides features such as an Item Scanner, a Promotion Nearby feature, a Mobile Payment method, a Membership Reward Program, and Indoor Navigation. With Data Analytics incorporated in the app, retailers can generate reports on sales, revenue, stock inventories as well as customers' shopping profiles.

Supervisor

Raymond Ho Weng Kiong

Team Members

Beh Chun Han, Lee Bing Xian, Zareen Fairoz Binte Sheik Alaudeen, Tee Kok Siang



Mobile App and iBeacons.



Ardufun

This project aims to develop an Arduino kit set for engineering students and hobbyists for rapid prototyping and project development. Arduino is an open-sourced platform which makes learning electronics, microcontrollers and programming very easy. It is very popular among engineering students and hobbyists since there are plenty of online sources for learning and knowledge sharing. In this project, a set of hardware shields and peripherals were developed so that an Arduino-based project can be developed simply and rapidly.



A starter kit for Arduino fans.

Supervisor

M Fikret Ercan

Team Members

Yeo Kai Liang Kenneth, Chia Hui Wen, Ernawati Binte Abdul Ghani

Smart Buddy

The Smart Buddy helps to organise tours or visitor groups in events, exhibitions or museums using programmable coloured lanyards for group identification and mobile apps for exhibit information and navigation within an event hall, an exhibition venue or a museum. The aim is to use smart technologies to provide a better visitor experience.

Supervisors

Wong Kwee Yin, Phyo Kyaw Kyaw

Team Members

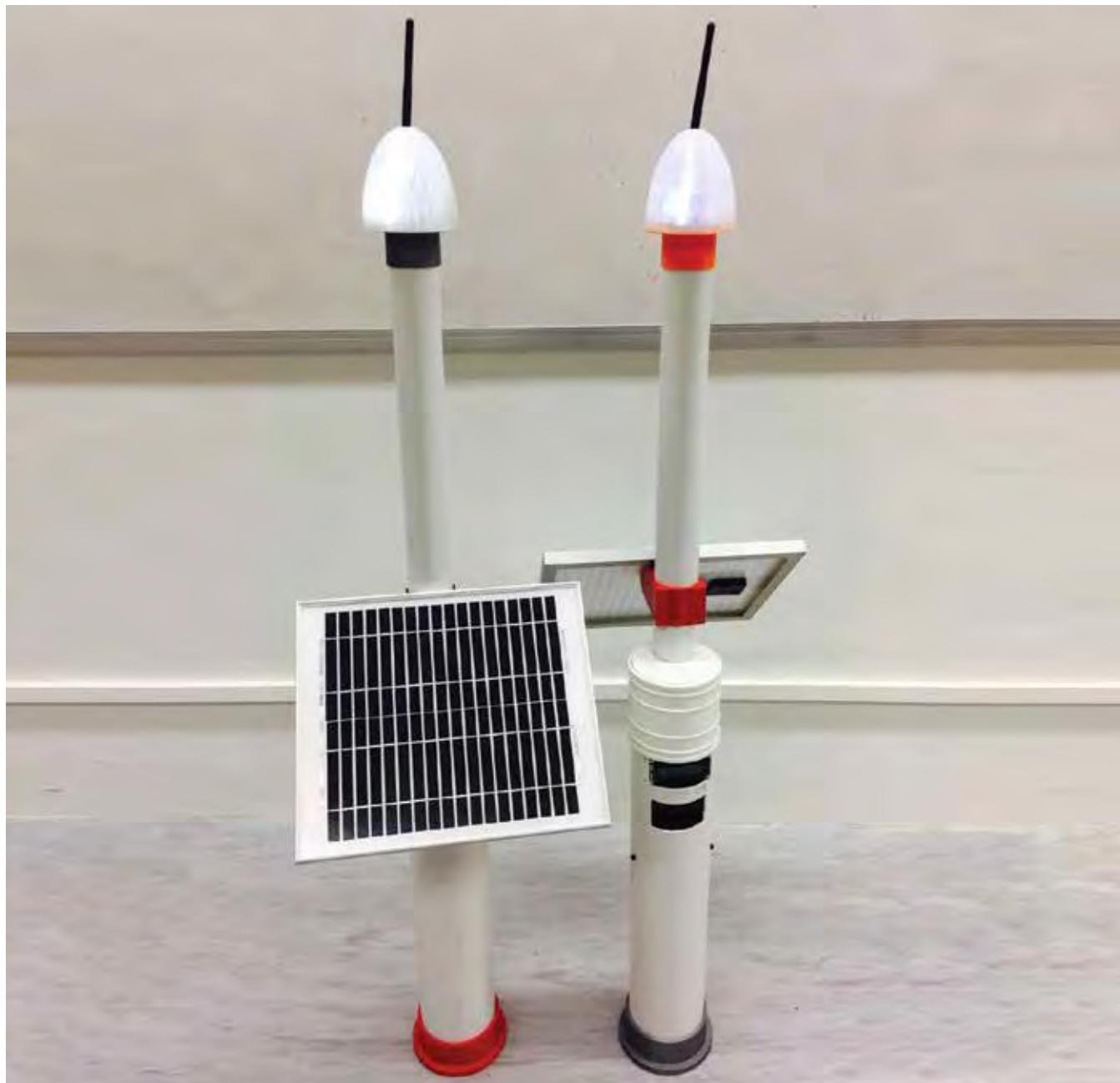
Lee Su Bin, Tan Wei Ern, K V Mitthoorn,
Muhammad Juhairi Bin Jasmani,
Iskandar Akif Bin Idris,
Lim Ding Wang Ivan



Event-illuminated lanyards with smart guide mobile application.



Citizen Driven IoT Innovations For Disaster Relief



The prototypes.

The proposed framework consists of several computing building blocks necessary to facilitate citizen-driven IoT innovations. The building blocks are modular designs of the prototype which allows for adaptation to different scenarios and incorporate a sensors module for data collection, a self-sustained power supply, long-range communication modules, a mesh network, and a data processing sub-system with visualisation capabilities hosted on cloud computing.

Supervisor
Teo Shin Jen

Team Members
Li Desheng, Loh Yong Jing Eugene, Woon Jun Shen



Interactive E-learning



Cessna Aircraft Weight and Balance.

The aim of this project is to design and prototype a three-dimensional Virtual Reality application for the use of learning/training in an interactive, immersive and safe environment. Two aircraft related applications - Towing and Weight & Balance applications - were developed by the DARE students with the use of the HTC Vive and Virtual driving system. These simulations would be used by future students taking the ME2511 Aircraft Structure module.

Supervisor

Kelvin Ong Chin Peng

Team Members

Tan Jie Hao, Teo Jing Chung, Jerron Lim Yi Quan, Chia Hao Guang,
Eu Koh Keng, Nicholas Lee Zheng Ting, Seah Kai'en Kryan,
Terry Wong Chiew Hoe, Lim Jia Hau, David Sangaran



TRANSPORT & MOBILITY



These projects contribute to the creation of integrated transport systems that are resource efficient and which tie in with substantial improvements in the mobility of people and freight.



Hunter Drone And Drone Hunter

The aim of this project was to develop two separate modules, namely, the software-tracking video analytic module and the video analytic module. The software-tracking video analytic module is designed to detect and track flying drones in a restricted zone. The video analytic module is created to detect ground intruders entering a restricted zone with the help of a UAV DJI Phantom 4 patrolling around a pre-configured location.

Supervisor

Lim Buey Kiang

Team Members

Faruq Idham, Chua Jasper, Lim Chin Siang, Soh Rui Xuan Daphne, Yeo Mian Ru, Hansen Hu



Drone hunter.

Rugged All-terrain Autonomous Land And Air Unmanned Vehicle

The Flying Tank project showcases how a quadcopter can be integrated onto a tank. This Flying Tank provides more significant features when compared to an existing flying car which is able to conquer almost all terrain. In addition, the Flying Tank is designed to incorporate functions such as the ability to fly in swarm formation with other Iconic UAV Projects in multi-disciplinary projects. It also has modular designs that can be input onto the quadcopter section to serve different purposes. The Flying Tank is designed to operate on both land and air.

Supervisors

Liew Hui Sing, Mike Ong Chin Siang

Team Members

Hoy Di Sheng Max, Ng Zun Hian, Pang Kang Kwan, Chua Ming Ze, Winston Lim Chen Rui, Ng Xuan Yi, Tay Teng Chean, Law Xuecheng



Rugged All Terrains Autonomous Land and Air Unmanned Vehicle (Flying Tank).

Indoor And Outdoor Autonomous Flying Machines and Battery Swapping System



Students and their autonomous multicopter project.

The aim of this project is to develop a fully autonomous UAV that is capable of taking off, flying, searching for a target and dropping a payload without any human controlling it. The UAV can snap photos at various pre-set locations automatically and record videos along the flight path. This project also involves the development of an automatic battery swapping system where electrically powered multicopters can land precisely and replace depleted batteries with charged ones before continuing their mission. It also involves a Quadcopter equipped with 360 camera, capable of flying in a tunnel for maintenance inspection.

Supervisors

Danny Lee, Tan Toh Seng

Team Members

Tan Tian Fu, Tan Soon Fu Nigel, Justyn Au Shuen Hui, Chua Wai Aik, Yeoh Shun Bin, Raymond Ho Chin Wei, Fang Wei, Hung Chung-yuan, Bonn Lin Lian Hao, Saimen Imanuel, Wei Wenwen, Choo Sok Yee Gorgina, Leow Jun Cong, Jonathan Fong Jia Tong

Industry Partner

Land Transport Authority

Spherical Shaped UAV

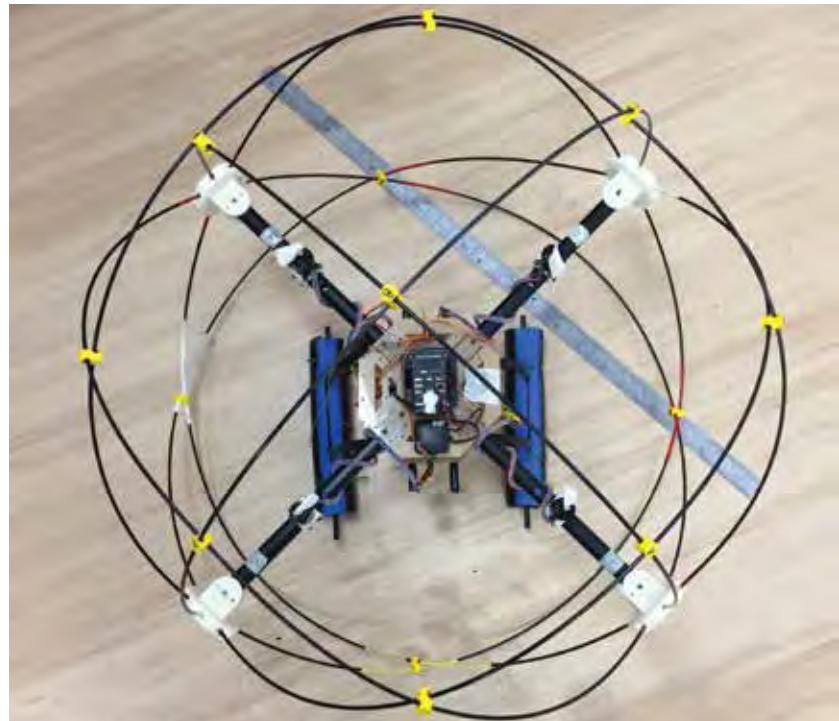
The UAV's primary design intent is for structural visual inspection with live streaming capability. It features a collision-resistant cage to minimise and protect the structure, drone and personnel from any damages. The UAV is also designed to be modular, providing the user with the ability to deploy other mission-specific modules with minimum reconfiguration.

Supervisors

Teo Ye Wei, Chaganti D V Subrahmanyam

Team Members

Seow Meng Kiat, Matthew Chua Yu Jie, Chung Han Jie, Jamie Voon Ji Xiang, Jeremy Chiam Bo Xun, Jerard Soh Jin Yi, Lee Liang Hong, Lai Zhai Yan



Spherical Shaped UAV.

Autonomous Security Surveillance Airship Carrier II

The aim of this project, done in collaboration with TwinRock Global, is to create a surveillance drone capable of tracking and chasing targets of interest. It has a hybrid design, combining properties of a fixed wing aircraft (Range and Endurance) and a multi-rotor drone (VTOL); the former offering high speed chasing capabilities and the latter allowing speedy deployment of the craft. The carrier:

- Needs minimal runway
- Minimises human effort
- Compliments existing security measures
- Optimises flight characteristics

The craft can also be flown autonomously via GPS waypointing, with its path preset before takeoff through the use of a ground station.



Autonomous Security Surveillance Airship Carrier.

Supervisors

Teo Ye Wei, Mike Ong Chin Siang

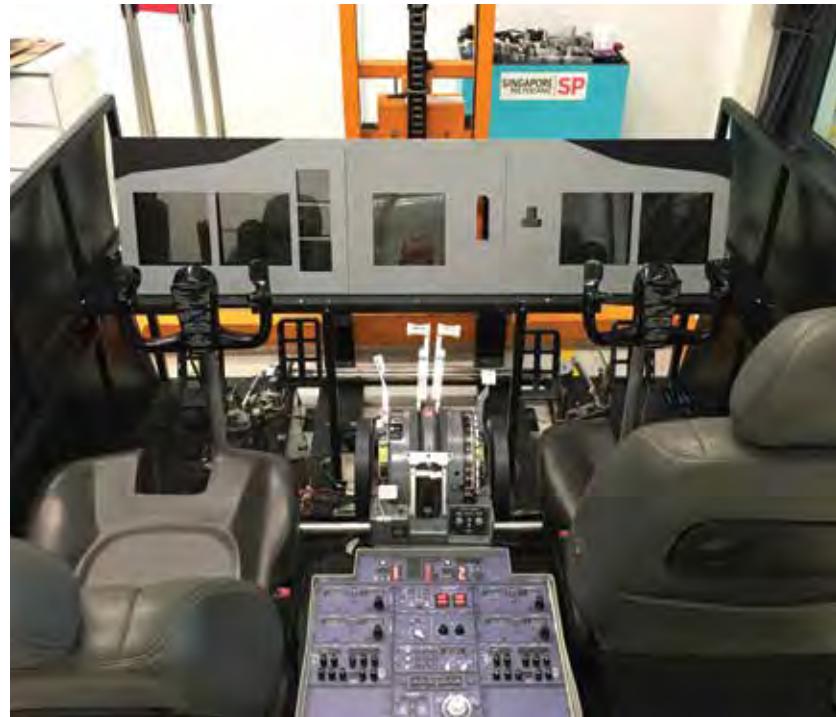
Team Members

Weng Minglong, Cheong Meng Wei, Goh Kai Wen Kean, Tan Ee Xing, Wang Yougui, Ang Wei Sheng, Yin Xu Jing Joseph



Commercial Flight Simulator Systems

The aim of this project is to upgrade the ergonomics and controls of the B737 flight simulator module to provide a more realistic flight experience. Features include re-designing the control column to reduce the weight and the thickness of the column, modifying the pilot seats to one with a cutout to accommodate the movement of the control column, designing the main instrument panel to simulate the actual layout of a B737 cockpit and shifting the pilot seat, throttle column and center pedestal forward. The upgraded module will be retrofitted into the existing SP full-motion simulator dome.



B737 Interchangeable Flight Simulator System with upgraded ergonomics and flight control.

Supervisors

Reagan Chionh, Tan Tiong Kwee

Team Members

Lim Jia Rong, Soon Shu Fang, Woo Jiaming Benjamin, Muhammad Aidil Bin Azman, Ahmad Taha Bin Selamat, Yan Chong Hao Marcus, Chong En Wen Raphael, Chong Ching Hoong

Damage-detecting Drone

The aim of this project is to utilise the use of a drone for aircraft inspection which will enable detection and image mapping of visible physical defects on the aircraft via photogrammetry. The UAV will also incorporate safety features such as motor redundancy and have an exoskeleton to prevent any inadvertent collision.



Damage-detecting Drone.

Supervisor

Faizal Sain

Team Members

Ng Huan Huat, Loi Wen Yang, Haiqal Anwar Bin Harneis, Liu Muyao, Nicky Lim Jun Ming

Automobile Design

The objective of the second phase of this project was to construct a vehicle platform which can be operated by a minimum of one person. The vehicle was designed to fulfil the basic requirements of a vehicle system i.e. the system has a drive unit, a suspension system, a directional change capability and an ability to brake. The system was designed to comply with regulations provided to the designer(s).

Supervisor

Foo Fang Siong

Team Members

Cheng Yibin, Chong Yong Sheen,
Lim Heng Kiat, Tan Kah Wee



Automobile Design.

Automated Transporter

The aim of this project is to design and develop an autonomous transporter than can transport a person or payload in an indoor space. Done in collaboration with an industrial partner, the transporter features autonomous navigation and control which allows it to move to a pickup point upon remote request and from there, send the person or payload to a selected destination. It incorporates navigation and anti-collision sensors to cater for human traffic, a manual and autonomous driver control feature and an automatic battery charging function.

Supervisor

Foo Fang Siong

Team Members

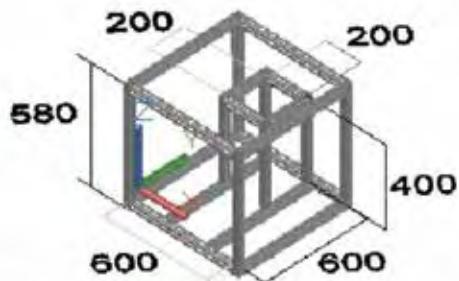
Wan Yaw Peng, Lim Jun Hao Derek,
Lee Chuan Sheng, Koh Da Min



Automated Transporter.



Rov-launching A-frame



A-Frame design and its intense moments.

This feasibility study explores the possibility of replacing conventional hydraulic articulation on an A-Frame to one using a hybrid drive of gears and a high torque gear motor to achieve precise control with minimum downtime that often disrupts the conventional hydraulic system. This project is a collaboration between Anecan Engineering Services Pte Ltd and the Singapore Maritime Academy (Singapore Polytechnic) for their requisition of ROVs Launch and Recovery System (LARS) on-board a vessel that their client will be deploying in the Jeju and Pohang regions of Korea in the last quarter of 2017 under sea state 3 conditions.

Supervisor
Foo Nan Cho

Team Members
Lin Htet Wai Yan, Alagappa Pragash Natarajan, Onn Jonn Yeow Jasper,
Priya Dharsan, Ho Jun De



SP TECH TO MARKET



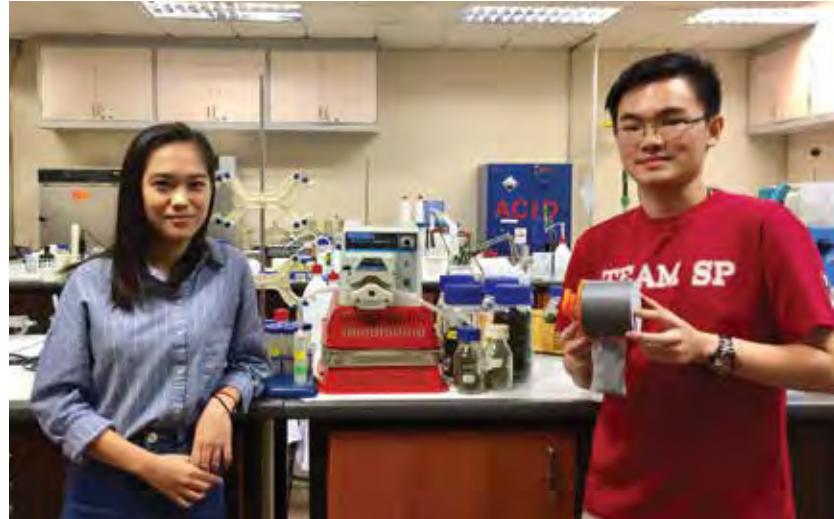
The Research and Technology Development at SP is application-driven, aligning itself closely with industry needs and the broader national agenda.

These projects showcase our efforts in developing technology that is industry-relevant, with strong potential for market impact.



Metal Biosorption Characteristics Of Green Algae

Improving catchment water quality has been a key feature of Singapore's water management strategy. The aim of this project is to study the capability of green algae in removing heavy metals from water contaminated by illegal industrial wastewater discharge. ICP-OES will be used to determine the remaining concentration of metals in water samples.



Students with their algae samples.

Supervisors

Handojo Djati Utomo, Lim Zheng Bang

Team Members

Yu Jiajia, Tan Keng Xuan Donovan

Formulation Of TCM And Local Plants Extracts For Personal Care Application

Although TCM and local plants have been used for skin care purposes, scientific studies of those extracts in topical formulations, while meeting consumer concerns, remain a challenge. Special extraction methods have been developed to improve the bio-activities of conventional plant extracts. Efficient encapsulation methods were designed to facilitate stability, ensure sustained release, bio-compatibility and contemporary formulations. The formulation's efficacy and safety were evaluated through in vitro cell free and cell models. These extracts demonstrated anti-bacteria, antioxidant, skin lightening or anti-inflammatory effects.

Supervisors

Li Chunxiang, Yin Hui, Jessica See,
Liu Naichun

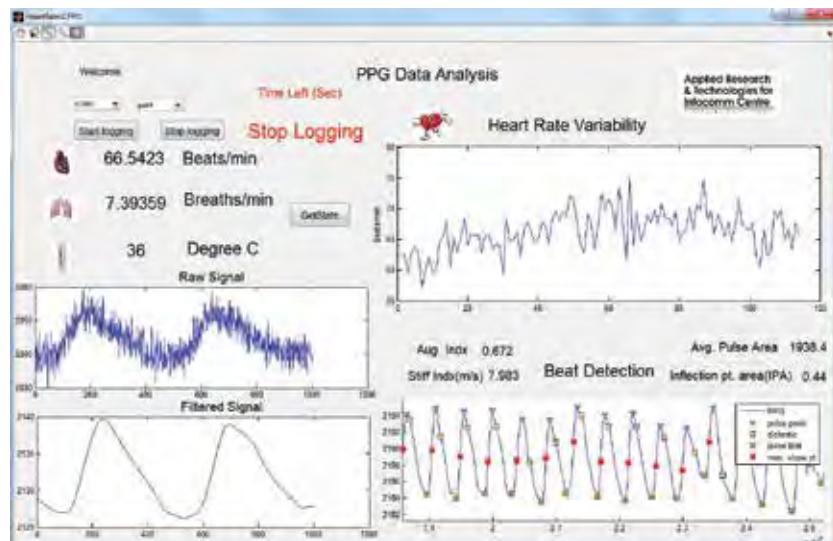


Personal Care products.



HRV Detector

The aim of this project is to determine heart rate variability (HRV) using a portable low-cost Photoplethysmogram (PPG) device. HRV contains a great deal of information for doctors as it helps preempt any serious medical conditions such as heart or other organ failures, diabetic neuropathy and hypertension etc. The home-based HRV detector allows subjects to acquire their HRV data at their convenience, obtain basic statistics through an interactive graphical user interface (GUI) and save the data for a more detailed analysis by doctors.



HRV Application.

Supervisors

Mark Wong, Bilal Mirza, Fang Chen

Biocide-free Antifouling Coatings For Maritime And Harbor Applications

The objective of this project is to develop a new generation of eco-friendly coatings using naturally occurring ingredients (such as herbs and spices) and to develop a scalable production process to produce these coatings for marine antifouling application. The natural ingredients were processed by breaking them down into smaller particles using mechanical methods. Solvent extractions were performed to purify and increase the concentration of the active compounds. The extracts obtained were incorporated into the paint matrix using established dispersion methods to stabilise the active compounds. The antifouling coatings developed are environmentally-friendly and comparable in performance and cost.



Anti-fouling testing.

Supervisors

Zhen Yongda, Low Aik Seng,
Chan Chung Hou, Adam Tan, See Yanni

Food Innovation And Resource Centre (FIRC) Capabilities

The Food Innovation And Resource Centre (FIRC) provides food enterprises with technical expertise in new product and process development - including packaging, shelf-life evaluation, market testing and automation. The centre's dedicated pilot plant, application laboratories, test kitchen and sensory suites are helmed by a core team of experienced professionals who work with clients to develop exciting new variants, solve manufacturing issues and adopt new practices for an increasingly sophisticated food and beverage market.

Supervisors

Zen Tan, Terence Tan, Yolanda Yong



Packaging and Shelf-life services.

WIP Tracking System II

The aim of this project is to design and deploy a WIP tracking system for jobs in Sanmina. The system will make use of an active RFID to wirelessly generate a signal to track the location of jobs at different zones in Sanmina's three plants. The system also provides 24/7 real-time job process monitoring and remote visual display of jobs in the plants to improve customer service.

Supervisor

Lee Kuoh Lih

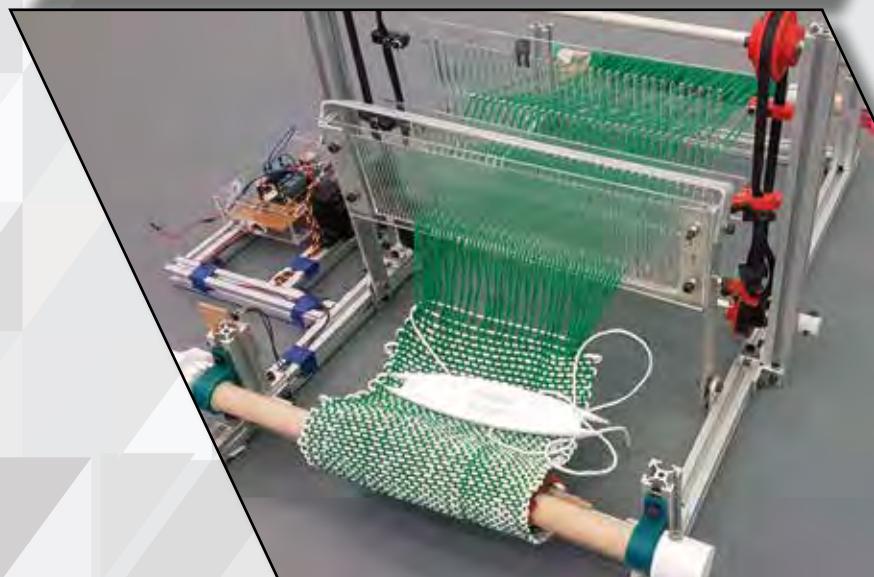
Team Members

Chew Bao Sheng, Kelvin Seah Jin Yuen, Khong Jia Xuan Victor

Task ID	Product Number	Zone	Updated Date	Due Date
10100	8061A	T PT ET	16/3/2016 2:02:40 PM	2016/3/19
10101	8061A	Line	16/3/2016 2:06:33 PM	0:00:17
10104	8061A	C P2 Multilingual Lab(X-inject Box)	16/3/2016 2:07:15 PM	1:00:13
10106	8061A	R PT Rating	16/3/2016 2:07:51 PM	0:00:24
10107	8061A	C P3 Inner Layer Line	16/3/2016 2:52:41 AM	21:39:18
10108	8061A	B P3 Cleanroom	16/3/2016 6:17:34 AM	0:35:27
10109	8061A	C P3 Line Drilling	16/3/2016 8:40:35 AM	1:37:19

WIP Tracking System in action.

FabLab@SP began in 2011 and is the result of collaboration among School of Electrical and Electronic Engineering (EEE), School of Mechanical and Aeronautical Engineering (MAE), and Singapore Maritime Academy (SMA), it was conceived to allow staff and students to make “almost anything”.





Optimization Of Mushroom Cultivation

The aim of this project is to implement an IoT-based online monitoring system, which records environmental conditions and provides notification of abnormal levels of temperature and humidity, in order to optimise mushroom cultivation in a rural village in Indonesia. Alarms are triggered when abnormal levels of temperature and humidity are reached.

Supervisor

Rubaina Khan

Team Members

Clarence Goh Wui Jie, Lim Fang Yi,
Navindran S/o Chandran, Loh Kuan Ming,
Natalie De Guzman

Industry Partner

Robert Bosch (SEA) Pte Ltd



BOSCH Mushroom Project.

Table-top Draw Loom

The purpose of the project is to study and recreate an ancient Asian invention, the loom, through engineering analysis and application of CDIO methodology. A compact device is fabricated to weave yarn into cloth, with some features to ensure ease of use such as a motorised heddle lifter and an automated electronic control.

Supervisor

Alvin Tay

Team Members

Chua Jiayi, Gabriel Yong Zhi Hian,
David Woodside, Tee Swee Kie

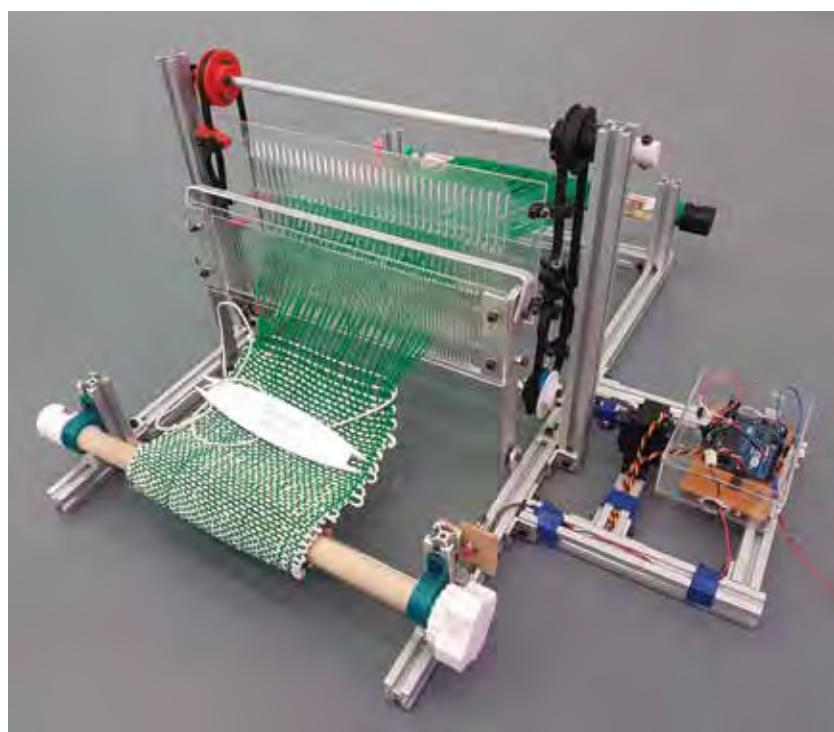
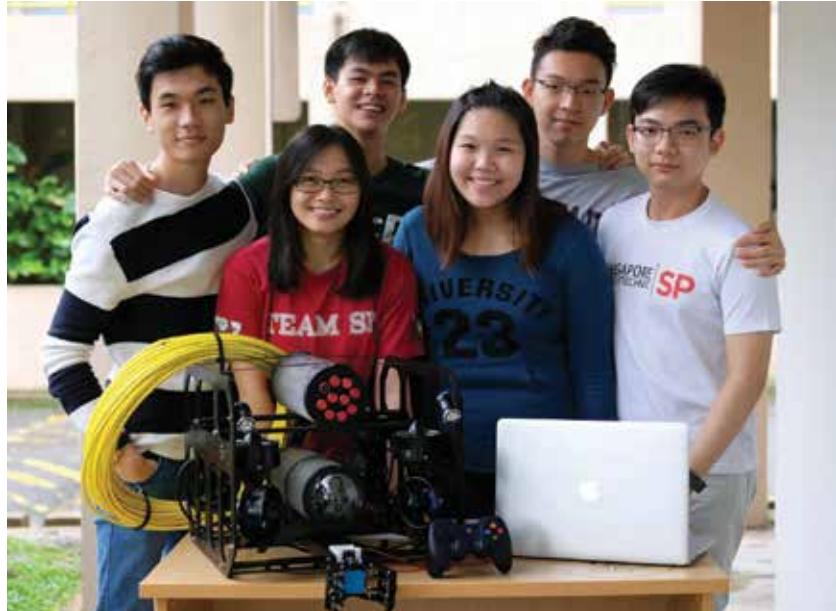


Table-top Draw Loom with electronics.



Remotely Operated Vehicle

The Remotely Operated Vehicle (ROV) is used in offshore engineering applications. It is an unoccupied underwater robot that is connected to a ship or platform by a series of cables which transmit command and control signals between the operator and the ROV, allowing remote navigation of the vehicle and the performing of tasks underwater that are hazardous for humans.



ROV and their creators.

Supervisors

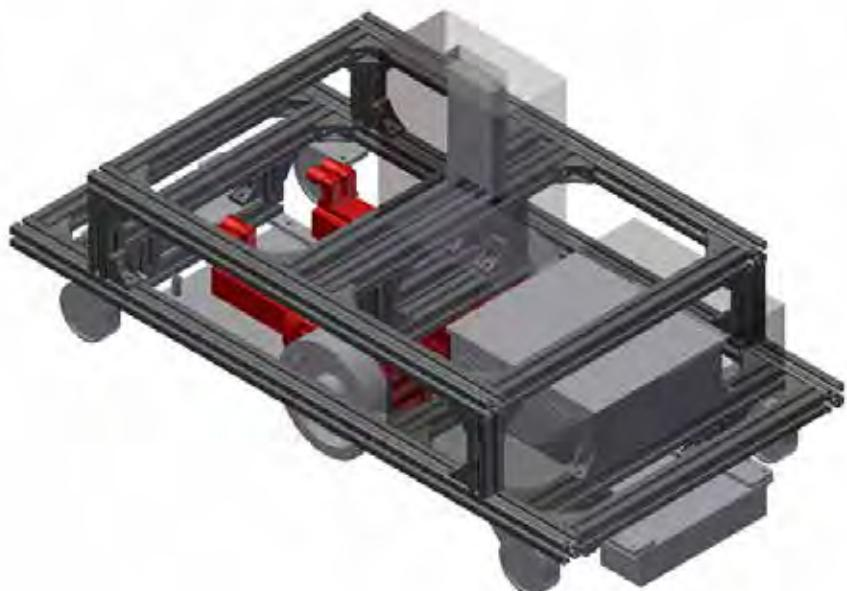
Rubaina Khan, M Fikret Ercan

Team Members

Tan Hwee Peng, Yang Fan, Chong Kai Ming, Lee Yann Ning, Lim Wei Kheng, Teo Shyan Jie

AGV

The project aim is to design an AGV for a production line, using a wireless charging system provided by SEW Eurodrive. It includes a vehicular structure design and cabled wooden flooring. The proposed AGV is an intelligent, autonomous mobile platform which will deliver materials to designated workplaces effectively. In the long term, the system design will allow for remote control, mobile data acquisition, wide area monitoring and Industry 4.0 interoperability through Cyber-physical connectivity.



Wireless charging AGV in CAD model.

Supervisors

Chew Choon Seng, Ong Hock San

Team Members

Tan Yi Xuan, Ho Kaiying Calvin, Muhammad Hadi Bin Hamdi

OTHER MAE PROJECTS



CLEANTECH & BUILT ENVIRONMENT

- DYNAMICS (DYNamo And Module Integrated Condensation System)
- Economic Thickness of Steam Pipes Insulation

- Kickspark
- Remote 48V SolarPower Pack for Ergo Blower
- SeeWatch



HEALTHCARE & WELLNESS

- Automata
- Convertible and Comfortable Crutch Design
- Research and Develop a Motorised Clothes Hanger

- Toilet Seat for the Elderly
- Wearable Chair



INDUSTRIAL & AUTOMATION

- Advanced Passive Camera Stabilisation Rig
- Inspection of Composite Structures using Laser Shearography
- Maintenance Training Jig

- Microtube Pick and Place
- RTM Process
- ThermoForming Machine
- Tools for Reeds Handicraft



TRANSPORT & MOBILITY

- Air Powered Craft
- Compact Mobile Fab Unit
- Composite Bike Frame
- E-Scooter
- Hoverboard Kart
- Mini Hovercraft
- Mini-Landspeeder
- Next Generation Liquid Rocket Engine

- Small Scale Volocopter Hybrid Engine with Electric/Fuel Management System
- Small Scale Volocopter Hybrid Structure
- Rugged Camera Gimbal UAV
- Tube-launched UAV
- Validation of a CFD Model for Supercritical Aerofoil

OTHER EEE PROJECTS



CLEANTECH & BUILT ENVIRONMENT

- Automated Sun Tracker
- Development of smart battery module
- Efficient Solar Platform
- Embedded Instrumentation Green Kit
- Energy Harvesting for common electrical/electronic applications
- FabLab Go Kart
- Generating electricity using rain water
- Intelligent Bus Shelter
- MDP Social Robot - Energy
- Mobile blood bank powered by renewable energy for remote area
- Mobile Solar Powered Watering system
- Motor Starter Demo System
- Pedal to stay cool!
- Race Timer
- Recycling Pal

- Sensing device for a persons pulse, temperature and oxygen
- SMART Baby Crib
- Smart Bag
- Solar Blinds
- SolarCatch
- Solar Farm Monitoring System
- Smart Home Energy Monitoring for Behaviour Changing
- Smart Home Energy
- Smart Home System
- Solar powered charger
- Solar Powered Cooker
- Solar powered fridge for kelong
- Solar Powered Home
- Solar powered wireless feeder
- Using FPGA for Smart Solution
- Wearable solar based cool cap



HEALTHCARE & WELLNESS

- A wearable interactive Biosignal device for Pet therapy
- An Exercise Bike with Novel Features
- An interactive game for people with dementia
- BioChip for Sample Separation
- BioMEMS device
- Crowd Monitoring in SP Food Courts with video analytics
- Development of 2 Axis motion controller, Interface and GUI application for the rehabilitation of Stroke patients with Spascticity
- Development of a 2D Polymer Card Key
- Muscle relaxation dsp project
- Development of Non_Contact vital parameter monitoring of infants
- Embedded controller of a 2-DOF rehabilitation robot
- Embedded Systems Mobile Sensor
- Emergency Alert Device for Elderly/ Disabled
- Enhance strong room security with video analytics
- Eye Care, Because I Care

- Sound Recognition for Security Surveillance
- Eye tracker based Communicator & Home Device Control
- Gesture based information system
- Health Analyser
- Indoor human tracking using ultrasonic based distance sensing
- Intelligence monitoring system (IMS) for bicycle parking area
- Music Therapy Cart and Glove
- Pink Cardio
- SDR
- Standardizing audio loudness in IPTV
- Smart Assist Bed (SAB)
- Underwater image enhancement
- Vision based verification of rehabilitative tests
- Vision-based Smoker Detection
- Voice Recognition for Robotic Toys
- Wearable technology for health care
- Wireless Automation of the Block and Box Test
- Wrist-wearable gadget to track daily outdoor time



- A Cooling Device
- Active Battery Cell Balancing
- Automated Home
- Automated trolley system (ATOM)
- Away from Home
- Bots War
- CAMLock
- Design and development of Arduino break out boards
- Development of a blood fractionation device
- Development of Receptionist Avatar App
- Educational Enrichment Games in Electrical Engineering
- Gemstone Dimension and Weight Analysis System
- Intelligent Intruder Alert System
- Intelligent Mouse Trap ver. 2
- Innovative Fabrication Techniques of cavity in next generation SAW filters for smart phone and RF applications
- Mail Alert System for SEEE Smart Office



- Automatic Transporter
- Excelling in SAFMC
- CRISP – Command and Reciprocate Instructional System for Paragliders
- Design and build Volocopter
- Development of Autonomous Flying Machine for Autonomous Aerial Vehicle Challenge 2016
- Development of Autonomous Flying Machine for SAFMC 2017
- EdUAV
- Fuel system simulation
- Fully autonomous outdoor flying machine for AAVC 2016
- GNC for UAV applications

- Monitoring Control of Fish Farm
- Musical Light Box Interactive Game
- Physical Contactless Device
- PLC Training Kit
- Raspberry pie and coffee
- Reactive Ripples
- Robotic controlled chess board
- Worldskills Singapore (Industrial Control)
- Receptionist Robot
- RoboCup@Work - Gripper
- RoboCup@Work - Kuka youBot Robot
- Safe bike
- Service Robot
- Step-by-Step Interactive Game
- Smart Bookshelf
- Smart Pet Food Dispenser
- Smart Sensor System for Wellbeing of Elderly
- Solar powered garden lamp
- Surface robot
- The Final Target
- Weaving Wing



- A mobile application utilising file compressing for storage reduction in mobile devices
- Android App Development
- App development for a robot
- Application of 6LoWPAN to Smart Campus
- Automated Rain Barrel
- Automated Storage & Retrieval System
- Automatic Mini Mental State Examination (MMSE) System
- Bio Fertilizer Mixer
- Bluetooth Wall Switch
- DigiLab
- DigitalHome
- “Directive Profile” for Personal Media
- Exam Script Management System
- Ez-Mart
- First-aid Box elnventory
- FIT Lah! Virtual Reality Social Fitness Application
- Grab Bite
- HDB Parcel Store with Dynamic PIN Access Control
- Identification of Fibre Routing Single-Point of Failure (SPOF) in IP network
- Integrated Project (Smart Healthcare)
- Integrated Smart Home System
- IoT-eractive table lamp
- Mail Alert System for EEE Smart Office
- MDP Social Robot - Teleoperation
- Mobile app development
- Mobile app development for campus
- Multi-Access & Multi-Purpose Electronic Lock
- NAFA Test System
- NAPFA Test 2.4km Run Tracking System
- Oculus
- Real time GPS tracker for Alzheimer & Dementia patients
- Remote car tracker
- Remote Lab scheduling and Security
- SafE-Longboard
- Secure End-to-End IoT & Cloud Computing
- Security Analysis of Smartphone Applications through Data Analytics
- Silent Door Answering System
- Smart notification in pest control
- Smart Home Control and Monitoring System
- Smart notification in pest control
- Smart Office
- Soil Conditions Logging System
- Spelling and pronunciation game - Worpro
- Taking Orders
- User Identity Verification for Personal Media
- We Care
- Wheelchair Tracking System

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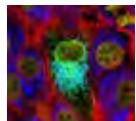
Molecular Diagnostics

- Real time PCR
- Next Generation Sequencing (NGS)



Rapid Diagnostics

- Lateral flow
- Carbon nanotubes technology
- Graphene oxide technology
- Near Infra Red Dyes (NIR)
- Tele-diagnostics



Tissue Diagnostics

- Multiphoton microscopy imaging
- Theranostic nanomaterials



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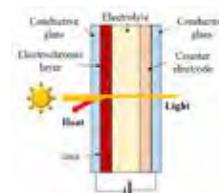
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Active Ingredient Materials



Building Materials & Clean Technology



Urban Sustainability & Solutions



SP-STK Applied Materials Engineering Centre

AMTC specialises in integrating specialty chemicals – personal care – functional materials – green building materials – materials recycling R&D activities.

We provide the translational interface between R&D and industrial applications. The work is done in close collaborations with government agencies, enterprises, local & overseas research institutions / universities and professional associations. We leverage on the different strengths from our School of Chemical & Life Sciences, School of Architecture & the Built Environment, School of Mechanical & Aeronautical Engineering and Singapore Maritime Academy.

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AMTC houses the state-of-the-art fabrication and analysis equipment in our different laboratories. We work with industry on **technology transfer and collaboration through research, consultation, training and licensing**.



Food Innovation & Resource Centre

SINGAPORE POLYTECHNIC

The Food Innovation and Resource Centre (FIRC) was launched in 2007 as a joint initiative between Singapore Polytechnic and SPRING Singapore. We are established to provide food enterprises with technical expertise in new product and process development including packaging, shelf life evaluation and market testing.

Our dedicated pilot plant, application laboratories, test kitchen and sensory suite are helmed by a core team of full-time, experienced professionals who work with clients to develop exciting new variants, solve manufacturing issues and adopt new practices for an increasingly sophisticated food and beverage market.

Our mission...to be a one-stop technology and resource venue for food enterprises.

Our focus...providing consultancy services in product and process development as well as equipment, packaging and training services.

Our specialty sectors...bakery, beverages, processed meats, ready-to-eat meals, ready-to-use sauces and soups.

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- Packaging Innovation
- Shelf Life Evaluation
- Sensory & Consumer Studies
- Food & Packaging Analysis
- Process Engineering Innovation
- Equipment Trials

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