I can

ENGINEER
SOLUTIONS FOR

healthcare & wellness

TRANSPORT & MOBILITY

INDUSTRIAL & AUTOMATION

2015

CLEANTECH & BUILT ENVIRONMENT

SP TECH TO MARKET

INFOCOMM & MEDIA

SINGAPORE POLYTECHNIC **SP**

SP ENGINEERING SHOW 2015

CONTENTS

ACKNOWLEDGEMENTS

EDITORIAL TEAM

Editor
Goh Kim Seng

Sub Editors
Ang Teck Sing
Lee Yoke Ling
Lynn Chhia

Photographer
Loh Yau Loong

Dr Sepulveda Jose
Co-Chairman,
SP Engineering Show Steering Committee
Centre Director,
TIE-Applied Research & Tech for
Infocomm Centre

Mr Ronny Tham Quin Fai
Co-Chairman,
SP Engineering Show Steering Committee
Deputy Director,
School of Mechanical &
Aeronautical Engineering

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

SP ENGINEERING SHOW 2015

This year's exhibition aims to give you, our stakeholders, a glimpse of the various opportunities available in Engineering@SP, enabling you to better connect with us. Whether you are an industry partner, a student from a secondary school or a current SP student, you will be exposed to the possibilities of collaboration with the various technologies that are being developed within the SP community.

Driven by the needs of the economy to innovate and for our work force to deepen their skills, the SP Engineering Show showcases refreshing innovations for diverse engineering industries. On display are technologies with real applications in Cleantech & the Built Environment, Healthcare & Wellness, Industrial & Automation, Infocomm & Media and Transport & Mobility.

There are 104 student projects on display in 53 booths, a showcase of the creative ideas from our 361 final year Engineering students who come from five different schools :

- School of Architecture and the Built Environment
- School of Chemical and Life Sciences
- School of Electrical and Electronic Engineering
- School of Mechanical and Aeronautical Engineering
- Singapore Maritime Academy

Visitors from the industry should also not miss viewing the "SP Tech to Market" section which showcases industry-ready ideas developed by staff from SP's Technology and Innovation Centres as well as our schools.

If you are a student planning to study in SP, our final year students will be able to share with you the relevant training and skillsets that are needed in their chosen field of work. You will learn how engineering students here are trained to develop skills through the various diploma programs. It is hoped that you will thus discover your area of interest in engineering and consider the possibility of a career in a chosen field of the industry.

First and second year engineering students will find it useful to identify these skillsets early so that they can prepare themselves to acquire these skills through the Fablab and Makers Community at SP on top of their training in the curriculum.

The SP Engineering Show will last over two days. There will be talks by industrialists, demonstrations of exhibits and areas where you can engage the SP Engineering community in fruitful discussions.

On behalf of the organizing committee, we wish to thank all industry members who have taken time off from their busy schedules to assess and judge our final year student projects. The committee would also like to congratulate all exhibitors and wish all guests and visitors a pleasant time at the exhibition.

Back (L-R)
Mok Kam Tim, Goh Kim Seng, Lui Siew Kwok,
Hein Min Htet Kyaw, Victor Choo, Chua Poh Hui,
Leong Mun Kin, Lim Zheng Bang,
Beh Hang Meng, Jonathan Ng

Middle (L-R)
Esther Kang, Handojo Djati Utomo, Teo Kian Hun,
Tay Kheng Siong, Seow Boon Chor,
Cheung Kim Kwong, Tan Cher Hwee, Tan Toh Seng,
Chua Hui Ching, Lew Woon Cheun

Front (L-R)
Thio-Tang Choy Yong, Tan Hai Su, Lynn Chhia,
Sepulveda Jose, Ronny Tham Quin Fai,
Sng Hong Lian, David Chai, Lee Mun Wai,
Teo Sarah Nadiah

COMM
WORKING

Back (L-R)
Khairul Annuar, Arnold, Manojkumar, Juveno,
Muhammad Muffies, Mohd Haiqal Amirul,
Muhammad Aqif

Middle (L-R)
Bryan Teo Wei Xuan, Amose Chuan, Tan Hon Keat,
Lim Yong Peng Aloysius, Jeremy Wong Yong Jie,
Loo Tai Wai, Wan Jun Jie James, Benz Ng Kai Xiang,
Chua Heng Yi Alvin, Jason Chia Wei Kiat

Front (L-R)
Joey Ng, Esther Ng Shi Hui, Koko Sia,
Germaine Ng Jie Min, Verena Chong Yi Ru,
Esther Choon Jing Yi, Famel Tay Hui Kee

ITTEE
STUDENTS

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.
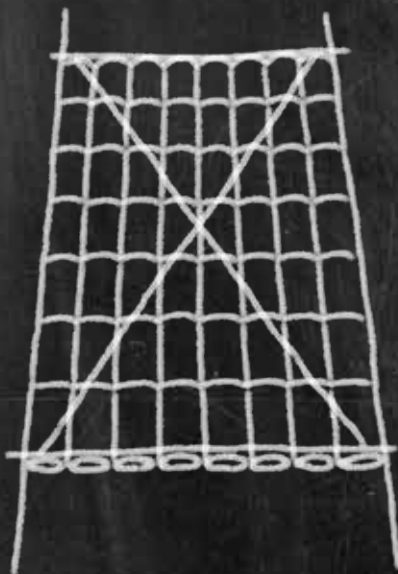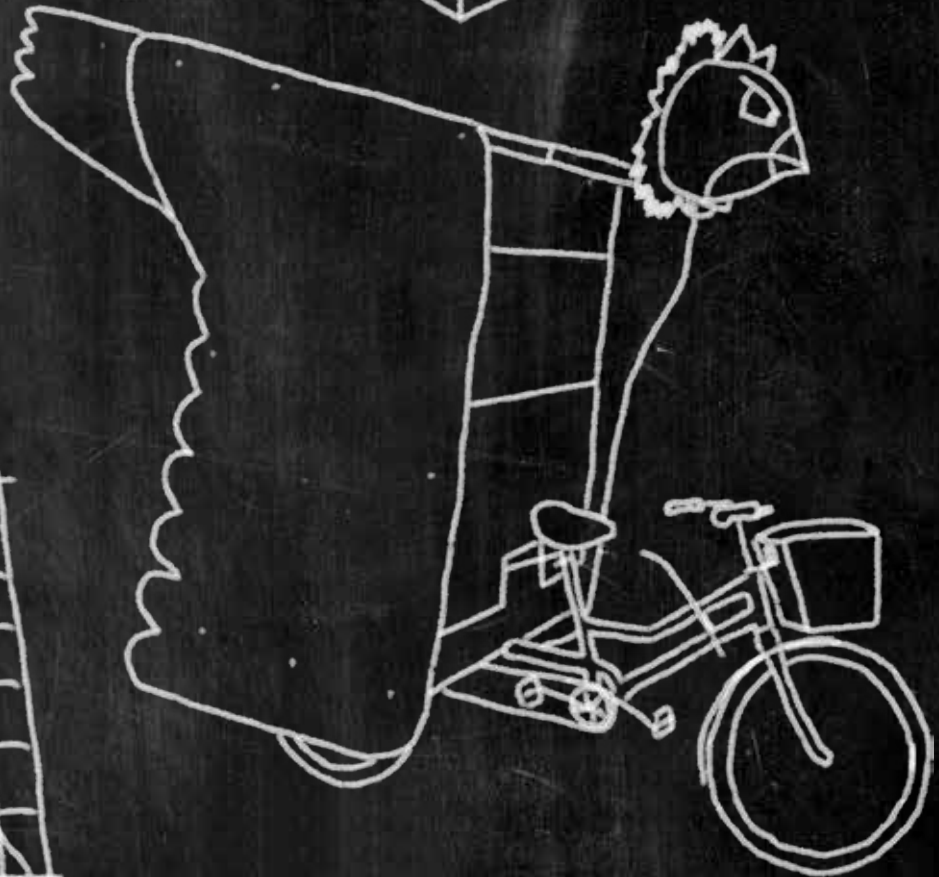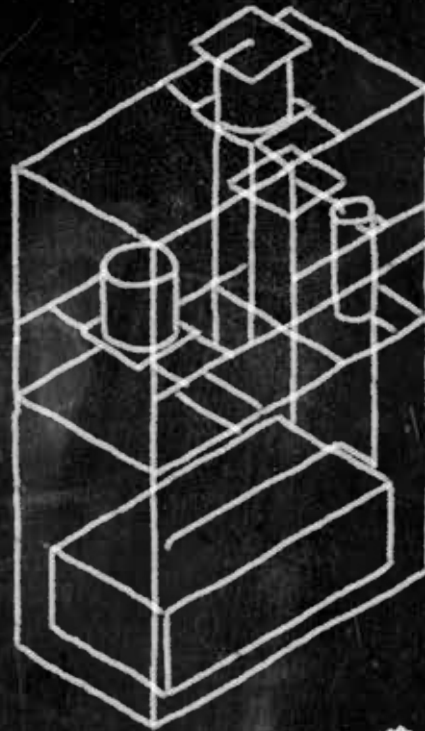
CLEANTECH & BUILT ENVIRONMENT

Reducing The Heat Load On West Facade Wall

The Water-cooled Facade Wall is a simple and innovative method to reduce heat gain on a west facade wall.The aim of this project is to reduce the heat gain on the west facade wall to ultimately reduce indoor temperature for greater energy efficiency and sustainability. This will contribute towards the conservation and improvement of our environment for sustainable development.

Supervisors
Chua Yina, Lim Chun Keat

Team Members
Koh Han Yen Mclyne Mcjorie, Joey Neo Wan Qi, Khoo Kai Ting, Ignatia Chew Shuzhen
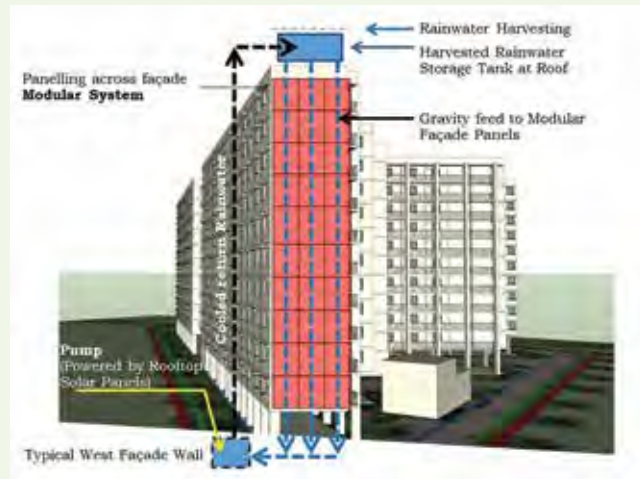
Proposed implementation design of Water-Cooled facade wall on a typical residential building.

Use Of Recycled Concrete Aggregate (RCA) In Concrete For Structural Applications

The aim of this project is to study the engineering properties of concrete containing various replacement levels of coarse (ranging from 4 to 20mm) to fine recycled concrete aggregate (RCA). This will be done through laboratory tests to assess the workability and the engineering properties of concrete for structural applications.

Supervisor
Tan Poh Seng

Team Members
Wang Zihao, Tan Wei Jie, Dai Haiyu, Li Hongyi, Chiang Jia Jun, Ho Weng Kit Gordon, Chua Cai Hui Janet, Wong Choon Jia
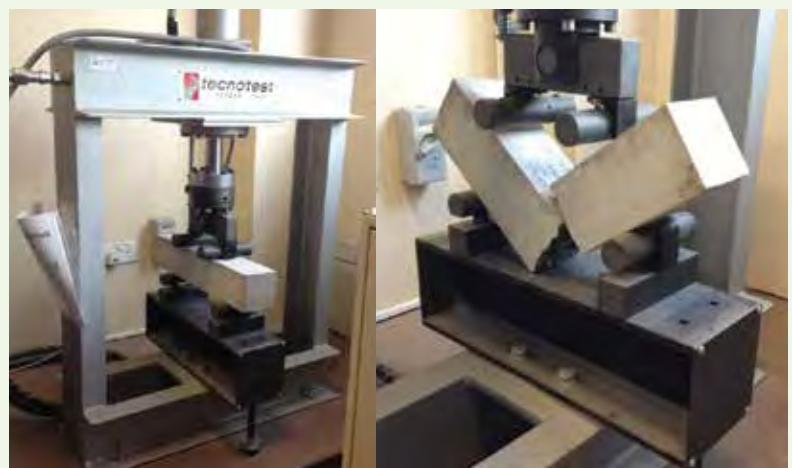
Test for mechanical properties - flexural strength.

Functionalised Sugarcane Bagasse in Dual Uptake of Organic Dye And Oil From Water

Sugarcane bagasse (SB) demonstrates the capability of removing dispersed oil and organic dye in a water medium. The objective of this project was to investigate the possibility of SB in removing organic dye of methylene blue in an water-oil matrix. The results showed that SB has great potential in removing the organic dye at various pH levels.

Supervisors
Handojo Djati Utomo, Lim Zheng Bang

Team Members
Shen Zhonghuan, Ng Li Hui, Yu Suchun,
Phoon Ru Yi Natalie

Overview of environmental problem and solution.
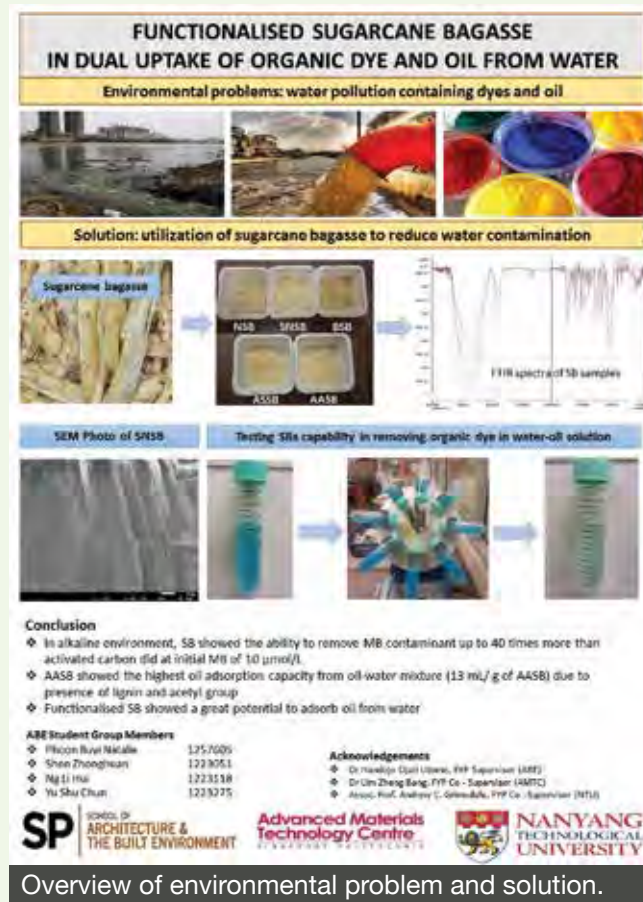
# Designing And Developing A Prototype To Produce Potable Water For Disaster Struck Countries

Natural disasters like floods and cyclones are regular occurrences each year. When typhoon Haiyan struck the Philippines and other neighbouring countries in 2013, the already scarce water resources were contaminated or disrupted. With a lack of clean drinking water, the possibility of spread of disease was high. This project aims to design and develop a prototype which is able to treat contaminated water turning it into safe drinking water for such scenarios.

Supervisor
Wang Huanjie

Team Members
Teo Zaiyang Edward, Wang Mimi,
Koh Boon Sheng

Drawing of water treatment prototype.
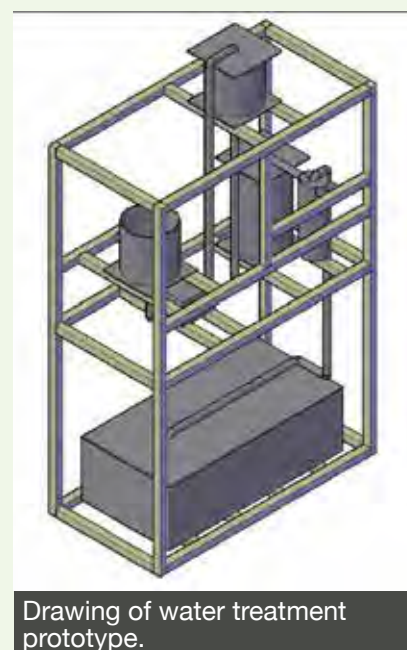
Natural Enzymatic Floorclean Solution For Homes Of The Elderly

The project focuses on "back to nature" technology. It uses enzymes extracted from fruit waste (obtained from SP foodcourts) for cleaning purposes. The advantages include 100% biodegradability, safety in usage and sustainability in development. The enzymes, a natural digestion of pollutants, work by digesting leftover organics, thereby leaving no substrate for microbes to thrive on. Working with an industry partner, Envizyme Pte Ltd, the team was able to ferment and extract selected enzymes to produce an effective floorclean liquid to help improve the living environments of many one-room rental flats that house elderly residents living alone or in pairs.

Production of enzymes.

Supervisors
Teo Kian Hun, Ng Khee Yang

Team Members
Joseph Ong Kai Zheng, Syafiqah Binte Ja'afar, Koh Hin Nge, Grace Lee Zi Zi

Construction Of Electric Green Vehicle Phase 1

The objective of the project is to construct a green vehicle to be operated with one driver with or without passengers. The vehicle will run on batteries and fulfills basic requirements of a vehicular system i.e. the system consists of a drive unit, a suspension system, is able to carry a laden load of approximately 200kg (min) to 450kg (max), has a directional change capability and has the ability to brake. The prototype designed shall comply to regulations and specifications provided by the designer(s).

Phase 1 completion of Green Electric Vehicle prototype.

Supervisor
Lim Chee Kian

Team Members
Eugene Gwan Wei Yang, Xerxes Chong Xian, Lim De Quan, Herman Theng Wen Jun

Hybrid Powered Mobile Freezer

This is a mobile freezer that is powered both by the sun and by conventional energy. This innovated product is suitable for frozen and chilled food-related businesses such as frozen and chilled food delivery, retailing and outdoor events. It reduces business operating cost by making use of renewable energy.

Supervisor
Bernard Tan Boon Beng

Team Members
Shwun Lai Win, Shi Guanxiong, Alfian Bin Muhammad Amin, Aravin Raj Nalall Tamby

Mobile Hybrid Powered Freezer.

Intelligent Internet Control And Monitoring Incorporating Wireless RF And Powerline Systems

The aim of this project is to develop an automation system for optimising energy efficiency with the ability for secure internet control and monitoring. This project makes use of low power RF modules, WiFi-enabled modules as well as powerline communication modules to provide connectivity to various types of electrical equipment which can then be controlled and monitored.

Industry Partner
Surbana Technologies Pte Ltd

Supervisor
Hui Wing Hong

Team Members
Jose Yip Zheng Ho, Muhammad Haziq Bin Abdullah Sane, Lye Weng Kuan, Ong Zhen An, Li Fali, Ng Ai Shu, Chen Chieh Rong, Eugene Lim Bing Han

Intelligent Internet Control and Monitoring incorporating Wireless RF and Powerline systems.

Increase Efficiency Of Post-harvesting Processes Of The Sorghum Crop At Poncosari Village, Indonesia

The aim of this project is to increase the drying efficiency of Sorghum crops in the village of Poncosari in Indonesia by utilizing cheap, widely available and sustainable methods and materials in order to cause more heat to be absorbed, allowing for a faster drying process of the crops as compared to more common conventional methods.

Simple and low-cost dryer to remove moisture from sorghum seeds for the community in Poncosari village.
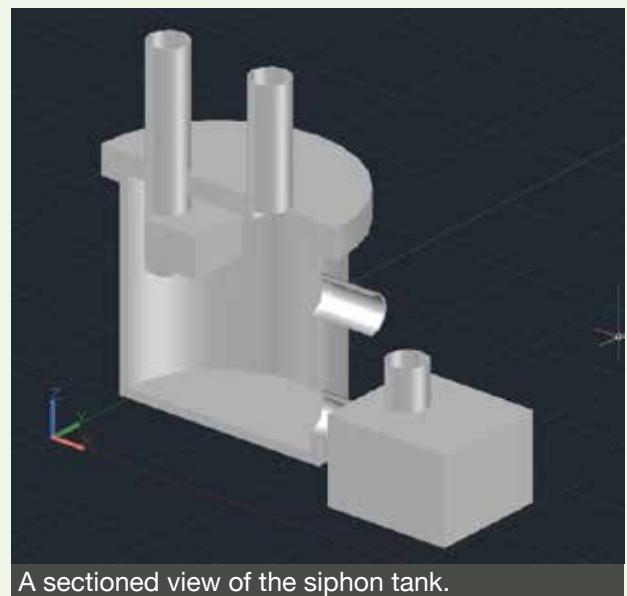
Supervisor
Noel Kristian

Team Members
Darryl Ng Jun Wei, Prabasri D/o Veeriah, Lim Yi Quan

Underwater Siphon Generator

The Underwater Siphon Generator is a novel way of generating electricity. It uses the siphon principle thus producing electricity by means of clean energy methods. It uses water to drive a turbo-generator to produce the needed electricity. The jet of water is obtained by creating a head of water and a siphon tube above the turbine.

A sectioned view of the siphon tank.

Supervisor
Wong Yoon Quee

Team Members
Yeo Jie Ming, Vinci Yeo Leng, Jonathan Loi, Liew Jun Hao

Power Over Under

The project aims to generate electricity through the use of underwater currents. The strong underwater current is utilised to drive a turbine generator to produce electricity in support of the clean and green energy movement. The electricity produced can be used to provide lighting to a local community, to power small motors and battery chargers.

Supervisor
Wong Yoon Quee

Team Members
Wang Pengxiang, Sim Choon Wee Gerald, Tan Hwee Min Geraldine,
 Shawn Lim Jun Wei

The demonstration tank.

Ultra-high Performance Carbon Fibre Reinforced Concrete

This project requires students to do a preliminary Research & Development of Ultra High Performance of Carbon Fibre Reinforced Concrete (UHPFRC) with low costs and which are energy saving, which have high compression and flexural strength, increased tensile ductility and which can reduce the ecological footprint through the use of recycled materials.

Ultra-high Performance Carbon Fibre Reinforced Green Concrete Beams.

Supervisor
Tao Nengfu

Team Members
Teo Chun Yi, Daryl Chew Shi Han,
Low Kian Xin, Tan Kok Quan

Green Water Systems

The Green Water Systems (GWS) is an unmanned water irrigation system designed for everyone. From simple backyard lawns to futuristic green wall gardens, the GWS can adapt to any situation. Using wireless modules, real time sensors and a simple, easy-to-use user interface, The GWS is the future of plant irrigation technology. It is the way forward.

Supervisor
Lee Mei Lai

Team Members
Lee Jian Wei, Gan Shen Yi Gabriel

Green Water Systems Overview of vertical garden.

Green Solarain System

The aim of this project is to promote energy and water conservation by applying basic engineering concepts. The Green Solarain System (GSS) is an integrated design, which encompasses Hydro Micro-turbine (HMS) and Solar Harvesting Systems (SHS) in high-rise buildings. By installing a solar panel at the rooftop and a micro-turbine in the rainwater downpipe, it is able to capture energy during sunny days and as well as rainy days.

Supervisors
Elizabeth Chow, Tao Nengfu

Team Members
Pang Kai Li, Koh Chun Wei, Lim Zhe Xuan, Teo Jun Hao, Arthur Sam Wai Kit, Terence Thng Xiong Jie, Jonathan Peh Zhuang Sheng, Huang Weide
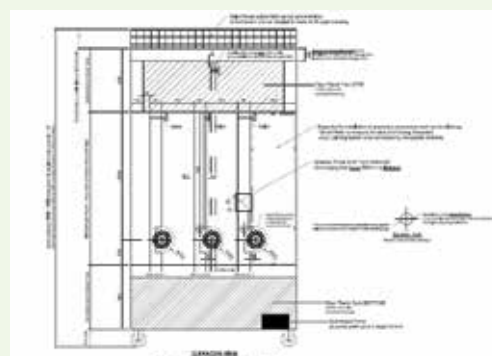
The Green Solarain System (GSS) blueprint.

Wooden Boat-building

This project focuses on the traditional methods and techniques of building boats. The project covers material and tools selection, boat design and drawing, cutting and assembly as well as testing. The wooden boat will be used by NParks as a mode of transportation as well as for research purpose around the wetlands reserves.

Supervisor
Cathy Cong

Team Members
Low Tian Yao Marcus, Shannon Chua Rui Yang, Mikhail Riyah Mohd Rizuan, Sarvin Selva Kumar, Aaron Michael Fenandez
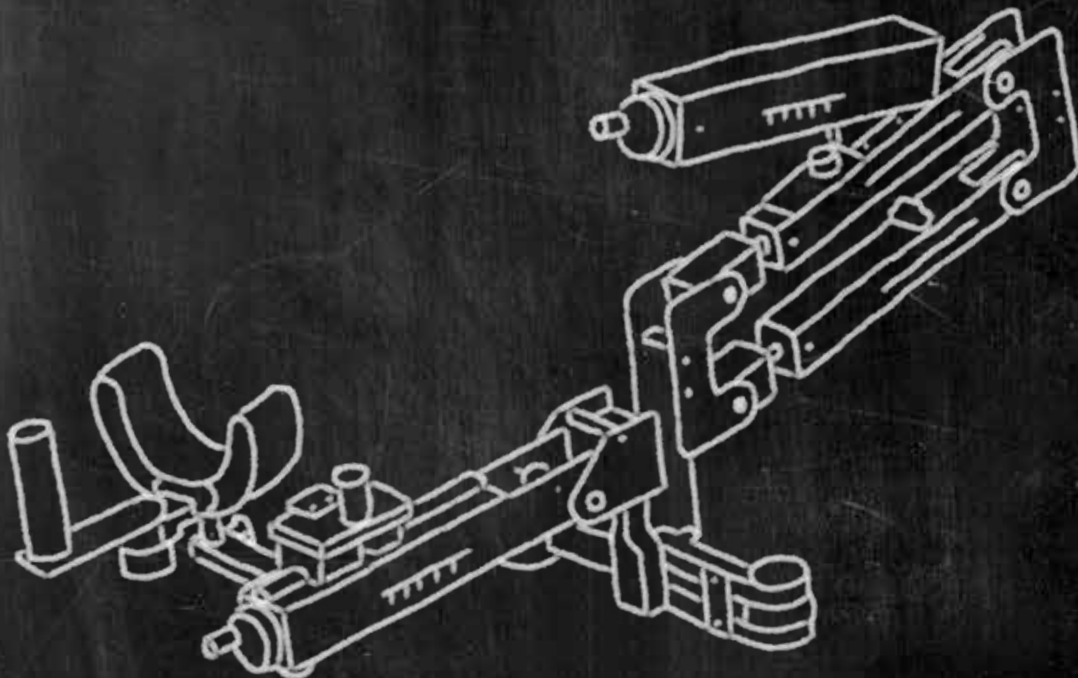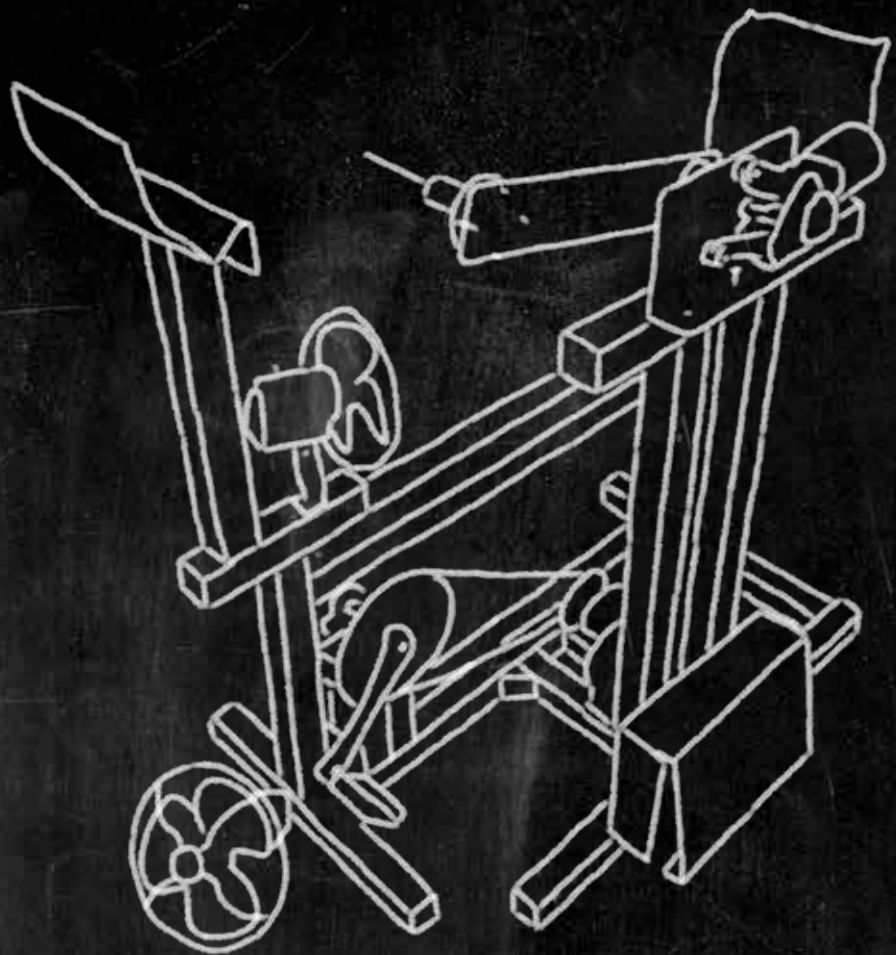

A Glue and Stitch Wooden boat building.

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.

HEALTHCARE & WELLNESS

Unraveling Immune Response To Primary Tumour In A Zebrafish Cancer Model

Mechanisms underlying tumour progression in relation to the host's immune response remain elusive. The in vivo zebrafish cancer model established in our project will offer a uniquely powerful system to investigate the mechanisms that orchestrate inflammatory responses to primary tumours and cancer development. Our findings will aid in better cancer patient prognosis in association with intratumoral neutrophils infiltration.
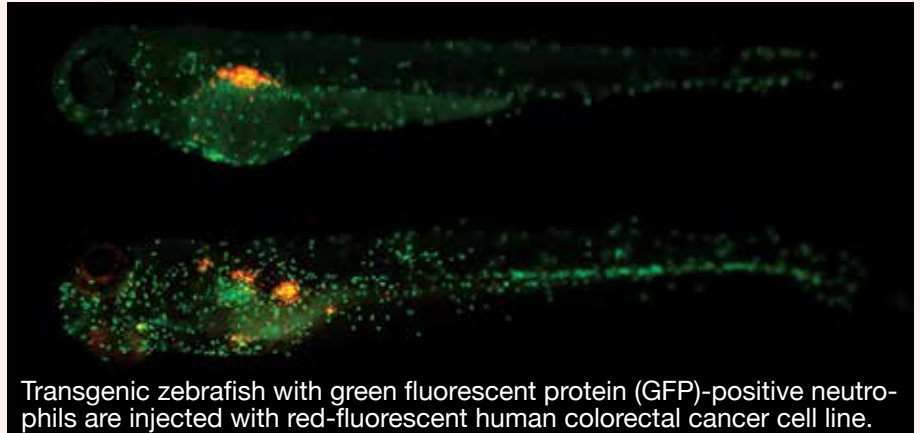
Transgenic zebrafish with green fluorescent protein (GFP)-positive neutro-phils are injected with red-fluorescent human colorectal cancer cell line.

Supervisor
Samantha Lee

Team Members
Kenneth Png Jia Hui, Shaun Tan, Seow Jun Hsien Lincoln

A Unique Exercising System

The Unique Exercising System is a hybrid system of the Kettler Favorit Rowing Machine and a Bicycle developed to train different parts of the body by using just one system. The energy released by the user is converted to electrical energy through the help of two generators. This energy can then be used to power electrical appliances like lights, fans, handphones and television sets. Through this, the system aims to motivate people to exercise frequently.

The generator driven by pedal power.

Supervisors
Rajnish Gupta, Jiang Fan

Team Members
Paul Scott Lange,
Muhammad Faiz Bin Jamil,
Muhammad Sufiyan Bin Abdul Razak

Research & Development Of Functional Packaging For Food Applications

The rapid food market growth all over the world has led to a high volume of food wastage. Food spoilage and contamination are often the main reasons of food wastage. In Singapore, due to the humid climate, insect infestation of packaged food is an issue. This often leads to food that is not fit for consumption which results in more food waste. This project seeks to study the feasibility of a multi-functional packaging prototype that can repel ants or delay the attack by ants through the use of a natural bioactive extract incorporated into packaging materials.
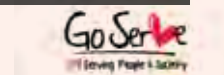

Application of Functional Food Packaging Film.

Supervisors
Ng Ting Ting, Lee Mun Wai

Team Members
Chan Jia Min, Lim Zhi Long, Ong Li Ling

Using APPIBUDDY Mobile Application As Platform To Promote Healthy Lifestyle

The APPIBUDDY is a mobile application created to promote a healthy lifestyle. The aim is to create an exciting user interface experience to encourage daily usage of the application and to educate the user about nutrition so as to enable the user to make right food choices in their diet. Personalized meal plans and recipes are available which can be tailored to the individual needs of the users.

Let APPIBUDDY help you to maintain a healthy lifestyle!

Supervisor
Carol Leung

Industry Partner
Apilinx Pte Ltd

Team Members
Lim Xin Yi, Chan Huimin, Liong Kui Ling Melanie

Smart Flat For Elderly: Intellisense System To Monitor Resident And Therapeutic Pet As Companion.

This project, the Smart Flat for Elderly provides an integrated solution to enhance the living conditions for elderly, using technology to assist, motivate and monitor. The flat comes with Pet Robots as well as systems that monitor elderly movement. It has an Intellisense bed which can monitor temperature and movement and a temperature-controlled mattress which can activate room lights when the elderly leaves the bed. This will reduce the likelihood of falls.
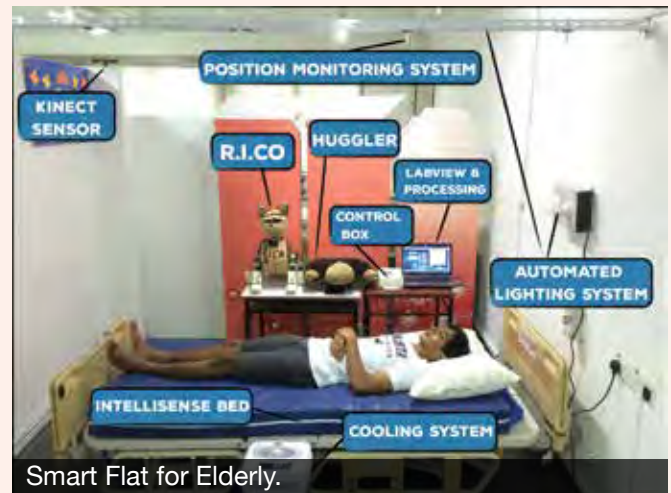

Smart Flat for Elderly.

Supervisors
Jaichandar K S, Ho Soon Seng, Chew Boon Seng, Asadollah Norouzi, Benjamin Koh Yee Foo

Team Members
Kathleen Kaye Awayan Villanueva, Vinita Ganesan, Yeo Yong Ming, Lin Haiqiang, Leow Jia Xiang, Janson Chang, Ng Pei Jun, Ho Jun Jie, Caleb Foo, Ayub Mohamed Rasool, Maung Nyan Lin, Loh Wei Jien, Shambavi, Poysollameyyar Parthiban, Emil Yong Kai Wen, Pheh Jing En, Henry Lau Shan Kuang, Lee Choon Siang, Sherman Lim Kwang Hwee, Beh Aaron, Chia Nang Ying, Ramakrishna Santhira, Ching Pei Hao Frederick

Industry Partner
Bethany Bethany Methodist Nursing Home, Methodist Welfare Services, Ling Kwang Home for Senior Citizens, Nanyang Technological University, SUTD Singapore University of Technology and Design, Agency for Science, Technology and Research (A*STAR)

Wheelchair Tracking And Monitoring System

Wheelchairs provide mobility to patients in hospitals. The aim of this project is to design and deploy a tracking and monitoring system for wheelchairs at the Khoo Teck Puat Hospital. The system makes use of active RFID wireless tags to generate signals to track the location of wheelchairs at different zones in the Khoo Teck Puat Hospital.

Team Members
Farid Aide Bin Amir, Sathia Seelan Vetrichelvan

RFID enabled wheelchairs in action.

Supervisor
Lee Kuoh Lih

Industry Partner
Khoo Teck Puat Hospital

Visual Function Tests Using An IPad

Vision testing is the simplest yet one of the most important tests during an eye examination. There are many applications in the market that claim to be able to test vision. However, there are many factors that can cause variation in results - like target size, testing distance and chart types. This study aims to find out how reliable and repeatable are the results using apps as compared to conventional vision-testing methods.

Supervisor
Lim Hui Shan

Team Members
Qiu Wang Jia, Prabu S/o Ravinthiren, Jolene Foong Jie Lin

The various types of charts used in vision testing.

Assistive Technologies For Disabled At Home

Many disabled individuals cannot talk. This results in a lack of communication between such disabled individuals and their caregivers. Their lack of movement also prevents them for doing many things for themselves. The aim of this project is to use various assistive technologies to help the disabled communicate with their caregivers, control home device wirelessly, be entertained at home through games and painting and be mobile through the use of a motorized wheelchair control.

Supervisors
Lu Hongli, Lo Cheong Wah Frank, Daniel Lim Jye Suenn

Assistive technology for disabled at home.

Team Members
Choo Chuen Lerk Kenneth, Heng Sijie Remus, Tan Ding Han, Hansel Kong Xu Yang, Ong Xuan Yu Jeremy, Koh En Rong, Nur Hayat Bin Ahmad Saini, Ho Boon Wee Addison, Khoo Yi Yun Denise, Om Bahadur Thapa, Goh Wan Ying, Nur Diyanah Binte Johan Yeo Abdullah, Muhammad Nasri Bin Yusri, Lan Miao, Wang Ning, Xing Yunqing

New Upper-limb Rehabilitation Device

This project aims to develop an upper-limb rehabilitation device for stroke patients. It incorporates with gravity elimination, 6 degree-of-freedom (DOF), a virtual game interface and movement sensors and a feedback control mechanism. It can easily be interchanged to be used on either arm during rehabilitation sessions. To maximize the patients' potential to recover faster, it is designed to be active-assisted for the patients.

3D CAD model of rehabilitation device.

Supervisors
Lee Kim Kheng, Sampath Kumar

Team Members
Goh Zong Lin, Samantha Bay Wee Xin, Muhammad Shafieq Bin Muhammad Nizam, Dovyn Gan Kangjie, Muhammad Nur Haikel Bin Rasiti, Lee Kar Chuen, Muhammad Haziq Bin Mohammad Hanafiah, Lim Yu Yang

'Sampan' Toilet

The project aims to design and build a floatable and navigable toilet for third world countries. This toilet could be easily deployed during a flood. The design must consider indigenous fabrication skills and use material available locally in tropical countries such as Cambodia and Indonesia. The product must be easy to fabricate, assemble and operate. The toilet can be propelled from place to place and will be equipped with a tank for storing human waste. The tank will double as a fermenting system converting human waste to fertiliser.
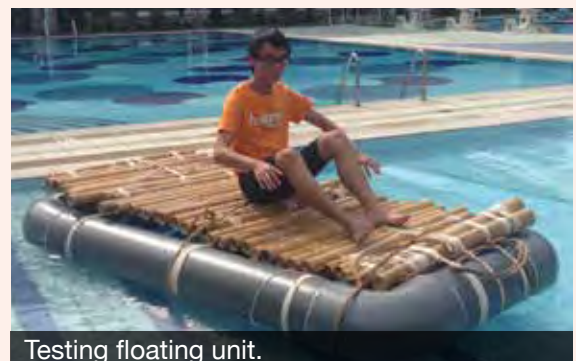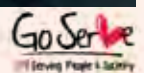

Testing floating unit.

Supervisor
Soh Kim Fai

Team Members
Ow Wai Jie, Ng Joon Hau Winson, Chan Ee Seng Cogels

Silver Suit

The objective of this project is to design and develop a user-friendly, robust and aesthetically appealing "Silver" suit for the purpose of studying the needs of the elderly and the challenges they face. The suit will help us understand the mobility, vision and hearing needs of this group of people in our community.

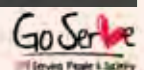Restraining leg movement.

Supervisors
Soh Kim Fai, Arun Kumar

Team Members
Heng Yoke Heng, Diviyanth Jayaraman, Lee Chong Jin Vincent, Tay Woei Jye, Tan Ee Thean Giggs, Tang Yen Hong, Yong Phi Lip, Javier Chan Jian Zhe, Mok Kheng Wee Ernest
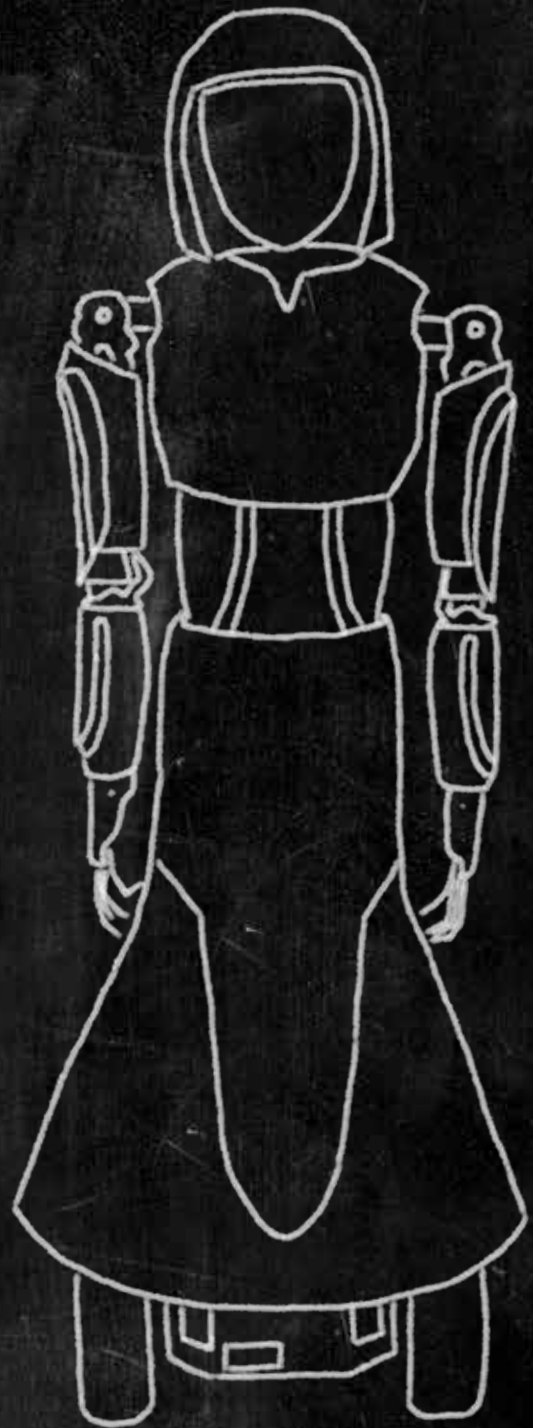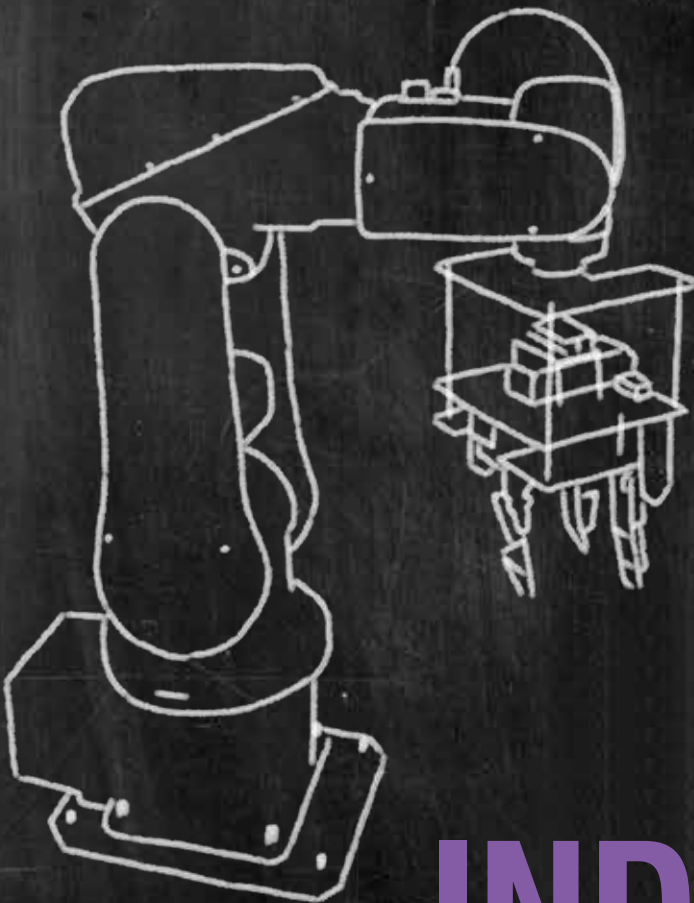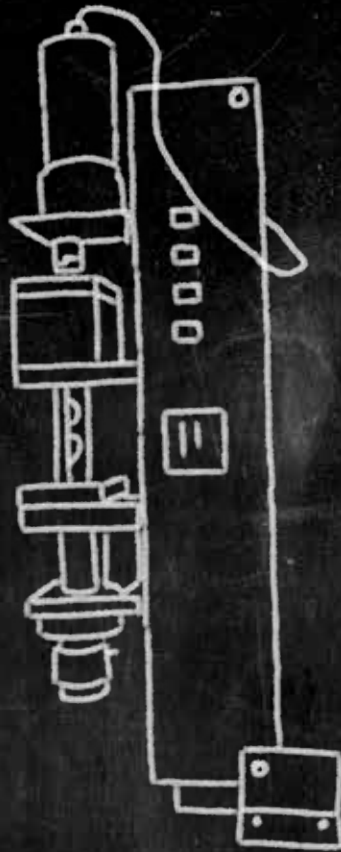
These projects provide control systems with processes that need to interact in real-time with other applications with significantly superior performance in terms of precision and speed.

INDUSTRIAL & AUTOMATION

Automated High Precision Liquid-mixing Processor

The aim of this project is to develop a precision liquid measurement product for chemical industry application. The product provides an automated process in the measurement of four different liquids and their mixing processes. The whole process uses sensors and motorised mechanisms that are fully controlled by a PLC programme. The control process can be used for other industry applications such as for gas and liquid measurements.

Supervisor
Chung Ock Jin

Team Members
Lee Shi Min,
Koh Wei Hao,
Lee Puay Fong,
Lim Zhan Xing,
Tan Wei Hong,
Derrick Tan Chung How

Industry Partner
Golden Season Pte Ltd

Automated Measurement Prototype Control.

Interactive Boiler Model For Use As A Teaching Tool.

The Interactive Boiler Model will simulate as well as ilustrate actual boiler operations. Students will have a clearer and deeper understanding of boiler mountings and operations as well as gain insight into the inner side of the boiler. The aim of using the model is to arouse student interest and assist them in their course of study.

This model illustrates the various parts of a boiler.

Supervisor
S Premanathan

Team Members
Brandon Toh Teng Cong, Wang Yi Tian, Eugene Ang Mao Jie, Choo Wei Xian, Jazmond Cheng Yik Hong

Robotic Manipulation @ Work

The twist-lock is used to connect two containers together in shipping containers logistics. The task of twist-lock installation and removal is usually implemented by workers manually. The project aims to provide a solution using robotics to deal with twist-lock handling in the logistics industry. In this project, a three-finger-grasping robotic arm solution will be explored to handle the installing and removing of the twist-lock in the Port Automation industry.

Supervisors
Shen Jiayao,
Zhang Liandong

Team Members
Tan Yee Hon, Ng Wei Jeak,
Yeo Heng Mian Shawn

Robot Manipulation @ Work.

Design And Implementation Of A Real And Virtual Humanoid Robot In CoSpace Robotics

The objective of the project is to design and fabricate both a real and virtual humanoid robot for CoSpace robotics. Both these robots will have the same design in terms of mechanical structure and functions. Thus the programming of the real and virtual humanoids will be exactly the same. The real and virtual humanoid robots will then be capable of communicating with each other and collaborating to perform various tasks in CoSpace.

Supervisors
Yue Pik Kong, Yang Tianwu

Team Members
Gian Siang Meng, Lee Eu Gene,
Ching Li En Amos

Exhibition at RINC.

Mobile Microgrid Control And Management

The objective of the project is to develop a controller as well as a system management programme of a small scale mobile microgrid power network to enhance power availability and capability in remote area applications.
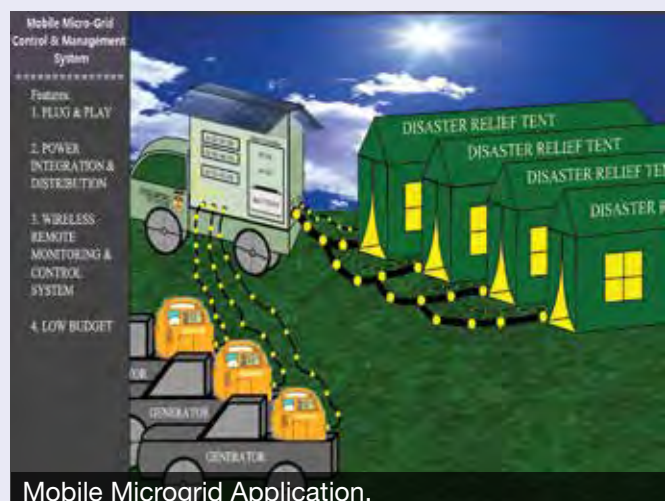
Supervisor
Jiang Hao

Team Members
Win Myint Aung, Lin Ying, Ko Soon Teck

Industry Partner
ST Kinetics Ltd

Mobile Microgrid Application.

SP Air Hockey

SP Air Hockey Project: Teamwork and Commitment.

The aim of this project is to create a game that attracts students and showcases engineering in an exciting and fun way. Collaborating with Weidmuller Pte Ltd, an industry partner, the team modified the way traditional air hockey is played by turning it into a 4 player game and by incorporating other features like automatic puck shooters, an infrared-activated scoring system and a first-of-its-kind table design. Through this game, students have fun challenging one another, while discovering the engineering ideas behind the creation of the game.

Supervisors
Chia Soo Ping,
Roger Chiun Koon Yong

Industry Partner
Weidmuller Pte Ltd

Team Members
Ye Htet, Ng Kim Yi, Min Marn Oo, Ei Thet Khine, Heng Kah In, Muhammad Nico B Mohd Mario Hamid, Andre Kwan Wei Da, Neo Ying Qi, Chen LiLi, Chen Zhixiang

Development Of A Micro Motion-sensing System For Micromanipulation

Sensing of the tool motion in micro scale is required for effective hand tremor compensation in micromanipulation such as in microsurgery. Commercially available motion-sensing systems are not suitable since they are bulky or do not provide adequate sensing resolution in micron level. In response to the need, the team proposed to develop a sensing system that can sense in micro scale for effective tremor compensation. Apart from its use in a tremor compensation system, the system can also be used as part of a training and assessment system for micromanipulation tasks in microsurgery.

The Micro Motion-sensing System.

Supervisor
Win Tun Latt

Team Members
Chong Han Xiang Bervyn, Low Wei Ming,
Yvonne Goh Ai Qin, Tan Wen Ling

High Performance Lightweight Composite Structure

This project saw the development of a lightweight, functional high performance composite structure, made from the combined use of chopped carbon fibre, carbon fibre braids and epoxy resin, for use in the defence industries (e.g. as a law enforcement baton), where efficiency and reliability is key, In addition, these fibre rods are non-corrosive and are stronger and tougher than their traditional metal counterparts. This makes it possible to increase the load bearing capacity and flexural properties of the structures without adding significant dead weight.

Hybrid (Braid/chopped fibre) Composite Structure with Custom Profile.

Supervisor
Kelly Koh

Team Members
Kevin Tan Chu Yan, Mok Ka Wui Kelvin, Loh Liang,
Jeremy Lim Zheng Wei, Ore Chee Yuan

Non-destructive Testing Of Defect Composite Panels

Fiber-reinforced composites, featuring high specific strength and stiffness, are increasingly being used in various industries. In order to assess the structural integrity of composite structures, non-destructive testing (NDT) can be employed. Signal interpretation of the NDT data is identified as one of the biggest challenges for the technology to succeed. The aim of this project is to develop procedures to create standard defects in composite panels and to characterise the defects using phased array ultrasound equipment. The results of the project can be used by the industry to train staff locating specific defects in composites using ultrasound equipment.

Defect in a composite panel located using phased array ultrasound inspection equipment.

Supervisor
Erwin Wouterson

Team Members
Lim Jee Heng Reuben, Nur Afiqah Binte Nasser, Terry Tay De Rong, Ng Jun Jie Perry

Robotic Gripper

Robotics in industrial automation are generally used for object manipulation in a wide variety of applications which include material handling, manufacturing and assembly. Such applications require the robot to handle different objects at the end effector. Whenever there is a process change the end effector would need to be changed to handle a different object. The aim of this project is to design and develop various concepts of robotic grippers that can handle objects of different shapes and surfaces. Developing such a generic gripper at the end effector can significantly reduce the setup time for handling different tools and materials.

Supervisor
Tan Tuan Kiat

Team Members
Myo Naing Htut, Hnin Yu Yu Mon, Aung Thura Htay, Naw May Zin Kyaw, Nur Muhammad Bin Abdullah

Adaptive finger.

Filament Extruder

The aim of this project is to design and fabricate a filament extruder with a coiling system which is capable of extruding ABS to meet design specifications. The design should feature ease of assembly and operation, should be aesthetically appealing and come with an interchangeable nozzle size suitable for home use. The coiling system should allow for the ease of storage and collection of the filament spool.

Supervisor
Leong Teng Boon

Team Members
Wong Min Jie Bryan, Lim Wei Sheng Wilson, Benjamin Neo Wen Hao

Industry Partner
Apex Network Design Pte Ltd

Filament Extruder (Vertical).

Futuristic Home

The aim of this project is to use technology to revolutionize the way people live. Advanced technologies such as image processing techniques, speech recognition and voice command control technologies are used in this project. With these technologies, owners can now gain access to their homes via facial recognition. Owners also have the ability to control household objects (e.g. curtains, fan, lighting) by making a gesture or by issuing a voice command or by using a smartphone.

Supervisors
Goh Say Seng, Voon Ching Choo

Team Members

Tan Po Song, Abdul Rahman Bin Abdullah, Soo Zhen Yu, Chay Hong Wei, Yip Chun Mun, Goh Jun Hao Daniel, Lee Shi Hao, Ar Kar Min Thu, Victor Chia Sing Hoe

The Futuristic Home, with blinds, fan, lighting and curtain, to be controlled using advanced technology.

SP Social Robot

SP Social Robot is a multi disciplinary project involving the Schools of EEE and MAE.

The aim of this project is to develop a social robot that can assist humans in their daily tasks, such as delivering items and servicing customers. This project showcases SP's capabilities in the field of robotics and promotes engineering and robotics among students undergoing tertiary education. The project is a multi-disciplinary one involving 30 students from the School of Mechanical & Aeronautical Engineering (SMAE) and the School of Electrical & Electronic Engineering (SEEE).

Supervisors
Carlos Acosta, Rubaina Khan, Asadollah Norouzi, Zhou Wei

Team Members
Sun Weibo, Nelson Siauw, Kam Yit Ling, John Low Zhi Hao, Nguyen Anh Vu, Tan Kok How, Darren Tan Jin Han, Chua Eng Soon, Kim Chester Geraldo Garcia, Sharaveen Subramaniam, Thandayuthabani Maturaveeran, Chiew Zu Peng, Koh Zhi Xiang, Tan Jun Xuan, Mohamed Fadhil Bin Mohamed Soffe, Tan Siang Leng, Tan Boon Hock, Choo Zhen Zong, Muhammad Asyraf Bin Azman, Benjamin Yong Boon Hin, Arjun Singh Avtar Singh, Mohamad Yunos Amran Bin Mohamad Yazid

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.
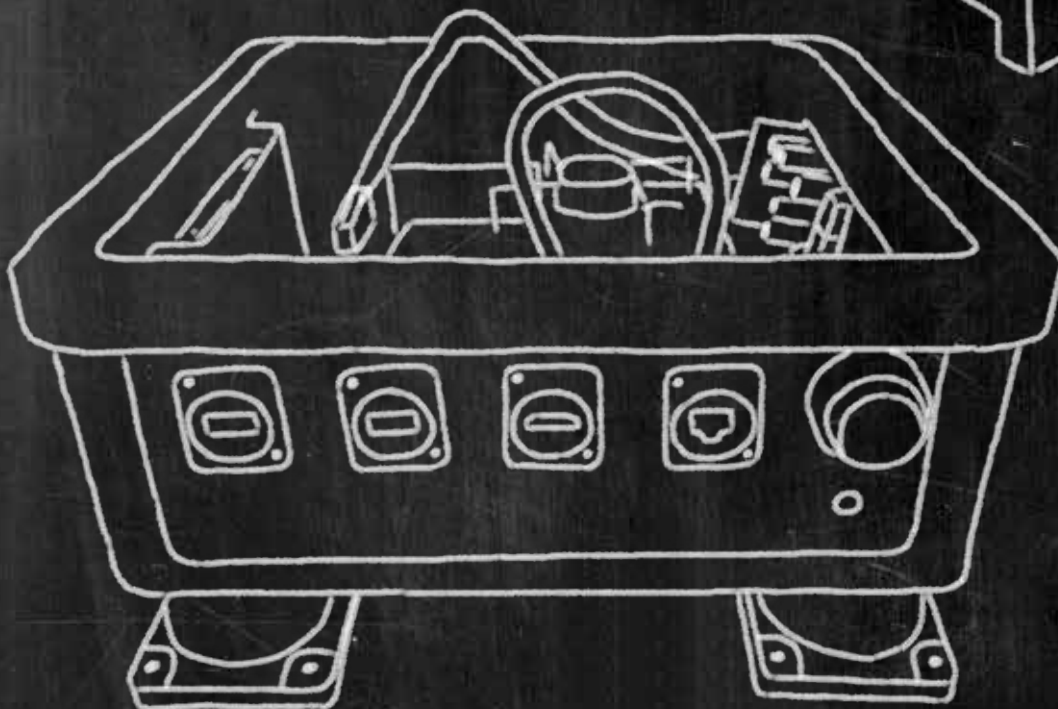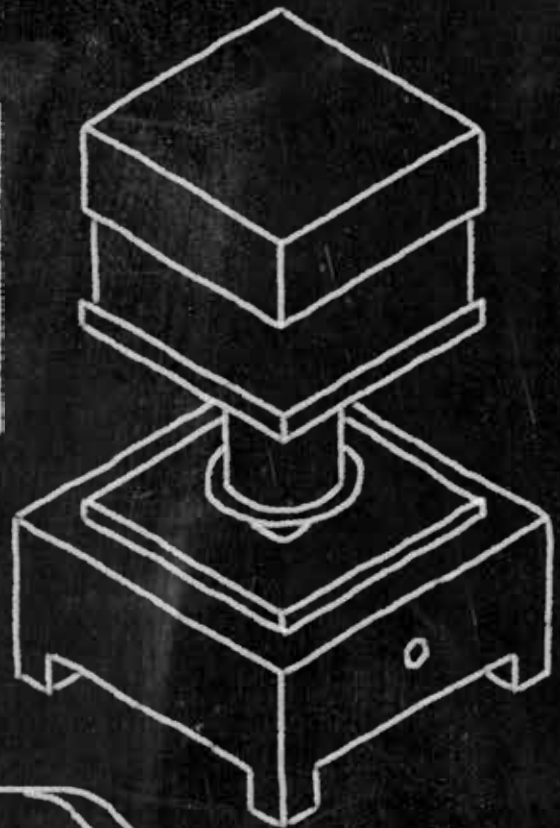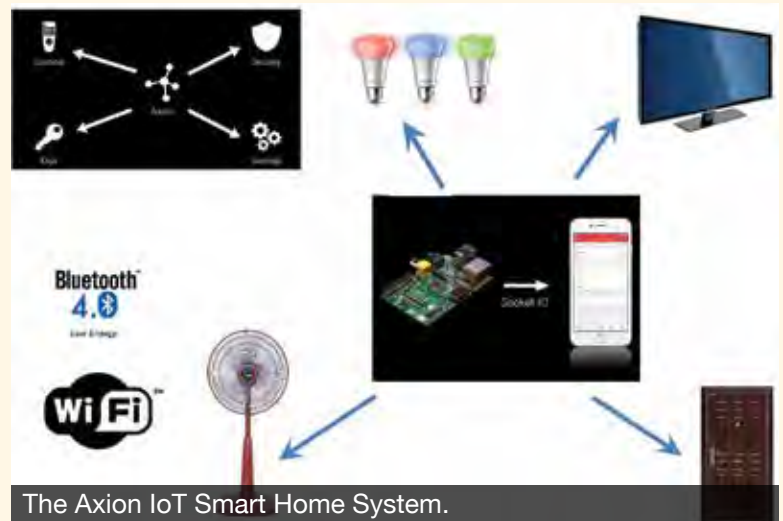
INFOCOMM & MEDIA

Axion - The IoT Smart Home System

The aim of this project is to enhance the daily lives of users by making their homes smarter and safer. Users will be able to control the various devices and things in the home with the one thing that is always found on the modern individual - a smart phone. The team leveraged on the capabilities found in the smart phone and closely integrated it to household devices, creating an Internet of Things (IoT) system for the home that will provide convenience and security to the user.

The Axion IoT Smart Home System.

Supervisor
Lim Joo Ghee

Team Members
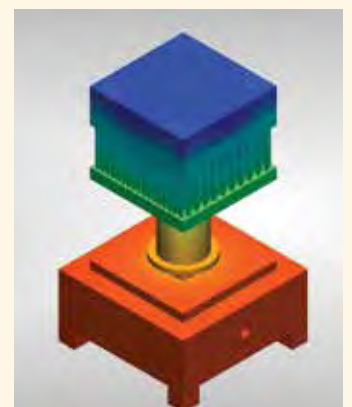Lim Yu Da Bryan, Ong Pin Chun Timothy, Leong Wen Qing, To Hui Min Serene

Numerical Simulation Of A High Performance Test Socket

This project explores the use of Computational Fluid Dynamics (CFD) software to analyze the High Performance Test Socket used for performing stress-tests on an IC package. It is shown that the use of a CFD tool can help to comprehend how the heat is being dissipated from the IC package. The numerical results will be compared against the experimental ones.

Temperature Contour Plot of High-Performance Socket (Front View).

Supervisor
Lee Kim Kheng

Industry Partner
BeCe Pte Ltd

Team Members
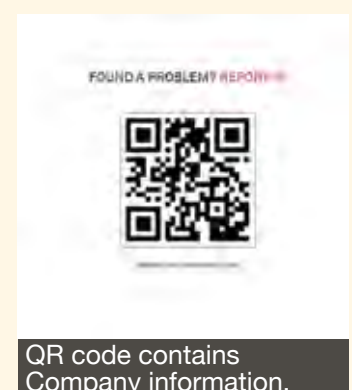Ang Beng Heng, Lim Ee Aun Andrew, Zhang Wenjie, Sia Jia Heng, Muhammad Fahmi Bin Zakaria

Reporting System For Monitoring And Control

This is a system which allows a user with Android Apps to scan a QR code and report the condition of a location using text and photos sent via email to a company. It is useful for cleanliness or fault reporting. The system is also able to remotely control devices using sms.

QR code contains Company information.

Supervisor
Chua Kay Chiang

Team Members
Jitrakorn Tan Soon Huat, Lim Keng Zhi

Interactive Shopping Experience (ISE)

The objectives of the project, named the Interactive Shopping Experience (ISE), are to create a business solution that will enhance a customer's shopping experience, to help small business owners advertise with ease through an administrator platform and to promote a paperless virtual wallet system. The target audience are current small business owners shop and start-ups who run a physical store in Singapore. With the increasing popularity and availability of mobile apps and smartphones, the project seeks to create more interactivity throughout the whole shopping experience with the usage of smart phones and mobile applications.
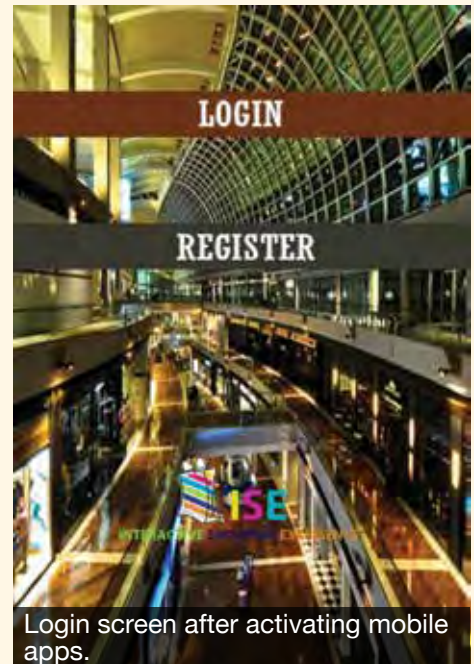
Supervisor
Raymond Ho Weng Kiong

Team Members
Serene Tan Hui Juan,
Chee Wei Xiang, Ke Shu Yi,
Mah Guo Jie, Chan Jia Feng

Industry Partner
Konica Minolta Business
Solutions Asia Pte Ltd

Login screen after activating mobile apps.

Design And Fabrication Of Ruggedized Computer

A ruggedised computer is an electronic computer specifically designed to operate reliably in harsh usage environments and conditions, such as during strong vibrations, under extreme temperatures and in wet or dusty conditions. The ruggedized computers are unique due to their design robustness. They are reliable not just in terms of external housing but also in terms of internal components and cooling arrangements. Hence, they are widely used in applications for unmanned systems, biometrics, military & critical communications, public safety operations, construction and even surveying.

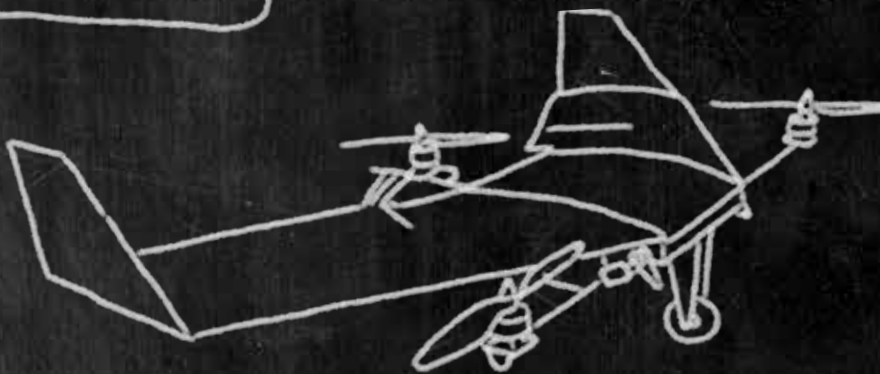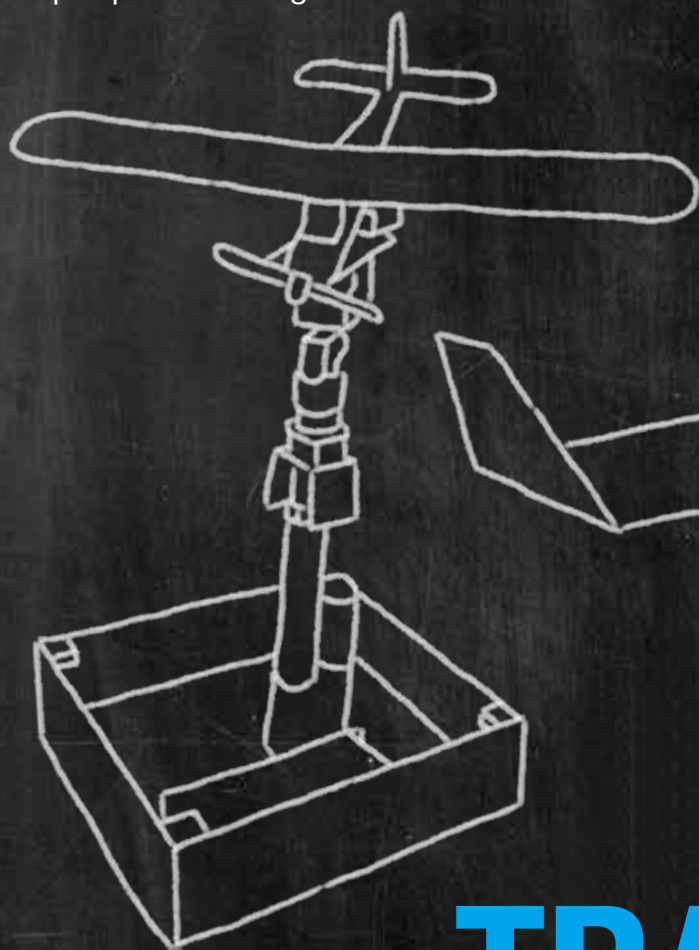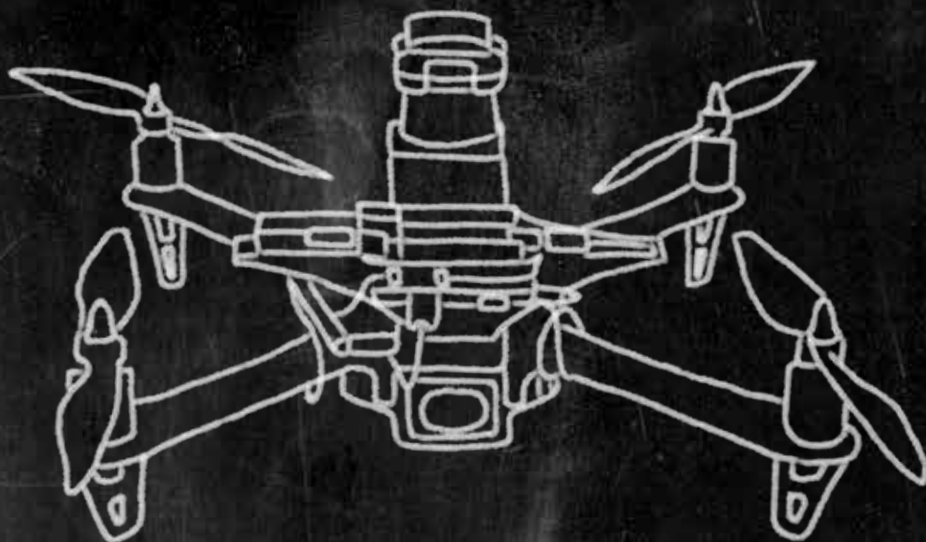First prototype of ruggedized computer.

Supervisor
Lee Kim Kheng

Team Members
Chan Wei Xiang, Wee Zhi Yuan Aloysius Darren,
Eugene Pang Yuan Jing, Gan Thian Soon

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.

TRANSPORT & MOBILITY

Precision Landing UAV with Efficient Power Management System and M-A-D (Mini Aerial Devices)

A quadrotor that can perform autonomous landing precisely on the ground charging station by LiDAR and camera sensors.

This Precision Landing UAV with Efficient Power Management System is an MOE-TIF funded project which aims to develop autonomous UAVs which can travel from waypoint to waypoint and swap battery on the ground station, when the battery voltage is low, by landing precisely on it. The ground charging station will then automatically charge the discharged battery. The aim of this project is to design Mini Aerial Devices (M-A-D) that are able to fly using a flapping mechanism that resemble that of a bird. Users are able to manoeuvre it with easy-to-learn controls.

Supervisors
Danny Lee, Chaganti D V Subrahmanyam, Liao Choon Way, Toh Ser Khoon

Team Members
Joseph Loh Joo Guan, Han Jin Xuan, Goh Wei Wen Benjamin, Goh Wei Zhang Benedict, Ngim Wei Long, Quek Jing Jie, Choi Chun Kit, Esther Ng Shi Hui, Ooi Shayn Dern, Fong Wei Xian, Loh Aik Hau, Shamim Shafiq Loo, Chan Wei Shin, Teo Wei Xuan Bryan, Ang Wei Xiang, Tan Jian Xuan, Wee Wei Sheng, Ong Tai Fu, Tan Hui Ping, Soh De Jun, Michael Tjeng, Goh Wei Ming, Ng Shan Yi

Iconic Project - Solar Car For World Solar Challenge 2015 (Cruiser Class Category)

Singapore Polytechnic's latest solar car, SunSPEC4, will participate in the 2015 World Solar Challenge, held from 18th to 25th Oct 2015. Teams have 6 days to complete the 3000km journey from Darwin to Adelaide, driving between 8am to 5pm each day. Energy is provided by 6m^2 of solar cells and 15kWh Li-ion battery pack. A pair of wheel-mounted brushless DC motors powers the vehicle. Real time telemetry system is used for vehicle monitoring and strategy planning. The carbon fibre body has independent double wishbone suspensions on all wheels and uses high performance, low-rolling resistance tyres.

SunSPEC4.

Supervisors
Leong Fai Choy, Than Keng Hwa, Lam Yee Ki, Steven Chew Lai Keat, Foo Fang Siong

Team Members
Chian Yit Hoe, Chua Ghim Hwee Anson, Phua Chun Boon, Lee Yong Wei, Muhammad Azhar Bin Abdul Karim, Sean Yap Hock Keong, Tham Shun Cai, Nicholas Tan Pei Jun, Muhammad Shahmi Bin Mohd Sabli, Tan Jia Wei, Tang Zhiyang Clement, Soh Sze Min, Joell Thng Chong Shu, Ng Jun Wei Wilson, Choi Jia Jun Grady, Foo Kai Xiang, Voo Qin Gui Roth, Sia Ren You, Chai Vun Lim, Kang Wei Liang Melvin, Seet Ngee Yang, Adriel Teguh Santosa, Lim Jian Ping, Tan Kah Chun

Aircraft Autopilot System With Interactive 3D model

The Aircraft Autopilot System (APS) is an aircraft navigation system that tracks and locates the position of an aircraft with retrieved data from motion sensors, such as yaw, pitch and roll, coupled with a computer program. This project is a downscaled mock-up model of the APS. The model will be able to sense real-time changes to the 3 axes (roll, yaw and pitch) of a model aircraft and indicate the relative changes in the instrument display. It will perform auto correction with real time flight surface compensation which will be plotted on display.

Supervisor
Tan Tiong Kwee

Team Members
Ng Xin Chi Joan, Oh Yicong, Chia Jing Daryl, Lim Wei Liang, Kenneth Choo Hui Rong, Lai Joo Qee

Industry Partner
ST Aerospace Ltd

Completion of hardware assembly.

New Iconic UAV Project (Hybrid SWARM UAV)

The aim of this project is to design and build four Hybrid UAV systems utilizing a combination of various technologies from different platforms to achieve optimum operating parameters with SWARM capability which can provide cooperative behaviour to complete complex missions and eliminate redundancy in the system. Hybrid UAVs are a method of expanding the operational characteristics of unmanned vehicles by combining various modes of travel.

New iconic UAV Project (Hybrid SWARM UAV).

Supervisors
Liew Hui Sing, Shanker Maniam, Tan Hwee Siang, Liao Choon Way, Mike Ong Chin Siang,

Team Members
Lim Boxian, Cheong Tjit Jude, Lee Yong Jin Jacob, Goh Liang Yu, Muhammad Syafiq Bin Senin, Teo Zhijun Jasper, Jason Ang Jiesheng, Toh Zhi Hao Jeremy, Liau Jian Jie, Goh Jun Yang, Jonathan Leo Wen Rong, Voon Yong Keong, Nicholas Ong Jun Jie, Heng Jing Jie, Timothy Zhang, Ahmad Shakir Bin Mohd Masbur, Chua Meng Lim, Yong Haw Yih, Kenneth Chai Kai Jie,

Surveillance Through UAVs – Multicopter And Hexacopter

The aim of this collaborative project is to enhance surveillance through the use of UAVs. The project saw the building of a multicopter; more specifically a hexacopter, to perform high risk surveillance. The UAV would most likely be operated in an urbanised areas to reduce the risk of danger to humans.

"Hexa-copter" in the making.

Supervisor
Ganesh

Team Members
Chua Eng Kiat Kenny, Toh Jing Han, Syed Amir B Syed Anwar Sahab, Zabidi Bin Kamsani, Joey Ng Yi-jun

V-CUBE

The aim of this project is to design and prototype a portable three dimensional virtual reality aircraft-related simulator, for the use of learning/training in an interactive, immersive and safe environment. This immersive multi-user environment would also be used as a home-based learning teaching aid for MM3521 Aircraft structure and assist in the design of Aircraft Interior Optimization within the Aeronautical Technology Roadmap.

Virtual Reality Training.

Supervisor
Kelvin Ong Chin Peng

Industry Partner
Veldis Experience Pte Ltd

Team Members
Chin Zhi Kai, Lin Xueying, Lee Hong Wei, Goh Jia Hui,
Cordeiro Dominic Gabriel Tan

Advanced Composite Parts For An Electrical Vehicle

Although increasing rapidly, the market for electric cars could be expanded even further if the range of such cars can be significantly improved. The current range of the electric car is limited by the weight of the batteries used. In order to minimise the overall car weight, manufacturers are turning to the use of fiber-reinforced plastics in the car structure and drivetrain. This project focuses on the design and development of a carbon fiber-reinforced epoxy suspension system for an electric car with the aim of reducing the weight of the current aluminium suspension by 40%.
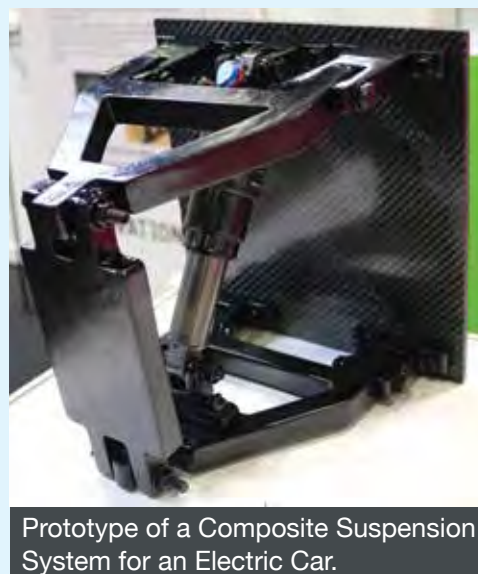
Prototype of a Composite Suspension System for an Electric Car.

Supervisor
Erwin Wouterson

Team Members
Law Khai Xin, Mak Sher-mern,
Lim Yan, Low Ee Tuck

Autonomous Underwater Vehicle

The Autonomous Underwater Vehicle (AUV) was designed for participation in the SAUVC 2015 competition. The control and Image Processing of the AUV is implemented in a Robotic Operating System (ROS). It is designed to perform tasks such as tracking a line, delivering a payload and using underwater acoustic signals to locate itself. This is a joint collaboration project by the School of Electrical & Electronic Engineering (SEEE) and the Singapore Maritime Academy (SMA).

Supervisors
Rubaina Khan,
Leong Mun Kin

Team Members
Alzam Bin Abdul Ghani, Wong Jensen, Patrick Chia Chee Leong, Ng Ming Kwang, Nicholas Ng, Ngai Qi Jie

SEEE & SMA team with AUV Loong Wang.

Switchblade Ii-2: Jumpjet

This project, called Switchblade Ii-2: Jumpjet attempts to use the first generation SwitchBlade as a guide. It is from the first generation model that the design, building and testing of a flying platform was to be created. The platform should weigh less than 1.5 kg and be capable of in-flight transitions.

JumpJet Prototype 1 (side)

Supervisor
Duncan Sih Wei Cheong

Team Members
Chua Yong Chun, Alexander Tan Yong Meng, Chu Yung Keung Joshua, Ryan Tan Yeh Hui, Ng Jun Tian

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.
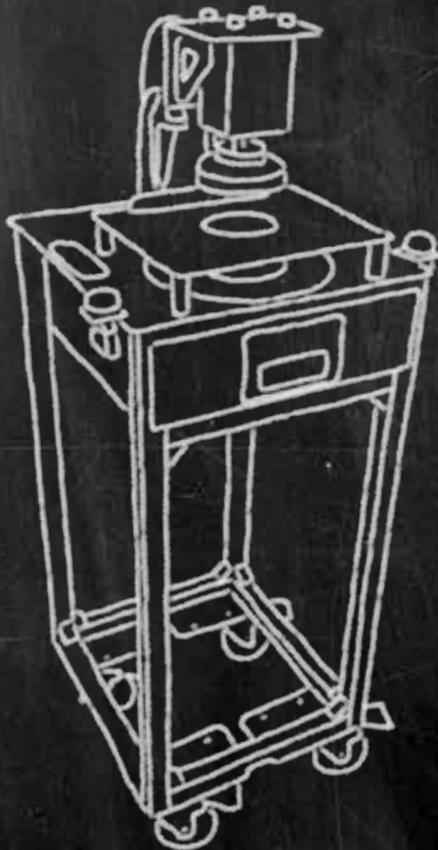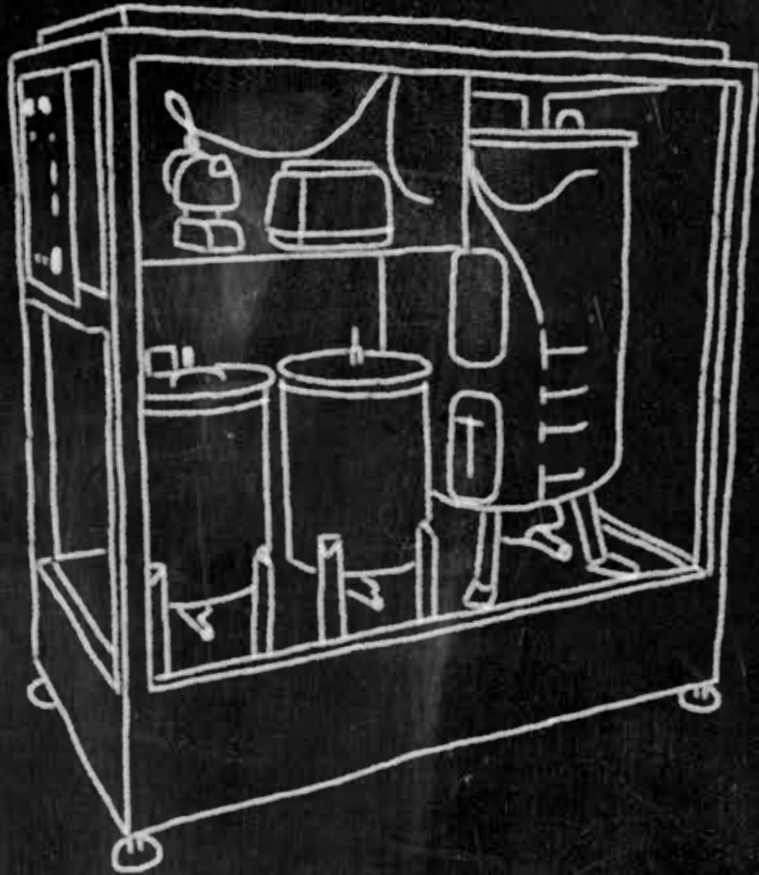
SP TECH TO MARKET

Development Of Self Assembled Monolayers (SAM) For Electronic Applications

In conventional SAM solutions, thiols and silanes are workhorses. Silanes, however are not suitable for most electronic applications while thiols have been used mostly in solvent-based solutions which emit a lot of volatile organic chemicals (VOCs) that are harmful to health. Due to solvent bases, the conventional SAM solutions can only be used at low temperatures and therefore need longer process times which will significantly affect productivity. Thus there is great need to develop SAM which are free of VOCs and to deposit the organic films within 5-30 seconds.

Supervisor
Jiang Jianping

Industry Partner
Stella Specialty Chemicals Pte Ltd

Poster.

Biodiesel Generator For Small To Medium Enterprise Biodiesel Producers

This staff driven project involves the use of a patented process which gives a faster reaction time and a better conversion rate. The 200-litre reactor will be scalable upwards for use by commercial partners. The conventional process reaction time takes up to 2 days, while this method allows for the completion of the reaction within half a day. This project has been funded by the Singapore Maritime Institute for the purpose of investigating the use of biodiesel for marine diesel engines.

Supervisors
Andrew Kon Kwok Leong,
Leong Mun Kin,
Naung Zaw Htun

Team Members
Loh Shao Bin, Tay Wei Quan,
Ryan Soh Jing Heng

Low energy Biodiesel Generator for Small to Medium Enterprises.

Leaf-cutting Machine

This project aims to resolve a productivity bottleneck for food companies that are seeking for technology and automation solutions to effectively cut banana leaves into desired shapes and sizes. The Leaf-cutting Machine was designed and built to assist food companies to reduce their laborious activity in cutting leaves for use in nyonya kuehs, tutu kuehs and nasi lemak.

Supervisor
Terry Tan

The Leaf-cutting Machine - simple to use, easy to clean & increases productivity!!

Nasi-go

Nasi Lemak, Pineapple Fried Rice and Chicken Rice are well known local meals which are conventionally consumed on a plate using utensils. This project, called Nasi-go, focuses on the development of on-the-go meals based on these three traditional rice recipes. The product is enhanced to prolong its shelf life and modified for ease of consumption such that it can be eaten with one hand.


Nasi Go.

Supervisor
Martyn Wong

An EMI Shielding Coating

EMI is an unwanted disturbance caused by electromagnetic conduction and radiation emitted from electronic equipment. An increasing number of countries have enacted strict EMI control measures in medical, telecommunication and transportation equipment. All electrical and electronic products and systems are now required to comply with the EMC and EMI standards. Therefore, there is a high demand for the use of EMI shielding coating to reduce the EMI hazards and their associated problems. The aim of this project is to develop the coatings for EMI shielding applications.
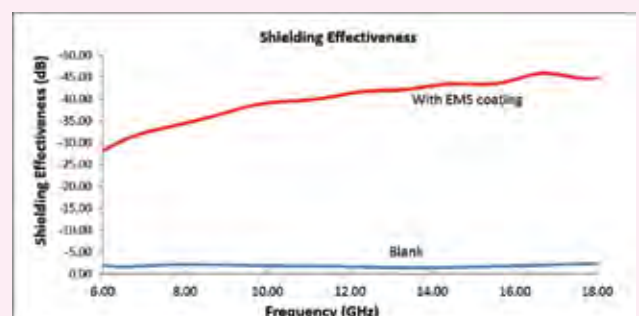
Shielding effectiveness of EMI Shielding Coating.

Supervisor
Li Ping

Thermal Analysis Of IC Package

The objective of this project is to perform thermal analysis using a CFD tool for the PCB and mobile device mounted with an Intel new SOC chipset. The use of the CFD tool allows for the prediction of the surface temperature of the product under different case scenarios. Hence, it provides an invaluable insight into how the heat is being dissipated from the PCB to the housing.
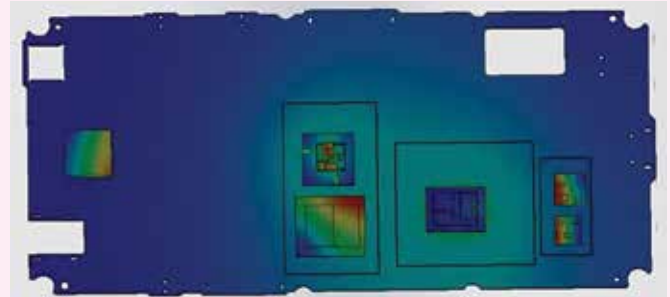
Supervisor
Lee Kim Kheng

Industry Partner
INTEL Mobile Communications SEA Pte Ltd

Team Members
Chun Weng Fai, Etige Dinesh Silva, Tan Choon Heng, Loo Meng Wee

Temperature contour plot at PCB.

Rapid Easy-authoring Platform For Serious Game

This project saw the development of a Rapid, Easy-authoring Platform for Serious Games (REAPSG) application. The application aims to empower academics and trainers to create game-based learning content on their own without the need to acquire specialized programming skills. The target audience are individuals in the construction industry.

Supervisor
Sepulveda Jose

The player mode of the training system.

MedTech Equipment

The MedTech equipment is a scaled-down model of a pharmaceutical bottle dispensing system jointly designed and developed by MDC's staff and students and an industry partner. During off-peak hours, the equipment automatically loads incoming bottles from boxes onto storage shelves, and dispenses bottles according to a prescribed order scanned into the system during the pharmacy operation hours.

Supervisors
Steven Tan Yih Min,
Soon Yew Boon,
Pan Seng Kie

Team Members
Ho Sze Jian Garrick,
Khoo Ju Teck Bryan,
Khaw Wei Hng Samuel,
Ko Li Yen, Loh Ying See,
Sim Guan Zheng Douglas,
Muhammad Irfan B Zailani,
Ting Chek Li James, Yu Peng,
Ong Yi Cong Milford, Chua Zhen Wei, Faruq Kyrul Bin Md Jumadi, Lim Yuan Min, Amirul Ashraf Bin Gombari, Ang Shi Han Alex, Muhammad Hafiz Bin Abdul Aziz

CAD model of MedTech Equipment.

Rapid Detection And Differentiation Of Methicillin-resistant Staphylococcus Aureus (MRSA)

Staphylococcus aureus is a clinically significant pathogen that causes a wide spectrum of clinical manifestations. Beta-lactam antimicrobial agents are often used as the preferred drugs for serious S. aureus infections. However, since the clinical introduction of methicillin, methicillin-resistant S. aureus (MRSA) strains have emerged as important nosocomial pathogens worldwide, and have shown to have increasing prevalence in the community. In this project, specific primers and fluorescent probes were designed to amplify, detect and differentiate MRSA from a mixed bacterial culture using multiplex real-time TaqMan polymerase chain reaction (PCR) in a single tube reaction.

Supervisor
Tan Eng Lee

Case	OrfX	ATTBscc	mecA	Identity	Interpretation
1	+	+	+	MRSA	All markers present
2	+	+	-	MSSA	deleted mecA (rare event)
3	+	-	+	MSSA & MRNSA	OrfX and mecA present, no SCCmec integration
4	+	-	-	MSSA	Only OrfX present
5	-	+	+	MRSA	mutated OrfX (rare event)
6	-	+	-	MSSA	mutated OrfX, deleted mecA (rare event)
7	-	-	+	MRNSA	Only mecA present
8	-	-	-	NSA	All markers absent

MRSA: Methicillin Resistant *Staphylococcus aureus*
MSSA: Methicillin Sensitive *Staphylococcus aureus*
NSA: Non-*Staphylococcus aureus*
MRNSA: Methicillin Resistant Non-*Staphylococcus aureus*

Interpretation of real-time PCR results in detecting and differentiating MRSA in a mixed culture in a single reaction.

Intelligent Remote Physiotherapy Monitoring Using Wireless Body Area Network (WBAN)

The aim of this project is to develop a remote physiotherapy monitoring system using a Wireless Body Area Network (WBAN). The team developed a WBAN prototype using low-cost, low powered sensors and radio frequency integrated circuits. The data is transmitted to a visualisation platform that can track the upper limb motion of the user visually. The data can also be stored in a database for further processing.

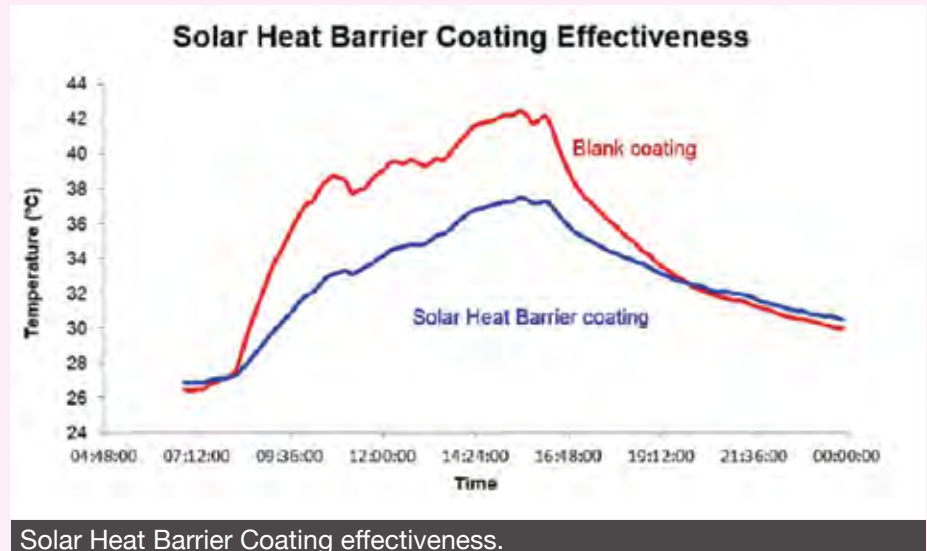**Supervisor**
Lim Joo Ghee

Industry Partner
Biofit Technology & Services
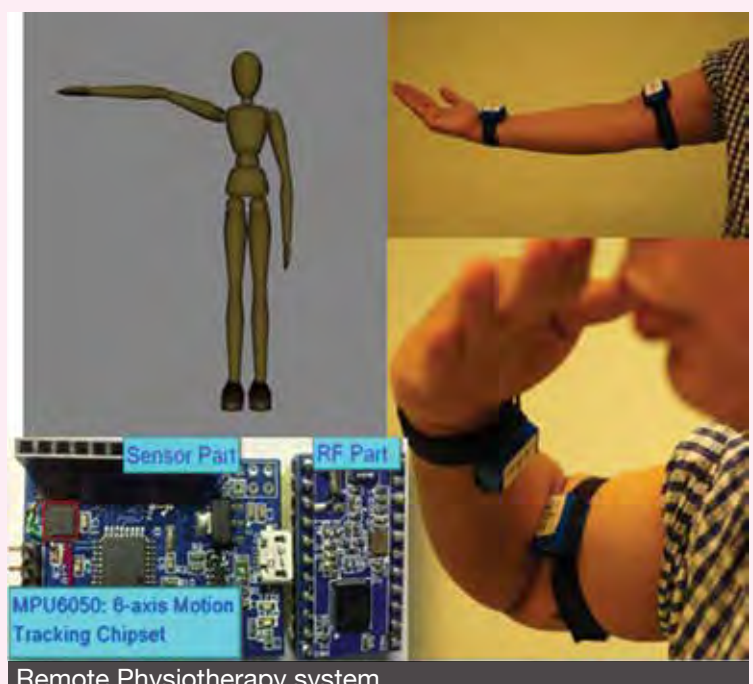
Remote Physiotherapy system.

Solar Heat Barrier Paint

In tropical regions, buildings are exposed to solar radiation all year round. The heat caused by solar radiation heats up the exterior walls of buildings and raises temperatures indoors. As a result, a lot of electric energy is spent to keep the buildings cool. Therefore, there is a high demand by industrial and residential consumers to for an effective method to cool buildings while reducing electric usage. The Solar Heat Barrier Paint is a coating that can be used to block solar heat from buildings.

Solar Heat Barrier Coating effectiveness.

Supervisor
Li Ping

Industry Partner
StratBiz Global Pte Ltd

Translation And Scale-up For Bioremediation Of Petroleum Hydrocarbon Contaminated Soil And Water

This patented technology, which sees to the translation and scale-up for the bioremediation of Petroleum Hydrocarbon contamination, has been shown to be effective for the treatment of soil and water under both laboratory and field conditions. The treatment process has also been shown to have the added benefit of reducing the ecological toxicity.

Prototype bio-reactor for waste water treatment. Contaminated earth. Natural growth 9 weeks after treatment.

Supervisor
Gregory Poi

OTHER MAE PROJECTS

Industrial & Automation

- Design and Development Ornaments Using 3D Wax Printer
- High Intensive Loading Platform
- In-Flight "Beverage-On-The-Go" System
- Krystal Quench

Healthcare & Wellness

- Airrollstuhl
- Composite Evaluation of Brace Body
- Control of an Upper-Limb Robotic Exoskeleton for Assistance in Self-Feeding
- Design and Build a Prototype Slit-Lamp Table
- Design and Fabrication of an Upper-Limb Exoskeleton System for Assistance in Self-Feeding
- Elevated Wheelchair
- Elevating Chair for Polio User
- Exercise Machine
- Kinematics Analysis of Upper Limb Functional Tests
- Lifting Exerciser on Wheelchair
- Outdoor Elliptical Exerciser Bike
- Outdoor Lower Limb Strength Training Machine
- Outdoor Upper Limb Strength Training Machine
- Portable Hoist

Transport & Mobility

- Aircraft Seat Adjustable Head Rest
- Amphibious UAV for Surveillance Over Land and Underwater
- An Interactive Experiment on Aircraft Buckling
- An Interactive Experiment on Aircraft Deflection
- An Interactive Experiment on Aircraft Pressurization
- An Interactive Experiment on Aircraft Vibration
- Cabin Interior Enhancement for Low Cost Carriers
- Cockpit Simulator with Flight Control Surfaces
- Composite Vehicle: Fairing and Structure
- Grasy Multi-Terrain VTOL Quadcopter
- Interchangeable B737 Cockpit Simulator System
- LearJet Cockpit Simulator
- LPADS UAV
- Magnetic Motion System
- Project Endurance
- Project VersaTilt I
- Project VersaTilt II
- Sub-Wagen
- Switch Blade II-1: Airxtreme
- The Humming Bird
- Thrust Vectoring Nozzles on UAV
- Turbocharge Combustion Engine (Structure)
- Turbocharge Combustion Engine (System)
- UAV Ball 2

Cleantech & Built Environment

- Biofuel for Aircraft Engines
- Laser Charging

OTHER EEE PROJECTS

Cleantech & Built Environment

- Airflow Management/Energy Management to Conserve Energy
- Automated Plant Watering System
- Automated Tennis Court Dryer
- Automatic Lighting Control
- Buoyant Airborne Turbine (BAT)
- Charge & Go
- Controllable Street Lamps
- DC Microgrid System
- Dual Axis Solar Tracker
- Easy Access Home
- Energy Conservation Scheme for Household
- Energy Efficient LED lighting to Enhance Food/Product Display
- Energy Friendly Device
- Ez-Lock for Bicycle
- Flux Transfer Energy (FTE)
- Green Avatar: Rubbish Recycling at Residential Buildings
- Green Explorer
- Green Shelter
- Home Automation Using Arduino for Energy Efficiency
- i-chop
- Integrated Electricity and Water Monitoring for Schools
- Intelligent Home
- Intelligent Lighting System (E-House)
- Lollipop Man
- Micro Wind Turbine Generator
- Microbial Fuel Cell
- Microfluidics Component for Diagnostic Application
- Mobile Power Generation
- NYN Cooling
- OK Toilet Management System
- Renewable Energy Application
- SandStorm Solar Drifter
- sCharger
- Smart House-Hold Controller
- Smart Light
- Solar Aerator System
- Solar Display Board
- Solar Garden Farm
- Solar Lighting System
- Solar Power Signage
- Solar Powered Charging Kiosk
- Solar-Powered Greenhouse
- Solar-Powered Traffic Lights
- Stationary Bike Generator/Charger
- Study on Solar Photovoltaic/Thermal Collector
- The Aquafective
- Thumbs Up Energy Monitoring
- Traffic Control
- Water Surface Litter Collector

Industrial & Automation

- 3D Sensing Applications
- Agricultural Monitoring Robot
- An Automated, Sustainable Ambient Lighting for a Community Garden
- Arduino Based Web-Control of S-Power
- Arduino Power Switch
- Auto Watering System for Plants
- Automating a Standalone Test for Gross Manual Dexterity
- Barcode Reader Monitoring System
- Design a Switched Capacitor Filter Integrated Circuit
- Design and Fabrication of Adult Size Humanoid Robot for RoboCup Humanoid League
- Design and Fabrication of Dance Robot for CoSpace Robotics
- Envo-robot
- Flexible Electronics Applications
- Follow "U"
- Marksman
- Mobile Base
- Mobile Robot @ Work
- Object Motion Detection Using Vision Based Techniques
- Smart Carpark
- Smart Modular Storage System
- Smart Warehouse Rack Indication System and Call Notification System
- Solar Array Connectivity and Monitoring System
- System Integration of Grid-Connected Photovoltaic Converters
- Table Soccer Machine v2
- Underwater Autonomous Robot
- Universal Remote Controller

Healthcare & Wellness

- 3D Movement Tracking for Rehabilitation Purposes
- A Monitoring Device for Ankle Physio-Therapy
- AIR-plication
- Audio Warning System
- Automation to Aid the Elderly or the Physically Challenged
- DEW (Disable Elderly Wristband)
- Digital Design Power Optimization Techniques
- Distributed Control System
- Edu-tainment Robot
- Elderly Care System in a Smart Flat - Non Intrusive System for Monitoring.
- Elderly Care System in a Smart Flat "Body Sound analysis"
- Elderly Health Care System
- Enhanced Carpal Tunnel Ligament Device v2
- Eye Breaker
- Finger Movement Simulation of Stroke Patients
- Graphene Based Electrochemical Biosensor
- GUI Design for Liver Image Post Processing
- Home Based Remote Vital Signs Monitoring and Alert System for Elderly Residents
- Huggler
- Intelligent Medicine Dispenser & Alerting System
- Intelligent Physiological Monitoring System
- Interactive "Air Hockey" Game
- Interface for Evaluating Real-Time Audio -to Score Alignment
- Journey into the Body
- Limb Simulator II - Leg
- Limbi Simulator I - Hand
- Lite-MyQueue
- Liver Image Pre-processing
- Low Cost Physical Activity Monitor
- Measurement of Electrical Axis of ECG
- Memory Mania
- NFC for HealthCare
- ONE Key
- Pill Dispenser
- Pill Reminder
- Reveal Yourself
- Robo-Wrist
- Singing Evaluation
- Smart Flat system- Image acquisition System
- Smart Master Controller
- Social Robot
- Sports Electrical Energy Generation
- Stressense
- Survival Backpack
- Telehealth - Finger Muscle Measurement Design
- Telehealth - Simulation of Lower Arm and Finger Movement
- Telehealth - Simulation of Lower Arm and Leg Movements
- Utilization of Technology to help Visually Handicapped
- Visitor Minder
- Wearable Vital Signs Monitoring Device for Elderly Residents
- Workout Machines with Rewards

Transport & Mobility

- Aircraft Battery Measurement & Management System (Wireless)
- Aircraft Blackbox Project
- Aircraft Fuel Measurement System
- Airport Security System
- An Affordable DIY UAV
- Boeing 737 Glass Cockpit Simulator
- Design and Build an Autonomous Quadcopter
- Flying Machine Telemetry Radio Test System
- GPS Data Transmission from an RC Plane
- Hydrogen Fuel Cell Model Car
- M-A-D (Mini Aerial Devices)-Integration
- MEMs-based High Accuracy Tilt Sensor
- Photos Stitching Using Aerial Photos
- Remote Monitoring of Temperature and Pressure of an RC Plane.
- Sensor-O-Matic
- Taxi Pool App
- To Build and Design an Unconventional Flying Machine
- UAV with Navigation Capability
- UAV with Surveillance Capability
- Use of UAV in shopping mall
- Visual Display Aircraft Simulator

Infocomm & Media

- "Operation Cloudify"(Private Cloud for Commercial Entity)
- A Software Solution for Managing Router Interconnection for the Teaching of Computer Networking
- An Application of Big Data Collection and Analysis
- Applied Cloud Computing use cases
- Batteryless Green Signage
- Bus Assistant
- Cloud Based Conferencing & Collaboration
- Crowd Flow Management
- Crowd Monitoring
- Crowd Monitoring and Control
- Crowdket
- Data logger for Quality of Service (QoS) of Wireless System
- Date-In Application
- DE Planet
- Design of Touch Panel Control of Valve Pressure Testing
- Develop a Mobile App Using iBeacon
- Ebook Application
- eBook for Year 1 Students
- e-Incident Form
- Fab Lab Facility Booking & Training Scheduler System
- Fab Lab Facility Controller System
- Fast Checkout at Supermarket
- Fingerprint Security Locker System
- Fish Sorting System
- Flexible sensor
- Food Ordering System
- Fourier Series Theorem Demo Kit
- FPGA-Based Real-Time Image/Video Processing System
- Headphone & Mic
- Independent Mobile Health Service System (IMHSS)
- InsTap
- Integrated Project: Internet of Things (Smart Home)
- Intelligent Electronic Lock
- Language Translator
- Lingual Swap
- Magic DVD Storage
- Mobile App for Educational Interaction
- Mobile Application Using NFC
- Mobile Applications Using Augmented Reality
- Monitoring in Different Crowded Situations
- Monitoring of Fishes
- Multi-room Media Streaming from the Cloud
- My Choice Career
- MyExPlan
- MyOneApp
- NFC Application
- NFC for Business
- Panic Companion
- Play While U Wait
- Recruit Management Website
- Simulation of an ISP for Teaching Networking
- Smart Checker Board
- Smart Door Chime
- Social Networking Service
- Solar Control System
- Sparcel
- SPformula
- Thermal Electric Fan
- Using iBook to Create Interactive Lessons
- Wearable Device
- Web Design on the Public Cloud with Openshift PAAS
- Web Hosting Service

POINT OF CONTACT

For enquiries, please get in touch with us

— @ —

School of Architecture & The Built Environment (ABE)
Student and Industry Project:
Dr Chan Chin Loong (chan_chin_loong@sp.edu.sg)

School of Chemical & Life Sciences (CLS)
Student and Industry Project:
Dr Chua Poh Hui (ph_chua@sp.edu.sg)

School of Electrical & Electronic Engineering (EEE)
Student Project:
Mr Chong Siew Ping (spchong@sp.edu.sg)
R&D and Industry Project:
Dr Cai Zhiqiang (zqcai@sp.edu.sg)

School of Mechanical & Aeronautical Engineering (MAE)
Student Project:
Mr Cheung Kim Kwong (kkcheung@sp.edu.sg)
R&D and Industry Project:
Mr Steven Tan (steventan@sp.edu.sg)

Singapore Maritime Academy (SMA)
Student and Industry Project:
Mr Leong Mun Kin (tieong@sp.edu.sg)

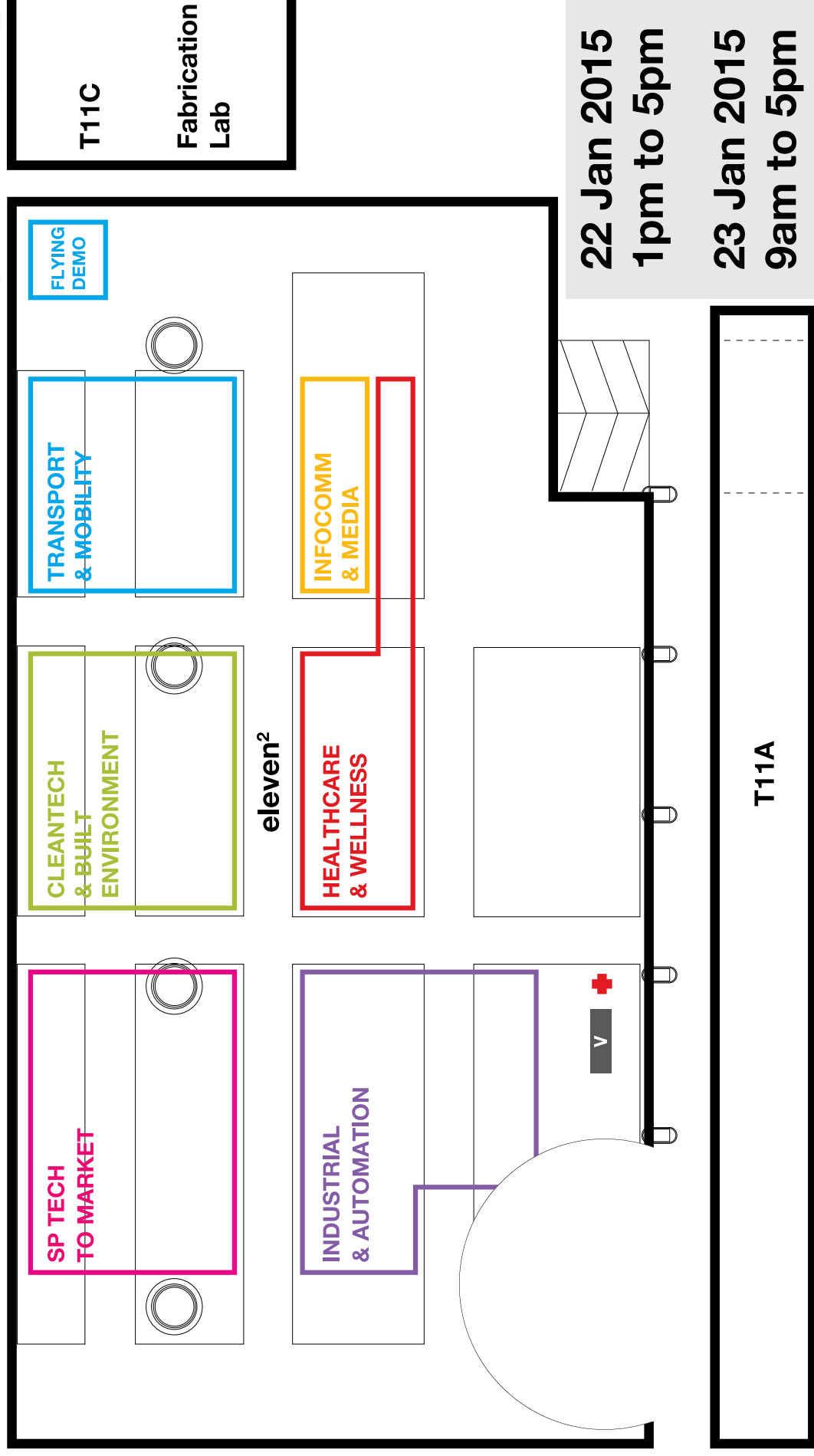**Department for Technology, Innovation and Enterprise (TIE)**
All other R&D, industry projects or SPRING grants enquiry:
Mr Jonathan Ng (csa@sp.edu.sg)

Exhibition Layout

SP ENGINEERING SHOW 2015

Service Road

T11C

Fabrication Lab

FLYING DEMO

TRANSPORT & MOBILITY

CLEANTECH & BUILT ENVIRONMENT

INFOCOMM & MEDIA

eleven^2

HEALTHCARE & WELLNESS

SP TECH TO MARKET

INDUSTRIAL & AUTOMATION

**22 Jan 2015
1pm to 5pm**

**23 Jan 2015
9am to 5pm**

Car Park

T11A

+ : First Aid Counter

v : Visitor's Reception Counter