

20 July 2019

STRICTLY EMBARGOED UNTIL 20 JULY 2019, SATURDAY, 3.00PM

Media Release

Youths Clinched Awards for Engineering Ingenuity at National Engineers Day 2019

*Minister for Education Mr. Ong Ye Kung witnessed signing of an MoU for
National Engineering Career Progression Pathway for technologists and
technicians*

The Institution of Engineers, Singapore (IES) awarded outstanding students for innovatively applying their STEM knowledge to create engineering solutions to address global problems and societal needs, at the National Engineers Day (NED) 2019.

Mr. Ong Ye Kung, Minister for Education graced the Prize Presentation Ceremony of the Engineering Innovation Challenge 2019 and the IES Innovation Challenge for the Community 2019 awards as the guest-of-honour.

New National Engineering Career Progression Pathway for Technologist and Technician

At the event, Minister Ong witnessed the signing of a Memorandum of Understanding (MoU) for the new **National Engineering Career Progression Pathway for Technologist and Technician**.

IES has formed a Steering Committee with the other 20 MoU signatories to build the pathway, focusing on the development of an engineering competency framework; and training and assessment for technologists and technicians to progress to become Chartered Engineers.

Comprising three levels of certifications – Chartered Technicians, Chartered Technologists and Chartered Engineers, the pathway will recognise and build on the applied skills and

competencies of engineering professionals who have been through academic or non-academic route. It will facilitate their career progression towards Chartered Engineers by attending modular skills-based programmes and accumulating of relevant work experience.

IES will also set up a Technologist and Technician Accreditation Board (TTAB) with stakeholders from the industry, academic and government agencies to develop the industry accreditation framework, which will take reference from the Skills Frameworks. It aims to register the first batch of Chartered Technologists and Chartered Technicians by early 2020.

"Technologists and technicians are key contributors in Singapore's engineering ecosystem. However, traditional emphasis on academic qualifications has limited their career advancement. In line with the government's growing emphasis on continuous skills training and mastery-based career development, the new pathway will redefine the career pathways of technologists and technicians. It will provide opportunities for them to gain greater recognition for their competencies and increase their job mobility," said Prof Yeoh Lean Weng, President of IES.

With strong support from industry partners, this initiative will promote employer recognition and career development based on skills and mastery; and will foster a culture that supports and celebrates lifelong learning.

Please refer to Annex 1 for list of MoU signatories.

Engineering Innovation Challenge 2019 Winners

Building upon the success of the Energy Innovation Challenge, IES and Science Centre Singapore have expanded its scope to include engineering topics beyond energy and rebranded it as the Engineering Innovation Challenge (EIC). EIC is supported by the Ministry of Education (MOE) and the National Research Foundation (NRF).

EIC 2019 challenged students to design prototypes of affordable, easy-to-use detectors capable of accurately and effectively measuring background radiation in Singapore, in response to the topic "Radiation is everywhere".

A total of 93 student teams across four categories participated in the competition, comprising 82 teams from secondary schools, junior colleges, polytechnics and ITE in Singapore and 11 teams from local and overseas universities.

These students embarked on their five-month experiential journey in March 2019; and went through a series of workshops, camps and clinics on topics from introduction to radiation to using laser machines. Under the guidance of professional engineering and business mentors, they have gained hands-on experience in building prototypes of their invention.

After a preliminary judging round, a total of 40 teams earned their place in the final rounds of judging at NED 2019. These shortlisted teams put up their project displays at the event from 18 to 20 July 2019 at the Devan Nair Institute for Employment and Employability.

Results on the 2019 winners will be made known only during the Prize Presentation Ceremony and added accordingly to Annex 2.

“This year saw a marked twist to the challenge where students are tasked with the detection of radiation from extra-terrestrial cosmic rays to radioactive nuclides in natural environment. Submitted entries were creative and merged modern science with sound engineering to construct clever devices. Students demonstrated strong resolve and determination in the numerous iterations to produce their ideal prototype and we look forward to judging and showcasing them,” said Associate Professor Chung Keng Yeow, Chairman, EIC 2019 and Director, Singapore Nuclear Research and Safety Initiative, National University of Singapore.

Prizes for winners include a fully sponsored overseas educational trip and cash prizes. *Please refer to Annex 2 for breakdown of prizes for each category.*

IES Innovation Challenge for the Community 2019 Winners

NED 2019 also celebrated youthful engineering brilliance from students of polytechnics, ITE and universities, by presenting awards to winning students of the IES Innovation Challenge for the Community (ICC) 2019.

Designed to cultivate the spirit of community service amongst local youths, the competition engages them to make use of their engineering knowledge and creativity to design and build devices to help the elderly, handicapped, injured and community at large. A total of 15 project submissions were received.

The 2019 Gold Award winning team for Category A (Polytechnics and ITE) is from Nanyang Polytechnic, for their project 'AvTant – Development of Assistant Auditory–Verbal Therapy based Speech Recognition and Graphic Feedback Correction with Gamification'. Comprising a mobile app and a physical interactive component, AvTant is an educational aid designed for hearing–impaired children to improve their pronunciation and speaking skills through gamified exercises. A web portal enables auditory–verbal therapists to track the children’s progress and prescribe further exercises.

The Gold Award for Category B (University) goes to Senthul Kumar Kurthuka from the National University of Singapore for the project on 'Anywear: Modifying clothes to adaptive wear in one step'. The solution helps those who are less able to dress themselves independently through clothing modification tailored specifically to their needs. It reduces the hassle of users having to dress themselves and helps them gain independence and normality in their daily life.

The Prize Presentation Ceremony marked the conclusion of NED 2019. Since its introduction in 2011, NED has become the largest annual engineering youth carnival in Singapore that celebrates the achievements of engineers, inspires young engineers and intrigues the young generation in engineering.

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Notes to Media:

i. Annexes

1. Annex 1 – MoU signatories for the National Engineering Career Progression Pathway for Technologist & Technician
2. Annex 2 – Engineering Innovation Challenge 2019 Winners, Project Descriptions & Prizes *(Please refer to updated Annex on actual day)*
3. Annex 3 – IES Innovation Challenge for the Community 2019 Winners, Project Titles & Prizes

ii. Chinese Glossary

Terms in English	Terms in Chinese
The Institution of Engineers, Singapore (IES)	新加坡工程师学会
National Engineers Day	全国工程师日
Prof. Yeoh Lean Weng, IES President	杨联文博士, 新加坡工程师学会会长
Engineering Innovation Challenge	工程创新挑战
National Career Progression Pathway for Technologist and Technician	全国技术专家与技师职业进展途径
IES Innovation Challenge for the Community	新加坡工程师学会社区创新挑战

About The Institution of Engineers, Singapore (IES)

The Institution of Engineers, Singapore (IES) was formally established in July 1966 as the national society of engineers in Singapore. IES is the premier engineering institution in Singapore and is called upon by the Government to provide feedback on professional engineering matters.

IES is well represented among the faculty members of the major engineering institutions of higher learning in Singapore. Through close collaboration with the local universities and polytechnics, IES organises courses, seminars and talks for engineers and IES members to advance the continuous development of engineers.

The Institution maintains close links with professional organisations of engineers regionally and throughout the world. These include organisations in Australia, China, Japan, United Kingdom and the United States. The Institution also represents Singapore in the ASEAN Federation of Engineering Organisations (AFEO) and the Federation of Engineering Institutions of Asia and the Pacific (FEIAP) in promoting goodwill and fellowship among all engineers in ASEAN and the Asia-Pacific region.

Through its Engineering Accreditation Board (EAB), IES obtained full signatory status in the Washington Accord (WA) in June 2006. The entry grants IES the authority to represent Singapore, the first country within the ASEAN region which has obtained full signatory status in the WA, to vet education systems under the WA mutual recognition framework.

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Annex 1

MoU signatories for the National Engineering Career Progression Pathway for Technologist & Technician

MOU Signatories

Saturday 20 July 2019

1	Name : Mr. Hugh Lim Designation : Chief Executive Officer Organisation : Building and Construction Authority
2	Name : Ms. Low Khah Gek Designation : Chief Executive Officer Organisation : Institute of Technical Education
3	Name : Mr. Goh Teck Seng Designation : Deputy Chief Executive Organisation : Land Transport Authority
4	Name : Ms. Jeanne Liew Designation : Principal & Chief Executive Officer Organization : Nanyang Polytechnic
5	Name : Mr. Ram Bhaskar Designation : Deputy Chief Executive Officer (Environmental Protection) Organization : National Environment Agency
6	Name : Ms. Cham Hui Fong Designation : Assistant Secretary-General Organisation : National Trades Union Congress
7	Name : Mr. Clarence Ti Designation : Principal Organisation : Ngee Ann Polytechnic
8	Name : Ms. Teoh Zsin Woon Designation : Deputy Secretary (Transformation) Organisation : Public Service Division
9	Name : Ms. Koh Liang Chee, Angela Designation : Director, Human Resources Department Organisation : Public Utilities Board
10	Name : Mr. Yeo Li Pheow Designation : Principal & Chief Executive Officer Organisation : Republic Polytechnic

11	Name : Prof. Tan Thiam Soon Designation : President Organisation : Singapore Institute of Technology
12	Name : Dr. Ahmad Magad Designation : Secretary-General Organisation : Singapore Manufacturing Federation
13	Name : Mr. Soh Wai Wah Designation : Principal & Chief Executive Officer Organisation : Singapore Polytechnic
14	Name : Prof. Cheong Hee Kiat Designation : President Organisation : Singapore University of Social Sciences
15	Name : Mr. Ng Cher Pong Designation : Chief Executive Organisation : Skillsfuture Singapore Agency
16	Name : Mr. Neo Kian Hong Designation : Group Chief Executive Officer Organisation : SMRT Corporation Ltd
17	Name : Er. Lim Soon Heng Designation : President Organisation : Society of Floating Solutions (Singapore)
18	Name : Mr. Chan Hua Tek Designation : Chief Corporate Officer, Land Systems Organisation : ST Engineering
19	Name : Mr. Peter Lam Designation : Principal & Chief Executive Officer Organisation : Temasek Polytechnic
20	Name : Prof. Yeoh Lean Weng Designation : President Organisation : The Institution of Engineers, Singapore
21	Name : Mr. Tan Choon Shian Designation : Chief Executive Organisation : Workforce Singapore

Annex 2

Engineering Innovation Challenge 2019 Winners, Project Descriptions & Prizes

Category 1 – Secondary Schools

- Champion:**
- Name of School: School of Science and Technology, Singapore
Project Title: Development of a Photovoltaic Blue Light Delivery System for the Growth of Corals
Project Description: Corals require light to survive as its symbiodinium (algae) has to carry out photosynthesis. At a 15-metre depth, corals only receive a third of the minimum requirement. Hence, they are not able to grow well, and are often bleached. This problem can be solved with our system, photovoltaic blue light delivery system. We aim to deliver 3000 lux consistently to corals for 12 hours. We have proved and found that this is possible, and all of our specific requirements were met, most even surpassed. The system is realistic as the buoyancy is 807 kg/m³, and the ratio of LED to Solar Panel is 1.04:1. Through our project, we found a solution to improve and rehabilitate the dying corals. This solution can also be integrated into the BioRock™ system, which refers to the accumulation of calcium ions through electrolysis, to further rehabilitate affected coral.
Prize: Fully-sponsored Overseas Educational Industry-Visit Trip
- First Runner-Up:**
- Name of School: Yuvabharathi International School
Project Title: Infrared Assisted Irrigation System
Project Description: Our prototype, the Irrigator, aims to provide better irrigation facilities and overcome problems of the current irrigation methods such as that of drip irrigation and sprinkler system. It is a device that employs the properties of Infrared Rays (985 nm) to manoeuvre itself along a specified path and water the rows of pots at the same time. The water is dispensed only to the roots of the plant to prevent water wastage.
Prize: S\$1,000

Second Runner-up: Name of School: Dunman High School

Project Title: Robopleco

Project Description: The team's prototype is a sustainable solution for clean waterways. It safeguards precious water resources vulnerable to pollution. Solar power utilised to power the prototype for the waste clearing process makes it cheaper, more sustainable to maintain and more environmentally friendly. Secondly, recycled materials such as scrap metal can be used for the building of the prototype, further reducing costs and making it more environmentally friendly as well. Not only can the prototype clean our waterways, it will also reduce the manpower required for the taxing jobs of having to remove waste stuck at the sides of waterways manually. The fundamental structure of this prototype will allow it to function for a long period of time so that it can be used on a much larger scale.

Prize: S\$700

Popularity Award: Name of School: Yuvabharathi International School

Project Title: IR Assisted Wearable Guider for the Visually Impaired Person

Project Description: We have named our prototype IR NAVIGATOR. The main objective is to help Visually Impaired Person to navigate with ease using advanced technology. The IR navigator is used by the VIPs to detect obstacles and help to ease movement. The IR navigator for the VIPs automatically detects the obstacle in front of them and gives a response to them by producing vibrations, with a greater intensity when the person moves closer to the obstacle. Through this, the VIPs can be aware of the obstacles in front of them and take actions to avoid them.

Prize: S\$300

Category 2 – Junior Colleges

- Champion:** Name of School: Anglo-Chinese School (Independent)
Project Title: Tempo: A Biosensor – Integrated Mobile Application for Real-Time Pacing Feedback to Increase Training Efficiency and Reduce Overexertion and Casualties
Project Description: Recognising that pacing is inherently challenging for athletes, we aim to maximise training efficiency while minimising on-the-field casualties by using biosensors to monitor a number of informative parameters, such as core body temperature and heart rate. This data will be consolidated by a mobile application, providing users with simple pacing advice and warning alerts, for them to act upon in real time. Supervisors can also monitor the performance data of their charges to intervene where necessary, such as during a mass run. The app can also be customised to the user’s individual needs, and allows for the incorporation of personal training/pacing programmes. Together, it will minimise over-exertion and under-exertion during physical activities.
Prize: Fully-sponsored Overseas Educational Industry-Visit Trip
- First Runner-Up:** Name of School: Hwa Chong Institution
Project Title: Vehicooler
Project Description: The project aims to engineer a device that cools the boot of the car by utilising solar radiation from the sun to dissipate heat via thermal radiation. This is done by attaching Peltier devices that are powered by solar radiation onto the surface of the car boot.
Prize: S\$1,000
- Second Runner-up:** Name of School: St Joseph Institution
Project Title: Cooking in the Sun
Project Description: Our team aims to devise a more efficient way to utilise solar radiation to cook food or heat up water by improving the current solar oven designs. We will use our knowledge of lenses

and their effects on infrared rays that are emitted by the sun to use in the design of the Solar Oven Mk.

Prize: S\$700

Popularity Award: Name of School: Hwa Chong Institution
Project Title: Vehicooler
Refer to 'First Runner-up'
Prize: S\$300

Category 3 – Polytechnics and ITE

Champion: Name of School: ITE College West
Project Title: Self Build a Radiation Detector
Project Description: Our project aims to design and self-build a radiation detector which is able to detect the radiation level in the surrounding.
Prize: Fully-sponsored Overseas Educational Industry-Visit Trip

First Runner-Up: Name of School: Singapore Polytechnic
Project Title: NEW-CLEAR and NEW-PLANT
Project Description: Our team believes in empowering locals who live in close proximity to nuclear power plants to know the radiation levels around them through our platform called NEW-CLEAR. It is an online dashboard that reflects the real-time radiation level in the area of concern. Through the dashboard interface, users are able to explore the radiation level across the past week and plan their travel route to avoid areas with high radiation. We realised that educating through teaching the public to build and deploy their self-made Geiger counter will not only educate but give them the assurance that the data collection is not tainted by us. We have decided that our remote Geiger counters called NEW-PLANT will be given out to citizens living in proximity to nuclear plants. NEW-PLANTs are self-made Geiger counters to detect and measure radioactivity while sending data to the cloud which is then pushed to the dashboard.

Prize: S\$1,000

Second Runner-up: Name of School: Temasek Polytechnic

Project Title: Smart Radiation Detection System

Project Description: The project that our team is working on is a “Smart” Radiation Detection System targeted for educational purposes, with the capability to detect X-ray and gamma ray. This novel product is a compact device with Bluetooth connectivity to mobile phone/tablet. The product also comes with an Android app for data visualization and also link with real-time database for remote monitoring and data analytics.

Prize: S\$700

Popularity Award: Name of School: Temasek Polytechnic

Project Title: Radiation is Everywhere

Project Description: BOB the highly accurate and compact mobile radiation detector.

Prize: S\$300

Category 4 – Local and Overseas Universities

Champion: Name of School: National University of Singapore

Project Title: Project Rad-X

Project Description: This project aims to prototype a portable radiation detector which would be capable of providing useful and reliable information but also made easily accessible to consumers in terms of cost and portability. Since the target audience is to be as inclusive as possible, the team decided to integrate the domestic use of everyone’s daily tool – smartphone in the prototype design. There will be an external device, which acts as the radiation detector to acquire data. The data will then be transferred onto the handheld device for further analysis and provides the user with useful information through a mobile app.

Prize: S\$8,000

First Runner-Up: Name of School: PSB Academy
Project Title: Underground Latent Radiation Autobot (U.L.T.R.A)
Project Description: We propose to create a small portable autobot that could analyse underground conditions for radioactive sources. Named as the Underground Latent Radiation Autobot (U.L.T.R.A), U.L.T.R.A could analyse the underground conditions and feedback in real time to the controller at the surface or off location. The constant monitoring by U.L.T.R.A would allow personnel to focus on their work, and be alerted to any harmful exposure. U.L.T.R.A would be built on a modular based platform, where the autobot would house a small removable Geiger counter. The counter would be portable and light weight, sized less than the dimensions of an A6 paper format, allowing it to be transported easily. The autobot would be connected via long range radio waves and wifi. It would be controlled via onboard cameras through a mobile application. The mobile application will allow the user to view radiation level data in real time at the underground worksite.
Prize: S\$5,000

Second Runner-up: Name of School: Nanyang Technological University
Project Title: Autonomous Radiation-Mapping Robot
Project Description: Our group intends to create a solution that simultaneously tackles the unwieldiness and inefficient data collection cum analysis method seen in current radiation detection equipment. Our group thus proposes a portable autonomous radiation-mapping hexagon-legged robot that can explore and accurately map out the radiation levels of a defined area. The data the robot collects will also be logged and analysed in an accompanying program that can be viewed from the user's mobile device.
Prize: S\$3,000

Popularity Award: Name of School: Technological Institute of the Philippines
Project Title: GeCo: A Compact Pocket Geiger Counter for Mobile

Devices

Project Description: GeCo is a Compact Pocket Geiger Counter design in combination with Mobile Devices connected through Bluetooth. The power supply of the device will come from the smartphone's micro USB port. The purpose of the project is to develop a device that is highly sensitive to ionizing radiation, portable, and of low-cost. According to a general research about radiation, most devices that precisely detect radiation is through the use of a Geiger counter device. The use of a Geiger counter circuit enables the device to detect low levels of radiation, more over detecting background radiation. GeCo will be able to detect background ionizing radiation: accurately and precisely.

Prize: S\$300

Annex 3

IES Innovation Challenge for the Community 2019 Winners & Project Descriptions

Category A (Polytechnics & ITE)

Gold Award: Team from Nanyang Polytechnic for “AvTant – Development of Assistant Auditory–Verbal Therapy based Speech Recognition and Graphic Feedback Correction with Gamification”

Prize: S\$1,600 in cash

Silver Award: Team from Singapore Polytechnic, for “Computational Design and Modelling of Transtibial Prosthetic Leg Socket”

Prize: S\$1,200 in cash

Bronze Award: Team from Republic Polytechnic, for “Face Recognition on Low Quality Image/Video Using Super–Resolution in Surveillance”

Prize: S\$800 in cash

Category B (Universities)

Gold Award: Senthul Kumar Kurthuka from National University of Singapore, for “Anywear : Modifying clothes to adaptive wear in one step”

Prize: S\$1,600 in cash

Silver Award: Isabel Ang from Singapore Institute of Technology, for “Physio Tilt Table for Cerebral Palsy in Developing Countries (Cambodia)”

Prize: S\$1,200 in cash

Bronze Award: Loh Hui Lin from Singapore Institute of Technology, for “3D–printed Food for Elderly”

Prize: S\$800 in cash