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Media Release

Student Winners Commended for Brilliant Artificial Intelligence Solutions

Minister Masagos Zulkifli presented Engineering Innovation Challenge 2022 awards at National Engineers Day 2022 finale

National Engineers Day (NED) 2022 concluded today at PSB Academy @ Marina Square with the Engineering Innovation Challenge (EIC) 2022 Prize Presentation Ceremony organised by The Institution of Engineers, Singapore (IES). Mr. Masagos Zulkifli, Minister for Social and Family Development, graced the event as the guest-of-honour and presented prizes to the winning student teams of EIC 2022.

The eighth EIC challenged students from Singapore and abroad to devise solutions under the theme of "**Artificial Intelligence for a Sustainable Future**". The champions of the four categories that emerged from a total of 70 participating teams are:

- **Category 1 (Secondary Schools):** Team S-8 from Yuvabharathi International School with their project titled 'FBI (Farm Beyond Intelligence)'

- **Category 2 (Junior Colleges):** Team J-9 from Yuvabharathi International School with their project titled 'Artificial Intelligence Enabled Urban Vertical Sustainable Farming'

- **Category 3 (Polytechnics and Institution of Technical Education):** Team P-1 from Republic Polytechnic with their project titled 'AI Enabled, Recyclable Waste Processing Smart Bin'

- **Category 4 (Local and Overseas Universities):** Team U-30 from Batangas State University - The National Engineering University with their project titled 'ai-quaponic-360: Intelligent Small-Scale Aquaponic System for the Sustainability and Food Security of Home Urban Farming'

Please refer to the Annex for the champion teams' project descriptions.

"All participating teams of EIC 2022 had the opportunity to embark on an insightful journey to discover the spirit of innovation, build new technical skills in prototyping and product development, and develop presentation and collaboration skills under the mentorship of practising engineers. I would like to congratulate all winning teams and hope that they will keep learning, exploring and inventing, as it is innovators like them who can make the world a better place, one idea at a time," said Ms Jasmine Foo, Chair of NED 2022 Organising Committee.

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Organised annually by IES since 2015, EIC is a nation-wide competition supported by the Ministry of Education (MOE). It provides valuable opportunities for local and international students from secondary schools, junior colleges, the Institute of Technical Education (ITE), polytechnics and universities to gain out-of-textbook experience in developing innovative solutions to address real-life problems, under the guidance of industry mentors. A $100 seed fund will be given to each team under Category 1, 2 and 3 that advances to the final round and a $500 prototype fund will be given to each team under Category 4 that advances to the final round.

EIC is the grand finale of NED 2022, an engineering festival with a rich line-up of talks, workshops and guided tours, that took place from 8 to 19 November 2022. Carrying the theme "**Realising Opportunities for a more Equitable and Sustainable World**", NED 2022 aimed to spotlight the pivotal role of engineering in addressing the needs of underserved communities in the areas of food, security, education, health and more. Through NED, IES aims to increase appreciation of engineers and their contributions to society, inspire young engineers and raise awareness about engineering career opportunities amongst students.

- End -

Notes to Media:

i. Annex

Engineering Innovation Challenge 2022 champion teams' project descriptions

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
Engineering Innovation Challenge	工程创新挑战

iii. 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

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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.

- End -

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Annex - Engineering Innovation Challenge 2022 champion teams' project descriptions

Category 1 – Secondary Schools

Champion Team: S-8

School: Yuvabharathi International School

Project title: FBI (Farm Beyond Intelligence)

AI is commonly being used in multiple agricultural setups today. The team uses AI-enabled IoT sensors to monitor soil health and provides the collected data to the farmers where they can seamlessly access it. The team also integrated an automated irrigator which functions on the basis of the moisture level reading provided by the sensors and rectifies the problem of low moisture.

The team aims to preserve and improve the quality of the soil by giving the soil exactly what it needs at the right time to ensure better crop yield. They also plan to implement an automated fertilizer spray to counter high or low acidic contents of the soil.

The project research is about studying how improved soil conditions can affect quality of the yield. Their prototype monitors soil contents, provides that data to the farmers and based on its readings, automatically waters the soil as per the requirement.

Category 2 – Junior Colleges

Champion Team: J-9

School: Yuvabharathi International School

Project title: Artificial Intelligence Enabled Urban Vertical Sustainable Farming

The project is focused at developing Artificial Intelligence-based closed loop integrated monitoring system for sustainable vertical urban farming that monitors the plant status so that it can provide timely intervention for productive urban farming. The purpose of this automation project is to develop a prototype addressing food production challenges, enhance productivity of plant growth and support the 30 by 30 vision of Singapore. This would save water and incorporating AI will also minimise labour.

Machine learning would be used to predict the growth based on the inputs from the sensor to maximise yields and reduce failure of crops. A higher predicted growth value ensures that the optimal combination of various factors has been provided. It can also explore new factors that are influencing plant growth trends.

The team would also incorporate Internet of Things (IoT) to monitor the plants and to remotely have control. If the plant is in deficient of any factor, it would automatically be recharged with the optimal amounts.

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Category 3– Polytechnics and Institution of Technical Education

Champion Team: P-1

School: Republic Polytechnic

Project title: AI Enabled, Recyclable Waste Processing Smart Bin

The team decided to implement artificial intelligence into their unique smart bin design. They will install an AI-enabled camera in the bin so that it would be able to sort out the recyclable items.

Furthermore, the unique function of the team's product, when compared to existing smart bins, would be that its ability to clean the recyclable items that still have organic waste in them such as soda, food waste or any other organic matters to prevent contamination in the bin.

With regard to sorting recyclables from waste, their design strives to increase workers' efficiency. Users may place both rubbish and recyclables in the trash because their AI-enabled cameras can separate them into many categories. Additionally, this design aids in lowering the rate of contamination in the trash can so that they can recycle more materials.

Category 4 – Local and Overseas Universities

Champion Team: U-30

School: Batangas State University - The National Engineering University

Project title: ai-quaponic-360: Intelligent Small-Scale Aquaponic System for the Sustainability and Food Security of Home Urban Farming

The world is a vastly different place than it was seven years ago when it committed to eradicating hunger and food insecurity as well as promoting sustainable food production. However, according to The State of Food Security and Nutrition in the World, the world is not creating good progress in guaranteeing access to safe, nutritious and adequate food for all people or ensuring sustainable food production systems and implementing resilient agricultural methods.

Hence, this project will highlight the use of intelligent algorithms and optimisation model control to make the aquaponic system more efficient in food production and easier to use.

This project will use AI to develop an aquaponics control system capable of controlling and monitoring all aspects of small-scale production and all degrees of complexity in aquaponics.