



Celebrating 50 Years of Engineering Excellence

Media Release

Thirteen Outstanding Local Engineering Teams Lauded for Exemplary Contributions to Singapore

Acting Minister for Education (Schools) Mr. Ng Chee Meng presented the IES Prestigious Engineering Achievement Awards 2016 at the opening ceremony of the National Engineers Day (NED) 2016

23 July 2016 – The Institution of Engineers, Singapore (IES) honoured 13 engineering teams with the IES Prestigious Engineering Achievement Awards 2016 today, recognising them for their prominent contributions to advancing engineering and enhancing quality of life in Singapore. Mr. Ng Chee Meng, Acting Minister for Education (Schools), bestowed the esteemed awards to the winning teams at the National Engineers Day (NED) 2016 Opening Ceremony at the Toa Payoh HDB Hub Atrium today.

For delivering distinctive impact to the well-being of people and communities, these winners emerged from 26 project submissions that entered into an intensive round of evaluation by a judging panel comprising industry experts.

Hailing from a variety of engineering fields from healthcare and defence to infocommunications and satellite technology, the winning projects exhibited excellence in adopting breakthrough methods in the planning and solving of design problems, inventiveness in use of materials and methods, innovations in planning, design and construction as well as unique aspects and aesthetic values.

The winning projects in the four award categories are:

Applied Research and Development

- A Biophilic Waterway@Punggol – Innovative Floating Wetlands and Freshwater-Tolerant Mangroves by Housing & Development Board (HDB)
- Highly flexible and wearable sensors for real-time healthcare monitoring applications by the National University of Singapore (NUS)
- Innovative LED-based communications and privacy windows for Smart Nation living by Institute of Materials Research and Engineering (IMRE) of A*STAR
- Rapid Diagnosis of sepsis using a plasmonic sensor-based point-of-care system by Temasek Polytechnic, IMRE – A*STAR and Tan Tock Seng Hospital

Engineering Project

- Galassia – NUS first nanosatellite by NUS
- Development of Semakau Landfill (SL) Phase II by National Environment Agency
- Next Generation Data Centre by DSTA

Technology Innovation

- Anti-reflective glass – engineering large surfaces with nano solutions by Wangi Industrial & IMRE – A*STAR
- Large-scale command post systems integration for overseas military exercise – Forging Sabre by Defence Science and Technology Agency (DSTA) and DSO National Laboratories
- Seeing is believing: from microscope to nanoscope by NUS and Singapore University of Technology and Design (SUTD)
- The future of auditing: early detection & prevention of significant trading irregularities by A*STAR, Institute for Infocomm Research (I2R) and Group Audit, DBS Bank Ltd

Young Creators

- Design & development of digital in-vitro fertilisation (IVF) device for oocyte retrieval by Department of Electrical and Computer Engineering of NUS
- Smart White Cane by Engineering Science Programme, Faculty of Engineering of NUS

“The high calibre of this year’s winning projects and the diversity of fields they represent are true reflections of the presence of dynamic, creative and inventive engineering talents in Singapore. We congratulate every one of them and hope that the awards will motivate them to continue to use their ingenuity to transform our lives and

inspire our younger generation to strive to do the same or better,” said Er Edwin Khew, President of IES.

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Notes to media:

i. Annex

Citations – 13 winning projects of IES Prestigious Engineering Achievement Awards 2016

ii. Chinese Glossary

<i>English Terms</i>	<i>Chinese Terms</i>
The Institution of Engineers, Singapore (IES)	新加坡工程师学会
IES Prestigious Engineering Achievement Awards	新加坡工程师学会卓越工程成就奖
National Engineers Day	全国工程师日
Er. Edwin Khew, President of IES	邱德福, 新加坡工程师学会会长

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 Organizations (AFEO) and the Federation of Engineering Institutions of Asia and the Pacific (FEIAP) in promoting goodwill, fellowship and exchange of knowledge 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

IES Prestigious Engineering Achievement Award 2016 – Citations

1. A Biophilic Waterway@Punggol– Innovative Floating Wetlands and Freshwater–Tolerant Mangroves

By: Housing & Development Board

As an Eco–Town, Punggol serves as a living laboratory to test bed new urban solutions, in support of Singapore’s efforts to become a liveable and sustainable city. The Freshwater–tolerant Mangroves and Floating Wetland System are two of the key sustainable innovations that HDB has developed in–house for My Waterway @ Punggol. Besides enhancing greenery, these initiatives also help to improve water quality, stabilize slope embankments and promote biodiversity.

2. Highly flexible and wearable sensors for real–time healthcare monitoring applications

By: National University of Singapore

Researchers from the National University of Singapore have developed highly flexible and wearable tactile sensors using liquid as a novel sensing element. These sensors can be mounted on our skin and used for real–time monitoring of grip strength, hand movement, and even localised foot pressure. Other applications include rehabilitation, prosthetics and robotics.

3. Innovative LED–based communications and privacy windows for Smart Nation living

*By: Institute of Materials Research and Engineering, A*STAR*

IMRE presents a novel LED–based communications and privacy windows for Smart Nation living in a populated urban country like Singapore. In order to help relieve the congested Wi–Fi traffic, the team developed fast switching light emitting diodes with GHz intrinsic speeds for fast visible light communications. The team also developed a new light control technology for a true one–way–view privacy window, which has not been done before.

4. Rapid diagnosis of sepsis using a plasmonic sensor based point–of–care system

*By: Temasek Polytechnic, Institute of Materials Research and Engineering (IMRE) – A*STAR and Tan Tock Seng Hospital*

An automated point–of–care system is developed to reduce the cost and turn–around time of the procalcitonin detection, which helps guide the therapy for infectious diseases such as sepsis. Nanotechnology and microfluidics are incorporated in the point–of–care system to enhance the detection sensitivity using minimum amount of blood. The point–of–care system will take the clinical validation to go to market in the near future to benefit infectious disease patients.

5. Galassia – NUS first nanosatellite

By: National University of Singapore

Nanosatellite Galassia is the first NUS student-centric nanosatellite that was successfully launched on 16th Dec 2015. Galassia features a 2U Cubesat bus design with Passive Magnetic Attitude Control and comprises three scientific mission payloads. Galassia's primary payloads are the Total Electron Content payload (TEC), and a Quantum Science payload from the Centre for Quantum Technologies (CQT). Galassia's secondary payload is an Active Attitude Determination & Control Subsystem payload.

6. Development of Semakau Landfill (SL) Phase II

By: National Environment Agency

Adopting an innovative single-cell design for Phase II Semakau Landfill resulted in significant savings in construction and sand costs as there was no longer a need to build internal sand bunds. This design also increased the landfill's capacity and extended its lifespan. Phase II features two engineering feats: a 200-metre long floating platform and a floating wastewater treatment plant. In order to protect Semakau Island's vibrant ecosystem and rich biodiversity, over 700 colonies of corals in the Phase II lagoon were harvested and transplanted to Sisters' Island.

7. Next Generation Data Centre

By: Defence Science and Technology Agency

DSTA developed the Next Generation Data Centre to be highly resilient, reliable and secure. It incorporated unique features to enhance security and operational efficiency as well as accommodate future growth. This forward-looking modular design adopted by DSTA provided not only flexibility for deployment of new and better technologies, but also prudence for data centre equipping. Technologies such as RFID personnel tracking were used to strengthen security of the centre without stretching limited manpower resources.

8. Anti-reflective glass - Engineering large surfaces with nano solutions

*By: Wangi Industrial & Institute of Materials Research and Engineering (IMRE) - A*STAR*

The anti-reflective glass mimics the compound eye of a moth. With nanoimprinting technologies, nanoscale moth eye lens are engineered onto the glass, creating an anti-reflective glass which gives clearer and brighter images.

9. Large-scale command post systems integration for overseas military exercise - Forging Sabre

By: Defence Science and Technology Agency and DSO National Laboratories

DSTA developed a new Command Post System that has enabled the SAF to strike as one in overseas live-firing exercises. This result was accomplished by integrating diverse sensors and weapon systems to facilitate timely information exchange, and adopting a modular design to accommodate the SAF's wide spectrum of exercises. This approach ensures realistic and challenging training for the SAF.

10. Seeing is believing: from microscope to nanoscope

By: National University of Singapore (NUS) and Singapore University of Technology and Design (SUTD)

Light enables us to capture the beauty of this world. By employing this novel imaging technique, optical resolution of 25 nm, which is far beyond the diffraction limit (~200 nm), can be achieved. Optical microsphere nanoscope extends our vision from current micro-world down to nano-world at our homes, schools, production lines, clinics and laboratories.

11. The future of auditing: early detection & prevention of significant trading irregularities

*By: A*STAR, Institute for Infocomm Research (I2R) and Group Audit, DBS Bank Ltd*

From Nick Leeson to the London Whale, what is evident about rogue traders is the catastrophic financial and reputational impacts of their actions on their banks. In this context, DBS-I2R Joint Lab has developed a data analytics driven solution for the early detection and prevention of trading irregularities. This system now monitors all traders and their key activities at all times, significantly augmenting the bank's surveillance capabilities by detecting irregularities that would have been difficult to identify using traditional methods. Engineered in Singapore, this system has also attracted foreign interest and press coverage.

12. Design & development of digital in-vitro fertilization (IVF) device for oocyte retrieval

By: Department of Electrical and Computer Engineering, National University of Singapore

The innovative medical device is designed and developed to assist doctors in the Oocyte Retrieval (OR) process for in-vitro fertilization (IVF) application leading to potentially higher birth rate in the country. It combines all the required functions (such as aspiration unit, flushing unit and test tube warmer) for OR into a single unit. This device can improve the efficiency and success rate on OR/IVF as well as reduce the cost, which can help the country's low birth rate and also encourage more women to take up IVF channel of production or to have the oocytes frozen for future usage.

13. Smart White Cane

By: Engineering Science Programme, Faculty of Engineering, National University of Singapore

The white cane, used by a visually impaired individual to navigate, does not detect objects of raised heights. Ultrasonic sensors are incorporated at the middle and top of the cane for obstacle detection through vibration feedback. Conductivity sensor on the end tip of the cane adds wet surface detection functionality with sound feedback.