ANNEX

Background info on Intel ISEF 2017

There are 22 scientific categories in Intel International Science and Engineering Fair (Intel ISEF) 2017. Within each category, the following awards are presented - *Best of Category*, *First*, *Second*, *Third* and *Fourth* awards. The top *Best of Category* project will be awarded the *Gordon E. Moore Award,* and selected on the basis of outstanding and innovative research, and potential impact of the work in the field and on the world at large.

For more information on the Intel ISEF, please refer to: https://student.societyforscience.org/intel-isef.

Details of projects submitted by the Singapore team

Students	Project description and Team's Insights
Clara Keng Hui Lin **Chow Kit Mun** (Team) IP Year 6 Raffles Institution and River Valley High School, respectively Won the *Second Award* in the category of Materials Science	**Enhancement of magnetorheological fluids for prosthetic knee applications** Hoping to find a way to make prosthetic knees more flexible, better able to support weight, and have a longer lifespan, Clara and Kit Mun capitalised on highly tunable magnetorheological fluids (MRFs), a class of smart materials, for use in MR prosthetic knees. In successfully optimising MRF composition, their research has the potential to enhance knee function in terms of flexibility, support for weight and device lifespan. They conducted their research under the mentorship of Mr Koh Huan Kiat from DSO National Laboratories. Clara shared that her research journey has motivated her to delve deeper into the fields of science and engineering; and Kit Mun felt that the best thing about Intel ISEF is how it unites students from so many cultural and ethnic backgrounds with an immense passion for scientific research.
Teo York Tiang, Andrea (Individual) Year 5	**Developing a High-Throughput Platform for Drug Toxicity Screening** Andrea developed an automated, sensitive and inexpensive platform to assess the toxicity

Raffles Institution Won the *Fourth Award* in the category of Translational Medical Science and *special awards* from the National Aeronautics and Space Administration and the National Anti-Vivisection Society	effects of drugs on human heart muscle cells. Unlike traditional methods of testing drugs on animals, Andrea's method of using induced pluripotent stem cells is more ethical and humane, not to mention more accurate. Andrea found it interesting to uncover the various real-life applications of our projects and shared that Intel ISEF taught her the importance of communicating science clearly and concisely. She conducted her research under the supervision of Dr Lu Hongfang from the A*STAR Institute of Bioengineering and Nanotechnology (IBN).
Paula Nazarene Evangelista Say (Individual) IP Year 6 National Junior College Won *Fourth Award* in the category of Translational Medical Science	**Label-free Immunosensors for Early and Expeditious Diagnosis of Multi-Organ Failure** On learning that multi-organ failure is the leading cause of death in the Intensive Care Unit, Paula's research presented a novel impedance-based immunosensor that simultaneously detects heart, lung, kidney, and liver failure within 0.5 hour, potentially transforming current inefficient diagnostic methods by offering early, rapid, and more accurate medical diagnosis. Paula developed her sensor under the guidance of Dr Patthara Kongsuphol from the A*STAR Institute of Microelectronics (IME). Paula is extremely thankful to her mentors and teachers for their support throughout her research journey. She is considering setting up a Singapore Intel ISEF alumni to support future Singaporean participants at Intel ISEF.
Belle Sow Miaoer (Individual) Year 6 NUS High School of Mathematics and Science Won *Fourth Award* in the category of Materials Science	**Emergent Properties from WS2 Empowered by Laser Sculpting and Au Nanoparticles Landscaping** Unlike monolayers with concentric fluorescence patterns, bulk layer WS_2 (a 2D nanomaterial) does not fluoresce so it is conventionally deemed not useful. So Belle created a cool nanohybrid WS_2 materialto turn these bulk layers into useful fluorescence materials for optoelectronic and sensing applications. Belle shared that this experience has really motivated her to take up a scientific career in future.

	This project was conducted under the mentorship of Professor Sow Chorng Haur and Dr Lu Junpeng from National University of Singapore.
Lim Hai Leong Shawn **Dominic Yap Wei Ting** **Lim Wei Leong Bryan** (Team) IP Year 5 Hwa Chong Institution Won a *Special Award* presented by King Abdul Aziz & his Companions Foundation for Giftedness and Creativity in the category of Environmental Engineering (Recycling and Waste Management)	**Versatile Usage of Spent Coffee as an Eco-Friendly Water Purifier** The team's research tackled both issues of water purification and waste management. They developed a water purification bag containing carbon and silver nanoparticle adsorbents synthesised in an eco-friendly manner from coffee waste that was effective in removing heavy metal ions as well as bacteria from water. This has potential applications in water purification for disaster relief and domestic use. This school-based research project was done under the guidance of Mrs Sow Yoke Keow from Hwa Chong Institution. The team shared that while their research journey had its ups and downs, the journey had imbued in them the importance of perseverance and sheer determination.
Chan Hsi-Min (Individual) IP Year 4 Raffles Girls' School (Secondary)	**Inexpensive and Accurate Test Kit for Zika: Point-of-Care Diagnostics in 10 Minutes with Paper-Based Serological Flow Device** Under the category of Biomedical Engineering, inexpensive paper-based test kits have been developed for rapid, accurate Zika screening. Zika non-structural protein (NS1) in blood can be detected within 10 minutes with excellent sensitivity and selectivity. The assays are multiplexed to provide simultaneous detection and differentiation of Zika and Dengue NS1. Hsi-Min conducted her research under the mentorship of Dr. Soh Jun Hui from the A*STAR Institute of Bioengineering and Nanotechnology (IBN). Hsi-Min felt that from participating in dialogues to interacting with fellow competitors, and making international friends, Intel ISEF was truly a very meaningful experience.