# INTEL-ISEF 2019 WINNERS

| Full Title of Award | Student | Project |
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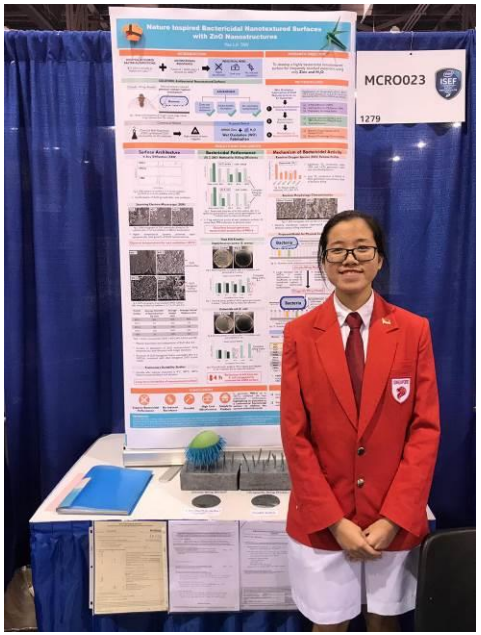
| 3rd Award in the Microbiology Category | **Tan Yee Lin**<br>**(IP Year 6)**<br>National Junior College<br>  | **Nature Inspired Bactericidal Nanotextured Surfaces with ZnO Nanostructures**<br><br>Synthesised a novel antibacterial surface with zinc oxide nanostructures that kills bacteria using a physical rupture mechanism<br><br>Yee Lin's project was inspired by the wings of the Clanger cicada, where she synthesised a novel antibacterial surface that kills bacteria using a physical rupture mechanism, and was fabricated simply by boiling zinc in water. This surface possesses superior bactericidal performance, is highly cost-effective and does not induce additional antimicrobial resistance formation, highlighting its potential to be used on frequently touched exteriors such as hand-railings, door knobs and elevator buttons.<br><br>Through the project, she has learnt about the importance of exploring new possibilities and the key role of creativity in scientific research in order to come up with new discoveries that can make a positive change to the lives of the people around us. |

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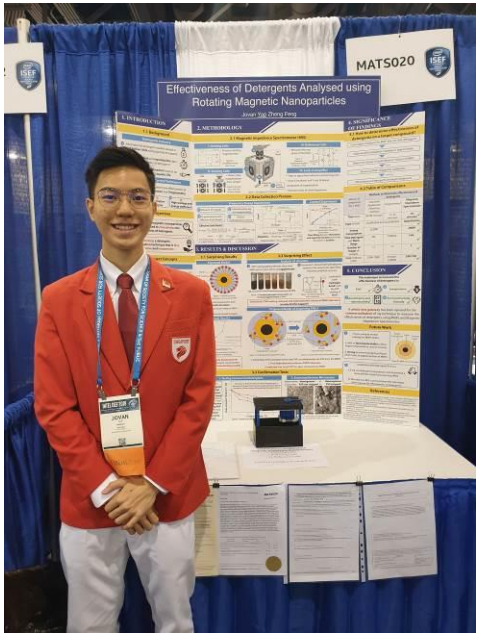
| 3rd Award in the Materials Science Category | **Jovan Yap Zheng Feng**<br>**(IP Year 6)**<br>Dunman High School<br>  | **Effectiveness of Detergents Analysed using Rotating Magnetic Nanoparticles**<br><br>Developed an innovative technique to determine the effectiveness of detergents using rotating magnetic nanoparticles and magnetic impedance spectrometer<br><br>Jovan's project involved the development of an innovative detergent characterisation technique that is environmentally friendly, cheap and fast. This involved mixing magnetic nanoparticles with detergents and placing them in a rotating magnetic field. The breakthrough of this project was the discovery that the strength of detergent could be tested by determining the amount of coating on the magnetic nanoparticles that the detergent has broken down.<br><br>Despite the tough journey of research, Jovan gained personal fulfilment through hard work and determination. He acknowledged that process trumps results, and focused more on gaining insights and personal growth from the experience. |

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| 3rd Award in the Materials Science Category | **Tan Yi Jie, Valerie**<br>**Kwek Zhong Wei, Isaac**<br>**(IP Year 6)**<br>Dunman High School<br>  | **Zinc Oxide-Capped Carbon Nanoforest: Novel Method of Defects Engineering via Focused-Laser-Beam Modification**<br><br>Research on a novel approach of defect-introduction into zinc oxide-capped carbon nanoforest via focused-laser-beam to enhance its field emission properties<br><br>Using a focused laser beam, Isaac and Valerie synthesised a new material by controlling defect-introduction on a zinc oxide-capped carbon nanoforest for the use of field emission. This new material produced a higher current stability and required a lower turn-on voltage than current field emitters which shows potential to reduce costs. To prevent over-heating of this new material, they discovered the synergistic effect of field emission together with photo-enhancement to produce an even higher current.<br><br>Throughout their research journey, Isaac and Valerie felt privileged to be mentored by passionate and experienced scientists, and connected with many inspirational and amazing individuals with common love for science. They felt that the process was undoubtedly mentally, emotionally and spiritually fulfilling. |

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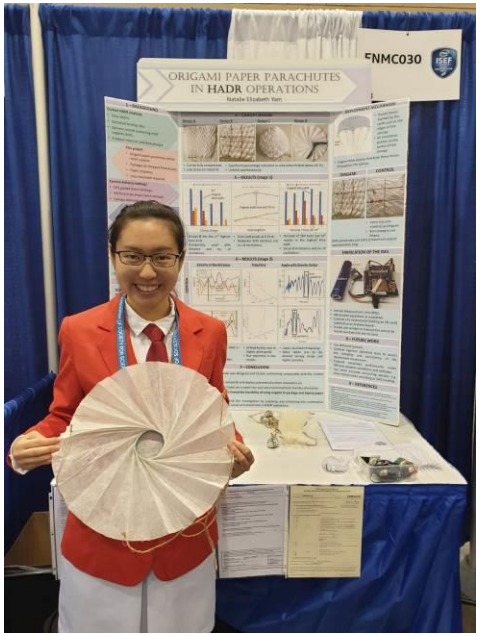
| 4th Award in the Engineering Mechanics Category | **Natalie Elizabeth Yam**<br>(Individual)<br>IP Year 6<br>Anglo-Chinese School (Independent)<br>  | **Origami Paper Parachutes in HADR Operations**<br><br>Designed and tested origami paper parachutes for use in humanitarian aid and disaster relief operations<br><br>Natalie designed and tested origami paper parachutes for use in humanitarian aid and disaster relief operations. Through experimentation, her origami paper parachute showed potential as a viable alternative to conventional parachutes that are non-biodegradable.<br><br>Through the project, she learnt to enjoy the process of discovery instead of being fixated on getting results. She also learnt the value of perseverance in the face of failure. |

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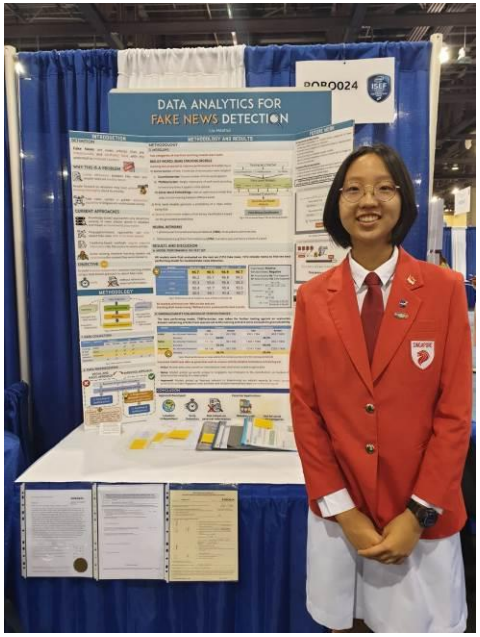
| 4th Award in the Robotics and Intelligent Machines Category | **Liu Haohui**<br>**(IP Year 5)**<br>Raffles Institution<br>  | **Data Analytics for Fake News Detection**<br><br>Developed an effective machine-learning approach to detect fake-news which is location-independent and able to detect fake news early, requiring only the text of the article<br><br>In order to combat the rise of fake news, Haohui developed a machine-learning approach of detecting fake news early and with high accuracy. Regardless of the source of news, this approach analyses the text of the article directly to determine if it is real or fake.<br><br>Haohui had a lot of fun doing this project as she learnt how to apply machine learning techniques to solve real world problems. She enjoyed the self-directed learning process through utilising online resources to solve problems that she encountered. |

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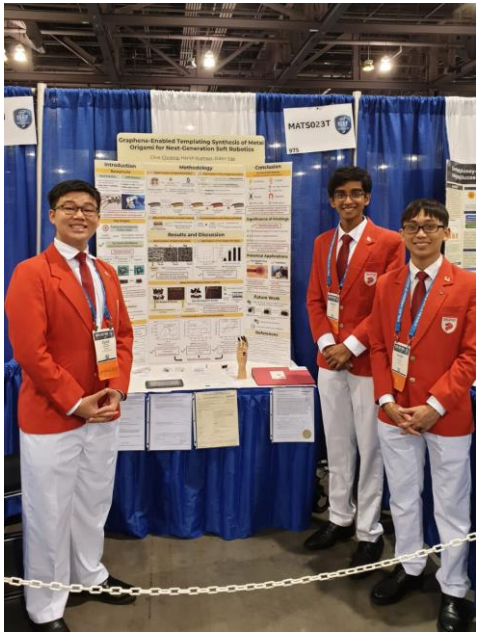
| 4th Award in the Materials Science Category | **Clive Choong**<br>**Harish Kumaar S/O Tamil Selvan**<br>**Yap Yi Tern, Elden**<br>**(IP Year 6)**<br>NUS High School of Mathematics and Science<br>  | **Graphene-Enabled Templating Synthesis of Metal Origami for Next-Generation Soft Robotics**<br><br>Developed a graphene-enabled origami-templated synthesis to produce a novel platinum-carbon composite material for soft robotics that is simultaneously flexible, conductive, durable and magnetic<br><br>Soft robotics has the potential to revolutionize the field of prosthetics. Current soft robots can be bulky and inefficient since they require many separate components to be installed.<br><br>To address this issue, Clive, Harish and Elden successfully developed a novel material for soft robotics that is simultaneously flexible, conductive, durable & magnetic; and thus has the potential to move, sense and communicate.<br><br>They learnt that teamwork is necessary to overcome the challenges faced along their journey of discovery. Overall, their learning through research was more meaningful than the final result, as the experiences and connections they made with people live on and continue to aid them in the future. |