

Background info on Regeneron ISEF 2021

There are 21 scientific categories in Regeneron ISEF 2021. Within each category, awards were presented to the top four projects. In addition, the ISEF Special Awards were presented by various supporting organisations that represent a wide variety of scientific disciplines. For more information on the Regeneron ISEF, please refer to: <https://www.societyforscience.org/isef/>

Details of projects submitted by the Singapore team

S/N	Students	Project Description and Team's Insights
1.	<p>Celyn Chng Tay Li Ann Low Iing (Team) IP Year 5 Raffles Institution</p>	<p>Supplementation of <i>Lactobacillus casei</i> reduces B-amyloid accumulation in Alzheimer <i>Drosophila melanogaster</i></p> <p>Celyn, Li Ann, and Low Iing were inspired to discover new treatments for Alzheimer's disease when they chanced upon <i>Lactobacillus casei</i> (<i>L. casei</i>). Based on their research, <i>L. casei</i>, which is low in cost, has the possibility to treat the root cause of Alzheimer's. Hence, it is a potentially promising method to treat patients suffering from this disease.</p> <p>Through the project, they learned of the importance of teamwork and trust. It was through their teammates' support and encouragement that they managed to step out of their comfort zones when doing the research project.</p>
2.	<p>Lim Dillion Ho Shanley Bryan Lee Chong Han (Team) IP Year 5 Hwa Chong Institution</p>	<p>Intricate Study of Hydrothermally-Synthesised Hexagonal $K_2W_4O_{13}$ Nanowires for the Adsorption and Photodegradation of Organic Dyes and Heavy Metal Ions</p> <p>Dillion, Bryan, and Shanley's project involved the synthesis of Potassium Tungstate Nanowires to remove water pollutants. Their one-pot and hydrothermal synthesis technique is environmentally-friendly, cheap, and fast.</p>

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		<p>The breakthrough of this project was the discovery that the Potassium Tungstate nanowires had dual properties – the ability to adsorb pollutants and photodegrade dyes.</p> <p>Their research journey had been an exciting one. While they struggled with the research during the COVID-19 pandemic, they managed to overcome the odds in completing the research project. They are especially thankful to their mentor Mrs Sow-Peh Yoke Keow for her constant support and guidance, acknowledging that they would not have come this far without her.</p>
3.	<p>Shen Lingbo (Individual) IP Year 6 National Junior College</p>	<p>Novel Coating of Porous Cu as Heat Pipe for thermal management</p> <p>Lingbo's project deals with the problem of overheating in electronic devices which could potentially cause damage to fragile electrical components. For the first time through this project, a multilayered porous copper structure was synthesised by electrodeposition, functioning as capillary wicks in heat pipes. This material demonstrates superior characteristics including high porosity, great capillarity and structural integrity which can greatly facilitate cooling actions. Its fabrication method, electroplating, is environmentally-friendly, time-efficient, and cost-effective, and hence will be promising in industrial settings.</p> <p>From the research journey, Lingbo learned the importance of several transferable skills, especially communication skills which are crucial for the delivery of scientific findings. She also learnt the value of adaptability, open-mindedness and perseverance when conducting scientific research.</p>
4.	<p>Nathaniel Tan Xin Rui (Individual) IP Year 6 Raffles Institution</p>	<p>Liar Liar Pants on Fire: A Computer Vision Approach to Deception Detection</p> <p>Lie detection has been a subject of interest of late due to the potentially severe repercussions that false statements have on society. For example, the harm from a false testimony can be significant and potentially lead to an innocent person</p>

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		<p>being convicted and incarcerated, while allowing a guilty person to be freed. Nathaniel's project uses computer vision and machine learning to detect deception in high-stakes situations, such as testifying in court and during police investigations, through the facial characteristics of the subject.</p> <p>Through this journey, Nathaniel learned the importance of independence and perseverance when facing challenges. At the ISEF 2021, Nathaniel enjoyed meeting people from all over the world, who shared similar interests in wanting to improve the world through science.</p>
5.	<p>Huang Huiyan (Individual) IP Year 6 Hwa Chong Institution</p>	<p>Wearable Strain Sensors with Silver Nanowires for Health Monitoring</p> <p>Huiyan's project aims to fabricate kirigami-patterned wearable strain sensors for long-term human health monitoring. He systematically optimised the silver nanowire synthesis process, producing long silver nanowires to create strain sensors with high stretch ability, stability, and sensitivity. These strain sensors have been applied on the human hand, and have been proven to allow muscle rehabilitation and wound healing.</p> <p>Through the project, Huiyan learned the importance of resilience in bouncing back from setbacks.</p>

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6.	<p>Jishnu Talukdar (Individual) IP Year 6 Anglo-Chinese School (Independent)</p>	<p>Novel Open Time to Event model for low-cost and long-term marine population abundance estimates from remote underwater video stations</p> <p>Having observed a lack of marine population size and distribution data to come up with efficient conservation strategies, Jishnu developed a low-cost method to obtain full open fish population estimates using only cameras and his probability model.</p> <p>Jishnu described his experience participating in the ISEF 2021 as “beyond thrilling”. Apart from having the opportunity to speak to experienced scientists and entrepreneurs, he also enjoyed interacting with like-minded individuals who were passionate in science.</p>