Annex A

Details of Projects submitted by the Singapore Delegation

S/N	Students	Project description and Team's Insights
1	**Name:** Ang Gedeon Kusuma (洪義禎) **School:** Raffles Institution **Level:** JC 1	**SMART (Sustainable, Modular, Additively-manufactured, Robust, Tower-style) Urban Farming** Food security and sustainability is becoming a major problem due to rapid urbanisation. Hence, Gedeon developed a highly space-efficient urban farming system for installation in homes and offices, using the strengths of additive manufacturing and innovative design, to help solve food security and sustainability issues in space-scarce nations like Singapore. ISEF 2024 was an enriching and unforgettable experience for Gedeon. He is honoured and grateful to have the opportunity to present his project at this platform, and found it meaningful to interact, learn, and be inspired by the judges and talented delegates from around the world.
2	**Name:** Cai Junxiang (蔡军翔) **School:** National Junior College **Level:** JC 2 **Name:** Aidan Ong (王泓凯) **School:** Hwa Chong Institution **Level:** JC 2	**State Space Models Are All You Need** Sequence modelling, used in fields such as natural language processing, is becoming increasingly common. However, current approaches are extremely computationally inefficient. Thus, Junxiang and Aidan sought to introduce new models to perform sequence modelling more accurately and efficiently computationally than other approaches. This project stemmed from Junxiang and Aidan's interest in state space models during their secondary school years, when they were from the same secondary school. They wanted to improve the architectures of state space models to better fit their specific workloads, and were encouraged to submit their project to the Singapore Science and Engineering Fair upon sharing their findings with their teachers.

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		Reflecting on their experience at ISEF 2024, Junxiang and Aidan are deeply grateful for the opportunity to represent Singapore on the international stage. They appreciated the opportunity to showcase their research and learn from fellow innovators, and they believe that this experience has profoundly enriched their understanding and passion for science. They are thankful to their mentors, family, and friends for their invaluable guidance and support throughout this journey.
3	**Name:** Lim Wan Qin (林宛亲) **School:** Hwa Chong Institution **Level:** JC 2	**Atomically Yours: Novel DeepGraphDTI Takes Fight Against Future Pandemics to the Next Level** There is an urgent need to find a cure for the deadly Nipah Virus, which has caused outbreaks around the world due to its high pandemic potential. To accelerate this process, Wan Qin used a deep learning drug discovery model to identify seven potential inhibitors, and she discovered that encoding protein atoms instead of residues enhanced model performance. During ISEF 2024, Wan Qin was inspired by the passion and creativity of delegates from all over the world. She is thankful to her parents, mentors, and friends who have made her research journey enriching and enjoyable.
4	**Name:** Martin Koh Zhen Xuan (许振旋) **School:** NUS High School of Math and Science **Level:** Year 6	**Precession, Nutation and Dynamic Trajectory of a Magnetic Rod in an Axisymmetric Magnetic Field** When a magnetic rod dangled beneath an acrylic plate with another magnet placed on top is given an initial angular velocity, the rod exhibits unique trajectories. Martin's project aims to investigate this motion both theoretically and experimentally, which may eventually aid in the development of a low-cost, environmentally friendly centrifuge. ISEF 2024 was an eye-opening experience for Martin. He enjoyed learning about other delegates' work and sharing his work with experts. He is grateful for this invaluable experience, and would like to thank everyone that made his research journey fun and meaningful.

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5	**Name:** Wu Jiaqi (吴家齐) **School:** NUS High School of Maths and Science **Level:** Year 6	**STEPs Ahead: Self-Powered TriboElectric Nanogenerator for Dynamic Multidirectional Pressure Sensing** Seeking to address the paucity of high-sensitivity pressure sensors available for biomedical applications, Jiaqi developed the self-powered triboelectric nanogenerator (TENG) based pressure sensor (STEPs). STEPs is fabricated with a simplified and scalable process while achieving high sensitivity through the use of optimal morphology and dopant content. Along with other features such as wireless multidirectional sensing properties, STEPs positions itself as an advancement over current technologies. ISEF 2024 was an enriching experience and allowed Jiaqi to learn from experts in related fields. He is grateful for this opportunity, and is inspired to further his research to contribute to the scientific community.
6	**Name:** Yin Yue (殷悦) **School:** Raffles Institution **Level:** JC 2 **Name:** Aseera Jannath (அசீரா ஜன்னத்) **School:** Raffles Institution **Level:** JC 2	**Haema-Lights: Facile Method of Site-Selective Synthesis of Fluorescent Ag-Fe_2O_3 Nanocomposites for Optical Electron Detection** Silver-iron oxide nanocomposites are prized for their catalytic and antimicrobial properties. However, as traditional methods of synthesis can be very expensive and time-consuming, Yin Yue and Aseera investigated a cheaper yet effective method of synthesising these nanocomposites using a hotplate and laser. Through ISEF 2024, not only did they learn scientific communication skills, but Yin Yue and Aseera also had the opportunity to engage with people with diverse interests in scientific fields, and were inspired by their immense passion for STEM.