Singapore Science and Engineering Fair 2022 Awards

S/N	Project ID	Project Title
GOLD AWARDS	
1	BE004	Calcium Phosphate/Collagen Ratio in Bone Grafts Influences Bone Repair in a Rabbit Tibial Defect Model
2	BE007	Minimally Invasive Annuloplasty using Shape Memory Materials
3	BM026	Machine-learning Approach to Predicting TDP43, Amyloid and Tau Neuropathology, to Aid in the Detection and Differentiation of LATE from Alzheimer's Disease
4	CB008	The Spike Protein of SARS-CoV-2 Targets the Human PRL Oncogene
5	CB009	Turning the TCA Cycle Backwards to Repair Damaged DNA
6	CH001	An Investigation into Super Hygroscopic Composite Films and their Applications
7	CH012	Fabrication and Evaluation of Solid-State Ion-Selective Electrodes for pH Measurement
8	CH022	NDDO Methods Revisited: Parameter Optimization and Theoretical Improvements
9	CO002	QSAR modelling of the activity of anti-colorectal cancer agents featuring quantum chemical predictors and interaction terms
10	EE006	3D design and construction of a microbubble generator and its application in the electro-Fenton process
11	EE025	Investigating the Bioelectric Effect for Treatment and Subsequent Inhibition of Nosocomial Biofilms
12	ET007	A Cost-Effective and Accessible Construction of Ground Station for Cubesat Applications
13	MA026	Crossing number of join product of some graphs
14	MA028	The Moon and the Sixpence
15	MI009	Effectiveness of different mouthwash agents and herb extracts in inhibition of Streptococcus mutans biofilm
16	MS005	Styling of Biofluorescence in Fish Scales
17	MS013	"Sotong"-nidin: the detection of squid spoilage using red cabbage extract
18	MS014	Interface Engineering of MOF-derived MnOx/Ni as an Efficient Bifunctional Electrocatalyst
19	PH002	Designing Arbitrary Non-Hermitian Hamiltonian Spectra via Electrostatic Conformal Maps
20	PH021	Effect of magnetic anisotropy on spin current driven magnetization auto-oscillation
21	PH025	The physics of a bead rolling on a rotating hoop - a problem in nonlinear dynamics
22	PH030	Design of cost-effective metasurface for efficient broadband polarisation conversion

Singapore Science and Engineering Fair 2022 Awards

	GOLD AWARDS	
S/N	**Project ID**	**Project Title**
23	PS013	Effect of different NPK ratios on the mass and chlorophyll content of the Kang Kong plant
24	RO002	PaRT: Parallel Learning Towards Robust and Transparent AI
25	RO011	Anti-virus Autobots: Predicting Deadlier Virus Variants for Pandemic Prevention through Deep Learning

	SILVER AWARDS	
S/N	**Project ID**	**Project Title**
1	AS001	Investigating the Toxic Effects of Allicin on Insects as a Potential Alternative to Synthetic Insecticides
2	BI006	Engineering ticks and mosquitos' salivary peptides into potent and uncleavable hybrid thrombin inhibitor
3	BM004	Novel analysis of the spectrum and pathogenicity of TTN genetic variants in neuromuscular disorders and cardiomyopathies
4	BM006	The role of kisspeptin in regulating macronutrient consumption in the zebrafish model
5	BM022	Discrimination of Extra Virgin Olive Oil Adulteration Using Non-Destructive Capacitance Methods
6	BM023	Investigation of effects of YWHAB gene on colorectal cancer cell growth
7	CH011	Developing Copper(II) Ion Sensors based on Localised Surface Plasmon Resonance and Fluorescence Spectroscopy
8	CH017	Formation and stability of gelatin tannic-acid multilayers
9	CH020	Artificial Metalloenzymes by Creation of Novel Catalytic Sites in DNA Scaffolds
10	CH031	Investigating the relationship between pH and the stability of oil-in-water emulsions with soy lecithin with Critical Coagulation Concentration of Potassium Chloride added via salt titration, and conductivity-derived emulsion stability
11	CH032	Continuous Flow Synthesis for rapid access of Active Pharmaceutical Ingredients
12	CO010	Automated Classification and Identification of Literature on Functional SARS-CoV-2 Spike Protein Mutations using Natural Language Processing and Machine Learning
13	EA006	Eikonal equation -based grid search method for precise earthquake location
14	EA007	Detection of ions in water through contact electrification at water-polymer interface
15	EE012	Heterotrophic cultivation of microalgae in food waste digestate for simultaneous biomass production and nutrient remediation
16	EE015	Effects of Organometallic Zinc Catalysts on the Conversion of CO_2 and Epoxide into Cyclic Carbonate
17	EE022	Production of Proteins from agricultural wastewater using algae Chlorella

Singapore Science and Engineering Fair 2022 Awards

	SILVER AWARDS	
S/N	**Project ID**	**Project Title**
18	EE024	Development of an autonomous solar powered atmospheric water generator
19	EE027	Water Quality Analysis by Precision Ellipsometry
20	ES006	Data Integrity Detection in Wearable IoT Devices for Cardiac Monitoring
21	ES011	Information Gathering by Passive SONAR
22	ES025	Solving the Rubik's Cube with Robot Operating System, Lego and Raspberry Pi
23	MA002	On elliptic curves of the form $y^2=x^3+Ax+t^2$
24	MA010	Core Allocations for Vaccine Cooperation of Interacting Countries
25	MA013	Modelling of Taxi Driver's Decision Making and Its Application on Optimising Changi Airport Taxi Management System
26	MI014	Investigating Singapore's environment for phages that attack Mycobacteria Fortuitum bacteria
27	MS030	Edible microcapsules from natural precursors
28	PH001	Quantum Transport in Topological Semimetal Tunnelling Nanostructure
29	PH018	The Use of Rayleigh Disk as a Sound Intensity Meter
30	PS009	Comparison of autotrophic and mixotrophic cultivation of Chlorella Sorokiniana based on biomass productivity, lipid productivity, and protein productivity
31	RO003	Manga Layout Analysis via Deep Learning
32	RO024	Adversarial Attacks Against Detecting Bot Generated Text
33	RO030	Virtual Arm with Multimodal Biased feedback for Improving EEG Motor Imagery Calibration Training

	BRONZE AWARDS	
S/N	**Project ID**	**Project Title**
1	AS003	Transcriptomic Analysis of the Hypothalamus Loci Involved in Appetite Control
2	BH005	The study of Covid-19 vaccine awareness, concerns and hesitancy among the 16-20 year old students in Singapore
3	BH020	EEG-based assessment of the influence of music-induced emotions on cognitive task performance
4	BI003	Enzyme activity assay development for sustainable bio-manufacturing
5	BM002	Dietary patterns and nutritional intake among severely obese children with varying metabolic phenotypes

Singapore Science and Engineering Fair 2022 Awards

S/N	Project ID	Project Title
BRONZE AWARDS		
6	BM008	Sustainable Nanofibrous Scaffold for Dental Tissue Engineering
7	BM010	Utilising an unsupervised machine learning approach to identify atopic dermatitis trajectories in the first 8 years of life in the GUSTO cohort
8	BM016	The significant impact of genetic variants on plasma lipoprotein(a) concentration, which is associated with coronary artery disease and its severity in the Singaporean population
9	BM028	Effects of repeated cycles of sleep curtailment and recovery on glucose tolerance and insulin sensitivity
10	CB001	Characterization of Mitochondrial Permeability Transition Pore Components
11	CB006	CRISPR-deaminase-mediated multiplex genome editing for enhanced microbial biochemical production
12	CH015	Characterization of Pomelo and Grapefruit Peel Biochars Synthesized under Low Temperature and Air Atmosphere in Removal of Pb(II), Cu(II) and Microplastics
13	CH019	Enzyme Activity Assay Development for Sustainable Bio-manufacturing
14	CH034	Photocatalytic Degradation of Pharmaceutical Pollutants by Radical Polymer
15	CO012	Using machine learning to train a model that is capable of identifying the amphibians belonging to the Hylidae family based on their advertisement calls
16	CO014	Deep Learning based cardiac ventricle segmentation using Cardiac Magnetic Resonance (CMR) Scans
17	ES021	HeatScout: Near-eye Display for Hot Object Detection
18	ET012	Investigation of Flow Resistance and Blast Propagation through Ventilation Pathways
19	ET023	Coolish Housing: Maximising natural ventilation for sustainable living in established HDB units
20	EY005	Power Supply System for Smart Contact Lens
21	EY016	Carbonised broccoli for solar steam generation of seawater
22	MA029	Mathematical modelling of dengue fever in the 2020 lockdown break
23	MA034	Investigation of Machin-like Formulas
24	MS011	Investigation of liquid polyurethane viscosity on surface glossiness and heat retention capabilities when hardened
25	MS027	Unusual Irreversible Behavior of Low-Voltage Electrowetting on Si-TiOx-Silane Substrate
26	MS028	Development of a 3D-Printable Hydrogel-based Antimicrobial Film
27	PH008	An Investigation on the aerodynamics of flight of a hand helicopter

Singapore Science and Engineering Fair 2022 Awards

	BRONZE AWARDS	
S/N	**Project ID**	**Project Title**
28	PH012	The Rebounding Capsule: A Novel Hertzian Contact Approach to the Collision of Rotating Bodies
29	PH013	Investigation of properties of patterned dielectric superlattice using computational methods
30	PH032	Simulating Plasma Fusion in Magnetic Mirror and Tokamak
31	PS011	Extracting cellulose from commonly consumed and wasted asian vegetables
32	RO021	Examining the impact of COVID-19 pandemic on personal mobility sharing: a machine learning approach
33	RO043	Deceiving Traffic Sign Recognition with Physical One-Pixel Attacks
34	RO047	Identification of Mosquito Larvae in Drains using Deep Learning
35	TM002	Analysis of Chemical Transport by iPSC-derived Proximal Tubular Cell (PTC)-like cells and other Emerging Human Kidney Cell Models for Nephrotoxicity Testing

	MERIT AWARDS	
S/N	**Project ID**	**Project Title**
1	BE008	Detection and classification of chromosomal mutations in metaphases for radiation damage
2	BE009	Fabrication of Multi-Layer Tubular Structures for Vascular Graft Application via 3D-Bioprinting
3	BH012	Investigating the role of emotions in moral judgement and reasoning
4	BH016	Effectiveness of videos and infographics on education of lower back pain
5	BM021	Quantification of butyrates in locally-produced vegetables using High-Performance Liquid Chromatography (HPLC)
6	CH014	Chalcone-ligated molybdenum carbonyl complexes: Synthesis, cytotoxicity and quadruplex DNA binding studies
7	CH026	Determination of Eu^{3+} and Tb^{3+} Concentrations in SiO_2 Films Embedded with ZnO Nanocrystals to Produce Desired Light
8	EE023	Strength Of Detergents Analyzed By Precision Ellipsometry
9	EE028	Intricate studies of Citric Acid coated Bismuth Sulfide Nanoparticles for the removal of Organic dyes and Heavy Metal Ions
10	ES005	Research on the effects of microclimate on emotion and health
11	ES007	Water Rectenna
12	ES017	Project UltraCount: Design and Implementation of an Integrated System for Real-time Pedestrian Monitoring with Ultrasonic Sensors

Singapore Science and Engineering Fair 2022 Awards

	MERIT AWARDS	
S/N	**Project ID**	**Project Title**
13	ES028	NUSHSat (Payload)
14	ET008	Behaviour of Sustainable Recycled Aggregate Concrete Structures
15	ET014	Design & Development of Delta Wing with Loitering Capability
16	EY017	Analysis of a Two-Terminal All Perovskite Tandem Solar Cell through Neutral Network-based Application
17	MA005	Application of Queueing Theory to a School Canteen Stall: A study of the Chinese Delights Stall
18	MA006	Basic Properties of Incomplete Hurwitz-Euler Eta Function
19	MA035	Investigating the Optimal Conditions of the Pirouette's Preparation Stage
20	MI013	Investigation on effectiveness of different types of solvents to extract out antibacterial compounds in garlic against Escherichia coli strain K12
21	MI020	Determining Effects of Urea on the Structure of Dengue Virus Serotype 2 using Fluorescence Spectroscopy
22	MS003	Developing a modelling tool for hydrothermal deposition of Yttrium-Stabilized Zirconia (YSZ) thin films
23	MS015	Hybrid TCO-Silver Metasurfaces for High Visible Transmittance and Selective Near Infrared Reflection
24	MS018	Development of optical models for managing light in modern agritech
25	MS021	3D printed acoustic metamaterial for noise mitigation
26	MS022	Optimisation of anodisation of aluminium by electrolysis
27	PH004	Numerical Analysis of Heat Equation Governing Fusing of a Straight Wire
28	PH027	Investigating the dynamic movement of liquid droplets on a moving plane
29	PS014	Effects of Antioxidant Levels Present in Compost of Food Waste
30	RO016	Artificial intelligence analysis of thyroid ultrasound images for early cancer detection and risk management
31	RO034	Automated AI Based Segmentation of Neuroblastoma
32	RO035	Investigation of Data Augmentation Techniques on the Performance of Autonomous Robots
33	RO041	LEARNING POLICIES THROUGH MONTE CARLO TREE SEARCH TO FIND UNSAT CORES
34	RO046	Multimodal Sentiment Analysis of Memes
35	SS011	Python-based X-ray CT Data Visualisation Tool

Singapore Science and Engineering Fair 2022 Awards

MERIT AWARDS		
S/N	**Project ID**	**Project Title**
36	SS013	Can computers understand Singlish?
37	SS031	Geolocation of street view images

Singapore Science and Engineering Fair 2022 Awards

SSEF SPECIAL AWARDS		
Special Award	**Project ID**	**Project Title**
Electrochemical Society, Singapore Chapter (ECS) Special Award	EY002	Comparing the Effect of Different Yeasts on Microbial Fuel Cell Performance
	EY007	Investigating use of Electron Mediators from Herbal Plants in Microbial Fuel Cells
	EY010	Designing a Solar Powered Evaporative Cooling System for Outdoor Spaces
Institution of Chemical Engineers (IChemE) Singapore Award	EY005	Power Supply System for Smart Contact Lens
	EY010	Designing a Solar Powered Evaporative Cooling System for Outdoor Spaces
	EY016	Carbonised broccoli for solar steam generation of seawater
James Dyson Foundation (JDF) Design Engineering Award	CH019	Enzyme Activity Assay Development for Sustainable Bio-manufacturing
	ET008	Behaviour of Sustainable Recycled Aggregate Concrete Structures
L'Oréal Special Award for Innovation in Sustainability	EE028	Intricate studies of Citric Acid coated Bismuth Sulfide Nanoparticles for the removal of Organic dyes and Heavy Metal Ions
L'Oréal Special Award for Innovation in Dermatology and Cosmetology	CB002	Evaluation of Antimicrobial, Radical-Scavenging and Toxicity properties of Heliconia psittacorum and the development of a green and topical delivery method for it
The Institution of Engineers, Singapore (IES) Special Award	ES013	Un-slippers: Fall Prevention and Detection for the Aged
	ES017	Project UltraCount: Design and Implementation of an Integrated System for Real-time Pedestrian Monitoring with Ultrasonic Sensors
Singapore Association for the Advancement of Science (SAAS) Special Award for Science Communication	BI006	Engineering ticks and mosquitos' salivary peptides into potent and uncleavable hybrid thrombin inhibitor
	BM026	Machine-learning Approach to Predicting TDP43, Amyloid and Tau Neuropathology, to Aid in the Detection and Differentiation of LATE from Alzheimer's Disease
	CB007	Single Cell Immune Profiling for Allergic Rhinitis gene candidates and pathways
	CH021	Chemically functionalized cellulose for micro- and nanoplastics removal from water
	EA006	Eikonal equation -based grid search method for precise earthquake location
	EE022	Production of Proteins from agricultural wastewater using algae Chlorella

	ET023	Coolish Housing: Maximising natural ventilation for sustainable living in established HDB units

Singapore Science and Engineering Fair 2022 Awards

SSEF SPECIAL AWARDS		
Organisation	**Project ID**	**Project Title**
Singapore Association for the Advancement of Science (SAAS) Special Award for Science Communication	EY016	Carbonised broccoli for solar steam generation of seawater
	MA026	Crossing number of join product of some graphs
	MI014	Investigating Singapore's environment for phages that attack Mycobacteria Fortuitum bacteria
	MS005	Styling of Biofluorescence in Fish Scales
	PH011	Scintillation-Based Detectors For High-Accuracy Proton Beam Characterisation
	PS019	Effect of the type of pond water in the growth of Kang Kong
	RO011	Anti-virus Autobots: Predicting Deadlier Virus Variants for Pandemic Prevention through Deep Learning
	TM004	Genetic variability of Survival Motor Neuron (SMN) genes in Spinal Muscular Atrophy (SMA): unusual observations among Singapore cohorts
Singapore Mathematics Society Award for Ingenuity	MA002	On elliptic curves of the form $y^2=x^3+Ax+t^2$
	MA026	Crossing number of join product of some graphs
	MA034	Investigation of Machin-like Formulas
Singapore Society for Microbiology and Biotechnology (SSMB) Special Award	MI009	Effectiveness of different mouthwash agents and herb extracts in inhibition of Streptococcus mutans biofilm
SUTD R&I Award: Artificial Intelligence	RO002	PaRT: Parallel Learning Towards Robust and Transparent AI
	RO025	A Dataset Generation Algorithm to Improve Meta-learning over Random Forest Models
SUTD R&I Award: Aviation	ET014	Design & Development of Delta Wing with Loitering Capability
	ES026	Communication Antenna Design On A Portable Device
SUTD R&I Award: Cities	EE024	Development of an autonomous solar powered atmospheric water generator
	MS021	3D printed acoustic metamaterial for noise mitigation
SUTD R&I Award: Healthcare	RO006	D-Pen - Personalised Practice with Assistive Pen for Young Dyslexic Learners using Machine Learning
	BE007	Minimally Invasive Annuloplasty using Shape Memory Materials

Singapore Science and Engineering Fair 2022 Awards

SSEF SPECIAL AWARDS		
Organisation	**Project ID**	**Project Title**
SUTD R&I Award: Multi-Disciplinary	ES011	Information Gathering by Passive SONAR
	EE026	Bubbleless Ozonation of Organic pollutants in wastewater
SUTD R&I Award: Sustainability	CH021	Chemically functionalized cellulose for micro- and nanoplastics removal from water
	EY010	Designing a Solar Powered Evaporative Cooling System for Outdoor Spaces
Yale-NUS College Special Award	CH014	Chalcone-ligated molybdenum carbonyl complexes: Synthesis, cytotoxicity and quadruplex DNA binding studies
	CH031	Investigating the relationship between pH and the stability of oil-in-water emulsions with soy lecithin with Critical Coagulation Concentration of Potassium Chloride added via salt titration, and conductivity-derived emulsion stability
	CO013	Modelling Singapore's Covid pandemic using Hybrid AI, Causal, and SEIRQV models
	EE013	Removal of copper and microspheres from wastewater using electrocoagulation
	MA020	Light Links
	MA032	Investigating the Process of Adding Knots when a Bacteriophage Injects Tangled DNA into a Bacterium.
	MA034	Investigation of Machin-like Formulas
	PH004	Numerical Analysis of Heat Equation Governing Fusing of a Straight Wire
	PH012	The Rebounding Capsule: A Novel Hertzian Contact Approach to the Collision of Rotating Bodies
	PH025	The physics of a bead rolling on a rotating hoop - a problem in nonlinear dynamics