

The 2022 Hawaii State Science & Engineering Fair

SR Division Best in Category

SR – ANIMAL SCIENCES (ANIM)		
1ST Place	Kellen A. Kamehameha Schools, Kapālama	ANIM-0077 Population Status and Monitoring of the Red-Crowned Parrot (<i>Amazona viridgenalis</i>) on O‘ahu, Hawai‘i
2ND Place	Makayla K. / Rachel C. Kauai High School	ANIM-0335 An Analysis of Soil Chemistry in the <i>Teleogryllus Oceanicus</i> (Insecta; Orthoptera) Habitat
3RD Place	Caleb H. Kahuku High & Intermediate School	ANIM-0367 Endemic Birds in the Koolau Mountains

SR – BEHAVIORAL & SOCIAL SCIENCES (BEHA)		
1ST Place	Amara M. Kamehameha Schools, Kapālama	BEHA-0068 Characterizing Nephrogenic Toxicity of Lithium as a Side Effect of Treatment for Bipolar Disorder
2ND Place	Megan I. ‘Iolani School	BEHA-0414 Researching the Effect of Therapy Dogs on Stress Levels in College Preparatory Students
3RD Place	Leah T. Waipahu High School	BEHA-0153 Stepping Up Health Through Dance

SR – BIOCHEMISTRY (BCHM)		
1ST Place	Jingjing W. ‘Iolani School	BCHM-0301 LuxI/LuxR-Type Quorum Sensing System in K61, <i>Dickeya</i> species Novel: Growth and Acyl Homoserine Lactone Production in MgSO ₄ -Rich Brine
2ND Place	Rovialyn A. / Michaela H. Waipahu High School	BCHM-0246 Analyzing the Effectiveness of <i>Tetraselmis Suecica</i> on <i>Escherichia Coli</i>
3RD Place	Maya O. Hilo High School	BCHM-0063 Examining the Effectiveness of Organic <i>Curcuma caesia</i> and <i>Curcuma longa</i> (Turmeric) Powder on Drug Resistant Neuroblastoma Cancer Cells

SR – BIOMEDICAL & HEALTH SCIENCES (BMED)

1ST Place	Hinano T. Kalani High School	BMED-0273 Serological Characterization of Drosophila S2 Cells- Expressed SARS-CoV-2 Spike Proteins
2ND Place	Belise S. Mililani High School	BMED-0096 Comparing Neural Network Strategies to Label Tricuspid Valve on MRI Images
3RD Place	Logan L. Kamehameha Schools, Kapālama	BMED-0066 Testing Fabric and Mask Particle Filtration Efficacy Against Durability, Distance, and BPM (Year 2)

SR – BIOMEDICAL ENGINEERING (ENBM)

1ST Place	Alara B. Seabury Hall	ENBM-0358 Coronary Artery Disease and the Design Process of Medical Implants
2ND Place	Neriz Faith G. Waipahu High School	ENBM-0160 Creating a Reusable Laptop Stand to Improve Ergonomics for High School Students

SR – CELL & MOLECULAR BIOLOGY (CELL)

1ST Place	Taarini G. Waiākea High School	CELL-0193 Analyzing the Efficiency of CRISPR/Cas9-mediated Mutagenesis in the White Pupae (wp) Gene of the Melon Fly, <i>Zeugodacus cucurbitae</i> (Diptera: Tephritidae)
2ND Place	Amaya G. Kamehameha Schools, Maui	CELL-0139 The Interplay of Glucose Metabolism and HBV Replication
3RD Place	Aarya M. Roosevelt High School	CELL-0059 The Effects of SB and SIS3 on Adipocyte Differentiation 2022

SR – CHEMISTRY (CHEM)

1ST Place	Alanna S. Waiākea High School	CHEM-0164 Evaluation of Natural Products in Mamaki Tea Using Untargeted Metabolomics
2ND Place	Yumi M. 'Iolani School	CHEM-0308 A Sustainable Alternative to Textile Dyes: Synthesizing Nanoparticles to Create Structural Color
3RD Place	Beatrice K. Waiākea High School	CHEM-0267 Effects of Polysaccharide Coatings on Preserving the Quality of Rambutans

SR – COMPUTATIONAL BIOLOGY & BIOINFORMATICS (CBIO)

1ST Place	Tyler M. ‘Iolani School	CBIO-0299 Modeling the Origin of Transcriptional Drift and its Role in Cellular Aging
2ND Place	Cindy M. / Freddie L. / Mana H. Roosevelt High School	CBIO-0071 Attensor1Fold: A Novel Approach to Decomposition of Protein Structures Utilizing Artificial Intelligence
3RD Place	Emily P. Waipahu High School	CBIO-0136 Identification of Target IVF Preimplantation Screening Regions via Developmental Pathway and RNA-Seq Expression Analysis

SR – EARTH & ENVIRONMENTAL SCIENCES (EAEV)

1ST Place	Ethan A. Kamehameha Schools, Kapālama	EAEV-0188 Effectiveness of a Fire-Fighting Foam as an Eco-Friendly Replacement
2ND Place	Hope R. Kamehameha Schools, Kapālama	EAEV-0105 PH Levels and Their Effect on Urchin Fertilization
3RD Place	Hannah M. St. Andrew’s Schools, Priory	EAEV-0237 Utilization of Invasive Hawaiian Algal Species: Benefits and Implication of Fermented Macroalgae

SR – EMBEDDED SYSTEMS (EBED)

1ST Place	Natalie K. Kaiser High School	EBED-0417 Monitoring CO2 Levels to Reduce the Spread of COVID-19 in Classrooms
2ND Place	Kyla L. Kalani High School	EBED-0302 “Eyes in the Back of Your Head” Motorcycle Blind Spot Helmet
3RD Place	Tara Makena F. / Jasmine C. Kalaheo High School	EBED-0020 Using Computer Algorithms and Sensors to Effectively Optimize Water Usage for Indigenous Plant Irrigation

SR – ENERGY SUSTAINABLE MATERIALS & DESIGN (EGSD)

1ST Place	Landon C. Kamehameha Schools, Kapālama	EGSD-0062 Harnessing the Energy in Waves to Generate Electricity
2ND Place	Kana E. Kahuku High & Intermediate	EGSD-0119 Solar Powered Car
3RD Place	Mariah R. / Angelo A. Waipahu High School	EGSD-0216 Solar-Powered Aquaponics

SR – ENGINEERING MECHANICS (ENMC)

1ST Place	Paul V. Waiākea High School	ENMC-0065 Modification of Squirrel Cage and Slip Ring Induction Motors for a Higher Efficiency and Starting Torque
2ND Place	Michael Q. Castle High School	ENMC-0361 Trial by Water a “Budget” ROV
3RD Place	Jack S. / Christian I. / Colby C. Castle High School	ENMC-0235 Non-Pneumatic Tire Design

SR – ENVIRONMENTAL ENGINEERING (ENEV)

1ST Place	Lauren S. Pearl City High School	ENEV-0033 Salinity Valve: Fresh Water Conservation
2ND Place	Cassidy I. Mililani High School	ENEV-0387 Biomass Powered Desalination Year II: Combustion Tuning
3RD Place	Angelyn P. Mililani High School	ENEV-0425 Comparing Plant Fiber Oil Booms and Absorption Efficacy

SR – MATERIAL SCIENCES (MATS)

1ST Place	Jefferson Y. Kalani High School	MATS-0291 Observing the Maximization of Recycled Plastic Use in Manufacturing While Maintaining Product Durability
2ND Place	Alex T. Waipahu High School	MATS-0130 Testing Alternate Building Material Designs for Greater Value from Limited Natural Resources
3RD Place	Ryan G. Kealakehe High School	MATS-0460 Wood Finishes and Tensile Strength

SR – MATHEMATICS (MATH)

1ST Place	Henry S. Kealakehe High School	MATH-0401 Traversal Rates of Pathfinding in Geometric Graphs
2ND Place	Priscilla Marie M. Kauai High School	MATH-0307 Developing a Mathematical Model to Predict Socio-Economic Impact of Global Warming

SR – MICROBIOLOGY (MCRO)

1ST Place	Ayana S. Roosevelt High School	MCRO-0031 Identifying the Role of Alternative Ribosomes in Inducing Biofilm Formation
2ND Place	Kailee T. / Marissa K. 'Iolani School	MCRO-0330 Quantification of the Concentration of Methicillin-Resistant Staphylococcus aureus in Waikiki Beach Waters
3RD Place	Pualii Ann Z. Kamehameha Schools, Kapālama	MCRO-0076 Abiotic Factors Affecting Micro-Invertebrate Biodiversity on Lichen Populations on O'ahu

SR – PHYSICS & ASTRONOMY (PHYS)

1ST Place	Kenta S. Roosevelt High School	PHYS-0030 Analyzing Earth's Bow Shock Compression Ratio with Magnetohydrodynamic Limits
2ND Place	Anica A. Baldwin High School	PHYS-0165 Habitable Zones of Galaxies
3RD Place	Kathryn E. Kalaheo High School	PHYS-0015 Redesigning a Bag Strap to Reduce Force by Increasing Impact Time

SR – PLANT SCIENCES (PLNT)

1ST Place	Stella B. Kauai High School	PLNT-0338 Testing Tetrazolium Triphenyl Chloride Staid as an Indicator of Pollen Viability in Pritchardia Minor (Plantae, Arecaceae)
2ND Place	Bryson K. Kamehameha Schools, Kapālama	PLNT-0078 In Vitro Studies on the Antibacterial Effects of Naupaka (Scaevola taccada) Berries
3RD Place	Claire M. Kealakehe High School	PLNT-0448 A Casual Study on the Viability of Sunflower Seeds: How Storage Temperature Affects Germination

SR – ROBOTICS & INTELLIGENT MACHINES

Honorable Mention	Kylan T. Waimea High School	ROBO-0399 Electronic Braking System
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SR – SYSTEMS SOFTWARE (SOFT)

1ST Place	Avnish G. ‘Iolani School	SOFT-0319 The Creation of a Convolutional Neural Network to Classify Chronic Ulcers
2ND Place	Alicia D. Castle High School	SOFT-0419 Gamifying Learning by Repetition
3RD Place	Benjamin W. Pearl City High School	SOFT-0230 Watershed Computer Game

SR – TRANSLATIONAL MEDICINE (TMED)

1ST Place	Atena M. ‘Iolani School	TMED-0426 Protective Effect of Bromelain and Pineapple Extracts on UV-Induced Damage in Human Skin Cell
2ND Place	Rachel T. Waiākea High School	TMED-0011 Understanding the Molecular Mechanisms Underlying the Anticancer Pathway of a Traditional Hawaiian Herb