

2017 Central Sound Regional Science and Engineering Fair

Grand Prize: Neha Hulkund (Tesla STEM) The Development of Machine Learning Linear Regression Algorithms for Epileptic Seizure Prediction

First Runner Up: Eshika Saxena (Interlake) Extracting Photoplethysmographic and Biometric Information from Smartphone Video Streams for Remote Assessment of Cardiovascular Health and Spoof-proof Identity Authentication

Category Awards

Animal Sciences and Plant Sciences

1. Mary Elizabeth Adler (Newport) A Bird's Eye View: Investing the Relationship Between Local Bird Syrinx Structure and their Phylogenetic Status Using Cladogram Analysis
2. Emma Dortsch (Mountlake Terrace) Studying the effects of ethanol on the rate of depigmentation of *Schmidtea mediterranea* under intense light
3. Veenadhari Kollipara (Interlake) Farmer, Test Thyself! Empowering Farmers with a Sustainable Precision Agriculture End-to-End Solution Harnessing the combined power of Sensing Technology, Information Communication Technology and Data-Driven Decision Support Systems

Biomedical & Health Sciences, Bioengineering, and Translational Medicine

1. Prerana Kulkarni, Anjali Sribalaskandarajah, and Priyanka Taneja (Tesla STEM) Developing a Diagnostic Process for Parkinson's and Schizophrenia by Measuring the Concentration of Homovanillic Acid in Urine by Reverse-Engineering a Glucometer's Circuitry and Performing a Sandwich Immunoassay
2. Shifa Somji (Newport) A Low-Cost Contact-Free Measurement System of Cognitive Stress Using Physiological Parameters and Machine Learning
3. Faris Gulamali (Interlake) Tactile Biofeedback: An Innovative Approach Toward Muscular Retraining

Behavioral and Social Sciences

1. Christina Goto and Grace von Scheliha (Tesla STEM) Plant Assisted Learning: The Effects of *Epipremnum aureum* on Student Cognition and Neural Oscillations.
 2. Jessie Ju and Cindy Liang (Annie Wright) The Science of Memorization
 2. Katherine Bo, Davina Lau, and Michelle Yeh (Tesla STEM) Familiarity of music and its effects on stress levels on students
 3. Hanna Karpstein (Tesla STEM) Investigating the Effectivity of Various Behavioral Addiction Prevention Methods
- HM Rachel Ray, Amelia Sabin, and Brenna Schwartz (Tesla STEM) The Effect of Personality Types on the Success of Group Work

Cellular & Molecular Biology, Computational Biology & Bioinformatics, and Microbiology

1. Neha Hulkund (Tesla STEM) The Development of Machine Learning Linear Regression Algorithms for Epileptic Seizure Prediction
 2. Vaishnavi Phadnis (Tesla STEM) Computational Analysis of Neurotrophin Receptor Splice Variant Expression Signatures in Multiple Cancer Types
 3. Savitha Srinivasan (Interlake) A Novel Machine Learning Approach Using Convolutional Neural Networks to Identify Melanoma
- HM Rishi Kavikondala, Rayan Krishnan, and Sashwatha Shankar (Tesla STEM) An Introduction of Methanogen Metabolism

HM Vidha Sudhesh (Tesla STEM) Using an Eye Exam to Detect Parkinson's at an Early Stage

Earth & Environmental Sciences, Chemistry, and Biochemistry

1. Yogitha Sunkara (Tesla STEM) Comparative Analysis of Total Mercury Concentration in Salmon Species using Atomic Florescence
2. Justin Qiu (Tesla STEM) Investigating the Effects of Floating Photovoltaic Systems on the Growth of Freshwater Algae
3. Hannah Schuster (Mountlake Terrace) Comparative Field Study of Washington Ocean Wellness

HM Annika Cederstrand and Abbey Turner (Annie Wright) The Effectiveness of Solar Cells in Rainy Climates

Embedded Systems and Robotics & Intelligent Machines

1. Adeline Hillier and Claire Hillier (Newport) Visual Hearing Aid
2. Ian Davidson and Matthew Trahms (Mountlake Terrace) Universal Actuator using Soft Robotics
3. Clayton Kristiansen (Cedarcrest) Predictive Highway Lighting System

Engineering Mechanics

1. Anne Lee and Isaac Perrin (Tesla STEM) Performing Fluid Dynamics Analysis to Develop an Automated Valve to Halt Natural Gas Blowouts
2. Nathaniel Cockbain, Joseph Gardner, and Bukhari Shakil (Mountlake Terrace) Airfoil Dimpling
3. Jake Broulette and Luke Smith (Mountlake Terrace) Drag Reduction on Multi-rotor Unmanned Aerial Systems

HM Mitchell Campbell (Mountlake Terrace) Mechanical Flight Simulator

Physics & Astronomy and Mathematics

1. Rashida Hakim (Tesla STEM) Particle Simulation of Phase-Dependent Fields Using Geometric Algebra
2. Helen Carson (Home School) Explaining Aeolian Features in Meridiani Planum, Mars: Winds and Saltation in Past Orbital States

Processes into Autotrophic Cyanobacteria for Carbon Neutral Photosynthetic Methane Production

Environmental Engineering

1. Vesta Baumgartner and Maxwell Leidig (Mountlake Terrace) Testing the effectiveness of *Stropharia rugoso-annulata* and *Pleurotus ostreatus* in reducing total petroleum
2. Silva Calinov (Tesla STEM) Water Waves to Light Waves
3. Lexi Gavigan (Cedarcrest) The Efficiency of Ferrofluid Removal of Petroleum Based Products from Ocean Waters

HM Arkaprabha Bhattacharya (Henry M. Jackson) Testing the Effectiveness of *Lemna minor* as a Biosorbent for Passive Accumulation of Arsenic From Water

Energy: Chemical and Physical

1. Sagarika Samavedi (Interlake) Designing a Cellobiohydase with Increased Thermal Stability to help Catalyze Cellulose at a Commercially Viable Rate
2. Andrea Dang and Sandra Militaru (Tesla STEM) Solketal Additive for Aviation Fuel
3. Angeline Cartwright and Elizabeth Jurgensen (Mountlake Terrace) Cost Efficient Solar Cells

HM Colin Cockbain, Andrew Fitch, and Cody Nickell (Mountlake Terrace) Solar Powered Cooler for Parked Cars

HM Chase Barton (Aviation) Will The Mass of Wood Affect The Runtime of An Engine?

Materials Science

1. Terrance Li (Newport) Exploring Piezoelectric Properties of Atomically Thin WSe₂
2. Isabelle MacMurchie (Ballard) Optimization Modeling of Thread Made from Polyethylene Plastic Bags
3. Dhruvik Parikh (Henry M. Jackson) Development of a superior SPEEK-based nanocomposite membrane for the vanadium redox flow battery

Systems Software

1. Eshika Saxena (Interlake) Extracting Photoplethysmographic and Biometric Information from Smartphone Video Streams for Remote Assessment of Cardiovascular

3. Michaela Fennell, Xavier Valdez, and Darryl Worcester (NW Nuclear) Magnethydrdynamic Vortices in a Fusion Reactor
- HM Quinn Nicholson and Simon Zombor (Mountlake Terrace) Effects of Ice on Airfoils

- Health and Spoof-proof Identity Authentication
2. Zachary Haroian (Mountlake Terrace) Routine Manager
 3. Molly Taylor (Mountlake Terrace) SafeU App
- HM Isaac Muhlestein, Bin Phan, and Nathan Wacker (NW Nuclear) Dynamic Network Intrusion Detection