Fair: 2021 Mercer Science and Engineering Fair

Award: Grand Prize

Division: Senior Division 2021

Organization: Mercer Science and Engineering Club

Category: Environmental Science and Engineering

School: Hopewell Valley Central High

Project Title: Innovative Climate Change Emissions Reduction: The Cargo Ship Flettner Rotor Centrifugal Vortex Exhaust Scrubber

Students: Charlotte Lenore Michaluk

Award: First runner up

Division: Senior Division 2021

Organization: Mercer Science and Engineering Club

Category: Plant Science

School: -- Other --

Project Title: A Novel Assay to Quantitatively Detect Bacterial Endotoxin by Harnessing PAMP-Triggered Immunity of FRK1-LUC Arabidopsis thaliana

Students: Aravind Krishnan

Award: Second runner up

Division: Senior Division 2021

Organization: Mercer Science and Engineering Club

Category: General Engineering

School: Princeton High School

Project Title: Zircon - An affordable, powerful, and customizable educational soccer robot kit for beginners

Students: Sota Mark Ogata

Award: Broadcom Masters

Division: Junior Division 2021

Organization: Society for Science and the Public

Category: General Science (Junior)

School: St. Ann's School

Project Title: The Effect of Silver Nanoparticles on the Viability of Bacteria, Fungi, Aquatic Organisms and Plants

Students: Jillian Yao

Category: General Science (Junior)

School: Chapin School

Project Title: The Effect of Balloon Type on Helium Diffusion

Students: Zachary Malus

Award: First Place

Division: Senior Division 2021

Organization: Mercer Science and Engineering Club

Category: Chemistry and Materials

School: Princeton International School of Mathematics and Science

Project Title: Catalytic Ability of TiO2 Nanoparticles Functionalized on Ag-coated Fe3O4 Microspheres

Students: Qiyang Zhou

Category: General Engineering

School: Princeton High School

Project Title: Zircon - An affordable, powerful, and customizable educational soccer robot kit for beginners

Students: Sota Mark Ogata

Category: Plant Science

School: -- Other --

Project Title: A Novel Assay to Quantitatively Detect Bacterial Endotoxin by Harnessing PAMP-Triggered Immunity of FRK1-LUC Arabidopsis thaliana

Students: Aravind Krishnan

Category: Mathematics, Physics and Astronomy

School: Princeton High School

Project Title: Sweet Mirage

Students: Adam Benslama

Category: Software and Embedded Systems

School: -- Other --

Project Title: Predicting Alzheimer’s Disease: Development and Validation of Machine Learning Models

Students: Jay Fu

Category: Environmental Science and Engineering

School: Hopewell Valley Central High

Project Title: Innovative Climate Change Emissions Reduction: The Cargo Ship Flettner Rotor Centrifugal Vortex Exhaust Scrubber

Students: Charlotte Lenore Michaluk

Category: Biochemistry, Biology and Medical

School: Lawrenceville School

Project Title: Detection and Classification of Immature Leukocytes for Diagnosis of Acute Myeloid Leukemia

Students: Satvik Dasariraju

Category: Biochemistry, Biology and Medical

School: Lawrenceville School

Project Title: Shape-Tunable Plasmonic Gold Nanosensors for Quantitative Circulating Tumor DNA Screening

Students: Lauren Zhang

Award: Superior Achievement

Division: Junior Division 2021

Organization: Mercer Science and Engineering Club

Category: General Science (Junior)

School: St. Ann's School

Project Title: The Effect of Silver Nanoparticles on the Viability of Bacteria, Fungi, Aquatic Organisms and Plants

Students: Jillian Yao

Category: General Science (Junior)

School: Chapin School

Project Title: The Effect of Balloon Type on Helium Diffusion

Students: Zachary Malus

Award: Second Place

Division: Senior Division 2021

Organization: Mercer Science and Engineering Club

Category: Behavioral and Social Science

School: Princeton High School

Project Title: The Impact of high school student body diversity on perceptions of racism

Students: Susannah Tuder

Category: Chemistry and Materials

School: Trenton Central High - Main Campus

Project Title: EcoConcrete - The search for and study of a viable alternative to highly energy-intensive and carbon-positive Portland cement

Students: Muhil Thendral

Category: General Engineering

School: The Pennington School

Project Title: Neural Networks in Glucose Prediction

Students: Minghao(Anna) Zhang

Category: Mathematics, Physics and Astronomy

School: West Windsor-Plainsboro High South

Project Title: Eject, crash, or survive: Using machine learning to predict orbital instability of exoplanetary systems

Students: Neha Ayyalapu

Category: Software and Embedded Systems

School: Princeton Day School

Project Title: Automatic deep-learning classification models for breast lesions

Students: Sarina Hasan

Category: Environmental Science and Engineering

School: Lawrenceville School

Project Title: Metal-doped Zinc Oxide Nanochip for Surface-Enhanced Raman Spectroscopic Sensing of Opioids in Liquids

Students: Michael Zhang

Category: Environmental Science and Engineering

School: Princeton International School of Mathematics and Science

Project Title: Modeling COVID-19 transmission in aircraft cabin by integrating particle dynamics, dilution effect, and risk assessment

Students: Xinkai Yu

Category: Biochemistry, Biology and Medical

School: Stuart Country Day School

Project Title: PneumoStack: A Novel Approach to Pneumonia and COVID-19 Diagnosis with Automated Chest X-ray Analysis via Stacked Generalization and Convolutional Neural Networks

Students: Sonya Jin

Category: Biochemistry, Biology and Medical

School: Princeton International School of Mathematics and Science

Project Title: A novel method for disinfection and sterilization of air and objects using electrified mist

Students: Helena He

Award: Outstanding Achievement

Division: Junior Division 2021

Organization: Mercer Science and Engineering Club

Category: General Science (Junior)

School: St. Ann's School

Project Title: Electrify Your Electrolytes: The Effect Drinks Have on Your Electrolytes

Students: William Black

Category: General Science (Junior)

School: St. Ann's School

Project Title: The Effect of Different Cleaning Products on Stain Removal.

Students: Lily Orn

Award: Third Place

Division: Senior Division 2021

Organization: Mercer Science and Engineering Club

Category: Behavioral and Social Science

School: West Windsor-Plainsboro High North

Project Title: Quantify the Factor Importance and the Effect of Mask Policy on COVID-19 Spread in the United States with Machine Learning

Students: Eddie Chen

Category: Chemistry and Materials

School: Princeton International School of Mathematics and Science

Project Title: Development of an Immunosensor of Aflatoxin B1 Based on Silica-coated Gold Nanoparticles

Students: William Wu

Category: Energy

School: The Peddie School

Project Title: Study on the Organic Nanoparticles for Sustainable Energy Using Computational Simulations

Students: Daniel Sung

Category: General Engineering

School: The Peddie School

Project Title: Force Analysis of Car Crash and Potential Improvements

Students: Yi Yan

Category: General Engineering

School: Lawrenceville School

Project Title: Localization of Natural Disaster Survivors Through Drone-based Sound Source Localization

Students: Ian Lee

Category: General Engineering

School: The Peddie School

Project Title: Force Analysis of Car Crash and Potential Improvements

Students: Yunze Li

Category: Software and Embedded Systems

School: Hopewell Valley Central High

Project Title: Designing and Evaluating the Use of Machine Learning Models and Nearest Neighbor Algorithms to Identify Colors for People Who Have Difficulty Identifying Them.

Students: Lucas Zapata-Sanin

Category: Environmental Science and Engineering

School: Princeton International School of Mathematics and Science

Project Title: Desalination and Purification of Water using a Solar Powered Hydrogel Multistage

Students: Kevin Murphy

Category: Biochemistry, Biology and Medical

School: West Windsor-Plainsboro High South

Project Title: Systematic Analysis of Genetic Variation of Duchenne Muscular Dystrophy and Implication for Cancer

Students: Hubert Chen

Category: Biochemistry, Biology and Medical

School: Princeton High School

Project Title: Customized cancer therapy based on the dynamic analysis of the Tumor-Immune-Drug System interaction

Students: Xin Chen

Award: Meritorious Achievement

Division: Junior Division 2021

Organization: Mercer Science and Engineering Club

Category: General Science (Junior)

School: Chapin School

Project Title: The Effect of Liquid Preservatives on Strawberry Decay

Students: Lucy Melchior

Category: General Science (Junior)

School: St. Ann's School

Project Title: The effect of different settings on a PC on the amount of energy in watts used while running rendering and FPS tests.

Students: Jamison Tormey

Award: Honorable Mention

Division: Senior Division 2021

Organization: Mercer Science and Engineering Club

Category: Behavioral and Social Science

School: Princeton High School

Project Title: The Relationship Between Media Bias and Political Views of US Adults

Students: Shoshana Henderson

Category: Behavioral and Social Science

School: Princeton High School

Project Title: Sleep Deprivation in High Schools Around the World

Students: Violeta Gonzalez Toro

Category: Mathematics, Physics and Astronomy

School: Princeton International School of Mathematics and Science

Project Title: The Influence of Self Interacting Dark Matter on Galactic Formation and the Last Parsec Problem

Students: Jihao Yu

Category: Mathematics, Physics and Astronomy

School: Princeton International School of Mathematics and Science

Project Title: Star, galaxy, quasar and star spectral types classification with broadband photometry

Students: Zhixin Wang

Category: Software and Embedded Systems

School: Princeton International School of Mathematics and Science

Project Title: Comparing Grover's Quantum Search Algorithm with Classical Algorithm on Solving Satisfiability Problem

Students: Runqian Wang

Category: Software and Embedded Systems

School: -- Other --

Project Title: An Efficient Algorithm to Generate Grids Using a Modified Transformation Method

Students: Yunseo Jeong

Category: Environmental Science and Engineering

School: West Windsor-Plainsboro High North

Project Title: Mitigating Effects of Natural Disasters on Economy

Students: Abhinav Mukherjee

Category: Biochemistry, Biology and Medical

School: Princeton International School of Mathematics and Science

Project Title: Modeling and visualizing the SARS-CoV-2 mutation based on geographical regions and time

Students: Bomin Wei

Category: Biochemistry, Biology and Medical

School: Princeton International School of Mathematics and Science

Project Title: A Novel Reconstruction and Expression of Endostatin with pDC316 Plasmid in Eukaryotic Cells

Students: Ziqi Wang

Category: Biochemistry, Biology and Medical

School: Princeton Day School

Project Title: Modified Edit Distance on Global SARS-CoV-2 Analysis

Students: Jenny Fan

Award: Honorable Mention

Division: Junior Division 2021

Organization: Mercer Science and Engineering Club

Category: General Science (Junior)

School: St. Ann's School

Project Title: The Effect of the Material of the Physical Obstruction and Distance on the Strength and Speed of the Signal for the WiFi

Students: Joyce Xia

Category: General Science (Junior)

School: Chapin School

Project Title: The Effect of Magnets on Seed Growth

Students: Ziya Kartar Sangha

Category: General Science (Junior)

School: Chapin School

Project Title: The Effect of a Wrapping on the Amount of Mold

Students: Genevieve Gambone

Award: Best Use of Photography

Division: Senior Division 2021

Organization: New Jersey Camera & One Hour Photo

Category: Environmental Science and Engineering

School: Princeton International School of Mathematics and Science

Project Title: Desalination and Purification of Water using a Solar Powered Hydrogel Multistage

Students: Kevin Murphy

Award: Air Force Research Laboratory Award

Division: Senior Division 2021

Organization: US Air Force

Category: Chemistry and Materials

School: Princeton International School of Mathematics and Science

Project Title: Catalytic Ability of TiO2 Nanoparticles Functionalized on Ag-coated Fe3O4 Microspheres

Students: Qiyang Zhou

Category: General Engineering

School: Princeton High School

Project Title: Zircon - An affordable, powerful, and customizable educational soccer robot kit for beginners

Students: Sota Mark Ogata

Category: Plant Science

School: -- Other --

Project Title: A Novel Assay to Quantitatively Detect Bacterial Endotoxin by Harnessing PAMP-Triggered Immunity of FRK1-LUC Arabidopsis thaliana

Students: Aravind Krishnan

Category: Mathematics, Physics and Astronomy

School: Princeton High School

Project Title: Sweet Mirage

Students: Adam Benslama

Category: Software and Embedded Systems

School: -- Other --

Project Title: Predicting Alzheimer’s Disease: Development and Validation of Machine Learning Models

Students: Jay Fu

Category: Environmental Science and Engineering

School: Hopewell Valley Central High

Project Title: Innovative Climate Change Emissions Reduction: The Cargo Ship Flettner Rotor Centrifugal Vortex Exhaust Scrubber

Students: Charlotte Lenore Michaluk

Category: Biochemistry, Biology and Medical

School: Lawrenceville School

Project Title: Detection and Classification of Immature Leukocytes for Diagnosis of Acute Myeloid Leukemia

Students: Satvik Dasariraju

Category: Biochemistry, Biology and Medical

School: Lawrenceville School

Project Title: Shape-Tunable Plasmonic Gold Nanosensors for Quantitative Circulating Tumor DNA Screening

Students: Lauren Zhang

Award: APA Outstanding Research

Division: Senior Division 2021

Organization: American Psychological Association

Category: Behavioral and Social Science

School: Princeton High School

Project Title: The Impact of high school student body diversity on perceptions of racism

Students: Susannah Tuder

Award: ASM Materials Outstanding Award

Division: Senior Division 2021

Organization: ASM Materials Education Foundation

Category: Chemistry and Materials

School: Trenton Central High - Main Campus

Project Title: EcoConcrete - The search for and study of a viable alternative to highly energy-intensive and carbon-positive Portland cement

Students: Muhil Thendral

Award: Environmental Protection Agency Award

Division: Senior Division 2021

Organization: Environmental Protection Agency

Category: Environmental Science and Engineering

School: Hopewell Valley Central High

Project Title: Innovative Climate Change Emissions Reduction: The Cargo Ship Flettner Rotor Centrifugal Vortex Exhaust Scrubber

Students: Charlotte Lenore Michaluk

Award: NJ Water Environment Association (NJWEA)

Division: Senior Division 2021

Organization: NJ Water Environment Association

Category: Chemistry and Materials

School: Princeton International School of Mathematics and Science

Project Title: Catalytic Ability of TiO2 Nanoparticles Functionalized on Ag-coated Fe3O4 Microspheres

Students: Qiyang Zhou

Award: Naval Science Award

Division: Junior Division 2021

Organization: US Navy Senior Division

Category: General Science (Junior)

School: St. Ann's School

Project Title: The Effect of Silver Nanoparticles on the Viability of Bacteria, Fungi, Aquatic Organisms and Plants

Students: Jillian Yao

Category: General Science (Junior)

School: Chapin School

Project Title: The Effect of Balloon Type on Helium Diffusion

Students: Zachary Malus

Award: Naval Science Award

Division: Senior Division 2021

Organization: US Navy Senior Division

Category: General Engineering

School: Princeton High School

Project Title: Zircon - An affordable, powerful, and customizable educational soccer robot kit for beginners

Students: Sota Mark Ogata

Category: Environmental Science and Engineering

School: Hopewell Valley Central High

Project Title: Innovative Climate Change Emissions Reduction: The Cargo Ship Flettner Rotor Centrifugal Vortex Exhaust Scrubber

Students: Charlotte Lenore Michaluk

Award: 1st Place

Division: Senior Division 2021

Organization: Theobald Smith Society

Category: Plant Science

School: -- Other --

Project Title: A Novel Assay to Quantitatively Detect Bacterial Endotoxin by Harnessing PAMP-Triggered Immunity of FRK1-LUC Arabidopsis thaliana

Students: Aravind Krishnan

Award: Honorable Mention

Division: Senior Division 2021

Organization: Theobald Smith Society

Category: Biochemistry, Biology and Medical

School: Princeton International School of Mathematics and Science

Project Title: A Novel Reconstruction and Expression of Endostatin with pDC316 Plasmid in Eukaryotic Cells

Students: Ziqi Wang

Category: Biochemistry, Biology and Medical

School: Robbinsville High School

Project Title: Effects of Polyphenols on Motor Movement Improvement in Parkinson’s Modeled C. elegans

Students: Kavya Velliangiri

Award: Stockholm Junior Water Prize

Division: Senior Division 2021

Organization: Stockholm International Water Institute

Category: Environmental Science and Engineering

School: Princeton International School of Mathematics and Science

Project Title: Desalination and Purification of Water using a Solar Powered Hydrogel Multistage

Students: Kevin Murphy

Award: USAID Science Champion Award

Division: Senior Division 2021

Organization: U.S. Agency for International Development

Category: Environmental Science and Engineering

School: Hopewell Valley Central High

Project Title: Innovative Climate Change Emissions Reduction: The Cargo Ship Flettner Rotor Centrifugal Vortex Exhaust Scrubber

Students: Charlotte Lenore Michaluk

Award: YSEA Science Fair Award

Division: Senior Division 2021

Organization: Yale Science & Engineering Association

Category: General Engineering

School: Princeton High School

Project Title: Zircon - An affordable, powerful, and customizable educational soccer robot kit for beginners

Students: Sota Mark Ogata

Award: Earle S. Rommel Communications Award

Division: Senior Division 2021

Organization: Mercer Science and Engineering Club

Category: Biochemistry, Biology and Medical

School: Princeton International School of Mathematics and Science

Project Title: A novel method for disinfection and sterilization of air and objects using electrified mist

Students: Helena He