

## 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 TiO<sub>2</sub> Nanoparticles Functionalized on Ag-coated Fe<sub>3</sub>O<sub>4</sub> 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 Tudor

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 TiO<sub>2</sub> Nanoparticles Functionalized on Ag-coated Fe<sub>3</sub>O<sub>4</sub> 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 Tudor

## 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 TiO<sub>2</sub> Nanoparticles Functionalized on Ag-coated Fe<sub>3</sub>O<sub>4</sub> 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