

Award: [Grand Prize](#)

Division: [Senior Division 2022](#)

Organization: [Mercer Science and Engineering Club](#)

Category: [Software and Embedded Systems](#)

School: [Lawrenceville School](#)

Project Title: [RARE: Machine Learning Approach for Binning Rare Variant Features to Detect Association with Disease](#)

Students: Satvik Dasariraju

Award: [First runner up](#)

Division: [Senior Division 2022](#)

Organization: [Mercer Science and Engineering Club](#)

Category: [Energy](#)

School: [Hopewell Valley Central High](#)

Project Title: [Innovative Climate Change Emissions Reduction: Flettner Vortex Scrubber with Active Seakeeping](#)

Students: Charlotte Michaluk

Award: [Second runner up](#)

Division: [Senior Division 2022](#)

Organization: [Mercer Science and Engineering Club](#)

Category: [General 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: [The Peddie School](#)

Project Title: [Prophages present in Acinetobacter pittii influence bacterial virulence, antibiotic resistance, and genomic structure](#)

Students: Richard Zhu

Award: [First Place](#)

Division: [Senior Division 2022](#)

Organization: [Mercer Science and Engineering Club](#)

Category: [Behavioral and Social Science](#)

School: [Princeton High School](#)

Project Title: [The effects of external variables on the likelihood of athletes to report concussion symptoms](#)

Students: Kate Becker

Category: [Energy](#)

School: [Hopewell Valley Central High](#)

Project Title: [Innovative Climate Change Emissions Reduction: Flettner Vortex Scrubber with Active Seakeeping](#)

Students: Charlotte Michaluk

Category: [General 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: [Software and Embedded Systems](#)

School: [Lawrenceville School](#)

Project Title: [RARE: Machine Learning Approach for Binning Rare Variant Features to Detect Association with Disease](#)

Students: Satvik Dasariraju

Category: [Environmental Science and Engineering](#)

School: [Princeton High School](#)

Project Title: [Conversion of Atmospheric CO2 to Solid Carbon: A Climate Change Mitigation Strategy](#)

Students: Shrey Khetan

Category: [Biochemistry, Biology and Medical](#)

School: [Princeton High School](#)

Project Title: [Imbalances in Copper or Zinc Trigger Further Trace Metal Dyshomeostasis in Amyloid-Beta Producing Caenorhabditis elegans](#)

Students: Ada Metaxas

Category: [Biochemistry, Biology and Medical](#)

School: [The Peddie School](#)

Project Title: [Prophages present in Acinetobacter pittii influence bacterial virulence, antibiotic resistance, and genomic structure](#)

Students: Richard Zhu

Category: [Biochemistry, Biology and Medical](#)

School: [Lawrenceville School](#)

Project Title: [GlioBLAST: Establishing Prognosis and Targeted Therapy for Glioblastoma by Applying Convolutional Neural Networks to Detect Histological Features, Molecular Subtypes, MGMT Methylation, and EGFR Amplification from Brain-Biopsy Whole-Slide Images](#)

Students: Bhushan Mohanraj

Award: [Superior Achievement](#)

Division: [Junior Division 2022](#)

Organization: [Mercer Science and Engineering Club](#)

Category: [General Science \(Junior\)](#)

School: [Chapin School](#)

Project Title: [The Effect Of Counterweight On Trebuchet Launch Distance](#)

Students: Bryan Zhao

Category: [General Science \(Junior\)](#)

School: [St. Ann's School](#)

Project Title: [Can Ferromagnetic Nanoparticles Help Clean Ocean Oil Spills? The Effect of Ferrofluids & Magnetic Strength on Efficiency of Separating Oil from Water](#)

Students: Jillian Yao

Category: [General Science \(Junior\)](#)

School: [St. Ann's School](#)

Project Title: [The Effect on the Electrical Load on the Temperature of the Solar Panel](#)

Students: Skylar Hewitt

Award: [Second Place](#)

Division: [Senior Division 2022](#)

Organization: [Mercer Science and Engineering Club](#)

Category: [Behavioral and Social Science](#)

School: [Princeton High School](#)

Project Title: [Early Detection of Mental Disorder via Social Media Posts Using Deep Learning Models](#)

Students: Amanda Sun

Category: [General Engineering](#)

School: [Princeton International School of Mathematics and Science](#)

Project Title: [An adaptive grabber with the ability to actively switch between accurate grabbing and compliant grabbing](#)

Students: Xuantong Wang

Category: [Mathematics, Physics and Astronomy](#)

School: [The Peddie School](#)

Project Title: [Study on the Geometric Properties in the Ceva's Triangle](#)

Students: Jenna Kim

Category: [Software and Embedded Systems](#)

School: [Princeton High School](#)

Project Title: [Training Neural Networks with a Genetic Algorithm for Obstacle Avoidance in Simulated Autonomous Drones](#)

Students: William Baumgartner

Category: [Software and Embedded Systems](#)

School: [Lawrenceville School](#)

Project Title: [High Accuracy Seasonal Hurricane Intensity Prediction Using Outgoing Longwave Radiation Maps](#)

Students: Antonia Comaniciu

Category: [Environmental Science and Engineering](#)

School: [West Windsor-Plainsboro High North](#)

Project Title: [Mechanism to Test Soil Fertility and Moisture in Small- and Family Owned-Farms](#)

Students: Neha Sudarshan

Category: [Biochemistry, Biology and Medical](#)

School: [Lawrenceville School](#)

Project Title: [Role of Cancer Associated Fibroblast Heterogeneity on Immunotherapeutic Potentials of Pancreatic Ductal Adenocarcinoma](#)

Students: Anushka Chintamaneni

Category: [Biochemistry, Biology and Medical](#)

School: [Princeton High School](#)

Project Title: [Toxicological Assessment of Medicinal Herbs to Identify Adverse Effects on Eukaryotic Cells](#)

Students: Julius Verma

Award: [Outstanding Achievement](#)

Division: [Junior Division 2022](#)

Organization: [Mercer Science and Engineering Club](#)

Category: [General Science \(Junior\)](#)

School: [Chapin School](#)

Project Title: [How Does The Amount of Light Effect Plant Growth](#)

Students: Charlotte Sweetman

Category: [General Science \(Junior\)](#)

School: [Chapin School](#)

Project Title: [Spoilers: for show, or for performance?](#)

Students: Phineas Dunne

Category: [General Science \(Junior\)](#)

School: [Princeton Montessori School](#)

Project Title: [The Effect of Cleaning Methods on the Approximate Bacterial Count of a Cell Phone Case](#)

Students: Sawyer Berness

Category: [General Science \(Junior\)](#)

School: [Princeton Montessori School](#)

Project Title: [How Do Amounts of pH Affect a Sponge's Performance](#)

Students: Grant Berness

Award: [Third Place](#)

Division: [Senior Division 2022](#)

Organization: [Mercer Science and Engineering Club](#)

Category: [Mathematics, Physics and Astronomy](#)

School: [Princeton International School of Mathematics and Science](#)

Project Title: [Non-existence of the Algorithm that can Obtain the Optimal Solution for a Few Given Options of Investment in Constructive Mathematics](#)

Students: Jiahong Sun

Category: [Software and Embedded Systems](#)

School: [Princeton High School](#)

Project Title: [Auto Attendance: A Mobile App for Automatic Attendance Taking and Rapid Contact Tracing](#)

Students: Amy Lin

Category: [Environmental Science and Engineering](#)

School: [Princeton International School of Mathematics and Science](#)

Project Title: [Modeling and Mitigating Infection Risks of COVID-19 in Aircraft Cabins](#)

Students: Xinkai Yu

Category: [Biochemistry, Biology and Medical](#)

School: [Princeton International School of Mathematics and Science](#)

Project Title: [Safe Distance of Viruses - Quantitative Analysis the Trajectory of Pathogen Containing Droplets in Respiratory Airways](#)

Students: Hanwen Miao

Category: [Biochemistry, Biology and Medical](#)

School: [West Windsor-Plainsboro High South](#)

Project Title: [A Computational Approach to Identify Small Molecules Interact with the Crystal Structure of Programmed Cell Death Protein 1 as Potential Therapeutics for Cancer Immunotherapy](#)

Students: Hubert Chen

Award: [Meritorious Achievement](#)

Division: [Junior Division 2022](#)

Organization: [Mercer Science and Engineering Club](#)

Category: [General Science \(Junior\)](#)

School: [Chapin School](#)

Project Title: [The Effect of Blade Length of Wind Turbines on the Amount of Energy It Produces](#)

Students: Sarin Singhal

Category: [General Science \(Junior\)](#)

School: [Princeton Montessori School](#)

Project Title: [The Effect Of The Method Prior To Washing a Shirt On The Opacity Of The Stain](#)

Students: Sadie Betz

Award: [Honorable Mention](#)

Division: [Senior Division 2022](#)

Organization: [Mercer Science and Engineering Club](#)

Category: [Behavioral and Social Science](#)

School: [Stuart Country Day School](#)

Project Title: [How Does the Brain See the World - Decoding Visual Stimulus Using fMRI](#)

Students: Emily Ma

Category: [General Engineering](#)

School: [West Windsor-Plainsboro High South](#)

Project Title: [Utilizing Color Sensors and Urinary Collection Bags as a Warning System for Hematuria](#)

Students: Riya Bhat

Category: [Mathematics, Physics and Astronomy](#)

School: [The Pennington School](#)

Project Title: [A Novel, Simple, Accurate Method For Experimental Determination of Thermal Diffusivity: Measure 9 Types of Foods](#)

Students: Lisa Wang

Category: [Software and Embedded Systems](#)

School: [Robbinsville High School](#)

Project Title: [Analysis of semantics and early linguistic symptoms to develop machine learning predictive modeling of Alzheimer's Disease](#)

Students: Anushka Paulchoudhury

Category: [Environmental Science and Engineering](#)

School: [The Peddie School](#)

Project Title: [Increasing Efficiency of Personal Gas Conversion System for Rural Homes](#)

Students: Edward Fujiwara

Category: [Biochemistry, Biology and Medical](#)

School: [West Windsor-Plainsboro High North](#)

Project Title: [Gene Network Analysis of DIO2 and Thyroid Hormone Replacement Therapy](#)

Students: Jihong Jung

Category: [Biochemistry, Biology and Medical](#)

School: [Princeton Day School](#)

Project Title: [Drug Repositioning Ketamine as a New Treatment for Bipolar Disorder Using Text Mining](#)

Students: Shivani Manikandan

Category: [Biochemistry, Biology and Medical](#)

School: [West Windsor-Plainsboro High South](#)

Project Title: [Treating Diffuse Large B Cell Lymphoma Using HLA Class I Molecule Deficient Anti CD19 CAR-NK Cells](#)

Students: Suraj Das

Award: [Honorable Mention](#)

Division: [Junior Division 2022](#)

Organization: [Mercer Science and Engineering Club](#)

Category: [General Science \(Junior\)](#)

School: [Princeton Montessori School](#)

Project Title: [Does Changing The Type of Liquid Affect How Fast An Ice Cube Will Melt?](#)

Students: Vinay Batra

Category: [General Science \(Junior\)](#)

School: [St. Ann's School](#)

Project Title: [The Effect of Different Brands, SPFs, Types of Sunscreens, and the Amount of Sunscreen on how well They Protect Against UV Light](#)

Students: Joyce Xia

Category: [General Science \(Junior\)](#)

School: [St. Ann's School](#)

Project Title: [Memory Games: The Effect of Age on Memory as Measured by Memory Games](#)

Students: Neve Sirois

Award: [Air Force Research Laboratory Award](#)

Division: [Senior Division 2022](#)

Organization: [US Air Force](#)

Category: [Behavioral and Social Science](#)

School: [Princeton High School](#)

Project Title: [The effects of external variables on the likelihood of athletes to report concussion symptoms](#)

Students: Kate Becker

Category: [Energy](#)

School: [Hopewell Valley Central High](#)

Project Title: [Innovative Climate Change Emissions Reduction: Flettner Vortex Scrubber with Active Seakeeping](#)

Students: Charlotte Michaluk

Category: [General Engineering](#)

School: [Princeton International School of Mathematics and Science](#)

Project Title: [An adaptive grabber with the ability to actively switch between accurate grabbing and compliant grabbing](#)

Students: Xuantong Wang

Category: [General 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: [Software and Embedded Systems](#)

School: [Lawrenceville School](#)

Project Title: [RARE: Machine Learning Approach for Binning Rare Variant Features to Detect Association with Disease](#)

Students: Satvik Dasariraju

Category: [Environmental Science and Engineering](#)

School: [Princeton High School](#)

Project Title: [Conversion of Atmospheric CO2 to Solid Carbon: A Climate Change Mitigation Strategy](#)

Students: Shrey Khetan

Category: [Biochemistry, Biology and Medical](#)

School: [Princeton High School](#)

Project Title: [Imbalances in Copper or Zinc Trigger Further Trace Metal Dyshomeostasis in Amyloid-Beta Producing Caenorhabditis elegans](#)

Students: Ada Metaxas

Category: [Biochemistry, Biology and Medical](#)

School: [The Peddie School](#)

Project Title: [Prophages present in Acinetobacter pittii influence bacterial virulence, antibiotic resistance, and genomic structure](#)

Students: Richard Zhu

Category: [Biochemistry, Biology and Medical](#)

School: [Lawrenceville School](#)

Project Title: [GlioBLAST: Establishing Prognosis and Targeted Therapy for Glioblastoma by Applying Convolutional Neural Networks to Detect Histological Features, Molecular Subtypes, MGMT Methylation, and EGFR Amplification from Brain-Biopsy Whole-Slide Images](#)

Students: Bhushan Mohanraj

Award: [APA Outstanding Research](#)

Division: [Senior Division 2022](#)

Organization: [American Psychological Association](#)

Category: [Behavioral and Social Science](#)

School: [Princeton High School](#)

Project Title: [The effects of external variables on the likelihood of athletes to report concussion symptoms](#)

Students: Kate Becker

Award: [NJ Water Environment Association \(NJWEA\)](#)

Division: [Senior Division 2022](#)

Organization: [NJ Water Environment Association](#)

Category: [General 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: [NASA Earth System Science Award 2020](#)

Division: [Senior Division 2022](#)

Organization: [NASA](#)

Category: [Software and Embedded Systems](#)

School: [Lawrenceville School](#)

Project Title: [High Accuracy Seasonal Hurricane Intensity Prediction Using Outgoing Longwave Radiation Maps](#)

Students: Antonia Comanicu

Award: [NOAA's "Taking the Pulse of the Planet" Award](#)

Division: [Senior Division 2022](#)

Organization: [NOAA](#)

Category: [Software and Embedded Systems](#)

School: [Lawrenceville School](#)

Project Title: [High Accuracy Seasonal Hurricane Intensity Prediction Using Outgoing Longwave Radiation Maps](#)

Students: Antonia Comaniciu

Award: [Naval Science Award](#)

Division: [Junior Division 2022](#)

Organization: [US Navy Senior Division](#)

Category: [General Science \(Junior\)](#)

School: [Chapin School](#)

Project Title: [The Effect of Blade Length of Wind Turbines on the Amount of Energy It Produces](#)

Students: Sarin Singhal

Category: [General Science \(Junior\)](#)

School: [Princeton Montessori School](#)

Project Title: [The Effect of Cleaning Methods on the Approximate Bacterial Count of a Cell Phone Case](#)

Students: Sawyer Berness

Category: [General Science \(Junior\)](#)

School: [Princeton Montessori School](#)

Project Title: [How Do Amounts of pH Affect a Sponge's Performance](#)

Students: Grant Berness

Award: [Naval Science Award](#)

Division: [Senior Division 2022](#)

Organization: [US Navy Senior Division](#)

Category: [Energy](#)

School: [Hopewell Valley Central High](#)

Project Title: [Innovative Climate Change Emissions Reduction: Flettner Vortex Scrubber with Active Seakeeping](#)

Students: Charlotte Michaluk

Category: [Software and Embedded Systems](#)

School: [Princeton High School](#)

Project Title: [Training Neural Networks with a Genetic Algorithm for Obstacle Avoidance in Simulated Autonomous Drones](#)

Students: William Baumgartner

Award: [RICOH Sustainable Development Award](#)

Division: [Senior Division 2022](#)

Organization: [RICOH](#)

Category: [Software and Embedded Systems](#)

School: [Lawrenceville School](#)

Project Title: [High Accuracy Seasonal Hurricane Intensity Prediction Using Outgoing Longwave Radiation Maps](#)

Students: Antonia Comaniciu

Award: [1st Place](#)

Division: [Senior Division 2022](#)

Organization: [Theobald Smith Society](#)

Category: [Biochemistry, Biology and Medical](#)

School: [The Peddie School](#)

Project Title: [Prophages present in Acinetobacter pittii influence bacterial virulence, antibiotic resistance, and genomic structure](#)

Students: Richard Zhu

Award: [Stockholm Junior Water Prize](#)

Division: [Senior Division 2022](#)

Organization: [Stockholm International Water Institute](#)

Category: [General 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: [Environmental Science and Engineering](#)

School: [Princeton High School](#)

Project Title: [Conversion of Atmospheric CO₂ to Solid Carbon: A Climate Change Mitigation Strategy](#)

Students: Shrey Khetan

Award: [YSEA Science Fair Award](#)

Division: [Senior Division 2022](#)

Organization: [Yale Science & Engineering Association](#)

Category: [Mathematics, Physics and Astronomy](#)

School: [The Peddie School](#)

Project Title: [Study on the Geometric Properties in the Cevases Triangle](#)

Students: Jenna Kim

Award: [Earle S. Rommel Communications Award](#)

Division: [Senior Division 2022](#)

Organization: [Mercer Science and Engineering Club](#)

Category: [Biochemistry, Biology and Medical](#)

School: [Princeton High School](#)

Project Title: [Imbalances in Copper or Zinc Trigger Further Trace Metal Dyshomeostasis in Amyloid-Beta Producing Caenorhabditis elegans](#)

Students: Ada Metaxas