2023 Mercer Science and Engineering Fair Awards

Embargo Date: April 2, 2023

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Award: Grand Prize

Division: Senior Division 2023

Organization: Mercer Science and Engineering Club

Category: General Engineering

School: West Windsor-Plainsboro High South

Project Title: Autonomous Soccer Robot

Students: Naveen Enock

Category: Mathematics, Physics and Astronomy

School: Princeton High School

Project Title: Strict Inequalities for the n-crossing Number

Students: Nicholas Hagedorn

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Award: First runner up

Division: Senior Division 2023

Organization: Mercer Science and Engineering Club

Category: Biochemistry, Biology and Medical

School: Lawrenceville School

Project Title: CodOpt: Enhancing Drug and Vaccine Development by Using Deep Learning and Natural-Language Processing to Optimize Recombinant Codon Sequences via a Host-Independent Data Pipeline

Students: Bhushan Mohanraj

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Award: Thermo Fisher Junior Innovators Challenge

Division: Junior Division 2023

Organization: Society for Science

Category: General Science (Junior)

School: Chapin School

Project Title: The Gauss Rifle

Students: Zachary Phelan

Category: General Science (Junior)

School: Princeton Charter School

Project Title: The Impact of Different Fabrics and the Resistance to Mosquitoes: Which Types of Fabrics Let Mosquitoes Go Through?

Students: Olivia Ahn

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Award: First Place

Division: Senior Division 2023

Organization: Mercer Science and Engineering Club

Category: Chemistry and Materials

School: Lawrenceville School

Project Title: Engineering novel functional bread through fortification with quercetin nanoparticles

Students: William Huang

Category: General Engineering

School: West Windsor-Plainsboro High South

Project Title: Autonomous Soccer Robot

Students: Naveen Enock

Category: Plant Science

School: Robbinsville High School

Project Title: Combating the Effect of Global Warming on Plants through Photosynthesis Selection

Students: Srinand Tanakala

Category: Plant Science

School: Princeton High School

Project Title: Mealworm frass as fertilizer: growth outcomes in Brassica rapa

Students: Katherine Monroe

Category: Mathematics, Physics and Astronomy

School: Princeton High School

Project Title: Strict Inequalities for the n-crossing Number

Students: Nicholas Hagedorn

Category: Software and Embedded Systems

School: Princeton International School of Mathematics and Science

Project Title: DeepLPI: a novel deep learning-based model for protein–ligand interaction prediction for drug repurposing

Students: Bomin Wei

Category: Environmental Science and Engineering

School: Princeton High School

Project Title: Catalytic Carbon Capture: a Low-cost Climate Change Mitigation Strategy

Students: Shrey Khetan

Category: Biochemistry, Biology and Medical

School: Lawrenceville School

Project Title: CodOpt: Enhancing Drug and Vaccine Development by Using Deep Learning and Natural-Language Processing to Optimize Recombinant Codon Sequences via a Host-Independent Data Pipeline

Students: Bhushan Mohanraj

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Award: Superior Achievement (1)

Division: Junior Division 2023

Organization: Mercer Science and Engineering Club

Category: General Science (Junior)

School: Chapin School

Project Title: The Gauss Rifle

Students: Zachary Phelan

Category: General Science (Junior)

School: Princeton Charter School

Project Title: The Impact of Different Fabrics and the Resistance to Mosquitoes: Which Types of Fabrics Let Mosquitoes Go Through?

Students: Olivia Ahn

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Award: Second Place

Division: Senior Division 2023

Organization: Mercer Science and Engineering Club

Category: Chemistry and Materials

School: Princeton High School

Project Title: Scrubs with Bugs: Cleaning, Disinfecting, and Foaming Properties of Soaps Made with Sustainable Oils

Students: Daniela Gonzalez

Category: General Engineering

School: Princeton International School of Mathematics and Science

Project Title: Developing a Soft Robot Inspired by Octopuses for Efficient Ladder Climbing

Students: Zirui Wang

Category: Mathematics, Physics and Astronomy

School: The Pennington School

Project Title: The Physics Behind Cooking Intelligence

Students: Lisa (Nico) Wang

Category: Environmental Science and Engineering

School: Princeton High School

Project Title: A Novel Method to Accelerate the Degradation Rate of Plant-based Tableware Using Compost Tea

Students: Sumuk Anand

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Award: Outstanding Achievement (2)

Division: Junior Division 2023

Organization: Mercer Science and Engineering Club

Category: General Science (Junior)

School: Princeton Unified School Middle School (formally John Witherspoon)

Project Title: SALT & SURFACE: THE FASTEST WAY TO MELT ICE

Students: Samhita Shriram

Category: General Science (Junior)

School: Princeton Montessori School

Project Title: The Effect of Pesticide on Plant Development and Growth

Students: Sadie Betz

Category: General Science (Junior)

School: = Home School =

Project Title: An application to predict Traumatic Brain Injuries through analyzing variations of patterns in temperature.

Students: Amogh Dattatri

Category: General Science (Junior)

School: Chapin School

Project Title: Magnetic Radishes- The Effect of Magnetism on the Height of Radishes

Students: Avery Collins

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Award: Third Place

Division: Senior Division 2023

Organization: Mercer Science and Engineering Club

Category: General Engineering

School: Princeton International School of Mathematics and Science

Project Title: The implementation of an augmented reality display and a virtual reality controller on glasses

Students: Jiuhe Tian

Category: Mathematics, Physics and Astronomy

School: West Windsor-Plainsboro High North

Project Title: Using Gaia DR3 to Calibrate Cepheid Star Luminosity to Give Confidence to the Cosmic Distance Ladder

Students: Chris Joseph

Category: Software and Embedded Systems

School: Princeton High School

Project Title: Understanding Dog Behavior through Visual and Aural Sensing Using Deep Learning

Students: Amy Lin

Category: Biochemistry, Biology and Medical

School: Princeton Day School

Project Title: Role of S309-CAR-NK in Neutralizing SARS-CoV2

Students: Greta Yuan

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Award: Meritorious Achievement (3)

Division: Junior Division 2023

Organization: Mercer Science and Engineering Club

Category: General Science (Junior)

School: Chapin School

Project Title: Sunlight, Salt Water & Solar Desalination

– the effect container color may have on seawater desalination rates

Students: Samuel Lallier

Category: General Science (Junior)

School: Princeton Montessori School

Project Title: A Tsunami Study: The Effect of Water Depth on Wave Velocity

Students: Anamitra Abi

Category: General Science (Junior)

School: Chapin School

Project Title: Paper Towel Absorbency of Olive Oil

Students: Raj Saha

Category: General Science (Junior)

School: Princeton Montessori School

Project Title: Does the material used in a circuit affect the voltage of an electric current?

Students: Aiden Dutt

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Award: Honorable Mention

Division: Senior Division 2023

Organization: Mercer Science and Engineering Club

Category: General Engineering

School: Princeton International School of Mathematics and Science

Project Title: Standing Mobility Device for People with Lower Limb Difficulties

Students: Yihan Chen

Category: General Engineering

School: Hopewell Valley Central High

Project Title: Innovative Climate Change Emissions Reduction

Students: Charlotte Michaluk

Category: Mathematics, Physics and Astronomy

School: Princeton International School of Mathematics and Science

Project Title: Artificial Intelligence Diagnostic Approach of Infertility in Chinese Traditional Medicine

Students: Zhe Zheng

Category: Mathematics, Physics and Astronomy

School: Princeton International School of Mathematics and Science

Project Title: Nonexistence of a Universal Algorithm for Investment Problems in Constructive Mathematics

Students: Jiahong Sun

Category: Biochemistry, Biology and Medical

School: Robbinsville High School

Project Title: The Effect of Diet on the Lifespan of eat-2, daf-16 and Wildtype C. Elegans

Students: Anika Singh

Category: Biochemistry, Biology and Medical

School: Robbinsville High School

Project Title: Effects of Aluminum Nitrate on C-elegans

Students: Amudha Senthilkumar

Category: Biochemistry, Biology and Medical

School: The Peddie School

Project Title: The Genetic Inheritance Basis of Systemic Lupus Erythematosus

Students: Bohan Zheng

Category: Biochemistry, Biology and Medical

School: Princeton High School

Project Title: Biochemical Nanosensor Networks for Accurate Injury Detection

Students: Lawrence He

Category: Biochemistry, Biology and Medical

School: Lawrenceville School

Project Title: Prospects for Brain Computer Interfaces: Neuralink Versus Stentrode

Students: Christine Wu

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Award: Honorable Mention (4)

Division: Junior Division 2023

Organization: Mercer Science and Engineering Club

Category: General Science (Junior)

School: Princeton Montessori School

Project Title: Road Sign Recognition: Using Machine Learning to Spot Road Signs

Students: Adhya Abi

Category: General Science (Junior)

School: Chapin School

Project Title: The Effect of type of wax on a candle's melting time.

Students: Reya Thackalapatti

Category: General Science (Junior)

School: Princeton Montessori School

Project Title: How does the amount of heat affect the time it takes water to boil?

Students: Beatrice Clarke

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Award: Best Use of Photography

Division: Senior Division 2023

Organization: New Jersey Camera & One Hour Photo

Category: Mathematics, Physics and Astronomy

School: The Pennington School

Project Title: The Physics Behind Cooking Intelligence

Students: Lisa (Nico) Wang

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Award: Biomedical Science Award

Division: Senior Division 2023

Organization: Regeneron Pharmaceuticals

Category: Biochemistry, Biology and Medical

School: Lawrenceville School

Project Title: CodOpt: Enhancing Drug and Vaccine Development by Using Deep Learning and Natural-Language Processing to Optimize Recombinant Codon Sequences via a Host-Independent Data Pipeline

Students: Bhushan Mohanraj

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Award: Air Force Research Laboratory Award

Division: Senior Division 2023

Organization: US Air Force

Category: Chemistry and Materials

School: Lawrenceville School

Project Title: Engineering novel functional bread through fortification with quercetin nanoparticles

Students: William Huang

Category: General Engineering

School: Princeton International School of Mathematics and Science

Project Title: Developing a Soft Robot Inspired by Octopuses for Efficient Ladder Climbing

Students: Zirui Wang

Category: Plant Science

School: Princeton High School

Project Title: Mealworm frass as fertilizer: growth outcomes in Brassica rapa

Students: Katherine Monroe

Category: Software and Embedded Systems

School: Princeton International School of Mathematics and Science

Project Title: DeepLPI: a novel deep learning-based model for protein–ligand interaction prediction for drug repurposing

Students: Bomin Wei

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Award: AMS Outstanding Achievement

Division: Senior Division 2023

Organization: American Meteorological Society

Category: Environmental Science and Engineering

School: Princeton High School

Project Title: Catalytic Carbon Capture: a Low-cost Climate Change Mitigation Strategy

Students: Shrey Khetan

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Award: ASM Materials Outstanding Award

Division: Senior Division 2023

Organization: ASM Materials Education Foundation

Category: Chemistry and Materials

School: Lawrenceville School

Project Title: Engineering novel functional bread through fortification with quercetin nanoparticles

Students: William Huang

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Award: NJ Water Environment Association (NJWEA)

Division: Senior Division 2023

Organization: NJ Water Environment Association

Category: Biochemistry, Biology and Medical

School: Robbinsville High School

Project Title: Effects of Aluminum Nitrate on C-elegans

Students: Amudha Senthilkumar

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Award: NOAA's "Taking the Pulse of the Planet" Award

Division: Senior Division 2023

Organization: NOAA

Category: Environmental Science and Engineering

School: Princeton High School

Project Title: Catalytic Carbon Capture: a Low-cost Climate Change Mitigation Strategy

Students: Shrey Khetan

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Award: Naval Science Award

Division: Junior Division 2023

Organization: US Navy Senior Division

Category: General Science (Junior)

School: Princeton Montessori School

Project Title: The Effect of Pesticide on Plant Development and Growth

Students: Sadie Betz

Category: General Science (Junior)

School: = Home School =

Project Title: An application to predict Traumatic Brain Injuries through analyzing variations of patterns in temperature.

Students: Amogh Dattatri

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Award: Naval Science Award

Division: Senior Division 2023

Organization: US Navy Senior Division

Category: General Engineering

School: Hopewell Valley Central High

Project Title: Innovative Climate Change Emissions Reduction

Students: Charlotte Michaluk

Category: Mathematics, Physics and Astronomy

School: Princeton High School

Project Title: Strict Inequalities for the n-crossing Number

Students: Nicholas Hagedorn

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Award: RICOH Sustainable Development Award

Division: Senior Division 2023

Organization: RICOH

Category: Chemistry and Materials

School: Princeton High School

Project Title: Scrubs with Bugs: Cleaning, Disinfecting, and Foaming Properties of Soaps Made with Sustainable Oils

Students: Daniela Gonzalez

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Award: US Metric Award

Division: Senior Division 2023

Organization: US Metric Association

Category: Mathematics, Physics and Astronomy

School: The Pennington School

Project Title: The Physics Behind Cooking Intelligence

Students: Lisa (Nico) Wang

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Award: Stockholm Junior Water Prize

Division: Senior Division 2023

Organization: Stockholm International Water Institute

Category: Biochemistry, Biology and Medical

School: Robbinsville High School

Project Title: Effects of Aluminum Nitrate on C-elegans

Students: Amudha Senthilkumar

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Award: YSEA Science Fair Award

Division: Senior Division 2023

Organization: Yale Science & Engineering Association

Category: Biochemistry, Biology and Medical

School: Lawrenceville School

Project Title: CodOpt: Enhancing Drug and Vaccine Development by Using Deep Learning and Natural-Language Processing to Optimize Recombinant Codon Sequences via a Host-Independent Data Pipeline

Students: Bhushan Mohanraj