

***REGENERON***

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**REGENERON SCIENCE**  
**TALENT SEARCH**  
**2022 SCHOLARS**



# 2022 SCHOLARS

The Regeneron Science Talent Search (Regeneron STS), a program of Society for Science, is the nation's most prestigious science and math competition for high school seniors. Alumni of STS have made extraordinary contributions to science and hold more than 100 of the world's most distinguished science and math honors, including the Nobel Prize and the National Medal of Science. Each year, 300 Regeneron STS scholars and their schools are recognized. From that select pool of scholars, 40 student finalists are invited to participate in final judging, display their work to the public, meet with notable scientists and compete for awards, including the top award of \$250,000.

## ARIZONA

## Chandler

**BASIS Chandler****Wang, Ella, 17**

Assessing Light-Induced Fading of Colored Art Objects via Digital Visualization Techniques

**Hamilton High School****Sinha, Savar, 17**

The Persistence of Homology: Unity and Diversity in Eukaryotic ATP Synthases

## Gilbert

**Gilbert Classical Academy****Parikh, Khushi, 17**A Deep Convolutional Neural Network to Detect Antibiotic Resistance Polymorphisms in *S. Pneumoniae* DNA

## CALIFORNIA

## Arcadia

**Arcadia High School****Wong, Ethan, 17**

Yaw Characteristics of Aircraft With a Bell-Shaped Lift Distribution Built With a Novel Manufacturing Technique

## Claremont

**Vivian Webb School****Jiang, Fiona, 18**

Characterizing Decades of Technological Advances With Graph Neural Networks: An Innovation Network Perspective

## Cupertino

**Redwood Grove Academy****Chi, Nathan Andrew, 17**

A Machine Learning System to Classify Autism from Crowdsourced Semi-Structured Speech Recordings

## Eastvale

**Eleanor Roosevelt High School****Garudadhuri, Dimple Amitha, 18**

Developing a Pre-Risk Assessment Incorporating Machine-Learning and Biomarkers to Diagnose Alzheimer's Disease

## Goleta

**Dos Pueblos High School****Belkin, Ryan Seth, 18**Albuterol Extends Lifespan of *Caenorhabditis elegans*

## Irvine

**Northwood High School****Parthasarathy, Nithin, 17**

"Minimally Calibrated High Performance Communication Interfaces for the Neurologically Impaired": New Directions Using Language Models Along With Gaming Extensions to Assist ADHD Subjects

**University High School****Im, Haedam, 19**

EXoplanet ConflrmaTIoN throuGh Transits (EXCITING)

## La Cañada-Flintridge

**Flintridge Preparatory School****Lee, Aaron C., 18**

STROKEFAST: A Mobile Diagnostic Application to Facilitate Rapid Stroke Intervention

**Flintridge Preparatory School**

**Sivakumar, Ashwin, 17**

Late Pleistocene Fossils Recontextualize the Ecology of Introduced Turkeys in California

**La Jolla**

**Bishops School**

**Zeng, Michael, 17**

PI(t)D(t) Control and Motion Profiling for Omnidirectional Mobile Robots

**Mission Viejo**

**Capistrano Valley High School**

**Kara, Su, 18**

Identification and Localization of Endotracheal Tube on Chest Radiographs Using a Cascaded Convolutional Neural Network Approach

**Mountain House**

**Mountain House High School**

**Prawira, Jacqueline, 17**

CycloPlas 2: A Dual-Focus Development as Alternative Materials to Plastic by Upcycling Fish Scale Waste Components

**Mountain House High School**

**Roice, Ashlyn, 18**

PepPredBBB: A Novel Machine-Learning Powered Virtual Screening Method to Identify Blood-Brain Barrier Penetrating Peptides Using Vector Embeddings With Molecular Intuition

**Pacific Palisades**

**Palisades Charter High School**

**Jiang, Theodore Tianqi, 18**

Deciphering the Language of Genetic Variants: Using a Transformer-Based Language Model to Identify Pathogenic Missense Mutations Associated With Human Inherited Diseases and Cancer

**Palo Alto**

**Palo Alto High School**

**Rathi, Neil, 17**

Cross-Linguistic Universals of Morphological Fusion: An Information-Theoretic Approach

**Palo Alto High School**

**Wang, Franklin, 17**

The Fast and Inconspicuous: New Near-Earth Asteroids Discovered in Zwicky Transient Facility Data Using Neural Networks and Artificial Data Generation are Both Fast and Faint

**Rolling Hills Estates**

**Palos Verdes Peninsula High School**

**He, Vivien, 18**

Qube: A Low-Cost Internet-of-Things Device for On-Site and Regional Earthquake Early Warning

**Palos Verdes Peninsula High School**

**Lew, Jennifer, 18**

SafeBuild: The Risk-Based Power Grid Design Software

**San Diego**

**Canyon Crest Academy**

**Agrawal, Ayush, 17**

Detection of Arsenic Contamination Using Satellite Imagery and Machine Learning

**Canyon Crest Academy**

**Clairmont, Ryan, 17**

Evolution of the Cat's Eye Nebula Revealed through Morpho-Kinematic and Hydrodynamic Modeling

**Canyon Crest Academy****Gao, Andrew, 18**

Doctor PEPper: Novel Antiviral Peptide Generation via Bioactivity and Hemolysis-Aware Approach

**Canyon Crest Academy****Huang, Ryan Yuki, 17**

Multiplex Immuno-Strips With Object Detection Simultaneously Quantify Titers of Antibodies to SARS-CoV-2 and Influenza Virus

**Torrey Pines High School****Cai, Daniel, 18**

Deep Learning-Aided Diagnosis of Autoimmune Blistering Diseases

**Westview School****Mandyam, Atulya, 17**

Novel Biomarker for Identification of Bipolar Disorder Treatment Response

**San Francisco****Proof School****Zitzewitz, Zachary, 18**

A Theoretical Model of the Surface Geometry of Laminar Fluid Chains

**San Jose****Leigh High School****Kocalar, Selin, 18***De novo* Design of Biologically-Inspired Proteins as Novel Chelating Agents for the Remediation of Environmental Mercury Contamination**Lynbrook High School****Huang, William, 17**

An Investigation of the Formation of Fast Radio Bursts (FRBs)

**Lynbrook High School****Nishi, Kento, 18**

Augmentation Strategies for Learning With Insufficient Data

**Lynbrook High School****Zhang, Alexander, 17**

A Novel and Efficient Method of Persistent Homology to Detect and Remove Topological Errors in Triangle Mesh Data

**Lynbrook High School****Zhao, Luke Yuchen, 17**

Single-Cell Transcriptomic Analysis Reveals Genetic Drivers of Fast/Slow Motor Neuron Identity

**The Harker School****Feng, Alice, 17**

Deep Learning Modeling of the Relationship of Protein and RNA Levels With Manifold-Preserving Regularization

**The Harker School****Hu, Alexander, 17**

Improved Graph Formalism for Quantum Circuit Simulation

**The Harker School****Parthasarathy, Rishab, 16**

A Novel Combination of Natural Language Processing (NLP) and Pathway Analysis for Predicting Oncogenic Mutation Progression and Recommending Targeted Therapies

**The Harker School**

**Ramachandran, Sasvath, 17**

Genomic Reconstruction and Phylogenetic Analyses of *Cycloclasticus*, a Dominant Microbe at the Deepwater Horizon Oil Spill

**The Harker School**

**Wang, Aimee, 17**

Monitoring Pinto Abalone Recruitment in Sitka Sound, Alaska

**The Harker School**

**Zhou, Emily A., 18**

Computer-Assisted Detection of Intracranial Aneurysms Using a Transformer Deep Neural Network in 3D MR Angiography

**Valley Christian High School**

**Hsu, Sheryl, 17**

Explore-and-Fuse: A *Physarum*-Inspired Approach to the Steiner Tree Problem

**San Mateo**

**The Nueva School**

**Chu, Andrew Kai, 18**

Synergy and Competition between Long and Short Duration Storage in Renewable Power Grids

**The Nueva School**

**Guo, Karen, 18**

Sex Chromosome Dosage Effects on Children's Neurocognitive Profiles of Mathematics and Literacy

**The Nueva School**

**Narayan, Yash, 17**

DeepWaste: Applying Deep Learning on a Mobile Device for Accurate, Low Cost, and Ubiquitous Waste Classification

**San Ramon**

**Dougherty Valley High School**

**Shi, Sophia, 17**

A Novel Hybrid Deep Learning Architecture for Predicting Acute Kidney Injury Using Patient Record Data and Ultrasound Kidney Images

**Saratoga**

**Saratoga High School**

**Agarwal, Naisha, 17**

Recommendation Algorithms that Increase Equitable Access to Influencers (Fairness) in a Network

**Saratoga High School**

**Gupta, Riya, 17**

Formulating a Gene Signature for the Diagnosis of Autoimmune and Infectious Diseases

**Saratoga High School**

**Zuo, Ethan, 18**

Optimization of Novel Two-Phase Jet Impingement Cooling for Datacenter High Power-Density Processors

**Sherman Oaks**

**The Buckley School**

**Rasmussen, Vale, 17**

Enhancing Performance and Sustainability of Firefighting Aircraft in the Era of Wildfires Fueled by Global Warming

## COLORADO

### Boulder

#### Fairview High School

**Cui, Jason, 17**

Sodium Benzoate, a Common Food Preservative, Shortens Lifespan, Induces Premature Aging, and Accelerates Neurodegeneration in *Caenorhabditis elegans*

## CONNECTICUT

### Greenwich

#### Greenwich Academy

**Laumas, Sachi, 18**

The Genetic and Epigenetic Mechanisms by Which MYB Regulates MEP Fate Decision

#### Greenwich Academy

**Shell, Natalie Anne, 18**

Developing and Testing Updated Geometric Structures to Model the Optical Properties of Spirulina, a Helical Photosynthetic Microorganism

#### Greenwich High School

**Blank, Steven, 17**

Design of a Rapid, Sensitive SARS CoV-2 Nucleocapsid Luminescent Detection Card for COVID-19

#### Greenwich High School

**Moore, Ella, 18**

Inhibition of Covid-19 Respiratory Complications via an R-954 Peptide Bradykinin 1 Receptor Antagonist

#### Greenwich High School

**Nakanishi, Alexa, 17**

Multi-Component Fixation Tracking in Gaze Interaction for Rapid, Non-Invasive Diagnosis of Specific Learning Disorders

### Guilford

#### Guilford High School

**Li, Jerry Y., 17**

Optimizing Pool Size for Pooled Testing of SARS-CoV-2

### New Haven

#### Hopkins School

**Kenkare, Cyrus Jay, 18**

MSRB2 in SARS-CoV-2 Infection: A Bioinformatic Analysis

### Trumbull

#### Christian Heritage School

**Li, Bangzheng, 19**

A Weak Ascending Chain Condition on Principal Ideals and New Classes of Atomic Domains

### Wallingford

#### Choate Rosemary Hall

**Bang, Seyun, 18**

TFAM-DNA Complex, A Novel Digital Data Storage Model: A Histone-Like Architectural Role for the Stability of DNA

## DELAWARE

### Wilmington

#### Charter School of Wilmington

**Andreasen, Claire, 18**

Strain-Induced Second-Order Jahn-Teller Reconstruction and Magnetic Moment Modulation

**Charter School of Wilmington**

**Kahlon, Arjan Singh, 18**

Remote Gait Analysis as a Proxy for Traditional Gait Laboratories: Utilizing Smartphones as a Wearable Patient-Implemented Solution for Assessment of Gait Across Differing Terrains

**Charter School of Wilmington**

**Yang, Heran, 17**

Electronic and Mechanical Properties of Sub-nm Diameter Carbon Nanotubes

**Tower Hill School**

**Miao, Benjamin, 17**

Glucose Transporter Type 1 is Essential to the Transcription of Thrombomodulin in Human Brain Microvascular Endothelial Cells Under High Glucose Condition

## FLORIDA

### Boca Raton

**Florida Atlantic University High School**

**Lian, Julianna, 17**

*Sargassum* sp. Reductive, Polyphenol Extract Modulates *D. dorotocephala* Regeneration by Reduction of ROS, and has Potential as an Anti-Inflammatory Agent

**Florida Atlantic University High School**

**Sreejithkumar, Vivek, 18**

The Evolution of the Identifiable Analysis of the COVID-19 Virus

### Fort Lauderdale

**Pine Crest School**

**Ghosh, Shaurnav, 18**

Using Convolutional Encoder Networks to Determine the Optimal Magnetic Resonance Image for the Automatic Segmentation of Multiple Sclerosis

### Gainesville

**Buchholz High School**

**Balachandar, Anjana, 17**

Extending the Boundaries of 3D Printing of Soft Matter

### Homestead

**Medical Academy of Science and Technology**

**Gastelumendi-Franco, Lara, 17**

Immunomodulatory Properties of Mesenchymal Stem Cells for Knee Osteoarthritis Prevention and Treatment

### Miami

**Coral Reef Senior High School**

**Li, Krystal S., 17**

Isolating and Characterizing Phosphorus Solubilizing Bacteria from Rhizospheres of Native Plants Grown in Calcareous Soils and Sediments

### Naples

**Community School of Naples**

**Hoffmann, Heloise, 18**

Self-Reported Reduced Sleep Quality and Excessive Daytime Sleepiness in Facioscapulohumeral Muscular Dystrophy

### Orlando

**Lake Highland Preparatory School**

**Madan, Varun Raj, 17**

Developing a Novel Multiple Linear Regression Model to Optimize Honey Bee Gut Immunity Using a Lactic Acid Bacteria Probiotic Mixture



<b>Plantation</b>	<u><b>American Heritage School</b></u> <b>Ma, Larissa, 17</b> White Matter Connectivity of the Superior Longitudinal Fasciculus II and Executive Function in Young Children With Attention Deficit Hyperactivity Disorder
<b>Tampa</b>	<u><b>C. Leon King High School</b></u> <b>Ghosh, Arko, 17</b> A Novel Approach to Citrus Disease Management: Leveraging Computer Vision, Machine Learning and Convolutional Neural Networks
<b>Winter Springs</b>	<u><b>Winter Springs High School</b></u> <b>Naga, Varsha, 17</b> Prevention of Healthcare-Associated Infections Using Antibacterial Boron Carbonitride Nanoparticle Coating on Medical Devices  <u><b>Winter Springs High School</b></u> <b>Vaidyanathan, Annika, 17</b> Dynamic Contact Angle Measurements of Superhydrophobicity in Dip-Coated Face Masks to Minimize Exposure to COVID-19 Sized Nanoparticles
<b>GEORGIA</b>	
<b>Alpharetta</b>	<u><b>Denmark High School</b></u> <b>Dasari, Srihitha, 17</b> Improving Multiclass Classification of Alzheimer's Disease Using Cortical Volumetry and Inter-Cortical Ratios as Combined Markers
<b>College Park</b>	<u><b>Woodward Academy</b></u> <b>Jung, Samuel C., 18</b> The Electric Response of Wood for Guitar Pickups Using Surface Acoustic Wave Transducers
<b>Decatur</b>	<u><b>Decatur High School</b></u> <b>Bee-Lindgren, Max, 18</b> Calculating Transition Amplitudes of an Observable Using the Rodeo Algorithm for Quantum Computing
<b>Dexter</b>	<u><b>West Laurens High School</b></u> <b>Mishra, Vaibhav, 17</b> NeuroXNet: Creating A Novel Deep Learning Architecture that Diagnoses Neurological Disorders, Finds New Blood Biomarkers, and Assesses Surgical, Drugs, and Radiation Treatment Plans Using Medical Imaging and Genomic Data
<b>ILLINOIS</b>	
<b>Aurora</b>	<u><b>Illinois Mathematics and Science Academy</b></u> <b>Tiwari, Siddharth, 16</b> On the Relationship Between Pain Variability and Relief in Randomized Clinical Trials
<b>Des Plaines</b>	<u><b>Maine West High School</b></u> <b>Bhattacharyya, Pratiksha, 18</b> Molecular Mechanisms of Momordin in the Regulation of Glucose Homeostasis
<b>Hinsdale</b>	<u><b>Hinsdale Central High School</b></u> <b>Khankari, Jui, 17</b> Automated Detection of Arterial Landmarks and Vascular Occlusions in Acute Stroke Patients on Digital Subtraction Angiography Using Deep Learning

## INDIANA

### Bloomington

#### Bloomington High School

**Larsen, Daniel, 18**

Bertrand's Postulate for Carmichael Numbers

### West Lafayette

#### West Lafayette Junior-Senior High School

**Goel, Siya, 17**

PanCan Diagnosed (a miRNA Approach): Using Feature Selection, Ensemble Algorithms, and Interpretability for the Early Diagnosis and Personalized Treatment of Pancreatic Cancer

## IOWA

### Council Bluffs

#### Lewis Central High School

**Orth, Amara, 18**

Secret Sounds of Bees: Analysis of Honey Bee Vibroacoustics Using Hidden Markov Models

## KENTUCKY

### Louisville

#### duPont Manual Magnet High School

**Chandrashekhar, Varun, 18**

SpeakUp: A Machine Learning Based Speech Aid to Enable Real-Time Silent Communication for the Paralyzed by Translating Neuromuscular EMG Signals to Speech

#### duPont Manual Magnet High School

**Kar, Shreyas, 17**

Impact of Electronic Health Record Discontinuity in Prediction Modeling Algorithms

## LOUISIANA

### New Orleans

#### eLearning K12

**Pizzolato, Rachel Michelle, 18**

An Exploration Into the Effects of Incorporating a Novel 3D Printed Mount Design that Allows for Extension of a Custom Damping System During Front and Rear Oblique Impacts to a Football Helmet Facemask in an Effort to Reduce, or Possibly Eliminate, Concussions and Chronic Traumatic Encephalopathy (CTE)

### Shreveport

#### Caddo Parish Magnet High School

**Burks, Elijah Eshaun, 17**

The Effect of Freshwater Acidification on Clams

#### Caddo Parish Magnet High School

**Modi, Ashini, 18**

An Evolutionary Model for Stellar Wind-Induced Atmospheric Escape of Small Exoplanets

## MARYLAND

### Bethesda

#### Walter Johnson High School

**Choi, Lauren Elizabeth, 18**

Automated Breast Cancer Detection Pipeline via Mitotic Cell Recognition Using Artificial Intelligence

### Poolesville

#### Poolesville High School

**Foo, Orion Chuanyi, 17**

Powerful Quasar-Driven Outflows in the Local Universe from the Cosmic Origins Spectrograph Hubble Space Telescope Far-Ultraviolet Spectroscopic Archive

**Poolesville High School****Nachod, Benjamin Ethan, 18**Assessment of Petroleum-Based Plastic and Bioplastics Degradation  
Using Anaerobic Digestion**Poolesville High School****Xiao, Vivian, 18**

Clustering Gut Metabolomic NMR Data

**Silver Spring****Montgomery Blair High School****Eroz, Efe, 17**

A Novel Short Block-Length Coding Method for Arbitrary Channels

**Montgomery Blair High School****Guo, Phillip H., 17**

Bandit-Based Multi-Start Strategies for Global Continuous Optimization

**Montgomery Blair High School****Pai, Dhruv, 18**Representation and Deep Learning on Brain Surface Data for Transcranial  
Magnetic Stimulation**MASSACHUSETTS****Andover****Phillips Academy****Xiong, Nathan, 18**

The Master Field and Free Brownian Motions

**Phillips Academy****Yang, Ali, 17**Multimodal Contrastive Learning Matches the Transcriptome With Pathological  
Diagnoses**Phillips Academy****Yue, William, 18**

Reconstructing Spider Trees from Traces Using Bivariate Littlewood Polynomials

**Boston****Boston University Academy****Xi, Zoe, 17**

Approximation Algorithms for Dynamic Time Warping on Run-Length Encoded Strings

**Braintree****CATS Academy Boston****Tuchinda, Waris, 19**Planar Heterojunction Perovskite Solar Cell With Graded Energy Band Architecture  
via Fast-Drying Spray Deposition**Lexington****Lexington High School****Liu, Francis, 18**aFIP: Evaluating Pitchers' Abilities With Regard to Strength of Schedule Using  
a Universal Law**Milton****Milton Academy****Jiang, Yanan, 18**

Generalizing Ruth-Aaron Numbers

**Newton Centre****Newton South High School****Guo, Joshua, 18**On the Gauss-Epple Homomorphism of the Braid Group  $B_n$ , and Generalizations  
to Artin Groups of Finite Type

**Newton South High School**

**Liu, Frank, 17**

PRESTO: Rapid Protein Mechanical Strength Prediction With an End-to-End Deep Learning Model

**Wayland**

**Wayland High School**

**Zhao, Kevin Edward, 17**

More than BERT: oLMpics on Diverse Language Models

## MICHIGAN

**Allen Park**

**Allen Park High School**

**Liveoak, Donald J., 18**

Schrödinger Bridges on Discrete Domains

**Bloomfield Hills**

**Cranbrook Kingswood School**

**Yang, Margaret L., 17**

Engineering Multi-Enzyme Whole-Cell Biocatalysts for Biofuel Production

**Okemos**

**Okemos High School**

**Kulkarni, Kaivalya R., 17**

On the 3-Rank of Class Groups of Quadratic Fields

## MINNESOTA

**Minneapolis**

**Blake School Northrop Campus**

**Bhavsar, Atreyus Abdhish, 18**

The Spread of Macroscopic Droplets from a Simulated Cough With and Without the Use of Masks or Barriers

## MISSISSIPPI

**Columbus**

**Mississippi School for Mathematics & Science**

**Yan, Jessica Cindy, 18**

Reinforced Lignin Foams With Higher Adsorption Capability

## MISSOURI

**Ballwin**

**Parkway West High School**

**Gao, Wilson, 17**

Toxic Metal Accumulation in Shellfish Commercially Available in the US Market

## NEBRASKA

**Lyons**

**Lyons-Decatur Northeast High School**

**Chavira-Prieto, Samantha Janitza, 17**

Surface Biofilm and Spectral Analyses of Eight Common Plastic Materials Exposed to Different Environmental Conditions Using Basic Spectrophotometry and Advanced Microscopy

## NEVADA

**Las Vegas**

**Edward Clark High School**

**Zhang, Anya, 17**

Spatial Variability of Ocean Acidification and Its Influencing Factors in Massachusetts Bay

## NEW HAMPSHIRE

### Exeter

#### Phillips Exeter Academy

**Chowdhury, Neil, 18**

Modeling the Effect of Histone Methylation on Chromosomal Organization in Colon Cancer Cells

#### Phillips Exeter Academy

**Cong, Kevin, 17**

On the Sizes of Furstenberg Sets in Finite Fields

## NEW JERSEY

### Basking Ridge

#### Ridge High School

**Xia, Daniel, 18**

A Minkowski-Type Inequality in AdS-Melvin Space

### Hackensack

#### Bergen County Academies

**Alan, Julie, 17**

Using Antihistamines to Target  $\alpha$ -synuclein for the Treatment of Parkinson's Disease

#### Bergen County Academies

**Kumar, Rishi, 17**

Co-Culturing *S. cerevisiae* and *K. marxianus* to Bioremediate Copper from Water

#### Bergen County Academies

**Liu, Seton, 17**

A Novel Role for Fis1-Mediated Mitochondrial Fission in Senolytic Drug Development

#### Bergen County Academies

**Mantena, Rohit, 18**

The Critical Role of Glutamine Transporter ASCT2 on Parkinson's Disease Progression

#### Bergen County Academies

**Pichappan, Kannammai O., 17**

A Novel, Non-Invasive, Schwann Cell-Supporting Approach to Peripheral Nervous System Degenerative Disease

#### Bergen County Academies

**Shi, Isabel, 18**

5G Network High Frequency Radiation Exerts Biological Effects on the Health of Differentiated Neuroblastoma Cell and Silkworm Models

#### Bergen County Academies

**Volkova, Alexandra, 17**

The Potential of TGF- $\beta$  and Steroid-Induced Osteoblastic Transdifferentiation of Human Fibroblasts in Replacing the Bone Graft

### Kinnelon

#### Kinnelon High School

**Yu, Zara, 15**

Many-Body Quantum State Control in the Presence of Environmental Noise

### Lincroft

#### High Technology High School

**Chang, David Zhu, 18**

Searching for Exoplanets in Kepler Data With Deep Learning

Livingston	<p><b><u>Newark Academy</u></b>  <b>Recce, Brandon, 17</b>                      Quantitative Analysis of the Impact of Highly Skilled Immigrant Workers on American Innovation</p>
Martinsville	<p><b><u>The Pingry School</u></b>  <b>Xie, Katherine, 18</b>                      The Impact of Structural Changes on Learning Capacity in the Fly Olfactory Neural Circuit</p>
Millburn	<p><b><u>Millburn High School</u></b>  <b>Park, Ryan, 17</b>                      V-BIND: SARS-CoV-2 Inhibitor Design via Geometric Transformer</p>
Princeton	<p><b><u>Princeton High School</u></b>  <b>Huan, Mulin, 18</b>                      Effect of Temperature on Action Potential Propagation by Trigger Hairs of the Venus Flytrap (<i>Dionaea muscipula</i>) When Exposed to Mechanical Stimuli</p>
	<p><b><u>Princeton High School</u></b>  <b>Metaxas, Ada, 18</b>                      Imbalances in Copper or Zinc Concentrations Trigger Further Trace Metal Dyshomeostasis in Amyloid-Beta Producing <i>Caenorhabditis elegans</i></p>
	<p><b><u>Princeton International School of Math and Science</u></b>  <b>Wang, Atticus, 17</b>                      Representation Stability and Finite Orthogonal Groups</p>
	<p><b><u>Princeton International School of Math and Science</u></b>  <b>Yu, Xinkai, 18</b>                      Modeling and Mitigating Infection Risks of COVID-19 in Aircraft Cabins</p>
	<p><b><u>Stuart County Day School of the Sacred Heart</u></b>  <b>Jin, Sonya, 17</b>                      PneumoStack: A Novel Approach to Automated Pneumonia Diagnosis With Deep Transfer Ensemble Learning via Convolutional Neural Networks and Stacked Generalization</p>
Princeton Junction	<p><b><u>West Windsor-Plainsboro High School</u></b>  <b>Ayyalapu, Neha, 18</b>                      A Machine Learns to Predict the Stability of Highly Diverse Multi-Planetary Systems</p>
	<p><b><u>West Windsor-Plainsboro High School</u></b>  <b>Oruganti, Suraj, 18</b>                      Early/Late Chemotherapy: Mathematically Modeling Prostate-Specific Antigen Parameters and Investigating their Effects on Intermittent Androgen Deprivation</p>
Tenafly	<p><b><u>Tenafly High School</u></b>  <b>Park, Hannah, 17</b>                      Altered Development of Thymus in <i>Tmem131</i> Knockout Mouse Model of Down Syndrome</p>
	<p><b><u>Tenafly High School</u></b>  <b>Selver, Maxwell, 18</b>                      Expressional Correlations Between SERPINA6 and Pancreatic Ductal Adenocarcinoma-Linked Genes</p>

## NEW MEXICO

## Los Alamos

**Los Alamos High School****Strauss, Robert Russell, 17**

Neuromorphic Computing: Simulating the Brain's Visual Cortex for More Efficient Computation

## NEW YORK

## Armonk

**Byram Hills High School****Araki-Kurdyla, Derek, 17**

Elucidating the Role of Environmental Context in Carbon Sequestration and Preservation of Seagrass Sediment Carbon through Analysis of Sediment Grain Size and Carbon Lability

**Byram Hills High School****Bachmann, Edith, 18**

Tell Me a Story: The Effects of Storytelling vs. Story-Reading on the Executive Functions of Fourth Graders

**Byram Hills High School****Levy, Sydney, 17**

Revealing the Mechanosensitive-ATP-Purinergic Signaling Pathway that Underlies Fibrosis Resulting From Mitral Valve Prolapse

**Byram Hills High School****Pizzorusso, Emily, 17**

Color My World: Identifying Differences Between Females and Males in Types and Clusters of Synesthesia

## Bellmore

**John F. Kennedy High School****Brown, Michelle, 17**The Concurrent Effects of Metformin and Dietary Restriction on Parkinson's Disease in a *Drosophila melanogaster* Model**John F. Kennedy High School****Lin, Brandon, 17**A Novel Approach to Examine the Effect of Dietary Restriction and Exercise on Aging *Drosophila melanogaster* Involving Custom-Built 3D Printed Equipment**John F. Kennedy High School****Luisi, Christopher Vincenzo, 17**How Dietary Restriction Affects the Athleticism, Metabolic Rate, and Lifespan of *Drosophila melanogaster***John F. Kennedy High School****Prainito, Christopher, 17**

Development of a Polydiacetylene-Based Paper Biosensor for Naked-Eye Detection of COVID-19 in Saliva

**John F. Kennedy High School****Rigaud, Desiree, 17**

COVID-19 Induced Economic Stress: The Effect on Marital Functioning and Methods of Alleviating Financial Stress

**John F. Kennedy High School****Su, Shannon, 17**The Combined Effect of HIF-1 $\alpha$  Inhibition With Azacitidine and Venetoclax in Acute Myeloid Leukemia

**Bethpage**

**Bethpage High School**

**Bhatia, Aurrel, 18**

Utilizing a Long Short-Term Memory (LSTM) Machine Learning Algorithm to Create Soil Moisture Prediction Models and Improve Water Productivity in Southern California

**Brentwood**

**Brentwood High School – Ross Center**

**Lopez, Ricardo, 17**

Evaluating Salt Marsh Restoration at Sunken Meadow: Analysis of Sediment Loss and Accretion

**Brentwood High School – Ross Center**

**Lopez, Roberto Antonio, 17**

Evaluating *Phragmites australis* Wrack Accumulation in a Long Island Salt Marsh Ecosystem and Assessing its Effect on Carbon Sequestration, the Nitrogen Cycle, and Sediment Biota

**Bronx**

**Bronx High School of Science**

**Fisher, Aliya Rose, 18**

Non-Genetic Parental Effects on the Free-Running Period of *Drosophila* Circadian Clocks

**Bronx High School of Science**

**Gu, Richard, 17**

An Optimized H-MRCNN Architecture for Methane Gas Emission Detection Using Hyperspectral Imagery

**Bronx High School of Science**

**Iskhakov, Samuel, 17**

Adaptive Multi-Sigmoid Contrast Enhancement

**Bronx High School of Science**

**Labre, Enrique Clavecilla, 18**

Gaining Sustainable Development Insights for Data-Driven Decision Making through Artificial Intelligence

**Bronx High School of Science**

**Le, Kathryn, 17**

Methodology of Network Connection Removal Reveals Connection and Node Impact and Function in *C. elegans* Locomotion Neural Network for Guiding Effective Designs for Artificial Neural Networks

**Bronx High School of Science**

**Morange, Genevieve, 17**

An Examination of the Relationship Between Eating Disorder Symptoms and Sexual Assault Disclosure among College Students: A National Study

**Bronx High School of Science**

**Rossberg, Samuel, 17**

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