

**REGENERON**

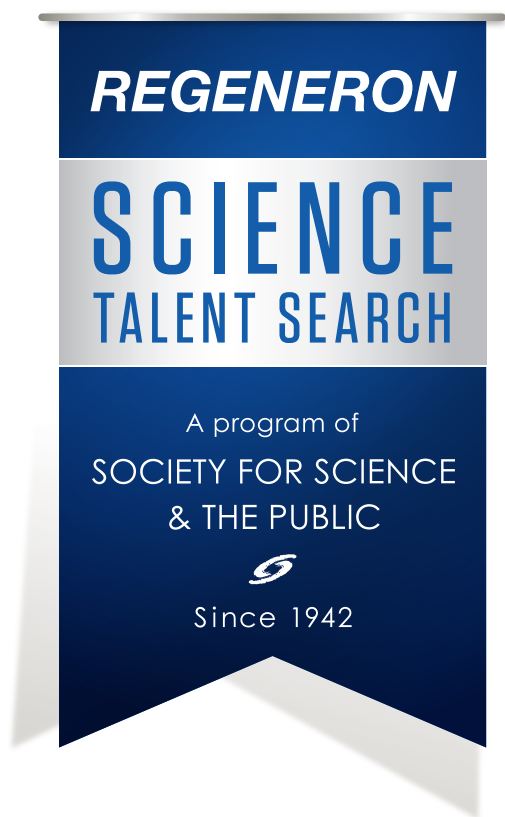
**SCIENCE  
TALENT SEARCH**

A program of  
SOCIETY FOR SCIENCE  
& THE PUBLIC



Since 1942

**REGENERON SCIENCE  
TALENT SEARCH  
2020 SCHOLARS**



## 2020 SCHOLARS

The Regeneron Science Talent Search (Regeneron STS), a program of Society for Science & the Public, 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 Washington, D.C. in March 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****Hamilton High School*****Iyer, Devrath, 17***

Automatically Analyzing Open-Ended Survey Responses Using Statistical and Machine Learning Methods

**Scottsdale****BASIS Scottsdale*****Hill, Zander, 18***

Upper Bound on the Distortion of Cabled Knots

**Tucson****Empire High School*****Fosdick, Matthew, 18***

A Novel Approach to Renewable Energy: Light Stimulated Active Cation Transport Membrane via Covalent Modification with a Photoacid

**ARKANSAS****Hot Springs****Arkansas School for Mathematics, Sciences, & the Arts*****Hwang, Victoria, 18***POLK<sup>KO</sup> GBM-Derived Cells Exhibit Increased Replication Catastrophe**CALIFORNIA****Arcadia****Arcadia High School*****Yeung, Andre, 18***Induction of the Endosymbiotic Gene Transfer Mechanism from Chloroplast to Nuclear Genome in the Green Alga *Chlamydomonas reinhardtii* and Its Role in the Subsequent Evolution of Functional Organelles**Atherton****Menlo School*****Lebedeva, Sonya, 18***

Altered Organoid Vascular Neogenesis in PAH Subjects

**Bakersfield****Stockdale High School*****Bose, Rishabh, 17***

Non-Line-of-Sight Image and Depth Recovery Using an Ordinary Digital Camera

**Belmont****Carlmont High School*****Sun, Selena, 18***

The outREACH Sensor: Validation and Evaluation of a Low-Cost Wearable Device for Upper Limb Telerehabilitation Among Brain Injury Patients in Sub-Saharan Africa

**Cupertino****Monta Vista High School*****Irrinki, Ashvin, 17***

Synergetic Prosthesis

***Raghupathi, Gautham, 18***

New Punctate Clathrin-Mediated Endocytosis Events Detected in 4D Super-Resolution Lattice Light-Sheet Microscopy Data via a Novel Deep Learning Pipeline Applicable to Numerous Puncta Segmentation Tasks

***Xia, Iris, 17***

Strange Echoes from Supermassive Black Holes: Anomalous Responses of High-Ionization Emission Lines in Active Galactic Nuclei (AGNs) to Continuum Variability

**Fullerton****Troy High School*****Bose, Soham, 17***

Application of Physics Informed Neural Networks to Diffusion Partial Differential Equations

- Irvine**
- Northwood High School**  
***Chung, Karen, 18***  
Integrating Mathematical Modeling with Machine Learning to Identify Cancer Driver Genes
- University High School**  
***Kruglyak, Lev, 17***  
Maximal Divided Power Extensions of the Rational Cherednik Algebra of Type  $A_1$
- Neervannan, Arjun, 17***  
Combating Cyberbullying and Toxicity by Teaching AI to Use Linguistic Insights from Human Interactions in Social Media
- La Jolla**
- La Jolla High School**  
***Cosman, Ilan, 17***  
Computer Vision for Detecting Errors in 3D Printing
- Los Altos**
- Los Altos High School**  
***Guh-Siesel, Alex, 17***  
A Method for Treating Celiac Disease: Synthesis of Small Molecule Inhibitors of the HLA-DQ2 Heterodimer
- Los Angeles**
- The Archer School for Girls**  
***Mirdamadi, Amireh, 17***  
The Role of Isolation and Socialization on Food and Drug Addiction in *Drosophila melanogaster*
- Mill Valley**
- Talmalpais High School**  
***Sanda, Rohan, 17***  
A Preventative Technological Solution to the Formation of Diabetic Foot Ulcers
- Palo Alto**
- Palo Alto High School**  
***Guo, Ashley, 17***  
Metabolic Regulation in Neuronal Morphogenesis
- Tang, Ivory, 17***  
Enhancing Ferromagnetism and Tuning Magnetic Anisotropy Utilizing Spin-Orbit Interaction
- Pleasanton**
- Amador Valley High School**  
***Wisoff, Jeffrey, 17***  
Assessing the Angular Dependence of Skull-to-Brain Impact Dynamics to Inform Future Bicycle Helmet Design
- Riverside**
- Riverside STEM Academy**  
***Lee, Michael, 17***  
Application of High Internal Phase Emulsions to Hierarchically Porous Structures for Solar Steam Generation
- San Diego**
- Canyon Crest Academy**  
***Pollner, Alina, 18***  
Novel Strategy to Increase Fruit Production via CRISPR-Cas9 Genome Engineering
- Del Norte High School**  
***Dogra, Arushi, 17***  
The Role of C1q and CD4+ T-Cells in the Pathogenesis of Systemic Lupus Erythematosus (SLE)

**Torrey Pines High School**

***Liu, Daniel, 17***

Adversarial Point Perturbations on 3D Objects

**San Jose**

**Evergreen Valley High School**

***Zhang, Serena, 17***

RNA-seq Analysis of Lung Pericytes Reveals Novel Genes Associated with Pulmonary Arterial Hypertension

**Lynbrook High School**

***Ganai, Milan, 17***

Identifying Merged Tracks in Dense Environments with Machine Learning

***Lalgudi, Chinmay, 17***

Designing a Novel Gene Entropy-Based Leukocyte Signature Matrix to Predict Cancer Tumor Composition

**Notre Dame High School**

***Sridhar, Shruti, 17***

Investigating Genetic Mechanisms of the Vascular Endothelium Using Deep Learning and Single-Cell Transcriptome Analytics

**The Harker School**

***Chen, Cynthia, 17***

Decoding Neural Networks: Discovery of Anti-Tumor B-Cell Receptor Motifs Using a Novel Sequence-Based Computational Framework

***Zhou, Joshua, 17***

Physical Analysis and Optimization of Electromagnetic Coilgun Launch Systems

**San Ramon**

**Dougherty Valley High School**

***Yang, Janice, 17***

A Novel Machine Learning Method to Predict Breast Cancer Patient Response to Neoadjuvant Chemotherapy and Progression-Free Survival from Axillary Lymph Node MRIs

**Santa Ana**

**Orange County School of the Arts**

***Liu, Bailey, 17***

Tracing the Evolutionary Stage of Supermassive Black Holes in Galaxy Mergers with High Spatial Resolution Archival Data

**Saratoga**

**Saratoga High School**

***Das Sharma, Bikrant, 17***

Power Savings in USB Hub through a Proactive Scheduling Strategy

**Studio City**

**Harvard-Westlake School**

***Yang, Andrew, 18***

Multi-Tissue DNA Methylation Predictors of Average Body and Brain Weights Across Dozens of Mammalian Species

**Walnut**

**Walnut High School**

***Cheng, Ken, 17***

Quantum Chemical Study of Molecular Structures and Stabilities of Iron Complexes Containing Nitric Oxide and Imidazole-Based Ligands

**COLORADO  
Boulder**

**Fairview High School**

***Golla, Anudeep, 17***

Discovery of Hidden Gene Regulators: A Novel Machine Learning Approach to Transcriptional Pause Site Determination

***Ma, Joy, 18***

Nanoscale Optical Probing of Two-Dimensional Heterostructures Suspended on Nano-Slits

***Yang, Kevin, 18***

From Greenhouse to Redhouse: Development of an Advanced Film to Promote Photosynthetic Activity and Crop Production

**Fort Collins**

**Fort Collins High School**

***Liu, Megan, 16***

Modeling the Potential Effects of Climate Change on the Availability of Polar Bear Denning Habitat

**Greenwood Village**

**Cherry Creek High School**

***Ijju, Siddarth, 17***

Fast MRI: Reducing the Acquisition Time for MR Images using Undersampled *K*-Space and a GAN

**CONNECTICUT**

**Greenwich**

**Convent of the Sacred Heart**

***Badagliacca, Caroline, 18***

Music and Memory: The Ideal Dosage of Music for Improved Cognition and Quality of Life in Patients with Alzheimer's Disease and Dementia

**Greenwich High School**

***Chen, Cynthia, 17***

A Green Nanotechnological Approach for Energy Efficiency and Conservation: Tungsten-Doped Vanadium Dioxide Thermochromic Smart Windows

***Hussain, Hiba, 17***

Non-Invasive, Low-Cost Diagnosis of COPD (Chronic Obstructive Pulmonary Disease) via Smartphone Breath Analysis

***Jain, Raina, 17***

Control of *Varroa destructor* Infestation with a Dual-Function Thymol-Emitting Honey Bee Hive Entranceway

***Speaker, Justin, 18***

Design of a Riboflavin-Enhanced Ultraviolet Contact Lens Disinfection System

**New Canaan**

**New Canaan High School**

***Mehra, Anna Thérèse, 17***

Structural Basis for FGF4 Subfamily Members' Receptor-Binding Specificity and Novel Dimerization Mechanism

***Nelson, Theodore, 17***

Transcriptome Comparisons of Placental Hofbauer Cells and Other Macrophages

**West Hartford**

**William Hall High School**

***Granquist, Ashley, 17***

Multi-Wavelength Identification of Black Hole Candidates in the M13 Globular Cluster

**Woodbridge**

**Amity Regional High School**

***Wang, Sophia, 17***

Real-Time Sinkhole Detection Using Civil Engineering Techniques, the Internet of Things (IoT), and Artificial Intelligence

## DELAWARE

Wilmington

### Charter School of Wilmington

**Xing, Albert, 17**

Lattice Relaxation and New Phase Formation in Au/Pt Multilayers

## FLORIDA

Delray Beach

### American Heritage School Boca-Delray

**Behara, Eeshani, 17**

Smart Microfluidics-Based Impedance Aggregometry Biosensor for Detection of Platelet Hyperaggregation

**Grimmett, Glenn, 18**

Carbon Capture Using Amine-Tethered Polystyrene and Polyacrylic Polymers

## Gainesville

### Buchholz High School

**Jiang, Helena, 17**

Novel Bioinspired Colorimetric Sensors for Detecting Chemicals in Vapor, Liquid, and Solid Phases

### Eastside High School

**Rathinasabapathi, Brindha, 18**

Developing Diagnostic Models for Cardiovascular Disease Using RNA Markers

**Verma, Himanshi, 18**

Protective Effects of Natural Products like Curcumin and *Centella asiatica* on Amyloid Beta-Induced Mitochondrial Dysfunction in Ocular Manifestations of Alzheimer's Disease

## Jacksonville

### Episcopal High School of Jacksonville

**Body, Ashton, 18**

Targeted Drug Delivery for Drug-Resistant Cancer

## Melbourne

### West Shore High School

**Shah, Pooja, 17**

Density Dependent Signaling in the Model Eukaryote *Chlamydomonas reinhardtii*

## Miami

### Dr. Michael M. Krop High School

**Levy, Ethan, 17**

Efficiency of a Novel Nano-Cardiac Device for Atherectomy of Coronary Artery Occlusion

## Orange Park

### Ridgeview High School

**Chen, Michael, 17**

An Investigation into the Distillation of Water from *Pennisetum purpureum* Using Solar Stills to Alleviate the Water Crisis in Uganda

## Orlando

### Lake Highland Preparatory School

**Konda, Sanjana, 17**

Development and Evaluation of a Novel Hydrothermally Treated Chitosan-Based Drug Delivery System

## Riviera Beach

### Suncoast High School

**Kantamneni, Subhash, 18**

*Precise Stellar Ages: Calibrating Theoretical Stellar Isochrones Using Non-Local Thermodynamic Equilibrium (NLTE) Conditions*

## Sebring

### Sebring High School

**Patel, Rohin, 17**

DNA Barcoding and Medicinal Properties of the Rare Plants of Florida Ridges Implicate Urgency of Conservation

- Stuart**                                **South Fork High School**  
***Jakhete, Rohan, 17***  
A Low-Cost, Autonomous, 3D-Printed Buoy for Hg<sup>2+</sup> Monitoring in Waterways
- Tallahassee**                        **James S. Rickards High School**  
***Haldiya, Tanvi, 17***  
Exploring Mechanisms Underlying Temporal Lobe Epilepsy: *An Analysis of the Neuron-Microglia-Astrocyte Triad*
- Vero Beach**                         **Vero Beach High School**  
***Wagner, Griffin, 18***  
A Novel Machine Learning Approach to Proactive Management of Cyanobacteria Blooms in the Indian River Lagoon
- Winter Springs**                    **Winter Springs High School**  
***Xu, Ronald, 18***  
Combating Stuttering via an Empowered Multimodal Neural Network based on Facial and Audio Recognition Data

## GEORGIA

Atlanta

**Coretta Scott King Young Women's Leadership Academy**

***Hester, Lauren, 18***

Inducing the Migration of Dying Non-Pathogenic Lymphoma Cells Towards Areas of High T-Cell Concentration with Chemoattractants *in vitro*

**The Westminster Schools**

***Ganesh, Ananya, 18***

Early Onset Scoliosis – A Novel Approach to the Assessment and Classification of Pulmonary Function

Marietta

**George Walton Comprehensive High School**

***Sun, Bill, 17***

Development of Robust Convolutional Neural Networks for Malaria Diagnosis from Thin Blood Smear Images

Milton

**Milton High School**

***Ramesh, Shreya, 17***

Real-Time Analysis of Emotions for Neurological Disorder Patients

## GUAM

Tamuning

**John F. Kennedy High School**

***Kang, Daniel, 17***

Paintable Graphene Nanoplatelet Nanocomposites for Low Cost Sustainable Electronics

## HAWAII

Hilo

**Hilo High School**

***Giardina, Sonja, 17***

Effects of Fragmentation and Isolation on Fish Utilization of Bleached Coral Reefs

## IDAHO

Boise

**Boise High School**

***Mouli, Jayanth, 18***

Predictive Modeling of Wildfire Shape Using Long Short-Term Memory Convolutional Neural Networks



**ILLINOIS**

Hinsdale

**Hinsdale Central High School*****Wang, Herbert, 17***

Granular Hybrid Materials Enabled Biodegradable Biocomposite Polymer for Advanced Food Packaging

Skokie

**Niles West High School*****Cudzich, Daniel, 18***

The Effect of Surfactant Functional Groups on Anode Corrosion and Specific Capacity in Zinc-Air Batteries

**INDIANA**

Evansville

**Signature School*****Dhawan, Ankush, 18***

An Improved Method for Trace Level Arsenic Quantification in Water

Munster

**Munster High School*****Ostojic, Annie, 17***

Targeting Cancer via Signaling Pathways: A Novel Approach to the Discovery of Gene CCDC191's Double-Agent Function using Differential Gene Expression, Heat Map Analyses through AI Deep Learning, and Mathematical Modeling

**IOWA**

Ames

**Ames High School*****Kasiviswanathan, Pooja, 17***

Farming on Mars: Potential Strategies for Sustainable Agriculture

**KANSAS**

Olathe

**Olathe North High School*****Dai, Eddie, 17***

Differential Expression of Retrotransposons in Stem Cell Lineages of the Preimplantation Embryo

**KENTUCKY**

Louisville

**duPont Manual Magnet High School*****Khodeir, Ramy, 18***

Virtual Colonoscopy: Engineering a Deep Learning Algorithm for Bio-Imaging Colon Segmentation to Diagnose Colorectal Cancer

**MAINE**

Bangor

**Bangor High School*****Ifeji, Amarachukwu, 18***

Testing the Effectiveness of Mycorrhizae in the Phytoremediation of Heavy Metals From Stormwater

**MARYLAND**

Baltimore

**Gilman School*****Li, Jeffrey, 18***

Biopolymer-Based Pore Fluids for Sustainable Geotechnical and Civil Engineering Applications

Bethesda

**Walter Johnson High School*****Lee, Seo Jin, 18***

Highly Sensitive and Selective Chemiluminescent Biosensor Capable of Rapidly Screening Mutated ssDNA Molecules

<b>Clarksville</b>	<b><u>River Hill High School</u></b> <b><i>Kannan, Harini, 16</i></b> A Ride-On Car to Sense, Improve and Encourage Mobility in Hospitalized Children for Neurological Improvement
<b>Ellicott City</b>	<b><u>Centennial High School</u></b> <b><i>Meister, Nadine, 17</i></b> Cooperative Relaxation in Supercooled Liquids: Kadanoff's Block Construction and Wilson's Renormalization Group Transformation
<b>Marriottsville</b>	<b><u>Marriotts Ridge High School</u></b> <b><i>Kim, Hannah, 18</i></b> Deciphering Active Wildfires in the Southwestern USA Using Topological Data Analysis (TDA) and TDAMapper
<b>Poolesville</b>	<b><u>Poolesville High School</u></b> <b><i>Lolla, Sadhana, 18</i></b> A Systematic Study to Improve the Performance of SrCoO <sub>3</sub> as an Anion-Intercalation-Type Electrode for Supercapacitors through Interface, Oxygen Vacancies, and Doping
<b>Rockville</b>	<b><u>Richard Montgomery High School</u></b> <b><i>Kolodner, Katie, 17</i></b> Utility of Commercial Satellite Shortwave Infrared Multispectral Imagery for Precise Geo-Location of Active Wildfires through Heavy Smoke Clouds over the California Camp Fire  <b><i>Yao, Laura, 17</i></b> Explaining Methane Plumes on Mars: Computational Model of Salt Seals in Martian Permafrost
<b>Silver Spring</b>	<b><u>Montgomery Blair High School</u></b> <b><i>Mattikalli, Tarun, 17</i></b> Early Indicators of Osteoporosis in Children and Adolescents Using Finite Element Analysis of Computed Tomography Scans  <b><i>Tang, Michelle, 18</i></b> Deep Multimodal Learning for the Diagnosis of Autism Spectrum Disorder  <b><i>Xin, Victoria, 18</i></b> Determining Antihypertensive Medication Efficacy through Machine Learning-Mediated Survival Analyses in a Revascularized Patient Population  <b><i>Yang, Ambrose, 17</i></b> Analogues of the Robin-Lagarias Criteria for the Riemann Hypothesis  <b><i>Zhao, Zach, 18</i></b> Clearing Kidney Exchanges via Graph Neural Network Guided Tree Search
<b>MASSACHUSETTS</b>	
<b>Acton</b>	<b><u>Acton-Boxborough Regional High School</u></b> <b><i>Bharadwaj, Pratik, 18</i></b> Suppressing Artifacts in CT using an Efficient Denoising Autoencoder  <b><i>Kavi, Nithin, 18</i></b> Cutting and Gluing Surfaces
<b>Andover</b>	<b><u>Andover High School</u></b> <b><i>Yu, Alice, 18</i></b> The New Method to Capture RF Signal for 5G NR Sniffing

**Phillips Academy**

***Duan, Katherine, 17***

The Effects of a Disrupted Circadian Rhythm on *C. elegans* Longevity, Egg Laying & Lipid Accumulation

***Yu, Zhifei, 18***

Orbital Decay of the X-Ray Binary LMC X-4

***Zhang, Victoria, 17***

Patterns and Symmetries in Spiking Neural Networks

**Belmont**

**Belmont High School**

***Xu, Andrew, 18***

Hierarchically Assembled 'Living' Filters for Wastewater Treatment

***Westover, Alek, 17***

Cache-Efficient Parallel-Partition Algorithms Using Exclusive-Read-and-Write Memory

**Belmont Hill High School**

***Gong, Renny, 19***

Differences in Cannabis Perception and Belief Updating between Adults and Adolescents

***Pappo, Jake, 18***

Molecular Beacon-Based Real-Time Diagnostic for Glioma

**Boston**

**Boston Latin Academy**

***Baker, Mairead, 18***

The Effect of Prolonged Morphine Administration on Infant Rat Regional Brain Volumes

**Boston Latin School**

***Wang, Daisy, 17***

A Non-Invasive RNA-Based Early Detection Method for Prostate Cancer Using Nanotechnology

**Lexington**

**Lexington High School**

***Erives, Ezra, 18***

Nash Equilibria for the Winner Takes All Variant of Colonel Blotto

**Newton**

**Newton South High School**

***Weinfeld, Andrew, 18***

Bases for Quotients of Symmetric Polynomials

**West Roxbury**

**The Roxbury Latin School**

***Zhang, Andrew, 18***

An Explainable Machine Learning Platform for Antimicrobial Resistance Prediction and Resistance Gene Identification

***Zhu, Christopher, 17***

Enumerating Permutations and Rim Hooks Characterized by Double Descent Sets

**Weston**

**Weston High School**

***Jasuja, Angad, 17***

Development of an Extensible, Wireless Electromyography (Emg) Coupled Functional Electrical Stimulation (Fes) Framework for Personalized Muscle Rehabilitation

**MICHIGAN**

**Bloomfield Hills**

**Cranbrook Kingswood School**

***Chen, Yang, 19***

Active Learning Over Deep Neural Network: Automated Engineering Design Optimization for Fluid Dynamics Based on Self-Simulated Dataset

**Grosse Pointe Woods**

**University-Liggett School**

***Fields, Maria, 17***

Genes that Potentially Drive Health Outcome Disparities for African-American Women with TNBC

**MINNESOTA**

**Shakopee**

**Shakopee High School**

***Nair, Gautham, 17***

Understanding the Effects of Disinhibition: Analyzing the Impact of Synaptic Disinhibition on Neural Activities and Patterns

**St. Paul**

**St. Paul Academy & Summit School**

***Nie, Melissa, 17***

Applying Thermopile Array Sensors and Machine Learning to Detect Falls of Older Adults

**MISSOURI**

**Chesterfield**

**Parkway Central High School**

***Yang, Ellie, 17***

A Deep Learning Model Using a Convolutional Neural Network for the Detection of Guns, Knives, and Blood: SafetyNet

**Eldon**

**Eldon High School**

***Martonfi, Caleb, 17***

And the Winner Is...: Developing a Computer Program to Investigate Neural Competition with Multimodal Stimuli

**MONTANA**

**Kalispell**

**Glacier High School**

***Ritzdorf, Lucas, 17***

A Computational Model of *Dreissenid* Mussel Invasion Risk for Montana's Waterways

**NEBRASKA**

**Omaha**

**Omaha North High Magnet School**

***Anderson, Audrey, 18***

Resilin Distribution and Abundance in *Apis mellifera* Wing Joints across Biological Age Classes

**NEVADA**

**Reno**

**The Davidson Academy of Nevada**

***Liu, Jason, 17***

On Q-Binomial Polynomials and Quantum Integer-Valued Polynomials

**NEW HAMPSHIRE**

**Exeter**

**Phillips Exeter Academy**

***Noori, Ayush, 17***

Meta-Analysis of Human Brain Transcriptomics Reveals Pan-Neurodegenerative and Disease-Specific Expression Signatures Across ALS-FTD, Alzheimer's, and Lewy Body Diseases

**NEW JERSEY**

**Basking Ridge**

**Ridge High School**

***Jin, Meghan, 17***

The Neuroprotective Effects of Potato Polysaccharides 3,4-Furan Dimethanol, Diacetate and 3,5-Diacetoxy-Benzyl Alcohol on Alzheimer's Disease Pathogenesis

**East Brunswick****East Brunswick High School*****Zou, Lucy, 17***

The Computational Development of a Novel Class of Boronic Acid-Containing Chalconoids and Cis-Restricted Combretastatin A-4 Analogs for Tumor Vasculature Disruption

**Hackensack****Bergen County Academies*****Anchipolovsky, Samuel, 17***

Doxycycline: A Repurposed Therapy for Combating Alpha-Synuclein Aggregation in Parkinson's Disease

***Joshi, Sunay, 18***

On the Degenerate Turán Problem and Its Variants

***Krivitsky, Olivia, 17***

Ketones: Novel Treatment for Aberrant Conditions in the Diabetic Eye

***Lee, Ju Young, 18***

Unraveling the Potential Role of MZF1 in Erastin-Induced Ferroptosis: Novel Approach to Treat Iron-Addicted Breast Cancer Cells

***McFadden, Maeve, 17***

Role of Pyruvate Supplementation on Genetic Juvenile-Onset Parkinson's Disease

***Mustafa, Sammy, 17***

PTENP1: A Pivotal Pseudogene in Glioblastomas

***Narala, Bhargava, 17***Downregulation of HLA-A Tipping the Balance of Inhibitory and Activation Signals to Increase Cytotoxicity of Neuroblastoma to NK-92 Cells *in vitro****Oh, Michelle, 17***

Inducible cAMP Early Repressor Upregulates Zika Virus Expression through cAMP Pathway

***Shah, Raehash, 17***

The Role of Glycoproteins and HLA Markers in Fibrosis of Rheumatic Valvular Disease

***Thomas, Anaiah, 18***The Manipulation of Natural Killer Cell Phenotype and Function using Sacromal Fibroblast-Like Synoviocytes *in vitro****Zhang, Maximilian, 17***

PIF1 Gene Integration: A Novel Chemosensitizing Approach in Non-Small Cell Lung Cancer

**Lincroft****High Technology High School*****Qiang, Kelly, 17***

Development and Study of a Novel Soft Robotic Actuator

***Zhang, Sophie, 17***

Developing a Microporous Hydrophobic Membrane from Hydrophilic Cellulose for Membrane Distillation

**Pennington****Hopewell Valley Central High School*****Michaluk, Sonja, 16***

A Novel Method of Monitoring the Health of our Global Fresh Water Supply using DNA Barcoding of Chironomidae (Diptera)

**Skillman**                      **Montgomery High School**  
***Wang, Frank, 17***  
The Integral Shuffle Algebra and the K-Theory of the Hilbert Scheme of Points in  $\mathbb{A}^2$

**Tenaflly**                      **Tenaflly High School**  
***Lee, Joo Un, 18***  
Gold Nanoparticle and Carbon Nanotube-Based Interdigitated Electrode Biosensors for Cancer Antigen Detection and Sensitivity Studies

**Warren**                      **Watchung Hills Regional High School**  
***Bhatia, Jagdeep, 17***  
Simple and Fast Algorithms for Interactive Machine Learning with Random Counter-Examples

## NEW MEXICO

**Farmington**                      **Navajo Preparatory School**  
***Hosteen, Keona, 17***  
Toxic Gases from Wood Fires in a Traditional Navajo Hogan

**Los Alamos**                      **Los Alamos High School**  
***Petersen, Lillian, 17***  
Real-Time Prediction of Crop Yields From MODIS Relative Vegetation Health: A Continent-Wide Analysis of Africa

**Los Lunas**                      **Valencia High School**  
***Gates, Makayla, 18***  
Comparative Analysis of Lovastatin Introduction through Botanical Dietary Supplementation in *Apis mellifera* for Treatment of Social Anxieties in Fragile-X Syndrome and Autism Spectrum Disorder Patients

## NEW YORK

**Ardsley**                      **Ardsley High School**  
***Brahmbhatt, Isha, 17***  
Removal of Rare Earth Metal Ions from Contaminated Water by Sustainable Carboxycellulose Nanofibers Derived from Agave through Nitro Oxidation Process

**Armonk**                      **Byram Hills High School**  
***Aberman, Sam, 17***  
Facilitation of an Orthogonal IL-2 System for CAR T-Cell therapy through the Novel Knockout of the Human IL-2 Gene

***Karp, Spencer, 18***  
A Step Towards Energy Efficient Infrastructure: A Weakly Supervised Approach to Energy Signal Labeling in Commercial Buildings

***Mayers, Merry, 18***  
An Evaluation of Network-Informed Disease Transmission Parameters for the California Puma Population

***McGrath, Alexa, 18***  
An Investigation of the Medicinal Value of the Baboon Diet: A Comparative Study Across Five Species and Six Study Sites

***Pedraza, Carolina, 17***  
Heightened Anxiety in Children and Adolescents with Tic Disorders

***Skriloff, Owen, 17***

An *in vitro* Evaluation of the Relationship between Stress and Mineralization through the Use of a Piezoelectric Barium Titanate Composite

**Bedford**

**Fox Lane High School**

***Poor, Kenny, 17***

Implementation and Refinement of Oscillometric Finger Pressing Cuffless Blood Pressure Measurement on Mobile Phones

**Bellmore**

**John F. Kennedy High School**

***Brinton, Andrew, 17***

Marsh Restoration: Ribbed Mussels (*Geukensia demissa*) as a Revival Mechanism to Rebuild the Coastal Salt Marshes of Long Island, New York

***Gelman, Kenar, 17***

Chondrocyte Adenosine A2A Receptor Signaling Leads to Cellular Homeostasis through Activation of Protein Kinase A (PKA)

***St George, Katherine, 17***

The Ketogenic Diet Ameliorates the Effects of Caffeine in Seizure-Susceptible *Drosophila melanogaster*

**Briarcliff Manor**

**Briarcliff High School**

***Halevi, Gil, 18***

Important Groups First: Encouraging Disentanglement in Variational Autoencoders

***Fante, Massimo, 17***

A New Method to Target and Degrade Transmembrane Proteins Inside the Cell

**Bronx**

**Bronx High School of Science**

***Bar-On, Jonathan, 17***

Depolarizing Polarity: Data Mining Shared Likes on Twitter to Uncover Political Gateway Groups

***Chan, Emily, 17***

An Examination Into the Relationship between Different National Attitudes Regarding Gender on Student STEM Career Aspirations: An International Study

***Lenn, Jared, 17***

Engineering a DNA Aptamer Nanomachine Platform for T-Cell Detection Based on Cancer Metabolites

***Mahootian, Zhaleh, 18***

Evolution of Communal Living in *Synalpheus* Snapping Shrimp

***Massey, Jonah, 17***

Lobbying and Corporate Change: Investigating the Role of Political Capital in Turnaround Success

***Morgan, Wyatt, 17***

Creation of a One-Step Method for the Generation of a Tandem-Guide RNA to Improve the CRISPR System

***Munsell, Jeffrey, 18***

Random Forest Classifier-Aided Candidate Selection of Photometrically Variable Milky Way Halo RR Lyrae in the NGVS Data Set

***Shao, Helen, 17***

Predicting Intensity Maps of Cosmic Neutral Hydrogen from Dark Matter Using Convolutional Neural Networks

***Wahid, Syed, 17***

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Ma, Joy	4	Ravindran, Abishek	18	Wisoff, Jeffrey	2
Mahootian, Zhaleh	13	Razmi, Anya	20	Wu, Brian	14
Maitra, Ishaan	19	Reed, Caroline	17	Wu, Elizabeth	16
Malhotra, Rhea	20	Ritzdorf, Lucas	0	Wu, Ryan	16
Martonfi, Caleb	10	Rosenzweig, Nicole	18	Xia, Chelsea	17
Massey, Jonah	13	Sanda, Rohan	2	Xia, Iris	1
Mattikalli, Tarun	8	Sardana, Anjali	23	Xie, Yi	14
Mayers, Merry	12	Sekmen, Mert	21	Xin, Victoria	8
Mc Sweeney, Sara	15	Shah, Pooja	5	Xing, Albert	5
McCreery, Kyra	15	Shah, Raehash	11	Xu, Andrew	9
McFadden, Maeve	11	Shao, Helen	4	Xu, Ronald	6
McGrath, Alexa	12	Shell, Hannah	14	Yan, Jiahe	17
Mehra, Anna Thérèse	4	Sheng, Kevin	23	Yang, Ambrose	8
Meimeteas, Nasia	15	Shigiltchoff, Nicole	21	Yang, Andrew	3
Meister, Nadine	8	Shytle, Elizabeth	21	Yang, Ellie	10
Michaluk, Sonja	11	Singh Rana, S Shamtej	14	Yang, Janice	3
Mirdamadi, Amireh	2	Skriloff, Owen	13	Yang, Kevin	4
Morgan, Wyatt	13	Speaker, Justin	4	Yao, Laura	8
Moskowitz, Alanna	19	Spiride, Andrei	22	Yasonik, Jake	23
Mouli, Jayanth	6	Sridhar, Shruti	3	Yeung, Andre	1
Munsell, Jeffrey	13	Srinivasan, Savitha	23	Yu, Alice	8
Mustafa, Sammy	11	St George, Katherine	13	Yu, Zhifei	9
Nair, Gautham	10	Stoller, Jake	18	Yuen, Valerie	17
Narala, Bhargava	11	Subramanian, Vikesh	17	Zhang, Andrew	9
Narang, Simon	17	Sun, Bill	6	Zhang, Maximilian	11
Neervannan, Arjun	2	Sun, Selena	1	Zhang, Serena	3
Nelson, Theodore	4	Tang, Ivory	2	Zhang, Sophie	11
Nie, Melissa	10	Tang, Michelle	8	Zhang, Victoria	9
Noori, Ayush	10	Thomas, Anaiah	11	Zhao, Zach	8
Oh, Michelle	11	Thompson, Adriane	19	Zheng, Kevin	14
O'Neil, Aidan	18	Tomescu, Lara	17	Zhou, Joshua	3
Ostojic, Annie	7	Totala, Kreena	17	Zhu, Christopher	9
Ozcan, Evrim	23	Toyomura, Maho	14	Zhu, Cindy	19
Pappo, Jake	9	Verma, Himanshi	5	Zhu, Yu	14
Parsan, Nithin	22	Vernik, Sophie	19	Zhuang, Kallista	15
Patel, Bhav	16	Vicas, Nikhil	22	Zou, Lucy	11
Patel, Rohin	5	Wagh, Rohan	20		



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The Society for Science & the Public is a champion for science, dedicated to expanding scientific literacy, effective STEM education and scientific research. Founded in 1921, we are a nonprofit 501(c)(3) membership organization focused on promoting the understanding and appreciation of science and the vital role it plays in human advancement. Through its acclaimed science research competitions, including the Regeneron Science Talent Search, the Regeneron Intel International Science and Engineering Fair and the Broadcom MASTERS, and its award-winning magazine, *Science News* and digital media properties, *Science News for Students*, the Society is committed to inform, educate and inspire.

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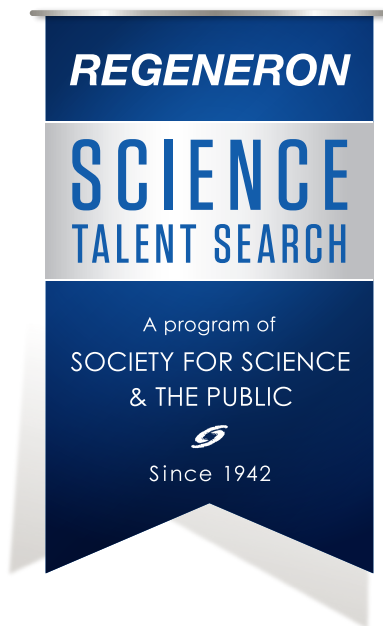
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## About Regeneron

Regeneron is a leading biotechnology company that invents life-transforming medicines for people with serious diseases. Founded and led for more than 30 years by physician-scientists, our unique ability to repeatedly and consistently translate science into medicine has led to seven FDA-approved treatments and numerous product candidates in development, all of which were homegrown in our laboratories. Our medicines and pipeline are designed to help patients with eye diseases, allergic and inflammatory diseases, cancer, cardiovascular and metabolic diseases, infectious diseases, pain and rare diseases.

Regeneron is accelerating the traditional drug development process through our proprietary VelociSuite® technologies, such as Velocimmune®, which produces optimized fully-human antibodies, and ambitious research initiatives such as the Regeneron Genetics Center, which is conducting one of the largest genetic sequencing efforts in the world.

We believe that scientists should be the world's heroes. We are committed to fostering the next generation of scientific talent by supporting education pathways to careers in STEM. Regeneron supports local, national and global outreach and equity programs with a focus on exciting young students about the power of science, equipping students and teachers with scientific skills and elevating the best and brightest young minds in science research. Our signature STEM initiatives include the Regeneron Science Talent Search and the International Science and Engineering Fair, programs founded and produced by Society for Science & the Public

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