80TH ANNIVERSARY

REGENERON

SCIENCE

TALENT SEARCH
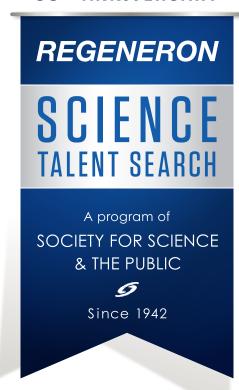
A program of
SOCIETY FOR SCIENCE
& THE PUBLIC

Since 1942

REGENERON SCIENCE TALENT SEARCH

2021 SCHOLARS

2021 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

Scottsdale

BASIS Scottsdale
Mehta, Viraj, 18
GLIA-Deep: Glioblastoma Image Analysis Using Deep Learning Convolutional Neural Networks to Accurately Classify Gene Methylation and Predict Drug Effectiveness

CALIFORNIA

Arcadia

Arcadia High School
Liu, Stanley Cheung, 17
A Microfluidic Device for Blood Plasma Separation and Fluorescence Detection of Biomarkers Using Acoustic Microstreaming

Atherton

Menlo School
Tung, Katherine, 17
The Sperner Property for 132-Avoiding Intervals in the Weak Order

Cupertino

Cupertino High School
Agrawal, Vardhan, 18
BP-Lytic: A Novel Apparatus to Continuously, Cufflessly, and Affordably Monitor Blood Pressure Trends

Homestead High School
Sanyal, Anushka, 17
Intronic RNA Lariats Protect Against Neurodegenerative Disease Related Protein Aggregation

Monta Vista High School
Asawa, Parth, 17
Mapping US Solar Insolation and Analyzing Cloud Predictability with a Novel Method Using NASA's DSCOVR & SORCE Satellites

Danville

Monte Vista High School
Li, Sean Jinxiang, 17
On Group-Theoretic Extensions of Penney's Game

San Ramon Valley High School
Vinaithirthan, Bala Meyyappan, 18
Prediction of Phenotypic Cancer Drug Response with an Image-Based Dual Convolutional Neural Network

Fremont

American High School
Ramachandran, Shreya, 17
Water Recycling: The Effect of Soap Nut Grey Water on Soil and Plant Health, *E. coli* and Fecal Coliform Contamination, and the Soil Microbiome

Mission San Jose High School
Narayanan, Charit Samyak, 17
A Novel Cohort Analysis Approach to Determining the Case Fatality Rate of COVID-19 and Other Infectious Diseases

Fullerton

Troy High School
Sreekumar, Nitin U., 18
Variation in Gene Expression Reveals Genes Predictive of Overall Survival in the Triple-Negative Breast Cancer Subtype

Irvine

University High School
Feng, Daniel, 17
Discovering Antibiotic Molecules in *Ceanothus leucodermis* and Enhancing and Quantifying Their Efficacy with a Novel Simulation-Aided Method

University High School
Mandelshtam, Andrei, 17
The Structure of the Positive Monoid of Integer-Valued Polynomials Evaluated at $\alpha \in \overline{Q}$

Los Angeles

Brentwood School
Zhou, Alec, 18
An Eddy Current Sensor for Low-Cost Smart Water Meter for Real-Time Water Management

Los Gatos

Los Gatos High School
Mihalache, Beatrice, 17
The Effects of Polyethylene Microbeads and Polyester Microfibers on the Firmicutes and Proteobacteria Phyla in the Human Gut Microbiome

Newport Coast

Sage Hill School
Park, Jian, 18
DT-DBSCAN: Density Based Clustering of Planar Datasets in Linear Expected Time Through Delaunay Triangulation

Palo Alto

Henry M. Gunn High School
Lam, Navya L., 18
Harnessing CRISPRi and HiPSCs to Down Regulate SFPQ Gene Expression Results in Massive Cell Death; Immense Implications for Animal Tested Drugs

Palos Verdes Estates

Palos Verdes High School
Kim, Beom Joon, 18
Flexible, Water-Resistant, and Biocompatible Medifoam-and URGO-Based Resistive Random-Access Memory for Skin-Wearable Healthcare Devices

Pleasanton

Amador Valley High School
Sunkad, Nitya, 17
Effects of Spaceflight on Gene Expression Patterns in Dermal Tissue

Rancho Palos Verdes

Joseph Lister High School for Biomedical Sciences and Technology
Johnston, Elisha Daniel, 17
A Novel Mechanistic Hypothesis Elucidating the Role of a Medical Procedure in Managing a Root Cause of Osteoarthritis by Regenerating Cartilage

San Diego

San Diego Jewish Academy
Gan, Jessie Low, 17
Predicting Metastasis with a Novel Biophysical Cell-Adhesion Force Technique

The Bishop's School
Wang, Jeffrey G., 17
A Systematic Method to Identify Significant Changes in 3D Genome Compartmentalization Across Multiple Cell Lines

The Cambridge School
Tianshi, Emily Lindsay, 17
Biomimicking Torrey Pine Needles: Atmospheric Moisture Harvesting Through Alternating Hydrophilic and Hydrophobic Micro-Patterns

Westview High School
Gurram, Sanjana, 17
Optimization of Plant Cellulose to Create a Cost-Effective and Environmentally Benign Oil Spill Sorbent

San Francisco

Proof School
Maloney, Michael J., 18
Mask Mandates and COVID-19: The Efficacy of Face Mask Mandates in Increasing Mask Usage, While Decreasing the Spread of and Deaths from COVID-19 in the United States

Proof School
Zhang, Jessica, 17
Classification of Tight Contact Structures on a Solid Torus

San Jose

Archbishop Mitty High School
Balasingam, Akhilesh Varadan, 17
A Kinetic Monte Carlo Simulator for Multi-Terminal RRAM Devices with Applications to Brain-Inspired Computing

Archbishop Mitty High School
Patwa, Aalok Nital, 18
Analysis of the Tumor-Immune Microenvironment Reveals Predictors of Recurrence and Overall Survival in Triple-Negative Breast Cancer

BASIS Independent Silicon Valley
Sharma, Siddharth, 18
Nature's Learning Algorithm? Experiments and Analysis of the Hebbian-LMS Algorithm

Lynbrook High School
Hu, David, 18
Probabilistic Zero Forcing on Grid, Regular, and Hypercube Graphs

Lynbrook High School
Jha, Eshani, 17
Thiol Functionalized and Manganese Dioxide Doped Biochar for the Removal of Toxic Organic and Inorganic Contaminants from Water

Lynbrook High School
Tang, Claire, 17
Automated Diagnostic Imaging for COVID-19: from the Unknown Detection to Clinical Prediction

The Harker School
Alag, Shray, 17
Analysis of COVID-19 Clinical Trials: a Data-Driven, Ontology-based, Longitudinal, and Natural Language Processing Approach

The Harker School
Shah, Saloni, 17
Identifying Resilience Mutations in an Alzheimer's Disease Whole-Genome Sequencing Cohort

The Harker School
Tadimeti, Aditya, 17
Machine Learning and Wildfire Burned Area: Examining Computational Techniques to Predict Fire Size for Practical Insights

The Harker School
Xu, Sidra Yang, 17
Application of Gene Embedding for Improved Somatic Mutation-Based Primary Cancer Typing and Biomarker Discovery

Studio City

Harvard-Westlake School
Zhao, Aaron, 18
Comparative Evaluation of Metal Chelators for the Reduction of Redox-Active Metal Concentration

Walnut

Walnut High School
Li, Sabrina, 17
Effect of Baycrete Texture and Tidal Elevation on the Recruitment of *Ostrea lurida* and *Amphibalanus amphitrite* in San Diego Bay, CA

Walnut Creek

Las Lomas High School
Quan, Melanie, 18
Developing a Sustainable Cycle of Compostable and Water-Soluble Plastics by Repurposing Waste Products of Algal Biofuel Production

COLORADO

Boulder

Fairview High School
Bharthulwar, Sid, 17
Reconstructing Thoracic Computed Tomography Volumes from Single-Plane and Dual-Plane Chest Radiographs Using Encoder-Decoder Neural Networks

Fort Collins

Fossil Ridge High School
Jin, Kylan, 18
A Novel Bioelectrochemical Tool for Real-Time *In Situ* Monitoring of Soil Microbial Activity

Lafayette

Peak to Peak Charter School
Woen, Andrew Matthew, 18
ReDetect: A Novel Way to Reduce Recycling Contamination by Telling Users if an Object is Recyclable Through Either the Portable Device or Mobile Application

CONNECTICUT

Greenwich

Greenwich High School
Goldenberg, Hannah, 17
Linking Continued Exposure to E-Cigarette Vapor Constituents with Chronic Obstructive Pulmonary Disease

Greenwich High School
Patti, Alexander Clement, 18
Plant Growth Enhancement & Fungal Disease Suppression via Copper, Zinc, and Manganese Nanoparticle Foliar Sprays

Greenwich High School
Pronina, Sofia, 18
Carbon Nanotube Lab-on-Chip as a Rapid, Inexpensive, Lyme Disease Detection System

Greenwich High School
Sosa, Edgar, 20
Metal Oxide Nanoparticle Suppression of Coffee Rust Using an Alternaria, Stomata-Sporulating Model Fungus

Redding
Joel Barlow High School
Popescu, Alexandra Ioana, 18
Conserved Cellular Crosstalk to the Microvascular Niche Identified via Single-Cell Analysis of the Lung and Liver

Ridgefield
Ridgefield High School
Choi, Kenneth Kawa, 18
Constructing General Hamiltonian Ground States on a Quantum Computer Using the Projected Cooling Sensor Algorithm

Simsbury
Westminster School
Wu, Jiefei, 18
Biases in First and Second Moments of the Fourier Coefficients in One- and Two-Parameter Families of Elliptic Curves

Stamford
King School
Hillenmeyer, Sammy Boyce, 17
The Electrochemical Oxidation of Methane in a Fuel Cell Utilizing Carbon Sequestration

King School
Winterlich, Joseph, 17
Antimicrobial Peptides and Antibiotics Produce Bactericidal and Bacteriostatic Effects on Wild-Type *E. coli*

DELAWARE

Wilmington
Charter School of Wilmington
Xu, Justin, 17
Novel Nanoscale Analysis of the Electronic Structure Basis of Strength and Toughness in Fluoropolymers

FLORIDA

Boca Raton
Florida Atlantic University High School
Willis, Devin, 18
SlideMap: A Flexure Based Approach to Automating Digital Pathology Cancer Diagnosis

Fort Lauderdale
Pine Crest School
El-Sharif, Maya Wael, 17
Understanding the Regulation of Food Consumption in *Drosophila melanogaster*

Miami
Dr. Michael M. Krop Senior High School
Finger, Tali, 18
A Genomic-Based Investigation of Repetitive Behaviors Across Four Neurodevelopmental Disorders Using a Machine Learning Approach

Dr. Michael M. Krop Senior High School
Odzer, Michael Noah, 18
Identifying and Overcoming Environmental Factors Affecting the use of Unmanned Aerial Systems (UAS) in Wildlife Studies of Chelonia mydas

Ocala
Vanguard High School
Shar, Andy, 15
Novel Fabricaiton and Implementation of Copper and Silver Plasmonic Nanostructure-Coated Foil as a Spectrally Selective Absorber in Highly Efficient Solar Steam Generation Under One Sun Illumination

Oviedo

Oviedo High School
Santra, Laboni, 17
Optimized 3D-Printed Microneedle Devices for the Delivery of New Therapeutics
to Citrus Phloem Tissue

Plantation

American Heritage School
Mishra, Roshni, 18
Expression of Anti-Neurodegeneration Genes in Mutant *Caenorhabditis elegans* Using
CRISPR-Cas9 Improves Behavior Associated with Alzheimer's Disease

GEORGIA

Atlanta

The Westminster Schools
Kadadi, Yash, 18
SWIFT: A Novel Machine-Learning Platform for Space Weather Forecasting from HMI
Vector Magnetograms

Johns Creek

Northview High School
Shi, William, 17
Refinements of Product Formulas for Volumes of Flow Polytopes

Milton

Milton High School
Nori, Divya, 17
Hero: Automated Detection System for Prescription Stimulant Overdose via AI-Based
Emotion Inference, Metabolite Detection, and Biometric Measurement

Milton High School
Ram, Vishaal, 18
Applications of an Age-Structured SIR Model

Milton High School
Soneji, Priya, 17
Autonomously Tracking Organisms in Three Axes at Microscopic Resolution

HAWAII

Honolulu

Kalani High School
Lubecke, Lana Carmen, 17
Life ReADeR: Remote Airborne Detection of Respiration

Kamehameha Schools Kapālama
Moniz, Taylor Moani Akemi, 18
Ivermectin Induces Apoptosis, Cell Cycle Arrest, and Senescence
in C4-2 Prostate Cancer Cells

Kailua Kona

Kealakehe High School
Bell, Alexander Keona, 17
Optimization of a Venturi Flow Mechanism for Gas-Transfer Applications

ILLINOIS

Chicago

University of Chicago Laboratory High School
Pietraszek, Nicholas Wayne, 18
Application of Machine Learning to Classify Unmarked Cancer Cells from 3D Images

Lincolnshire

Adlai E. Stevenson High School
Patankar, Sayalee N., 17
Deep Learning-Based Computational Drug Discovery to Inhibit the RNA Dependent
RNA Polymerase: Application to SARS and COVID-19

Winnetka   **New Trier Township High School**
Bardas, Alexandra Demetra, 17
Identification of Novel Candidate Genes for Anthelmintic Drug Susceptibility
to Alter Neglected Tropical Disease Treatment Strategies

INDIANA

West Lafayette   **William Henry Harrison High School**
Kim, Song, 18
Computational Modeling of Intracellular Movement of Vesicular Stomatitis Virus
Ribonucleoprotein Particles

IOWA

Iowa City   **West High School**
Taylor, Dasia T., 17
A Novel Suture Additive: Use of Beet Extract to Assess for Surgical Wound Infection

KANSAS

Olathe   **Olathe North High School**
Kohli, Khushi, 17
Dynamics of Brain Metastasis in Non-Small Cell Lung Cancer

KENTUCKY

Bowling Green   **The Carol Martin Gatton Academy of Mathematics and Science**
Zhang, Jason, 17
The Photocatalytic Single-Electron Oxidative Cyclopropanation of Ene-Ynamides
with 2, 6-Lutidine *N*-Oxide: Synthesis of Bicyclic Amides

Lexington   **Paul Laurence Dunbar High School**
Dhar, Saisha, 17
The Role of Apoptosis Signal-Regulating Kinase 1 (ASK1) in Hyperoxia-Induced
Lung Injury

Louisville   **duPont Manual High School**
Liang, Anne, 18
Grape Polyphenols Inhibit Pro-Inflammatory Signaling and Dental Bacteria

duPont Manual High School
Render, Elaina, 18
Exploring Probiotic Food Products as a Reservoir for Antimicrobial Resistance

LOUISIANA

Shreveport   **Caddo Parish Magnet High School**
Clary, Joseph Lee, 17
Designing and 3D Printing a 3D Clinostat to Simulate Microgravity

MAINE

Bangor   **Bangor High School**
Vel, Vetri Senthil, 16
Real-Time Fall Detection System for the Elderly Using Thermal Imaging and Deep Learning

MARYLAND

Rockville   **Richard Montgomery High School**
Shen, Jerry, 18
Analysis of the Asian Dust Trend in Recent Decades

Salisbury   **James M. Bennett High School**
Li, Marvin Fangzhou, 17
Machine Learning Classifiers to Predict Outbreaks of Toxic *Karenia brevis* Blooms
on the West Florida Shelf

Silver Spring   **Montgomery Blair High School**
Anand, Yash, 17
Developing a Toy Model for Quantum Chaos Theory: Entanglement Entropy
of Bipartite System Under Random Real Hamiltonians

Montgomery Blair High School
Chen, Alan, 18
Predicting High Energy Eigenstates by Coupling Discrete Supersymmetry
and the Localization Landscape

Montgomery Blair High School
Qian, Timothy Chenglei, 18
Optimal Measurement of Field Properties with Quantum Sensor Networks

Montgomery Blair High School
Tong, Christopher, 18
Signatures of Second Generation Exoplanet Formation

MASSACHUSETTS

Acton   **Acton-Boxborough Regional High School**
Friedman, Halley Rose, 17
Zombie Flies: Examining Effects of *E. muscae* on Olfactory Function in *D. melanogaster*

Acton-Boxborough Regional High School
Pulya, Ritvik Chandra, 17
A Novel Deep Learning Model for Breast Cancer Risk Quantification Using Mammography
and MRI Images

Andover   **Phillips Academy**
Chen, Sarah, 17
In Silico Prediction of Retained Intron-Derived Neoantigens in Leukemia

Phillips Academy
Zhou, Jeremy, 17
Reconstructing Rooted Trees from Their Strict Order Quasisymmetric Functions

Belmont   **Belmont High School**
Yang, Jason, 17
On Updating and Querying Submatrices

Boston   **Boston University Academy**
Liu, Friedrich, 18
Phenotyping Neuropsychiatric Symptoms Profiles of Alzheimer's Disease
Using Cluster Analysis on EEG Power

Brookline   **Brookline High School**
Li, Yangyang, 18
A Robust Classification Method Using Hybrid Word Embedding for Early Diagnosis
of Alzheimer's Disease

Lexington   **Lexington High School**
Chen, Linda, 17
Reducing Round Complexity of Byzantine Broadcast

Lexington High School
Zhu, Alec Chen, 17
Investigation of Selenium Mediated Allylic and Propargylic Amination
with Computational Chemistry

Newton   **Newton North High School**
Xiao, Helen Bingzhi Guo, 18
A Simple Approach for Evaluating Survey and Forecasting Data

Shrewsbury   **Saint John's High School**
Wadekar, Adway Suhrid, 17
A Psychosocial Approach to Understanding Substance Use Disorder Among Adolescents

Somerville   **Somerville High School**
Wen, Kevin, 17
Polystyrene Nanoplastics Spontaneously Enter Lipid Bilayers and the Blood-Brain Barrier

Southborough   **St. Mark's School**
Zhou, Beining, 18
High-Order Sensor Array Geometries for Improved Direction of Arrival Estimation
in Signal Processing

Westfield   **Westfield High School**
Sundararajan, Suvin, 17
Functionalized Polylactide Filament for Additive Manufacturing

MICHIGAN

Bloomfield Hills   **Cranbrook Kingswood Upper School**
Khan, Saaim Ali, 17
Identification of Novel LEAD Compounds for Solute Transporter Protein Member 5
in Sensorineural Hearing Loss

International Academy
Yee, Vivian, 17
A Novel Epidemiological Approach to Exploring the Implications of Social Determinants
of Health on COVID-19 Spread: A Call to Action for Health Equity

MINNESOTA

Saint Paul   **St. Paul Academy & Summit School**
Chen, Anthony, 18
The Effects of Short Term Radiofrequency Electromagnetic Radiation
on Diatom Photosynthetic Productivity

MISSISSIPPI

Columbus

The Mississippi School for Mathematics and Science
Lu, Michael Anran, 17
Development of Predictive Tools for Anticancer Peptide Candidates Using Generative Machine Learning Models

MISSOURI

Chesterfield

Marquette High School
Jagarlamudi, Rincon, 17
Utilization of a Novel Method of RNA Interference in *Caenorhabditis elegans* to Conduct a Phenotypic Analysis of the daf-2 and daf-16 Longevity Genes

Jackson

Jackson Senior High School
Jones, Eli L., 18
Towards the Total Synthesis of the Leishmanicidal Lindbergin E for the Development of an Enantioselective Phloroglucinol-Derived Polyketide Synthesis

Kansas City

Pembroke Hill School
Case, Katrina O'Connell, 17
Importance of Neoantigen Affinity for Determining the Effectiveness of Immunotherapy in Lung Carcinomas

Rolla

Rolla Senior High School
Bai, Elena, 18
Exploring Perceptual Associations Between Color and Music

St. Joseph

St. Joseph Central High School
Wiebelt-Smith, Bella, 18
Investigation of Bacterial Gene Transcription from Promoters with Proximal i-motifs and G-quadruplexes

NEVADA

Reno

The Davidson Academy of Nevada
Chien, Derek Lin, 18
Curing COVID-19: Novel Design and Computational Evaluation of Potential SARS-CoV-2 Helicase Inhibitors

NEW HAMPSHIRE

Exeter

Phillips Exeter Academy
Choi, Yunseo, 18
On Two-Sided Matching in Infinite Markets

Phillips Exeter Academy
Xiao, Zheheng, 18
On Real Forms of Dubrovin-Ugaglia Poisson Brackets

Phillips Exeter Academy
Zhu, Honglin, 18
Characters for Projective Modules in the BGG Category $\mathcal{O}$ for the Orthosymplectic Lie Superalgebra osp(3|4)

NEW JERSEY

Basking Ridge

Ridge High School
Xu, Angelina, 18
Is Seeing No Longer Believing? Detecting Deepfakes Using Discrete Fourier Transforms
and Frequency Analysis

Hackensack

Bergen County Academies
Choe, Erica, 18
The Effect of Human Hepcidin and *Pseudosciaena crocea* Hepcidin on the Prevention &
Mitigation of *Staphylococcus epidermidis* Biofilm

Bergen County Academies
Dabek, Patryk, 17
Exploiting Metabolic Reprogramming in Liver Cancer: Mitochondrial Membrane Potential
Response to Selective ATP Hydrolysis Inhibition

Bergen County Academies
Gomez, Michael, 17
Underscoring the "Hypo-Hyper" Duality of Celecoxib in Melanocyte Pigmentation

Bergen County Academies
Gordon, Shayna Eve, 17
FTY720 Enhances Remyelination in Sciatic Nerve Cells: A Targeted Approach
to Treating Peripheral Nervous System Demyelinating Diseases

Bergen County Academies
Hashem, Emily Nadia, 17
Contextualizing IP3 Receptor-Dependent Astrocytic TGF-β Signaling in Blood-Brain
Barrier Permeability: A Novel Functional Role

Bergen County Academies
Karam, Sarah, 17
GRN Acts as a Novel Biomarker of Chemotherapy Resistance in Small Cell Lung Cancer

Bergen County Academies
Kim, Isabel Yoonsuh, 18
Voltage-Dependent Anion Channel 1 (VDAC1) Expression in Retinal Cells Under Varying
Glucose Conditions

Bergen County Academies
King, Thomas, 17
The Impact of UV-Blocking Chemicals on the Bleaching of *Acropora yongei*

Bergen County Academies
Lee, Jessica, 17
Analysis of Data-Reduction Techniques Used in Dynamical Systems Modeling

Bergen County Academies
Ozkan, Lara, 17
Identifying the Causal Mediators Between Diet, Obesity, and Cancer

Bergen County Academies
Shefter, Sasha, 17
The Role of 5-fluorouracil in the Late Twentieth Century Decline of Cancer Mortality
in the United States

Bergen County Academies
Shaik, Raiyaan, 17
The p53 Dependent and Independent Chemotherapeutic Potential of TQ in Breast Cancer: Targets *In-Vitro* and *In-Silico*

Hillsborough

Hillsborough High School
Krishnan, Aravind Murali, 18
A Novel Assay to Quantitatively Detect Bacterial Endotoxin by Harnessing PAMP-Triggered Immunity of *FRK1-LUC Arabidopsis thaliana*

Lawrence Township

Lawrenceville School
Zhang, Michael, 17
Development of Silver Nanoparticle Decorated Zinc Oxide Arrays for the Portable and Label-Free Detection of Opioids in Liquids

Lincroft

High Technology High School
Tschand, Arya, 17
Implementation of Novel Semi-Supervised Machine Learning Model into Autonomous Irrigation Network Optimized for Power Self-Sufficiency

Plainsboro

West Windsor-Plainsboro High School North
Chen, Eddie, 17
Epidemiological Models for COVID-19 Spread in US

Princeton

Princeton International School of Math and Science
Chen, Quanlin, 18
The Center of the q-Weyl Algebra Over Rings with Torsion

Princeton International School of Math and Science
Huang, Lixin, 18
Risk Taker or Driver: An Empirical Analysis of American Stock Markets During the COVID-19 Pandemic

Scotch Plains

Union County Academy for Allied Health Sciences
An, Isabella, 17
A Systematic Analysis of SLC9A9 SNP Sites and Their Association with Human Disease

Skillman

Montgomery High School
Guha, Anshul, 17
A New Bound on Odd Multicrossing Numbers of Knots and Links

Tenafly

Tenafly High School
Dohi, Kosei, 18
Variational Autoencoders for Jet Simulation

Tenafly High School
Wong, Michael James, 17
The Human Tumor Microbiome Modulates Response to Checkpoint Blockade Immunotherapy by Influencing Immune Infiltrates in the Tumor Microenvironment

Tenafly High School
Yakar, Noam, 17
Design & Construction of a Cost-Effective Full Arm Prosthesis with Computer Vision

NEW MEXICO

Carlsbad

Jefferson Montessori Academy
Helmer, Ryan Scott, 17
Engineering a Desiccant-Driven ($CaCl_2$) Self-Contained Solar Distillation System to Collect Drinking Water from the Atmosphere

Los Alamos

Los Alamos High School
Ebey, Karin Ruth, 17
Climate Change on Crocodilians: Modeling the Effects of Variations in Rainfall on Crocodilians and Their Ecosystem

NEW YORK

Ardsley

Ardsley High School
Bradford III, Malik Aaron, 17
Exploring Novel Regulators of Endoplasmic Reticulum (ER) Stress Through Cell Signaling and Unsupervised Machine Learning Methods

Ardsley High School
Chun, Elizabeth, 17
Combating Familial Alzheimer's Disease: A Study of Resveratrol's Effects on a Presenilin Model of *Drosophila melanogaster*

Ardsley High School
Tomé, Marie-Hélène, 17
On the Use of Statistical Measures and Density Maps Generated from CT Scans for the Detection, Classification, and Monitoring of COVID-19 Cases

Armonk

Byram Hills High School
Canter, Olivia Grace, 17
Birds of a Feather Age Together: Telomere Dynamics and Social Behavior Predict Lifespan in Female Japanese Quail *(Coturnix japonica)*

Byram Hills High School
Dittrich, Mia Nicole, 18
Epigenetic Editing of Cdk5 Leads to Sexually Dimorphic Stress Responses

Byram Hills High School
Goldstein, Bailey Isaac, 18
Investigating Differences in the Relaxation of Non-Photochemical Quenching and its Implications for Crop Photosynthetic Efficiency

Byram Hills High School
Hafez, Ali, 17
Using Artificial Neural Networks to Accurately Simulate Carbon Nanotube Field-Effect Transistors

Byram Hills High School
Ilan, Jared, 17
Modulus of Elasticity of the Ideal Decellularized Plant Material Scaffold for the Production of Cultured Meat

Byram Hills High School
Kanner, Raquel, 17
How do Others Perceive Me? An Exploration of the Influence of Self-Disclosure Statements on Viewer Perceptions of Emerging Adults who Stutter

Bellmore

John F. Kennedy High School
Burns, Callie A., 17
Student Discipline in Nassau County High Schools: Comparing Distinct Layers of Law Enforcement and Disparity in Student Punishment

John F. Kennedy High School
Fusillo, Tara, 17
Predicting Health Disparities in Regions at Risk of Severe Illness to Inform Healthcare Resource Allocations during Pandemics: Observational Study

John F. Kennedy High School
Kacaj, Danielle Ann, 17
Retinal Ganglion Cell Dysfunction is Associated with Macular Microvascular Abnormalities in Pre-Perimetric Glaucoma

John F. Kennedy High School
Krinsky, Jordyn, 17
The Combinatorial Effects of Diet and Caffeine Mitigate Parkinson's Disease in a *Drosophila melanogaster* System

John F. Kennedy High School
Levine, Julia, 17
Reduced *Fasciclin 2* Expression in *Drosophila melanogaster* Leads to Impaired Locomotor Function and Abnormal Stress Response Following Dietary Alterations of Carbohydrates in a Celiac Disease Model

Brentwood

Brentwood High School
Alcantara, Ashley Amanda, 17
Farming Biodegradable Packaging Using *Pleurotus ostreatus* Mycelium

Briarcliff Manor

Briarcliff High School
Sendek, Jack, 18
Interactive Multiple Model Filter for Inertial Sensor Drift Correction in GPS-Denied Target Drone Waypoint Flights

Bronx

Bronx High School of Science
Barschdorff, Clara, 18
Race, Mobility, and the American Dream

Bronx High School of Science
Batavia, Michael, 17
New Computational Model For Mitosis to Save Lives from Cancer

Bronx High School of Science
Chan, Benjamin, 17
Revolutionizing Computer Vision Algorithms in Cancer Pathology:
The Use of Comprehensive Toolkits to Overcome Machine Learning Obstacles
in the Digital Pathology Field

Bronx High School of Science
Chari, Maya, 17
The Impact of Effective Policing, Victim and Community Demographics, and Community-Police Relations on Homicide Rates: A New Counter Intuitive and Scientifically Solid Methodology to Restructure Police Reform

Bronx High School of Science
Chasteen, Alexander David, 17
Genomic Analysis of Novel *Klebsiella pneumoniae* Phage Vulcan

Bronx High School of Science
Chen, Eric, 17
Organizing Science of the Future: Design of Cyberinfrastructure Networks
to Stimulate Collaboration and Equality in Availability of Resources for Researchers
from Different Fields

Bronx High School of Science
Dhalwala, Raiya Cushman, 17
The Entry Effect of Ride Sharing Services on NYC Taxi Wages

Bronx High School of Science
Getz, Noah Benjamin, 17
A Novel High Throughput Method for Prescreening Drugs: Using Machine Learning to Predict Phenothiazines That Reduce TNF-ALPHA Secretion with Applications for Alzheimer's Disease and COVID-19 Treatment

Bronx High School of Science
Lee, Katelyn, 17
Role of Obesity-Related MicroRNAs in Breast Cancer Survival Rates

Bronx High School of Science
Lin, Julie, 18
Introducing a Live Tutor after the Sensitive Phase Improves Song Learning in Zebra Finches Trained by an Artificial Tutor — A Pilot Study

Bronx High School of Science
Liu, Kelly, 18
Does the Media Still Matter?: Measuring the Effect of Traditional Media and Social Media Influencers on the COVID-19 Twitter Conversation

Bronx High School of Science
Mann, Aerin Josie, 18
The Partisanship of the Planet: A Look Into Climate Discourse on Social Media

Bronx High School of Science
Mazumdar, Arjun Pal, 17
Demystifying 'Fake News': Evaluating Media-Borne Misinformation Through the Novel Application of AI-Powered Sentiment Analysis

Bronx High School of Science
Pascual, Allison Casey, 17
The Potential Risk for Parents with Children Diagnosed with Congenital Cancer Predisposition Syndromes due to Parental Mosaicism

Horace Mann School
Singer, Sam, 17
Discovery of Eight Pathogenic Genetic Mutations Correlated with Poor Prognosis in African American and Hispanic Patients

Carmel
　　　　Carmel High School
Monge, Rebecca, 17
Polar Amplification in CMIP6 Models: Projections, Mechanisms, and Regional Patterns

Central Islip
　　　　Central Islip Senior High School
Ho Sang, Zen Terrance, 16
Covariant Study of the Coronavirus Spike Protein

Chappaqua
　　　　Horace Greeley High School
Fitzgerald, Alexandra, 17
Standardization of Plastic Particle Extraction and Analysis from Seafloor Sediment

Horace Greeley High School
Saxena, Lori, 17
Circadian Process in Prostate Cancer and Type 2 Diabetes

East Setauket   **Ward Melville High School**
Ghose, Animesh, 18
Prognosis and Diagnosis of Alzheimer's Disease Using Graph Convolutional Neural
Networks

Elmont   **Elmont Memorial High School**
Alexander, Christopher Edward, 17
Avian Paramyxovirus Serotype 4 (APMV-4) Promotes Greater Rates of Apoptotic
Cell Death & Stimulated Immune Responses in Malignant Melanoma and Relapse
Cancers in Respect to *Newcastle Disease Virus (NDV)*: The Characterization of a
Novel Oncolytic Virus

Elwood   **Elwood John Glenn High School**
Narayan, Rithika, 17
Machine Learning on Crowd-Sourced Data to Highlight Coral Disease

Glen Head   **North Shore High School**
Martin, Lucia, 17
The Effect of Political Division on Compliance with COVID-19 Health Guidelines

North Shore High School
Weseley-Jones, Kate, 17
Parenthood: Penalty or Premium? The Effect of Parental Status and Gender on
Perceptions of Physicians

Great Neck   **Great Neck South High School**
Wang, Mia, 17
Assessing the Impacts of Social Determinants on Adult Obesity Rates in New York

Harrison   **Harrison High School**
Burden, Tyler Elexis, 17
Evaluating the Effects of Dance Improvisation on Brain Activity Using
a Battery Cognitive Tests

Harrison High School
Spadini, Christian A., 17
Political Geographical Bias in Congressional House Elections: A Quantitative Analysis of
the Real Gap Between the Popular Vote and Electoral Outcomes

Hastings on Hudson   **Hastings High School**
Paerels, Celeste M., 17
Up in Smoke: Recent Influences on Adolescent E-Cigarette Usage

Hewlett   **George W. Hewlett High School**
Breslav, Alex, 18
Evaluating the Specificity of Novel Monoclonal Antibodies for Pancreatic Ductal
Adenocarcinoma

George W. Hewlett High School
Hsu, Alicia, 17
The Challenging Nature of Maternal Empathy: An Investigation of Maternal Empathy
and Its Relationship to Self-Esteem

Stella K. Abraham High School
Halpert, Priva, 18
Harnessing the Colorimetric Changes due to the Antenna Effect for Detection of Aliphatic
Alcohols in 2-HP-BETA-Cyclodextrin Solutions

Jericho

Jericho Senior High School
Li, Danny, 18
Astragalin and Antirrhinin: Novel Plant-Derived Ligands to Attenuate the Multifactorial Pathogenesis of Alzheimer's

Jericho Senior High School
Liu, Catherine, 18
Individual and Combined Treatments of Berberine and Estrogen Mitigate the Cytotoxic and Inflammatory Effects of DSS and LPS Induced Colitis

Jericho Senior High School
Shah, Vyom B., 17
Linking Diet and Cancer: Arachidonic Acid Augments Stemness via Canonical Wnt and Hippo Signaling

Jericho Senior High School
Shen, Justin Yang, 17
L-Theanine: Neuroprotective Against Trichloroethylene-Induced Parkinson's Disease Hallmarks

Kings Park

Kings Park High School
Salatti, Julia, 17
Utilizing MR Imaging to Analyze Tumor Texture and Its Effects on Long Term Survival in Patients with Glioblastoma Multiforme

Lincolndale

Somers High School
Reichbach, Sean James, 17
Does the American Political System Harm United States Representative Democracy?

Manhasset

Manhasset High School
Alam, Mir Zayid, 18
Identification of Genetic Biomarkers for Hepatocellular Carcinoma Using an Automated Microarray-Based Pipeline and Pathway Enrichment

Manhasset High School
Ma, Emily, 18
Optimizing the Efficiency of Amorphous Silicon Solar Cells

Manhasset High School
Wang, Emma, 17
Investigating Potential Agro-Economic Benefits of Solar Pollinator Habitats

Manhasset High School
Yoh, Julius, 17
The Optimization of Desalination and Ion-Removal Rate Through the Engineering of Novel Turbulent Modular Designs in an Electrodialysis System

Massapequa

Plainedge High School
Ruvolo, Tyler, 18
A Regression-Based Investigation Into Presidential Public Approval as a Factor of Political and Economic Policy

New Hartford

New Hartford Senior High School
Li, David, 18
Numerical Investigation on the Filtration Process of Alternating Micro-Nano Multilayer N95 Face Masks

New Hyde Park

Herricks High School
Rasquinha, Rhea, 17
Identifying the Prognostic, Tumor-Suppressive and Immunologic Roles of IRF5
in Breast Cancer

New York

Hunter College High School
Hu, William Y., 17
Molecular Dynamics Simulations of Sequence Dependent Nucleosome Core Particles
Unwrapping

Hunter College High School
Kim, Jaeah, 17
Save Our Sons: Exploring RNAi- Mediated Intragenomic Conflict in *D. sim* Through Genetic
Sex-Ratio Assays

Hunter College High School
Mani, Neha, 17
Distinguishing Bacterial Motion Quantitatively: A Diagnostic Method for Intestinal Disease

Hunter College High School
Sekhar, Krupa Chandra, 17
Discovering Population-Specific Epigenetic Markers for Pancreatic Cancer Through
Examination of Chromatin Accessibility

Packer Collegiate Institute
Weisberg, Ethan, 17
Development of a Peptoid-Peptide Macrocycle Targeting CDK2-Cyclin A
for Cancer Therapy

Stuyvesant High School
Mahankali, Srinath, 17
Velocity Inversion using the Quadratic Wasserstein Metric

The Brearley School
Yang, Emma, 17
Designing a Synthetic Neural Network Layer for Image Classification

Trinity School
Alauddin, Foyez, 17
Quadratization of Ordinary Differential Equations: Monomial *vs.* Non-Monomial

Old Westbury

The Wheatley School
Bansal, Manav, 18
Metformin and Mannose Inhibit Human Hepatic Stellate Cell Activation and Proliferation:
Implications for Anti-Fibrotic Therapies in Patients with MPI Deficiency and Chronic Liver
Disease

The Wheatley School
Chabria, Anya A., 17
A New Look at Writing: Using Fractal Geometry to Evaluate Whether SLV Affects
the Readability of Written Works

The Wheatley School
Li, Victor Desheng, 17
Acoustic Analysis of Laser-Induced Graphene: Development of Quantitative Indicators for
Direct Determination of Quality and Microstructure Morphology

The Wheatley School
Zha, Lucy, 17
Investigating the Therapeutic Potential of Curcumin and Capsaicin: A Comparative Study on Neuroblastoma and Hypothalamic Cells

Ossining

Ossining High School
Brown, Charles Linnaeus, 17
The Validation of Electrodermal Activity as an Objective Measurement of Generalized Anxiety Disorder in Adolescents

Ossining High School
Camilliere, Nicole Ann, 17
Year-Long Salinization of Groundwater and Surface Waters of Hudson River Watersheds due to Chronic Road Salt Application

Ossining High School
LaVaglia, Victor, 17
Open Office Noise Disrupts Worker Focus, Satisfaction, and Perception of their Productivity: A Quasi-Experimental Field-Study

Ossining High School
Mangialardi, Linlee, 17
Reciprocal Synthesis and Degradation of Trehalose and Glycerol in *Saccharomyces cerevisiae*: Analysis Using a Consensus Genome Scale Metabolic Model

Ossining High School
Pavelchek, Michael John, 18
Swap70 and Myc Promote Sequential Switching to High Affinity IgE in Allergic Asthma

Ossining High School
Roye, Leela G., 17
Race *vs.* Emotion: Evaluating Which is the More Predominant Bias When Using an Attentional Task

Ossining High School
Ryan, Meagan, 17
Discovering Long-Lasting Novel Epigenetic Mechanisms Associated with Cocaine Addiction: The Role of the SWI/SNF Remodeling Complex in the Nucleus Accumbens

Pawling

Pawling High School
Housen, Hayden, 18
Lecture2notes: Summarizing Lecture Videos by Classifying Slides and Analyzing Text

Port Washington

Paul D. Schreiber Senior High School
Lane, Hope Isabella, 17
Optimizing the Interconnectivity of the Liver Allocation Network to Minimize Death and Inequality Using LivSim

Paul D. Schreiber High School
Loewy, Noah, 17
Developing an Empirical Model to Forecast United States Presidential Elections: A Machine Learning Approach

Paul D. Schreiber High School
Unni, Zoya Sethi, 18
Shelter-in-Place, Connect Online: What Trending TikTok Content Reveals about Social Media use During the Early Days of the U.S. COVID-19 Pandemic

Putnam Valley

Putnam Valley High School
Silverman, Emma, 17
Examining Differences in Blood Calcium, Phosphorus, and T4 Levels in Various Breeds of Canines: A Study on its Association Between the Age of Spay/Neutering, and Osteopathic/Neurological Diseases

Putnam Valley High School
Steele, Alliyah Nicole, 17
A Visual Cortex Examination: Familiarity and Selective-ROI BOLD signal Differences Between Scenes and Objects, Behaviorally and Neurologically

Rye Brook

Blind Brook High School
Savitt, Sam, 17
The Suitability of Vibration Data Loggers for the Development of a Condition-Based Maintenance System for Aircraft and Rotorcraft Operations

Saratoga Springs

Saratoga Springs High School
Herzog, Ava, 17
The Effect of the Retinal Degeneration Mutation *rd1* on Circadian Locomotor Activity and Nesting Behavior in Mice

Sleepy Hollow

Dugan Homeschool
Dugan, Owen M., 17
Astronomy Will Not Trail Off: Novel Methods for Removing Satellite Trails from Celestial Images

Sleepy Hollow High School
Weitzen, Maya Sarina, 18
High-Throughput Discovery and Validation of Cancer-Testis (CT) Antigen and Neoantigen HLA-Presented Peptides in Non-Small Cell Lung Carcinomas (NSCLC)

Smithtown

Smithtown High School West
Savino, Julia, 17
Using the Sea Anemone, *Nematostella vectensis*, to Probe the Mechanism of Excitotoxicity

Syosset

Syosset High School
Ghotra, Aryan Singh, 18
Mathematical Models of Quaternary Body Equilibria

Syosset High School
Raghu, Maiya, 18
The Effect of Blue Light and Epigallocatechin Gallate on Oxidative Stress in *Caenorhabaitis elegans*

Syosset High School
Rasquinha, Giselle Leah, 17
Novel Strategies Targeting Entry and Membrane Fusion Steps in the Viral Life-Cycle to Enhance Potency and Stability of HIV-1 Inhibitors and Inactivators

Syosset High School
Souza, Isabella, 17
Seeing Through the Scan: The Impact of fMRI Evidence on Juror Satisfaction and Verdicts

Syosset High School
Wang, Eric Jian, 17
Investigation of Novel Anti-Cancer Effects of Oxymatrine and Deferoxamine on Neuroblastoma

Yorktown Heights

Yorktown High School
Bhattacharjee, Niharika, 17
Digital Dental Triage: Automated Digital Diagnosing System for Dental Cavities Using
Artificial Intelligence

Yorktown High School
Weitman, Scott Andrew, 18
Emotional and Social Impact of Autoimmune Diseases

NORTH CAROLINA

Charlotte

Ardrey Kell High School
Chheda, Dev, 17
Novel Methods for Shape Classification, Analysis, and Synthesis Using the Isoperimetric
Profile and Mathematical Morphology

Durham

North Carolina School of Science and Mathematics
Bhadriraju, Anika Lakshmi, 17
Computational Design of Pathogen-Specific Hsp90 Inhibitor to Target Malarial Parasites

North Carolina School of Science and Mathematics
Chen, Alvin, 18
Alpha Invariants of K-Semistable Smooth Toric Fano Varieties

North Carolina School of Science and Mathematics
Du, Melissa Xin, 17
A Stochastic Population Dynamics Model of Antibiotic Resistance, Tolerance,
and Persistence

North Carolina School of Science and Mathematics
Mantena, Sriya Devi, 17
Investigating the Geometric Determinants of Hemodynamics in Carotid Artery Stenosis
for Stroke Prediction

North Carolina School of Science and Mathematics
Nair, Nina Maheshkumar, 18
In Silico Rational Design of a Novel Anticancer Topo IIα/Hsp90 Dual Inhibitor with
Potential for Oral Administration

North Carolina School of Science and Mathematics
Nerurkar, Om, 17
Estimating The Effects of Ocean Acidification on Coastal Communities: A Case Study
in South Puget Sound

North Carolina School of Science and Mathematics
Obi, Nnamdi Ifeanyi, 16
Investigation of the Possible Synergistic Effects Between MSDC-0160 and Rapamycin
in Treating Parkinson's Disease

North Carolina School of Science and Mathematics
Yang, Emily Haoching, 17
The Effects of Social Interaction on the Distribution and Acquisition of Resources
in Terrestrial Hermit Crabs

North Carolina School of Science and Mathematics
Yang, Lixin, 17
The Effects of Small Molecules Jh-RE-06 and T2AA on Mutagenic Translesion Synthesis
in *Arabidopsis thaliana*

North Carolina School of Science and Mathematics
Zhen, Andrew, 18
Disentangling the Spatio-Temporal Heterogeneity of Alzheimer's Disease Using a Novel Deep Predictive Clustering Network

Raleigh   **Raleigh Charter High School**
Vatsavai, Amulya, 17
EVGG16: Extended VGG16 Model for Thoracic Disease Identification in X-Ray Images

NORTH DAKOTA
Flasher   **Flasher High School**
Boldt, Tymber Leigh, 18
Driving on Air

OHIO
Chagrin Falls   **University School**
Kapadia, Sohum, 17
Mitral and Tricuspid Valve Morphology: Analysis from Sheep Hearts to Normal and Diseased Human Hearts

Cincinnati   **Turpin High School**
Basu, Hirak, 17
The Efficacy of Retaining Water for Citrus Derived SAPs: Year Two — A Quest for Optimization

Dublin   **Dublin Jerome High School**
Li, Aidan C., 18
Quantitative Digital Imaging Analysis of HER2 Immunohistochemistry Predicts Response to Anti-HER2 Therapies in HER2-positive Breast Carcinoma

Mason   **William Mason High School**
Acharya, Laalitya, 17
Nereid: Using a Convolutional Neural Network (CNN) Approach, an AI Technique, to Rapidly and Accurately Detect Microbial Contamination that May Cause Water-Borne Diseases

Mayfield   **Mayfield High School**
Anne, Sraavya (Aashi), 16
Efficacy of Plant Extracts in Alzheimer's Disease Using Transgenic *C. elegans*

Ottawa Hills   **Ottawa Hills High School**
Khare, Ishan, 18
Computational Discovery: Novel Material NaAsS2 Predicted to Exhibit Promising Optical Absorption Coefficient and Seebeck Coefficient for Photovoltaic and Thermoelectric Applications

OREGON
Portland   **Jesuit High School**
Hou, Wenjun, 18
Quantum-Based Algorithm and Circuit Design for Bounded Knapsack Optimization Problem

Krishna Homeschool
Goel, Gopal Krishna, 17
Discrete Derivative Asymptotics of the beta-Hermite Eigenvalues

Oregon Episcopal School
Schweinfurth, Lila, 18
Predicting Harmful Algal Blooms to Mitigate Marine Neurotoxin Exposure Using 20 Years of Shellfish and MODIS Satellite Data

Sunset High School
Iyer, Vedanth, 17
First-Principles Characterization of a Novel Chromium Doped Vanadyl-Oxide Based Cathode for Higher Energy and Efficiency Lithium-Ion Batteries

Sunset High School
Kim, Eric Jiyun, 18
Combating Diabetes: Novel Synaptic Mechanisms of FGF1 in Hypothalamic and Hindbrain Neurons

PENNSYLVANIA

Allentown

Parkland High School
Mehta, Tanya, 17
Effect of Cytokines on Functional Performance of Human Mesenchymal Stem Cells (hMSC) Encapsulated in Synthetic Wound Healing Scaffolds

Ardmore

Lower Merion High School
Zhang, Alex Lu, 18
On Subalgebra-Forming Conditions of Rings of Formal Power Series

Fort Washington

Germantown Academy
Rojas, Sarah M., 18
Inducing Dysbiosis in Brown Planaria with Single Strain Probiotics *Clostridium butyricum*, *E.coli Nissle 1917*, and *Lactobacillus acidophilus*

Kennett Square

Unionville High School
Liu, Addison, 17
Simulation and Analysis on the Self-Foldability of the Origami Hyperbolic Paraboloid

Newtown Square

Episcopal Academy
Zhou, Alexander, 17
SEIR Model Forecasting Active Coronavirus Cases In Philadelphia County

Marple Newtown High School
Selvakumar, Ganesh, 17
Bacoside A: A Promising Synaptic Plasticity Enhancer to Overcome Memory Impairment in Alzheimer's Disease

Pittsburgh

Taylor Allderdice High School
Barsouk, Hannah, 17
Cross-Species Complementation Experiment Exploring the Role of Mammalian ALPHA-Arrestins in Glucose Transporter Trafficking

Robesonia

Conrad Weiser High School
Horack, Erin Marie, 17
Lycorma delicatula's Mitochondrial DNA in Relation to *L. delicatula*'s Feeding Pattern based on Monosaccharide Concentrations of Host Plants

PUERTO RICO

Mayaguez

Southwestern Educational Society
Sridhar, Saraswati, 17
A Deep Network-Based Brain-Computer Interface for the Detection of Mild Cognitive Impairment Using Sensorimotor EEG and EMG Data

SOUTH CAROLINA

Greenville

James L. Mann High School
Naveen, Aryan Pratham, 17
Correlation Agnostic Fusion for Enabling Drone Flights in Challenging Environments

TENNESSEE

Germantown

Houston High School
Saksena, Saksham Rajan, 17
Universal Screening Test for Cancer Using Ultrasound Detection and Machine Learning Automation

TEXAS

Austin

Liberal Arts and Science Academy
Christian, Sam, 17
A Possible Alignment Between Orbits of Visual Binary Stars and Their Planetary Systems

Corpus Christi

Veterans Memorial High School
Al-Akash, Ibrahim Samhar, 18
Max Health: Engineering a User-Friendly Smartphone and Smartwatch Application with Intelligent Textiles Biosensors to Detect Arrhythmias, Dysglycemia, Neurological Diseases, and Predict Asthma Attack Risk

Denton

Texas Academy of Mathematics and Sciences
Guan, Amy, 18
Designing a Catalyst for Methane Activation Through Density Functional Theory Optimizations

Frisco

Independence High School
Qian, Jeffrey, 17
Emotion Polarity Analysis: A NLP Deep Learning Model For Detecting Imperilled COVID-19 Frontline Workers

Plano

Plano East Senior High School
Vaziri, Parisa Aryana, 18
The Neuro-Protective Role of FOXO in a PINK1 Loss-of-Function Based Model of Neurodegeneration in *Drosophila melanogaster*

Plano West Senior High School
Shah, Alay, 17
Identifying Eye-Movement Patterns in Neurological Disorders to Assess Cognitive and Motor Function

Sugar Land

John Foster Dulles High School
Pratap, Jayanth, 18
An Optimal Control Strategy for Mathematically Modeling Cancer Combination Therapy

William P. Clements High School
Zhou, Amy Siyi, 17
Entropy of Amorphous Systems in Their Ground States

UTAH

Salt Lake City

West High School
Liu, Daphne, 17
Using Machine Learning to Predict Physiological Metrics from PPG Pulse Shapes

Sandy

The Waterford School
Martheswaran, Tarun Kumar, 17
Prediction of Dengue Fever Outbreaks Using Climate Variability and Markov Chain Monte Carlo Techniques in a Stochastic Susceptible-Infected-Removed Model

VIRGINIA

Alexandria

T.C. Williams High School
McCormack, Michaela, 18
Too Cool for JUUL: The Effect of Pod-Based E-Cigarettes on Sleep and Cognitive Function

Thomas Jefferson High School for Science and Technology
Krishnakumar, Siddharth, 17
A Genetic Tool to Analyze de novo Mutations in Autism Spectrum Disorder

Thomas Jefferson High School for Science and Technology
Sankararaman, Sreenidhi, 18
Discovery of COVID-19 N-Protein Active Sites for Effective Antiviral Drug Target Treatment: An Innovative Approach Using Torsion Angle Changes in Relation to Functional Activity of Viral N-Proteins

Thomas Jefferson High School for Science and Technology
Wang, Jason, 17
SOSNet: A Graph Convolutional Network Approach to Fine-Grained Cyberbullying Detection

Thomas Jefferson High School for Science and Technology
Wu, Charles H., 18
A Learned Encircling Strategy for Robot Swarm Pursuit-Evasion Against a Superior Evader

Thomas Jefferson High School for Science and Technology
Yang, Kaien, 18
New Methods for Computing the Configurational Entropy of Deeply Supercooled Liquids with the Potential Energy Landscape

Thomas Jefferson High School for Science and Technology
Zhang, Sarah, 17
Using Lock-In Detection to Reduce Glares in Low-Light Condition—A Useful Algorithm for Autonomous Driving Vehicles

Arlington

Washington-Liberty High School
Licato, James, 17
Development of a Zeolite Composite Material for the Simultaneous Removal of Pharmaceuticals, Personal Care Products (PPCPs), and Perfluorinated Alkyl Substances (PFAS) in Water Treatment

Charlottesville

Monticello High School
Field, Rachel, 18
A Potential Pathway for an Inducible, Protective Response to Excess Glutamate that may Be Disrupted in ALS

Fairfax

The New School of Northern Virginia
Ocasio, Ethan, 17
Deep Learning Prediction of Mild Cognitive Impairment to Alzheimer's Disease Conversion at 3 Years Using Longitudinal and Whole-Brain 3D MRI

Leesburg

Academies of Loudoun
Minnick, Brian, 17
A Fully 3D Printed 3D Printer as a Step Toward a Self-Replicating Spacecraft

McLean

Basis Independent McLean
Lin, Zipeng Leo, 18
An Old Bird with New Feathers: Classic SIR Model Incorporated with Novel Neural Network Achieves a Better Prediction on COVID-19's Infected Population

Richmond

Maggie L. Walker Governor's School
Ashar, Perisa S., 18
Development of a Novel Biomarker Panel and Investigation of Blood-Based and Tumor miRNAs for Rapid Identification of Lung Cancer by Blood Tests Utilizing Next-Generation Sequencing, Computational, and In-Vitro Analyses

Mills E. Godwin High School
Sheriff, Fareed, 17
ELMOPP: An Application of Graph Theory and Machine Learning to Traffic Light Coordination

Vienna

Oakton High School
Wei, Jerry, 17
Generative Image Translation for Data Augmentation in Colorectal Histopathology Images

Woodbridge

Forest Park High School
Sigrest, Eleanor, 18
"Can You Hear the Empty Spaces?" - Improving Spacecraft Efficiency and Capability Through a Novel Microgravity Fluid and Slosh Management Technique

WASHINGTON

Olympia

Olympia High School
Nallamalli, Sathvik, 17
A Portable Machine-Learning Based Detection System of Prevalent Chronic Respiratory Illnesses and Lung Cancer

Woodinville

Woodinville High School
Hill, Anthony Glenn, 18
TAME(ing) Human Caused Waterway Pollution: A Cleaning System Addressing Toxic Algal Blooms and Microplastics

CHINESE TAIPEI

Taipei

Taipei American School
Bruce, Jonathan A., 16
Conjugation of Carboxylated Graphene Quantum Dots with Cecropin P1 for Bacterial Biosensing Applications

SINGAPORE

Singapore
                          United World College of South East Asia, East Campus, Singapore
Kaker, Vasu, 18
Porous, Thin $Co/CeO_{1.88-}$NCNR Cathode Structure for Ultra-High Specific Capacity $Li-O_2$ Batteries

Acharya, Laalitya 22	Choi, Kenneth Kawa 5	Jha, Eshani 3
Agrawal, Vardhan . 1	Choi, Yunseo 10	Jin, Kylan 4
Alag, Shray 3	Christian, Sam 24	Johnston, Elisha Daniel 2
Al-Akash, Ibrahim Samhar 24	Chun, Elizabeth 13	Jones, Eli L. 10
Alam, Mir Zayid 17	Clary, Joseph Lee 7	Kacaj, Danielle Ann 14
Alauddin, Foyez 18	Dabek, Patryk 11	Kadadi, Yash 6
Alcantara, Ashley Amanda 14	Dhalwala, Raiya Cushman 15	Kaker, Vasu 27
Alexander, Christopher Edward 16	Dhar, Saisha 7	Kanner, Raquel 13
An, Isabella 12	Dittrich, Mia Nicole 13	Kapadia, Sohum 22
Anand, Yash 8	Dohi, Kosei 12	Karam, Sarah 11
Anne, Sraavya (Aashi) 22	Du, Melissa Xin 21	Khan, Saaim Ali 9
Asawa, Parth 1	Dugan, Owen M. 20	Khare, Ishan 22
Ashar, Perisa S. 26	Ebey, Karin Ruth 13	Kim, Beom Joon 2
Bai, Elena 10	El-Sharif, Maya Wael 5	Kim, Eric Jiyun 23
Balasingam, Akhilesh Varadan 3	Feng, Daniel 2	Kim, Isabel Yoonsuh 11
Bansal, Manav 18	Field, Rachel 26	Kim, Jaeah 18
Bardas, Alexandra Demetra 7	Finger, Tali 5	Kim, Song 7
Barschdorff, Clara 14	Fitzgerald, Alexandra 15	King, Thomas 11
Barsouk, Hannah 23	Friedman, Halley Rose 8	Kohli, Khushi 7
Basu, Hirak 22	Fusillo, Tara 14	Krinsky, Jordyn 14
Batavia, Michael 14	Gan, Jessie Low 2	Krishnakumar, Siddharth 25
Bell, Alexander Keona 6	Getz, Noah Benjamin 15	Krishnan, Aravind Murali 12
Bhadriraju, Anika Lakshmi 21	Ghose, Animesh 16	Lam, Navya L. 2
Bharthulwar, Sid 4	Ghotra, Aryan Singh 20	Lane, Hope Isabella 19
Bhattacharjee, Niharika 21	Goel, Gopal Krishna 22	LaVaglia, Victor 19
Boldt, Tymber Leigh 22	Goldenberg, Hannah 4	Lee, Jessica 11
Bradford III, Malik Aaron 13	Goldstein, Bailey Isaac 13	Lee, Katelyn 15
Breslav, Alex 16	Gomez, Michael 11	Levine, Julia 14
Brown, Charles Linnaeus 19	Gordon, Shayna Eve 11	Li, Aidan C. 22
Bruce, Jonathan A. 26	Guan, Amy 24	Li, Danny 17
Burden, Tyler Elexis 16	Guha, Anshul 12	Li, David 17
Burns, Callie A. 13	Gurram, Sanjana 3	Li, Marvin Fangzhou 8
Camilliere, Nicole Ann 19	Hafez, Ali 13	Li, Sabrina 4
Canter, Olivia Grace 13	Halpert, Priva 16	Li, Sean Jinxiang 1
Case, Katrina O'Connell 10	Hashem, Emily Nadia 11	Li, Victor Desheng 18
Chabria, Anya A. 18	Helmer, Ryan Scott 12	Li, Yangyang 9
Chan, Benjamin 14	Herzog, Ava 20	Liang, Anne 7
Chari, Maya 14	Hill, Anthony Glenn 26	Licato, James 25
Chasteen, Alexander David 14	Hillenmeyer, Sammy Boyce 5	Lin, Julie 15
Chen, Alan 8	Ho Sang, Zen Terrance 15	Lin, Zipeng Leo 26
Chen, Alvin 21	Horack, Erin Marie 23	Liu, Addison 23
Chen, Anthony 9	Hou, Wenjun . 22	Liu, Catherine 17
Chen, Eddie 12	Housen, Hayden 19	Liu, Daphne 25
Chen, Eric 14	Hsu, Alicia 16	Liu, Friedrich 8
Chen, Linda 9	Hu, David 3	Liu, Kelly 15
Chen, Quanlin 12	Hu, William Y. 18	Liu, Stanley Cheung 1
Chen, Sarah 8	Huang, Lixin 12	Loewy, Noah 19
Chheda, Dev 21	Ilan, Jared 13	Lu, Michael Anran 10
Chien, Derek Lin 10	Iyer, Vedanth 23	Lubecke, Lana Carmen 6
Choe, Erica 11	Jagarlamudi, Rincon 10	Ma, Emily 17

About Society for Science

The Society for Science 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 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.
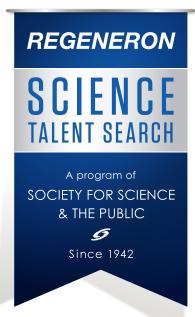
Learn more at:
www.societyforscience.org
and follow us on
Facebook   **https://www.facebook.com/societyforscience**
Twitter   **@Society4Science**
Instagram   **@Society4Science**
Snapchat   **Society4Science**

About Regeneron

Regeneron is a leading biotechnology company that invents life-transforming medicines for people with serious diseases. Founded and led for over 30 years by physician-scientists, our unique ability to repeatedly and consistently translate science into medicine has led to eight 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, pain, infectious diseases and rare diseases.

Regeneron believes that operating as a good corporate citizen is crucial to delivering on our mission. We approach corporate responsibility with three goals in mind: to improve the lives of people with serious diseases, to foster a culture of integrity and excellence and to build sustainable communities. Regeneron is proud to be included on the Dow Jones Sustainability World Index and the Civic 50 list of the most "community-minded" companies in the United States. Regeneron empowers and supports employees to give back through our volunteering, pro-bono and matching gift programs. Our most significant philanthropic commitments are in the area of science education, including the Regeneron Science Talent Search and Regeneron International Science and Engineering Fair.

Learn more about our programs at:
www.regeneron.com/scienceeducation
and follow us on
Facebook   **www.facebook.com/Regeneron**
Twitter   **@Regeneron**
Instagram   **@Regeneron**
Youtube   **https://www.youtube.com/regeneron**
LinkedIn   **https://www.linkedin.com/company/regeneron-pharmaceuticals**