

INQUIRE. INNOVATE. INSPIRE.



Intel Science Talent Search 2013 Semifinalists



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The [Intel Science Talent Search \(Intel STS\)](#) is the nation's most prestigious pre-college science competition. Alumni of STS have made extraordinary contributions to science and hold more than 100 of the world's most coveted science and math honors, including the Nobel Prize and the National Medal of Science. The Intel STS recognizes 300 students and their schools as semifinalists each year to compete for \$1.25 million in awards. From that select pool, 40 student finalists are then invited to Washington, DC in March to participate in final judging, display their work to the public, meet with notable scientists, and compete for the top award of \$100,000.

The semifinalists of the Intel Science Talent Search (Intel STS) 2013 were selected from among 1,712 entrants representing 467 high schools in 42 states, the District of Columbia, Guam, and two U.S. overseas schools.

Each of the 300 students named a semifinalist in the Intel STS 2013 will receive a \$1,000 award for his or her outstanding research. Additionally, to recognize excellence in teaching and school support of individual student research, every school will receive an award of \$1,000 for each semifinalist named in the Intel STS 2013. This award is used to further excellence in science, math, and/or engineering education.

Colleges and universities regard the Intel STS semifinalist award to be evidence of exceptional academic promise. Each semifinalist is provided with a certificate of accomplishment, which may be sent with his or her applications for college admission and scholarships. A listing in this book, as well as official publication at www.societyforscience.org/sts, is also documentation of this honor.

Many Intel Science Talent Search projects are the product of a research environment in which scientist mentors dedicate themselves to the intellectual development and technical training of students. The 2013 semifinalists, Intel, and Society for Science & the Public acknowledge with gratitude the guidance, expertise, and patience of the experienced researchers who supported many of these projects.

From this group of 300 Intel STS 2013 semifinalists, 40 finalists will be chosen to attend the Intel Science Talent Institute in Washington, DC from March 7-13, 2013. During their trip to Washington, these finalists will undergo further judging and share \$630,000 in awards.

ARIZONA

Gilbert

Mesquite High School

Lu, Amy Diane, 18

The Effect of Music Sound Distraction on Learning Behavior of Rats

Phoenix

Desert Vista High School

Dai, Annie, 17

Development of "Smart" Hydrogels for Three-Dimensional (3D) Dynamic Tactile Displays

CALIFORNIA

Atherton

Menlo School

Sauer, Christopher P., 17, Portola Valley

Computational Discovery and Analysis of Boolean Relationships between Cancer Mutations Identified from RNA-Seq

Chatsworth

Sierra Canyon School

Mehrotra, Pavan N., 17, Simi Valley

Facile, Single Step Conversion of Biomass to Electricity

Davis

Davis Senior High School

Jin, Benjamin E., 17

Developing Lympho Lab: Modeling Ionic Fluxes in T-Lymphocytes

Folsom

Vista del Lago High School

Buch, Shyamal, 17

Beyond the Nanostructure in Solar Cells

Fremont

Mission San Jose High School

Chen, Kevin, 17

Development of a Low-Cost Analyzer for Ferroelectric Characterization

Zhang, Yejia, 17

Potent Anti-Cancer and Anti-Inflammatory YD-3 Drug Synthesis: A Novel and Expedient Approach

Fullerton

Troy High School

Tao, Emily, 17, Placentia

A New Reaction Mechanism for the Atmospheric Formation of Sulfuric Acid

Irvine

University High School

Xu, Haotian, 18

Design and Build a Low-Cost System for In-Home Measurement of Brain Signals in Cochlear Implant Users, Allowing Automatic Artifact Removal and Remote Monitoring of Patients

Xue, James, 17

Rubberized Concrete: A Green Structural Material with Enhanced Energy-Dissipation Capability

Xue, William, 17

Heat Induction and IR Thermography for Non-Destructive Assessment of Rebar Corrosion

La Canada

La Canada High School

George, Kavitha, 17

New Multicomponent Synthesis Protocol for Facile Generation of Fluorinated Amino Acids

Los Altos	<p><u>Los Altos High School</u> <i>Liu, Jerry, 17, Mountain View</i> Modeling the Lithiation of Crystalline-Amorphous Silicon Nanowires using the Lattice Boltzmann Method</p>
Moraga	<p><u>Campolindo High School</u> <i>Vittimberga, Brooke Ashley, 17</i> Development of T-Cell Functional Assays to Measure Regulatory Activity of Myeloid-Derived Suppressor Cells in Tolerant Kidney Transplant Patients</p>
Oakland	<p><u>The College Preparatory School</u> <i>Zhang, Kelly, 17, Orinda</i> Fluorescent Imaging for Nano-Detection (FIND) of Cancer Cells for Future Surgery</p>
Palo Alto	<p><u>Castilleja School</u> <i>Dean, Victoria Lee, 18</i> Automated Search for Lyman-Alpha Emitters in the DEEP3 Galaxy Redshift Survey</p> <p><u>Gnyanam Academy</u> <i>Vasudevan, Sahana, 15</i> Minimizing the Number of Carries in the Set of Coset Representatives of a Normal Subgroup</p> <p><u>Henry M. Gunn High School</u> <i>Jiang, Helen, 17</i> Asymmetrical and Heterogeneous Single-Particle Volume Reconstruction of the Transcription Pre-Initiation Complex using a Novel Non-Reference Based Pipeline</p> <p><i>Tung, Laura Hsia, 17</i> Synthesis of Novel Phosphonium-Based Ionic Liquids and Analysis of Their Properties</p> <p><i>Yu, George, 17</i> Feasibility of Single-Molecule Imaging with a Free Electron Laser Optimized via Genetic Algorithm</p>
Salinas	<p><u>Salinas High School</u> <i>Sinha, Aradhana, 16</i> Triforine Sensitivity in Lettuce</p>
San Diego	<p><u>Canyon Crest Academy</u> <i>Rao, Vaishnavi Lakshminarasimha, 17</i> Activity-Dependent Regulation of Nitric Oxide Expression: Novel Form of Neurotransmitter Plasticity</p> <p><u>Point Loma High School</u> <i>Palmer, Corlin, 17</i> Reducing Forest Depletion through the Utilization of Palm Waste for the Production of Charcoal</p> <p><u>San Diego Jewish Academy</u> <i>Fagan, Melissa Rachel, 17</i> Creation of Alginate Microparticles as a Novel Drug Delivery Vehicle</p> <p><u>Torrey Pines High School</u> <i>Mahata, Sumana, 17</i> Single Nucleotide Polymorphisms Reveal Novel Insights into the Onset and Severity of Hereditary Angioedema</p>

Westview School

Wang, Suyang Kevin, 18

Application of Impedance-Based Cell Assays for Identifying Inhibitors of Oncogene Addicted Pathways

San Francisco

Lowell High School

Kwan, Kitty, 17

Dynamic Intracellular Zones of Microtubule Assembly during Epithelial Cell Height Change

San Jose

Bellarmine College Preparatory School

Buduma, Nikhil, 18

Modulation of Phagocytosis in *Tetrahymena thermophila* by Histamine and the Antihistamine Diphenhydramine: The Development of a Novel Flow Cytometric Drug Screening Protocol

Sur, Debnil, 17, Sunnyvale

Properties of Dwarf Ellipticals in Low-Density Environments

Lynbrook High School

Ho, Johnny, 17

Gene Network Analysis of Mental Disorders using Bootstrapped Bayesian Multinets on Gene Expression Data

Khare, Eesha, 17, Saratoga

Design and Synthesis of Hydrogenated TiO₂-Polyaniline Core-Shell Nanorods for Flexible High-Performance Supercapacitors

Takahashi, Jack Ryan, 17, Saratoga

Wnt Independent β -catenin Activation Is Associated with Increased Pulmonary Artery Smooth Muscle Cell Proliferation in Idiopathic Pulmonary Arterial Hypertension

Xu, Eric, 17

The Effects of Hydrostatic and Uniaxial Pressure on the Crystallographic Structure and Optical Properties of Scintillator CsI(Tl) for Nuclear Radiation Detection

The Harker School

Bhattacharya, Paulomi, 18, Cupertino

A Novel AAA-ATPase p97/VCP Inhibitor Lead for Multiple Myeloma by Fragment-Based Drug Design: A Computational Binding Model and NMR/SPR-Based Validation

Celik, Deniz, 17, Sunnyvale

Computation of the Cell Phone-Induced SAR Distribution in a 3D Multi-Layered Model of the Human Head/Brain using Finite Element Analysis

Chen, Jenny, 17, Fremont

RNAi of Rec12 in *Schizosaccharomyces pombe*: The Effect of Meiotic Recombination Inhibition on Fungicide Resistance

Luo, Andrew, 17, Los Altos

The Kinematics of Andromeda's Diffuse Ionized Gas Disk

Modi, Payal Nikhil, 17, Fremont

Understanding the Chemical Inhomogeneities in Globular Clusters: Examining M4 and M5 for Trends in Elemental Abundances

Swaminathan, Ashvin Anand, 17, Cupertino

Surreal Analysis: An Analogue of Real Analysis for Surreal Numbers

San Ramon

Dougherty Valley High School

Chen, Andrew, 17

Utilizing Novel Graphene Oxide Langmuir-Blodgett Film Catalysts to Enhance the Cost Efficiency of a PEM Fuel Cell

Pan, Grace Annette, 17

Investigating Effects of Ferroelectricity on Current Properties in Electron Tunneling Junctions

Sauer, Eric Michael, 18

PDFClearance: An Improved Method of Detecting Malicious Embedded JavaScript in Portable Document Files (PDFs) using Syntactic Analysis

Wang, Andrew, 17

Characterization of Controlled Release Dynamics of Doxorubicin to Cancer Cells within PLGA — Lecithin — PEG Hybrid Nanoparticles

Wen, Lily, 17

Regenerative Medicine: A Novel Micropatterning Approach to Clarify How Cells Transmit Extracellular Matrix Signals

Saratoga

Saratoga High School

Bedekar, Niharika Milind, 17

A Novel Environmentally Promising Alternative to Lead-Based Piezoelectric Materials — A Study of Lead Free (NaK)(NbSb)O₃-LiTaO₃-BaZrO₃ Ceramics

Chow, Amanda Yuling, 17

Electrocatalytic Hydrogenation of Furfural using Solid Polymer Electrolyte Electrolyzer

Garbe, Kevin, 17

Patterns in the Coefficients of Powers of Polynomials over a Finite Field

South San Francisco

El Camino High School

Hu, Daniel Alexander, 17

Beyond Timoshenko: Exact Solutions to Two-Variable Vibration Equations Not Found in Any Textbooks

COLORADO

Colorado Springs

Cheyenne Mountain High School

Volz, Sara, 17

Optimizing Algae Biofuels: Artificial Selection to Improve Lipid Synthesis

CONNECTICUT

Danbury

Danbury High School

Kerr, Ryan Daniel, 17

Biological Control of Ticks to Prevent Lyme Disease using Entomopathogenic Nematodes

Glastonbury

Glastonbury High School

Chowdhary, Kaitavjeet, 17

Morphogenesis of and Chromosome Segregation in *Escherichia coli* Branching Mutants

Greenwich

Greenwich High School

Le Breton, Stephen Adam, 17

In vivo Regeneration of Tooth Enamel using an Innovative Hydrophilic Polymer-Coated Retainer

Zhang, Annie, 16, Cos Cob

Graphene Oxide as a Novel Biosensor in Targeted Delivery of Chemotherapy Drugs

Hamden	<u>Hamden Hall Country Day School</u> <i>Buhimschi, Alexandru D., 17, New Haven</i> Improved and Novel Methods for Activation of Psoralens as <i>in situ</i> Anti-Cancer Agents
New Haven	<u>Hopkins School</u> <i>Meng, Ashley, 17, Shelton</i> The Where and When of Antibody-Secreting Cell Differentiation and Interactions: Exploration of the Subcapsular Sinus Microenvironment within Lymph Nodes
Wallingford	<u>Choate Rosemary Hall</u> <i>Zhang, Yifan, 17</i> Prestin Is Targeted to the Basolateral Membrane using a Tyrosine Motif
FLORIDA	
Jacksonville	<u>Episcopal High School of Jacksonville</u> <i>Forsyth, Alexander William, 17, Atlantic Beach</i> Using Virtual Screening to Identify Novel DNA Methyltransferase 1 Small Molecule Inhibitors as a Treatment for DNMT1 Overexpression Caused Cancer
Melbourne	<u>West Shore High School</u> <i>Chin, Michelle Man-Si, 17</i> Genetic Engineering: Improving Drought Resistance by Identifying the Underlying Mechanisms of Mitogen-Activated Protein Kinase 4 and its Interaction with Substrate MKS1
Sarasota	<u>Out-of-Door Academy</u> <i>Wenger, Brittany, 18</i> Global Neural Network Cloud Service for Breast Cancer
West Palm Beach	<u>Alexander W. Dreyfoos School of the Arts</u> <i>Wan, Christopher, 17, Wellington</i> Modeling Estuarine Salinity using Artificial Neural Networks
GEORGIA	
Atlanta	<u>The Westminster Schools</u> <i>Chin, Lillian Tiffany, 17, Decatur</i> Agent-Based Modeling of Collective Cell Movement during Wound Healing
College Park	<u>Woodward Academy</u> <i>Dave, Ronak Mahendra, 18, Atlanta</i> Elevation Change Alters the Genome-Wide Levels of 5-Hydroxymethylcytosine in Blood
Cumming	<u>South Forsyth High School</u> <i>Mudalegundi, Vijeth, 17</i> Gene Expression Analysis in a Mouse Model Expressing Mutant Huntington
Duluth	<u>Duluth High School</u> <i>Li, Jonathan Rong, 17</i> Kinetically Controlled Synthesis of Silver Nanoplates and Nanodisks via a Solvothermal Route
Marietta	<u>George Walton Comprehensive High School</u> <i>Goldshlager, Gil, 17</i> Characterizing α -Monotone and Outerplanar Thrackles
Milton	<u>Milton High School</u> <i>Selvakumar, Raja, 17, Alpharetta</i> Gastro Microbial Fuel Cell: A Novel Implementation of a GMFC in Capsular Nanorobotics

ILLINOIS

Aurora

Illinois Mathematics and Science Academy

Sha, Carrie, 17, Plainfield

Development of Novel Sensor to Reduce Postural Kyphosis

Barrington

Barrington Community High School

Kim, Jihoon, 17, Inverness

Ubiquitous Heart Rate Monitoring using a Webcam

Chicago

The University of Chicago Laboratory High School

Gunderman, Lane, 18

Investigating the Fenna-Matthews-Olson Complex using Molecular Dynamics Simulations:
Exploring the Mechanics of Energy Transport in Photosynthesis

Zhang, Shuodan, 18

LIN28 Represses miR-150 Maturation in MLL-Associated Leukemia

Evanston

Evanston Township High School

Goetz, Laura Gould, 18

Identifying Genetic Modifiers of Polyglutamine Expansion Toxicity in *Caenorhabditis elegans*

INDIANA

Carmel

Carmel High School

Vavilala, Vaibhav, 17, Indianapolis

Effects of Self-Action in a Neural Network with Hebbian Learning

Vemuri, Harsha, 17

PT-Symmetric Lattices with a Local Degree of Freedom

Munster

Munster High School

Kondamuri, Nathan Sai, 18, Dyer

The Improved Efficiency of a Solar Cell Based on Modified Photosynthetic Pigments

Kraft, Peter, 17

Synthesis and Analysis of Novel Coordination Polymers Containing 3- or 4-Pyridylnicotinamide
and Benzenedicarboxylates

IOWA

Ames

Ames High School

Fan, Bo, 16

Integration of Two Kinetic Analysis Methods for Evaluation of the Effect of a New Catalyst
on Reducing the Energy Consumption of CO₂ Capture

Iowa City

West High School

Ye, Ivan Bochuan, 18, Coralville

Tetrahedron-Based Orthogonal Simultaneous Scan for Cone-Beam CT

KENTUCKY

Louisville

duPont Manual Magnet High School

Mundkur, Naethan Sid, 17

Investigation into the Thermal and Rheological Properties of CuO Nanofluids
for Heat Transfer Applications

Park Hills

Notre Dame Academy

McFadden, Monica, 18, Ft. Wright

Biobarrier Filtration of Water Contaminants

MARYLAND

Clarksville

River Hill High School

Thakor, Jai, 17

A Nanofiber-Hydrogel Conduit as a Guide to Nerve Regeneration

Ellicott City

Centennial High School

Wang, Helen, 17

Strength in Numbers: Design and Synthesis of Glycoprotein-Based Multivalent Glyco-Ligands for Influenza Hemagglutinin and Human Galectin-3

Poolesville

Poolesville High School

Patel, Anand Vijaykumar, 17, Germantown

Searching for Transverse Wave Instabilities in the Maryland Centrifugal Experiment

Zeng, Joy Shuang, 17, Gaithersburg

Targeted Thermal Ablation of Cancer Cells using Biosurfactant Functionalized Carbon Nanotubes

Rockville

Richard Montgomery High School

Zhang, David, 17, Boyds

Sodium Abundance of Sungrazing Comets from Multi-Spacecraft Photometric and Morphological Analysis

Silver Spring

Montgomery Blair High School

Chen, Richard, 18, North Potomac

Ultrastructural Variations in Glycogen Synthesis

Chen, Sharon, 17, Potomac

Analysis and Development of Algorithms for the Densest k-Subgraph Problem

Ilangovan, Diwakaran, 17, Gaithersburg

The Perception of Vertical Visual Perturbation While Walking

Skarda, Jinhie Lee, 17

Analysis of Jovian Decametric Emission using the Long Wavelength Array Station 1

Zbarsky, Samuel, 17, Rockville

On Improved Bounds for Bounded Degree Spanning Trees for Points in Arbitrary Dimension

Timonium

Dulaney High School

Tang, Lisa Ann, 17, Lutherville

Applying Tripartite Split GFP Complementation Technology to Study RAGE Interactions and Signaling

MASSACHUSETTS

Acton

Acton-Boxborough Regional High School

Johnson, Jacob Paul Smullin, 17, Boxborough

Integrative Genomic Analysis of a Mouse Model of Malignant Breast Cancer Reveals Crucial and Novel Cancer Drivers

Amherst

Amherst Regional High School

Kundu, Shohini, 17

Reconstructing the History of Past Inundations in Lake Daija, Lake Amida, and Lake Ryuoo and Analyses of Their Intensities

Boston	<u>Commonwealth School</u> <i>Herrup, Rachel, 18, Cambridge</i> A Diagnostic Device using Laminar Flow and Colorimetric Analysis
	<u>The Winsor School</u> <i>Walsh, Jennifer Ming, 18, Chestnut Hill</i> Searching for the Oldest, Most Metal-Poor Stars from the SkyMapper Survey
Brookline	<u>Brookline High School</u> <i>Klein, Aaron J., 17</i> On Rank Functions of Graphs
Foxborough	<u>Foxborough High School</u> <i>Chattopadhyay, Aheli, 17</i> Engineering Nanoscale Energy Storage Devices from <i>C. aegagropila</i> Algae Cellulose Dispersed in Graphene
Lexington	<u>Lexington High School</u> <i>Bhupatiraju, Surya Narayanaraju, 17</i> On the Complexity of the Marginal Satisfiability Problem
Milton	<u>Milton Academy</u> <i>Cho, Haejun, 18, Fort Lee, New Jersey</i> Simulations of Three Shell Supernova Remnants (SNRs) for the Nuclear Spectroscopic Telescope Array (NuSTAR)
Newtonville	<u>Newton North High School</u> <i>Anand, Giridhar M., 17, West Newton</i> Disordered Protein Regions, Their Interactions, and Roles in Human Disease: Measurement via Disease-linked Genetic Variants
	<i>Chen, Christina, 18, Newton</i> Apollonian Equilateral Triangles
Worcester	<u>Massachusetts Academy of Math & Science</u> <i>Aiyam, Dhroova, 16, Shrewsbury</i> Modified Stern-Brocot Sequences
MICHIGAN	
Ann Arbor	<u>Ann Arbor Pioneer High School</u> <i>Mayukha, Ananya, 17</i> Swara Yatra: An Exploration into the Musical Preferences of Autistic Children
	<u>Ann Arbor-Huron High School</u> <i>Popova, Lilia, 17</i> Elucidating Environmental and Genetic Mechanisms of Magnetically Altered Plant Growth
Bloomfield Hills	<u>Andover High School</u> <i>Sun, Cuthbert, 17, West Bloomfield</i> The Interactions between Ccq1, Tpz1, Poz1 And Rap1 — Protein Components of Fission Yeast Telomeres — and Insight into the Telomerase Regulation Mechanism
Okemos	<u>Okemos High School</u> <i>Fu, Martina, 17</i> U.S. Cancer Mortality Rates Are Underestimated by the Standard U.S. 2000 Population. How to Correct It?

Parker, Greg, 18
Laser-Induced Breakdown Spectroscopy with a Yb Fiber Oscillator

Troy

Troy High School
Yang, Phillip, 17
Osteocytic Osteolysis in a Large Animal Model of Postmenopausal Osteoporosis and Metabolic Acidosis

MINNESOTA

Arden Hills

Mounds View High School
Duffy, Connor Vo, 16, Lino Lakes
Enhanced Drug Delivery via PEG-cross-linked Mucin Hydrogels

Plymouth

Wayzata High School
Lai, Jenny, 18
Development of an ELISA Prototype to Detect the Presence of Novel Peptide TUF1 in Serum and Its Role in Stress Management

Zhao, Roy, 17, Medina
New Models for HIV Latency

Stillwater

Stillwater Senior High School
Ylitalo, Andy, 17
Functionalization of Hexagonal Boron Nitride Monolayers and Analysis with Transmission Electron Microscopy

MISSISSIPPI

Oxford

Oxford High School
Ding, Taide, 18
Developing a Hurricane Landfall Model for Wind and Storm-Surge Prediction in the Northern Gulf Coast

MISSOURI

Chesterfield

Chakraborty Homeschool
Chakraborty, Uttara, 17
A New Stochastic Algorithm for Proton Exchange Membrane Fuel Cell Stack Design Optimization and its Markov Chain Analysis

Columbia

Rock Bridge High School
Shang, Charles, 17
New Multidimensional Scaling and Markov Networks Based Methods for Protein Model Quality Assessment

NEBRASKA

Omaha

Millard North High School
Jain, Nimansha, 17
Regulatory Motifs that Control the Trafficking and Assembly of Gap Junctions Formed of Connexin32

NEW JERSEY

Hackensack

Academy for Engineering & Design Technology
Chong, Julie, 18, Harrington Park
Electrochemical Synthesis and Characterization of Titania (TiO₂) Nanotubes for Application in Dye-Sensitized Solar Cells

Kim, Paul, 18, Paramus

Fabrication and Characterization of Functionalized Multi-Wall Carbon Nanotube Filters for Cd(II) Ion Removal

Academy for Medical Science Technology

Chan, Jennifer, 18, Upper Saddle River

Activation-Induced Cytidine Deaminase (AID): A Common Target for ER-Dependent and ER-independent Breast Cancer Therapies

Radin, Daniel Pierce, 18, Glen Rock

Lifeguard Inhibition of Fas-Mediated Apoptosis as a Possible Mechanism of Chemoresistance

Academy for the Advancement of Science and Technology

Guo, Michelle, 16, Ho-Ho-Kus

Identification of Novel Mechanisms of Resveratrol and Metformin in a Diabetic Model of Alzheimer's Disease

Sung, Janice Yejin, 18

A Novel Role of SIRT3 in Reprogramming Breast Cancer Metabolism

Academy for Visual and Performing Arts

Knyszek, Michael, 17

Growth of Pure and Co-Doped Single Crystalline Potassium Tantalate

Jersey City

Dr. Ronald E. McNair Academic High School

Savitsky, Kimberly, 17

The Analysis of Boating Motions on Biodiversity: The Duck River

Lawrenceville

Lawrenceville School

Mago, Aashna, 17, Newtown, Pennsylvania

A Novel EZH2 Histone Methyltransferase Inhibitor: Potential Advancement in Epigenetic Cancer Therapy

Lincroft

High Technology High School

Chen, Angelica, 17, Morganville

Towards the Prediction of Successful Outcome of Transcatheter Aortic-Valve Replacement (TAVR)

Schneider, Eric, 17, Freehold

On the Workday Number for Finite Multigraphs in a Variation of Cops and Robbers

Livingston

Livingston High School

Kania, Krishan, 17

Making an IMPACT: Advancing the Computation of Next-Generation Sequencing Data

Nie, Alexander, 17

Gelatin Hydrogels as a Cellular Scaffold: The Effect of Glucose on Gel Structure and Fibroblast Behavior

Millburn

Millburn High School

Lim, Keonho Chris, 17

The Effects of (2S,4R)-4-Fluoroproline Substitutions on Interchain Hydrogen Bonding Behavior in Collagen Triple Helices: A Computational Study

Xie, Emma, 17

Biodiesel Production from Microalgae via Solar-Powered Super-Critical Water Gasification

Morristown

Morristown High School
Wong, Catherine, 17

A Novel Design for Wireless Low-Cost Cardiac Examination over the Mobile Phone Platform:
Telemedicine for the Developing World

Teaneck

Ma'ayanot Yeshiva High School for Girls
Applebaum, Eliana, 17

A New Approach to Cancer: The Effects of Titanium Dioxide (TiO₂) Nanoparticles
on Human Cervical Adenocarcinoma (HeLa) Cell Membrane Mechanics

NEW MEXICO

Albuquerque

Manzano High School
Cordwell, Katherine, 17

Lower Central Series Quotients of Finitely Generated Algebras Over the Integers

NEW YORK

Armonk

Byram Hills High School
Arditi, Rose Lynn, 17, Bedford

Manganese-Enhanced Magnetic Resonance Imaging (MEMRI) for Measuring *in vivo* Hippocampal
Structure and Function in a Mouse Model of Fear Memory Resilience and Susceptibility

Blum, Zachary, 17

Evaluating Executive Functioning, Processing Speed, and P300 Event-Related Potential as
Predictors of Memory in Younger and Older Adults

Bricker, Jonathan Tyler, 17

Acute and Chronic Effects of Ethanol on GABA-mediated Synapses in the *Rattus norvegicus*
Cortex and Cerebellum

Di Capua, Christopher August, 17

A Comparison of Conventional CPR and CPR Utilizing a Novel Automatic Transport Ventilator:
The Automated Ventilator with Assisted Compressions (AVAC)

Fishberger, Gregory, 17, Bedford

A Novel Zinc Finger Protein Targeted Approach to Active DNA Demethylation of VEGF-A

Bellmore

John F. Kennedy High School
Pollock, Joshua Phillip, 17, Merrick
Emotional Face Recognition

Briarcliff Manor

Briarcliff High School
Moretto, Mark, 17

Deep Impact Spectral Observations of Naturally Occurring Mini-Outbursts

Bronx

Bronx High School of Science
Bushlow, Megan, 17, Kew Gardens

Perceived Cohesion, Flexibility, Communication, and Satisfaction in the Families
of Adolescents with Eating Disorders

Chittampalli, Yashaswini, 17, New York

APOBEC1-Mediated Editing of Amyloidogenic RNA Transcripts in Microglia

Donenfeld, Daniel Brian, 17

The Dynamics of Emulsion Separation: A Microscopic Investigation at the Interface

Liebman, Emma, 17, New York

"Poor Health" or a "Healthy Income": The Bidirectional Relationship of Health and Different
Measures of Income

Rahman, Rishad, 17, New York
Study of Swimming and Metaboly in *Euglena*

Ruiz, Amanda Elyssa, 17, Bellerose
Model Systems for the Analysis of Pax5 Function on V(D)J Recombination

Burnt Hills

Burnt Hills-Ballston Lake High School
Scibelli, Samantha Marie, 17
Census of Blue Stars in the Eighth Data Release of the Sloan Digital Sky Survey

Cedarhurst

Lawrence High School
Chapin, Arielle Bryn, 17, Atlantic Beach
Do Adolescent Males Have an Advantage in Spatial Learning?

Chen, Andrew, 17, North Woodmere
Incorporation of Graphene into Organic Polymer Solar Cells via Chemical Functionalization with Metal Nanoparticles

Tse, Alexandra Leigh, 17, North Woodmere
Grit vs. IQ: Assessing the Relative Impacts of Effort & Intelligence in Academic Success Among "Tweens"

Chappaqua

Horace Greeley High School
Liu, Angela, 17, Mount Kisco
Defibrillation of the Heart by Light: Simulation of Optogenetics in Cardiac Tissue

Peng, Jiayi, 17
A Cellular Automaton Model for Critical Dynamics in Neuronal Networks

Cross River

John Jay High School
Fulop, Daniel, 17, South Salem
Can MicroRNAs Revert Cirrhotic Hepatic Stellate Cells to a Healthy Quiescent State?

Pawlak, Kevin, 17, South Salem
Determining Efficacy of QSI-Antibiotic Combination Therapy against *Pseudomonas aeruginosa*

Croton-on-Hudson

Croton-Harmon High School
Traver, Chris, 17
Investigating Noise Pollution using Smartphones and Citizen Scientists

Dix Hills

Half Hollow Hills High School East
Bansal, Puja, 17
Three Dimensional Molecular Imprinting for the Detection of Viral Pathogens

Goyal, Rohan, 16, Melville
Human Immunodeficiency Virus Induces Pro-Apoptotic Features in Renal Cells through the Down Regulation of Vitamin D Receptor

Jin, Tammy, 17, Melville
Variable M3-S2 Linker Tension Modulates N-Methyl D-Aspartate Receptor Activity in a Subunit Specific Manner

Kim, Jonathan J., 17, Deer Park
Determining the Cell Cycle Stage of Cells in Developing Hair Follicles

Patil, Abhinav, 17, Melville
Geometric Phase as a Systematic Error in the Proton EDM Experiment

Tannenbaum, Robert, 17, Melville
Enhancement of Graphene-based Supercapacitor Devices in Both Symmetric and Asymmetric Electrochemical Cell Environments

Dobbs Ferry

Dobbs Ferry High School

Wang, Chloe, 16

Effects of Water Vapor on Hydrogen Permeation through a Metal Membrane

East Meadow

East Meadow High School

Wang, Anson, 17

Regulation of Memory Protein PKMzeta in Alzheimer's Disease

East Setauket

Ward Melville High School

McAuliffe, Phoebe Blyth, 17, Seatuket

Understanding the Connection between Metabolism and the HPG Axis by Linking Kisspeptin and Akt and Mapping p110 γ in Female Mouse Brains

Singhal, Sanjula, 17, Lake Grove

Novel Technology for Brand Protection and Anti-Counterfeiting Measures using DNA and Fluorophore

Zheng, Gloria, 17, South Setauket

The Potentiation of Human Glycine Receptor Channels in HEK-293 Cells by Sevoflurane

Farmingdale

Farmingdale High School

Gupta, Nakul, 17

Employing siRNA to Recruit KCNQ1 through microRNA Pathways: Implications for Long QT Syndrome

Fort Edward

Babbitt Homeschool

Babbitt, Matthew, 17

On Visibility Graphs — Upper Bounds and Classification of Special Types

Fresh Meadows

St. Francis Preparatory School

Arora, Aishvarya, 17, Middle Village

Interpretive Biases for Ambiguous Information in Adolescents with Body Dysmorphic Disorder

Great Neck

John L. Miller Great Neck North High School

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North Shore Hebrew Academy High School

David, Yonatan, 17, Syosset

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William A. Shine Great Neck South High School

Kim, David, 17

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Zhou, Cyrus, 17

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Greenlawn	<p><u>Harborfields High School</u> <i>Wax, Jacob Gary, 17</i> Investigating the Sensitivity and Specificity of the Potentiometric Biosensor Mechanism through Bacteria and Bacterial Spore Cross Testing</p>
Hewlett	<p><u>George W. Hewlett High School</u> <i>Kay, Jason Michael, 17</i> Why Do Bullies Bully? An Examination of the Role of Intrinsic and Extrinsic Factors in Motivating and Enabling Bullying Behavior</p>
Hewlett Bay Park	<p><u>Stella K. Abraham High School for Girls</u> <i>Sosnowik, Avigael, 17, Lawrence</i> The Coactivation of Positive and Negative Feelings: Film Genres' Effects on Adolescent Emotions</p>
Jericho	<p><u>Jericho Senior High School</u> <i>Joshi, Sonia M., 17</i> Concomitant Protease Inhibitor Administration: Saquinavir and Ritonavir Reduce Septic Complications Minus Cognition</p> <p><i>Lam, Samuel, 17, Old Westbury</i> Tai Ch Pilot Study: Assessing Quality of Life, Mood States, and Salivary Cortisol Levels in Chinese Americans after Breast Cancer Diagnosis</p> <p><i>Liu, Brendan, 17</i> Polyvinylamine Grafted Electrospun Polyacrylonitrile Membranes for Cr(VI) Adsorption</p> <p><i>Shen, Michael R., 16</i> FTO and RPGRIP1L Regulate Proliferation in 3T3-L1 Adipocytes and OXPHOS Gene Expression in HepG2 Hepatocytes</p> <p><i>Wu, Raymond, 17</i> A Model of the Action Potential in a Cardiac Myocyte and the Effects of Duration on Ion Currents</p>
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Lincolndale	<p><u>Somers High School</u> <i>Zheng, Simon, 16, Somers</i> Off-Axial Rocking Motion and Wavy Deformation in Triple-Walled Carbon Nanotubes</p>
Mamaroneck	<p><u>Mamaroneck High School</u> <i>Bernstein, Joby B., 17, Larchmont</i> The Scaffolded Grader: Activation of Embodied Sensory Experiences Influences Abstract Judgment</p>

- Manhasset** **Manhasset High School**
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- Merrick** **Sanford H. Calhoun High School**
McNamara, Emma Ann, 17
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- New City** **Clarkstown High School North**
Lee, Joan Yujae, 16, Congers
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- New Hyde Park** **Herricks High School**
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- Pleat, Benjamin Isaac, 17, Roslyn***
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- New York** **Regis High School**
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- Stuyvesant High School**
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- Kaczmarek, Zofii, 17***
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- Kandola, Amanpreet Singh, 17, Richmond Hill***
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- Lee, Jongyoon, 18, Little Neck***
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- Li, Miranda, 17***
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- Majumdar, Antara, 17, Astoria***
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- Solimano, Jamie Lee, 17***
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- Yao, Carolyn, 17, Whitestone***
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Zang, Ben, 17
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North Bellmore

Wellington C. Mepham High School
Wald, Corey, 17, Bellmore
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Ossining

Ossining High School
Hersh, Caleb, 17
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McQuaid, Daniel Conor, 17
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Rude, Eitan David, 17, Briarcliff Manor
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Rude, Sam, 17, Briarcliff Manor
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Plainview

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Zheng, Sunny, 17
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Pleasantville

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Naik, Jeewan, 17
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Port Washington

Paul D. Schreiber High School
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Rochester

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Roslyn Heights

Roslyn High School
Aalami, Arshia, 17, Roslyn
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Rye Brook

Blind Brook High School

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Saint James

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Spiezio, Nicholas, 17

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Scarsdale

Scarsdale High School

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Smithtown High School

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Staten Island

Staten Island Technical High School

Micek, Christopher, 17

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Suffern

Suffern High School

Silver, Benjamin, 17, Airmont

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Syosset

Syosset High School

Long, Michelle Jiang, 17

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Weiss, Jared Brandon, 17

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West Sayville

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Monastero, Rebecca Nicole, 17

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Westhampton Beach

Westhampton Beach High School

Beebe-Wang, Nicasia Joanne, 17, Westhampton

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Yorktown Heights

Yorktown High School

Hamann, Linus, 17

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NORTH CAROLINA

Durham

North Carolina School of Science and Mathematics

Carter, Landon, 16, Cary

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Chen, Yimo, 17, Jamestown

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Ge, William Hao, 17, Raleigh

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Jiang, Christie, 17, Cary

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Tsui, Elizabeth Llanes, 17, Goldsboro

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Wang, Yu, 17, Chapel Hill

A Computational and Statistical Analysis on the Self-Assembly of Nanoparticles

Xu, Amy, 18, Cary

Electrodeposition of Group IV Chalcogenide Thin Film Solar Cells

Raleigh

William G. Enloe High School

Chan, Jonathan, 17

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Waxhaw

Marvin Ridge High School

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OHIO

Mason

William Mason High School

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Shaker Heights

Hathaway Brown School

Catanzaro, Alice, 17, Cleveland Heights

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OKLAHOMA

Tulsa

Holland Hall School

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Beaverton

Valley Catholic High School

Naidu, Yamini Tondamantham, 17, Portland

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Eugene

South Eugene High School

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Allentown

Parkland High School

Wang, Joy Yiran, 17, Orefield

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Ambler

Wissahickon High School

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Bryn Mawr

The Shipley School

Danoff, Michelle, 18, Philadelphia

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Fort Washington

Germantown Academy

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Kennett Square

Unionville High School

Shea, Meghan Marjorie, 18, West Chester

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Addison

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College Station

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Denton

Texas Academy of Mathematics and Science
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Houston

Michael E. DeBakey High School for Health Professions

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Port Lavaca

Calhoun High School

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San Antonio

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Sugar Land

William P. Clements High School

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Alexandria

Thomas Jefferson High School for Science and Technology

Brenner, Alec, 17, McLean
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Peng, Jennifer, 17, Oak Hill

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Wu, Katherine, 17, Vienna

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- Arlington** **Bishop Denis J. O'Connell High School**
Dantzler, Alexa Victoria, 17, Manassas
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- Chantilly** **Chantilly High School**
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- Richmond** **Maggie L. Walker Governor's School**
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WASHINGTON

- Bellevue** **Interlake High School**
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- Kennewick** **Kamiakin High School**
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WEST VIRGINIA

- Wheeling** **Wheeling Central Catholic High School**
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- Madison** **James Madison Memorial High School**
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- Middleton** **Middleton High School**
Eom, Christopher, 18, Madison
 Paper-based Microfluidic Gradient Generator for Assaying Microglia Chemotaxis
- Milwaukee** **University School of Milwaukee**
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- Gyeonggi-do** **Korea International School**
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Chen, Andrew (NY)	13	Gondi, Suhas	22	Kwan, Kitty	4
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Chen, Richard	8	Gungor, Busra	21	Lee, Joan	16
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McQuaid, Daniel	17	Shi, Kensen	21	Wong, Catherine	12
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Minke, Madeleine	18	Singhal, Sanjula	14	Xie, Emma	11
Modi, Payal	4	Sinha, Aradhana	3	Xie, Lijia	20
Monastero, Rebecca	18	Skarda, Jinhie	8	Xu, Amy	19
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Mudalegundi, Vijeth	6	Sosnowik, Avigael	15	Xu, Haotian	2
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Mutlu, Kenan	15	Sridhar, Mayuri	15	Xue, James	2
Naidu, Yamini	20	Sun, Cuthbert	9	Xue, William	2
Naik, Jeewan	17	Sung, Janice	11	Yang, Phillip	10
Nie, Alexander	11	Sur, Debnil	4	Yao, Carolyn	16
O'Leary, Vincent	23	Swaminathan, Ashvin	4	Ye, Ivan	7
Padmanabha, Akshay	21	Takahashi, Jack	4	Ylitalo, Andy	10
Palmer, Corlin	3	Tang, Lisa	8	Yu, George	3
Pan, Grace	5	Tannenbaum, Robert	14	Yu, Kimberley	22
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Pawlak, Kevin	13	Tran, Andy	22	Zhang, David	8
Peng, Jennifer	22	Traver, Chris	13	Zhang, Kelly	3
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Popova, Lilia	9	Tung, Laura	3	Zhang, Yifan	6
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Rahman, Rishad	13	Vavilala, Vaibhav	7	Zheng, Gloria	14
Rao, Vaishnavi	3	Vemuri, Harsha	7	Zheng, Jenny	21
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