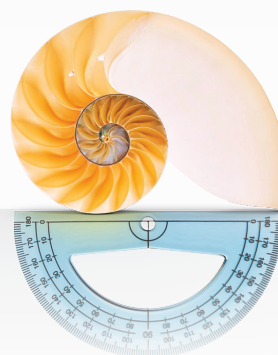


INQUIRE. INNOVATE. INSPIRE.



# 2011 Semifinalists



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# 2011 Semifinalists

**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 seven Nobel Prizes and four National Medals of Science. The Intel STS recognizes 300 students and their schools as Semifinalists each year—pulling from 1,744 applicants in 2011—to compete for \$1.25 million in awards. From that select pool, 40 student Finalists are then invited to Washington, D.C. in March to participate in final judging, display their work to the public, meet with notable scientists, and compete for the top award of \$100,000.

**The Semifinalists of the Intel Science Talent Search (Intel STS) 2011** were chosen from among 1,744 entrants representing 499 high schools in 42 states, the District of Columbia, and one overseas school.

Each of the 300 students named a Semifinalist in the Intel STS 2011 will receive a \$1,000 award for their 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 2011. This award is used to further excellence in science, math, and engineering education at the recipient school.

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 their applications for college admission and scholarships. A listing in this book, as well as official publication at [www.societyforscience.org/sts](http://www.societyforscience.org/sts), is also generally accepted as 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 2011 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 2011 Semifinalists, 40 Finalists will be chosen to attend the Intel Science Talent Institute in Washington, D.C. from March 10–15, 2011. During their trip to Washington, these Finalists will participate in a final judging process and share \$630,000 in awards.

The 40 Intel STS 2011 Finalists will be announced January 26, 2011 and published in *Science News* magazine.

The list of Intel Science Talent Search 2011 Semifinalists is compiled by Society for Science & the Public and based on entry data. If a student's city of residence differs from that of the school, it also will be listed. Intel STS 2011 Semifinalists are listed by high school state, high school city, and high school for group reference. Please refer to pages 23–24 for an alphabetical listing of the Semifinalists.

## ALABAMA

Birmingham

### Altamont School

**Johnsen, Peter Chase, 17**

The Effects of Varying Phosphine Ligands on the Electronic Structure of Rhodium Phosphine-Complexes and Their Implications in Catalysis

## ARIZONA

Chandler

### Basha High School

**Boisvert, Scott Paul, 17**

Influences of Environmental Chemistry on Growth and Chemotaxis of *Batrachochytrium dendrobatidis* in Aquatic Habitats: Implications for Amphibian Decline

Tempe

### Corona del Sol High School

**Mitra, Rahul, 17**

An Innovative Method to Trim the Barriers of Aluminum/Aluminum Oxide/Lead Tunneling Junctions Using Helium Ion Irradiation

## ARKANSAS

Little Rock

### Little Rock Central High School

**Zhao, Boshan, 17**

Nano-Graphene Laser Limiting

## CALIFORNIA

Aliso Viejo

### Aliso Niguel High School

**Kim, Samuel, 17**

Novel Fe-Based Bulk Amorphous Metals with Superior Soft Magnetic Properties for High Efficiency Power Electronics

Cerritos

### Gretchen Whitney High School

**Tung, Joe Kuanheng, 18**

Identification of Small Molecule Regulators of PIP3/AKT Signaling Pathway

Cupertino

### Cupertino High School

**Voss, Chelsea Sierra, 16, Santa Clara**

Applying Fast/Slow Asynchrony and Boolean Minimalism to the Computational Modeling of *C. elegans* Signaling Pathways

### Monta Vista High School

**Cheng, Zhaobin, 17, San Jose**

Creating a Stable GPR43-expressing Mammalian Cell Line

**Naik, Manali, 17**

Predicting Gene Expression of *Arabidopsis thaliana* Using *cis*-Regulatory Element Properties

**Tsai, Evaline Shin-Tin, 17**

Carbon-Doped Titanium Dioxide as a Novel Catalyst for the Photocatalytic Reduction of CO<sub>2</sub> to Hydrocarbons

**Wang, Stephanie, 17**

Effect of Trabecular Bone Orientation on Quantitative Ultrasound and Fracture Risk Prediction

Diamond Bar

### Diamond Bar High School

**Sim, Brandon Kenneth, 17**

Two-dimensional Arrays of Gold Nanoparticles

**Wang, Curtis Yen, 17, Walnut**

Effect of Organic Sub-structure on the Topology of Crystalline Divalent Metal-Organic Polymers

Irvine	<p><b><u>University High School</u></b>  <b><i>Ann, Phoebe, 17</i></b>  Therapeutic Natural Products: Effect of H36A Mutation on Structure and Function of StfQ</p> <p><b><i>Krolewski, Alexander Grant, 17</i></b>  Shape, Optical Properties, and Age of Borneo Smoke Plumes Imaged by MISR</p> <p><b><i>Yan, Eddie Qingyao, 17</i></b>  A Ray-tracing Analysis of Efficiency Enhancement of InGaN-Based Light Emitting Diodes through Geometric Chip Modifications</p>
Los Angeles	<p><b><u>Marlborough School</u></b>  <b><i>Kellman, Laura Nicole, 17, Pacific Palisades</i></b>  A Recursive Bayesian Estimation Method for Measuring Kinetics of Amyloid Fibrillogenesis</p>
Palo Alto	<p><b><u>Henry M. Gunn Senior High School</u></b>  <b><i>Gu, Youyang, 17</i></b>  Characterization of Drug Encapsulation in <i>Lycopodium clavatum</i></p> <p><b><i>Ho, Audrey, 17, Los Altos</i></b>  Formation Mechanisms of Derivatized Non-Classical [62] Fullerene</p> <p><b><i>Liu, Andrew Bo, 16</i></b>  Accounting for Cross-talk between Signaling Pathways Identifies Novel Model for Early and Late Post-transplant Acute Rejection</p> <p><b><i>Zhang, Brian, 17, Stanford</i></b>  Phase Diagram for Dipolar Wigner Crystals from Planar to Zigzag Configurations</p>
Pleasanton	<p><b><u>Foothill High School</u></b>  <b><i>Doraiswami, Rahul Ananth, 17</i></b>  Diagnosing Prostate Cancer Using Metabolomics and Chemokine-Signaling</p>
Rolling Hills Estates	<p><b><u>Palos Verdes Peninsula High School</u></b>  <b><i>Tang-Quan, David Kenneth, 18, Rancho Palos Verdes</i></b>  Evaluating the Role of the HOG1 and ESCRT Pathways in Host/Cell Interaction and Stress Response of <i>Candida albicans</i></p>
Sacramento	<p><b><u>Mira Loma High School</u></b>  <b><i>Desai, Nikita, 17</i></b>  Identification of a Putative Edinger-Westphal Nucleus in the Brain of the Northern Leopard Frog, <i>Rana pipiens</i></p> <p><b><i>Li, Selena Shi-Yao, 17, Fair Oaks</i></b>  A New Therapeutic Strategy for Liver Cancer: Metabolic Stress and Autophagy Modulation</p>
San Diego	<p><b><u>Torrey Pines High School</u></b>  <b><i>Cao, Xiaoyu, 17</i></b>  Novel Synthesis and Spectroscopic Characterization of Versatile Polymer Nanostructures Constructed Using Porous SiO<sub>2</sub> Templates for Chemical Sensing</p>
San Francisco	<p><b><u>Saint Ignatius College Preparatory</u></b>  <b><i>Safreno, Douglas Steven, 17, Woodside</i></b>  RAIN: The Rice Automated Irrigation Network</p>
San Jose	<p><b><u>Bellarmine College Preparatory</u></b>  <b><i>Delepine, Guillaume Daniel, 17, Cupertino</i></b>  Longitudinal Profiling of Autoantibodies to Cytokines and Chemokines in Murine SLE Models</p>

**Lynbrook High School**

***Chen, Jennifer Shuen, 17***

Massively Parallel DNA Sequencing-based Human Identification

***Huang, Julian, 17***

Gravitropism and Phototropism Interactions: Decision-Making in the Plant Root

***Ma, Andrew, 17, Saratoga***

Regulation of Plant Morphogenesis in *Arabidopsis thaliana* by Two HLH/bHLH Antagonistic Transcription Factors in the Brassinosteroid Signal Transduction Pathway

***Xu, Weishuang Linda, 17***

Photometric Light Curve and Orbit Integration of Amor Asteroid 19764 (2000NF5)

**The Harker School**

***Bhatnagar, Roshni, 17, Fremont***

The Relationship between Suppression, Negative Effect, and Volume of the Insula among Healthy Adolescents and Young Adults

***Chen, Benjamin, 17, Cupertino***

A Calibration of Spectral Absorption Line Strengths to the Magnesium and Iron Content of Red Giant Stars

***Chen, Josephine, 18, Santa Clara***

Heme oxygenase-1 as a Molecular Target in Asthma

***Mahajan, Rohan, 17, Cupertino***

The Effect of Doping on CdS Sensitized TiO<sub>2</sub> Nanowires for Photoelectrochemical Hydrogen Generation

***Parthasarathy, Nikhil, 17, Mountain View***

A Morphological Analysis of z~3 Lyman Break Galaxies in the Hubble Ultra Deep Field

***Tu, Susan Chuzhi, 17, Milpitas***

Evaporative Deposition of Zirconium Oxide Doped with Titanium Oxide: Effect of Oxygen and Comparison with Hafnium Oxide

***Young, Jason David, 17, Los Altos Hills***

Genome-wide Relationship between Histone Modifications and DNA-Binding Proteins in Diverse Cell Types

San Juan Capistrano

**St. Margaret's Episcopal School**

***Li, Jonathan F., 17, Laguna Niguel***

Effects of Cell Compressibility, Motility and Contact Inhibition on the Growth of Tumor Cell Clusters

San Mateo

**Aragon High School**

***Zhan, Peter Lee, 17, Foster City***

Global Warming's Impact on Living Organisms: A Quantitative Analysis of the Effect of Temperature on Bacteria

San Ramon

**Venture School**

***O'Dorney, Evan Michael, 17, Danville***

Continued Fraction Convergents and Linear Fractional Transformations

Saratoga

**Saratoga High School**

***Aggarwal, Amol, 17***

Repeated Distances in a Convex Polygon

## **South Pasadena**

### **South Pasadena High School**

***Wang, Sean Ku, 17***

Assessment of Glypican-3 as a Precancerous Marker in Different Types of Cirrhotic Livers:  
An Immunohistochemical and Molecular Study

## **Walnut**

### **Walnut High School**

***Lei, Bonnie Rae, 17***

Cryptic Species and Synonyms: A Reclassification of the *Spurilla* Genus Based on Morphological  
and Molecular Phylogeography

## **COLORADO**

### **Boulder**

### **Fairview High School**

***Petach, Tanya Nicole, 16***

Colorado River Salinity: Correlation to Geostrata and Mitigation with Carbon Fiber Capacitors

## **CONNECTICUT**

### **Darien**

### **Darien High School**

***Mauboussin, Andrew Michael, 17***

Differentiating Skill and Luck in Financial Markets with Streaks

### **Greens Farms**

### **Greens Farms Academy**

***Paul, Alexandra Master, 17, Redding***

The Effect of Relaxation and Music on the Informed Consent Process and Understanding  
Surgical Risk

### **Greenwich**

### **Greenwich High School**

***Kaneko, Marina, 17, Cos Cob***

Spectroscopic Modeling of Ergothioneine as a UV Dermal Protectant

### **Wallingford**

### **Choate Rosemary Hall**

***Nam, Hannarae Annie, 17***

Creating a Robust Optical Vortex Beam with a Single Cylinder Lens

***Saha, Shubhro, 17, Avon***

Modeling Proton Reduction Catalyzed by a Novel Nickel Electrocatalyst with Density  
Functional Theory

### **Westport**

### **Staples High School**

***Greenberg, Joshua Mayer, 17***

An Approach to Treating Sensorineural Hearing Loss through the Identification  
and Characterization of Mechanosensory Hair Cell Progenitors in the Zebrafish Lateral Line

***Lenskiy, Yuri Dmitry, 18***

Modeling an Optimal Receiver for a Binary Quantum Channel Using Information Theory

***Myers, Rachel Ann, 17***

Computational Investigation of Astrophysical Nuclear Reaction Rate Dominance

### **Woodbridge**

### **Amity Regional High School**

***Liu, Jenny Jiaqi, 17, Orange***

Emotional Models Improve Human-Robot Interaction

## **DISTRICT OF COLUMBIA**

### **Washington**

### **Saint Albans School**

***Gilbert, Alexander Prodromos, 17, McLean, VA***

Gallocyanine Chrome Alum: A Novel Histochemical Magnetic Resonance Imaging Contrast Agent

**FLORIDA**  
Coconut Creek

**North Broward School**

***Janaskie, Sophie Elizabeth Mary, 18, Coral Springs***

Mosaic Glass-forming Liquids: A Connection between Thermodynamics and Kinetics

**Fort Lauderdale**

**Pine Crest School**

***Oppenheim, Wendi Paige, 18, Southwest Ranches***

Out of Sight, Out of Mind: The Effects of Dispersants and Their Surfactants on *Cyprinodon variegatus* Embryos

***Rosenthal, Noam, 17, Miami***

Effects of Pax-4 on Beta-Cell Differentiation in C57/BL6 *Mus musculus*

***Shullman, Eric Gregory, 18, Boca Raton***

Development of a Pulsed Proton Exchange Membrane Electrolyzer for Hydrogen Generation

**Gainesville**

**Eastside High School**

***Rathinasabapathi, Bhiravi, 17***

Biofortification of Crops with Iron

**Orlando**

**Lake Highland Preparatory School**

***Mathur, Arjun, 17***

Development of a Highly Ordered Pyrolytic Graphite Dye-Sensitized Solar Cell as Proof-of-Principle of Graphene Solar Cells

***Reddy, Srikar Patlola, 17, Windermere***

Anti-Toxin Properties of Grape Extracts

***Zhou, Elaine, 17, Winter Park***

Shape-Dependent Catalytic Activity of Size-Selected Platinum Nanoparticles in 2-Propanol Oxidation

**Port Orange**

**Spruce Creek High School**

***Sathyanarayan, Deepak, 17, Ormond Beach***

Isolation of Salicylic Acid Metabolic Mutants

**Tallahassee**

**Rickards High School**

***Atolia, Eta, 17***

Preferred Polar Lipids of Marine Eustigmatophyte, *Nannochloropsis oculata*: Assessing Potential as Biofuel Feedstock and Eicosapentaenoic Acid Producer

**ILLINOIS**

**Aurora**

**Illinois Mathematics and Science Academy**

***Duan, Victor, 17, Darien***

A Novel Clustering Method via Nucleotide-Based Fourier Power Spectrum Analysis

***Hardin, Derek Wesley, 17, Morton Grove***

On Potentially Planar Graphic Degree Sequences

***Madsen, Corinne Angeline, 16, Downers Grove***

An Extension of the Erdős-Ginzburg-Ziv Theorem: Non-Zero Sums in  $\mathbb{Z}_n$

***Pak, Daniel Hyungseok, 16, Skokie***

Harmaline and Sodium Benzoate, Food Processing By-Product and Food Preservative, Induced Mitochondrial Damages: A Possible Implication in Degenerative Diseases

***Runkle, Nicole, 17, Libertyville***

Paracingulate Gyrus Influences Cognition, Negative Symptoms, and Personality in Schizophrenia



## Chicago

### Lincoln Park High School

***Balay-Wilson, Leah Avi, 17***

Loss of Chaos in Parkinson's Disease: Using Fractal Mathematics and Deep Brain Stimulation to Understand the Effects of Decoupling the Basal Ganglia from the Cortex in Parkinson's

### Northside College Preparatory High School

***Rojek, Alexandra Ewa, 18***

Energy Optimization of Synchrotron microCT for High-throughput Phenotyping of Zebrafish

### University of Chicago Laboratory High School

***Turner, Joseph Lucien, 17***

Creating an Automated Shutter System for Laser Spectroscopy

## Hinsdale

### Hinsdale Central High School

***Pillai, Divya, 17, Oak Brook***

Co-binding Relationships of Transcription Factors in Stem Cells

## Macomb

### Macomb High School

***Thottumkara, Prem Poothatta, 18***

Design and Development of an Ozone Equivalent for Oxidative Cleavage of Alkenes

## Naperville

### Naperville Central High School

***Hu, Kevin, 17***

Enumerating Multiplicity-Free Labeled Floor Diagrams for Rational Curves

***Leung, Krystle M., 17***

Exposure to Concentrated Ambient Particles of Rural Central California Induces Pulmonary Inflammation in Healthy Mice

***Swetlitz, Isaac Daniel, 17***

Analysis of Higgs Boson Candidates in the Electron Plus Jets Final State

## INDIANA

### Carmel

### Carmel High School

***Shi, Zenas Yimin, 17***

A Nanoparticle-Activated Autophagy Strategy to Mark and Kill HIV-Infected Cells

***Song, Kevin Muxi, 17***

The Effects of Solvent Purity on Highly Photoluminescent Nanocrystals (CdSe/ZnS Quantum Dots) Used as Biological/Biomedical Imaging Probes

***Zheng, David Xiazhe, 17***

Synthesis of Carbon-11-labeled bivalent  $\beta$ -carboline as New PET Agents for Imaging of Cholinesterase in Alzheimer's Disease

## Terre Haute

### Terre Haute North Vigo High School

***Foulkes, Thomas Peter, 18***

The Effect of Wood Hardness on the Speed of Fire by Friction

## KENTUCKY

### Bowling Green

### The Carol Martin Gatton Academy of Mathematics and Science

***Schrader, Sarah Michelle, 17***

The Discovery, Phenotypic Characterization, and DNA Sequence of Mycobacteriophage TiroTheta9

## LOUISIANA

### Shreveport

### Caddo Parish Magnet High School

***Wang, Allison Elizabeth, 17***

Characterization of Frizzled-7 as a New Target of Sirtuin Deacetylases

## MARYLAND

### Aberdeen

#### Aberdeen High School

*Karna, Molleshree, 17, Bel Air*

The Fundamental Interactions between Quantum Dots and Deoxyribonucleic Acids

### Baltimore

#### Baltimore Polytechnic Institute

*Borgnia, Dan Schlomo, 17*

Orientation-Dependent Elastic Energy of Diskoidal Colloids in Nematic Fluids

*Jones, Ilenna Simone, 17*

Gene Expression and DNA Methylation of KCNQ2 and KCNQ3 in Bipolar Disorder

### Bethesda

#### Walter Johnson High School

*Chin, Kuo-Kai, 17, Gaithersburg*

Electrochemical Investigations of Neurotransmitters Using Diamond Microelectrodes Insulated in Polypropylene

*Lin, Annie, 17, Rockville*

Identification and Characterization of the Mechanism of Action of a Novel Small Molecule Antiandrogen for the Treatment of Castration-Resistant Prostate Cancer

### Clarksville

#### River Hill High School

*Choi, Heejo, 17*

Differentiation of Pluripotent Stem Cells: Comparison between Induced Pluripotent Stem Cells and Human Embryonic Stem Cells

*Xing, Joanna, 17*

The BRAF<sup>T1799A</sup> Mutation Confers Sensitivity of Thyroid Cancer Cells to the BRAF<sup>V600E</sup> Inhibitor RXINH

### Marriottsville

#### Marriotts Ridge High School

*Kim, Se-Ho, 17, Ellicott City*

The Collatz Problem in  $\mathbb{Z}_p[x]$  and Its Connections to the Thue-Morse Sequence and Cantor Sets

*Yu, Kevin, 17, Ellicott City*

Novel Inhibitors against Chronic Myeloid Leukemia and HIV

### Poolesville

#### Poolesville High School

*Ayyagari, Raja Ratna Murthy, 17, Germantown*

Dense Nuclear Matter and Chiral Symmetry in the Skyrme Model, Revisited

*Gokhale, Pranav, 17, Germantown*

Investigation of Hard X-Ray Photoionization in Highly Charged Krypton

*Jain, Parakh, 17, Gaithersburg*

Electron Transport Theory for Graphene with Short Range and Gaussian-Correlated Impurities

### Potomac

#### Winston Churchill High School

*Ong, Sharon Ren-Wei, 17*

Do Presynaptic Blue Cone Cells Affect the Development and Synaptic Targeting of Postsynaptic Blue Cone Bipolar Cells in the Retina?

### Rockville

#### Richard Montgomery High School

*Cai, Wendy Wenyu, 17, Germantown*

Using Expression-Microsynteny Method to Identify Functionally Related Secretory Granule Proteins: Aspartyl Aminopeptidase Regulates Angiotensin II Levels in Pancreatic Islet Cells

*Wu, Yinglun, 17*

*In vitro* Differentiation of Induced Pluripotent Stem (iPS) Cells into Hematopoietic Lineage Cells

## Silver Spring

### Montgomery Blair High School

**Cao, Fang Y., 17, Potomac**

Using Very Large Promoter Fragments to Identify Modulating Neurons in the *Drosophila* Visual System

**Das Sarma, Andrew Christopher, 16, Potomac**

A Nanoscale Study of Structural and Electronic Transitions in Vanadium Dioxide

**Kannan, Ajay, 17, Potomac**

Observing SH-SY5Y Morphological Response to Hypoosmotic and Hyperosmotic Mechanical Stress

**Kumar, Nilay, 17, North Potomac**

Low Density Nuclear Matter in the Large  $N_c$  and Heavy Quark Limits of QCD

**Liu, Winston W., 17, Potomac**

Ethane-Hydrogen Systems under High Pressure

**Yan, Sandra Chun-Shan, 17, Derwood**

Determining Iron Concentration in the Motor Cortices of Patients with Focal Hand Dystonia

**Zheng, Raina, 17**

STAT1 as a Molecular Target in Breast Cancer Therapy

## MASSACHUSETTS

### Andover

#### Phillips Academy

**Cao, Wenyu, 17, Belle Mead, NJ**

On the Second Eigenvalue and Expansion of Bipartite Regular Graphs

### Boston

#### Commonwealth School

**Wang, Rui, 17, Lexington**

The Impact of Honey on Bacterial Quorum Sensing

### Concord

#### Concord Academy

**Kim, Geon Ho, 18**

Phylogeny of Korean Crab Spider (*Thomisidae*)

### Dover

#### Dover-Sherborn High School

**Raman, Achutha Narayana, 17, Sherborn**

*In silico* Exploration of Type-C Hyper-Methylation

### Groton

#### Groton School

**Cho, Sung Won, 18, Lexington**

An Analysis of Effects of Habitat Structure on the Ground Beetle (Coleoptera: Carabidae) Communities of Two Sites in Eastern Massachusetts, USA

### Manchester

#### Manchester Essex Regional High School

**Marsh, Kyle Delano, 17, Essex**

Concordance of the CKIT Gene with del(9q) in the Causation of Acute Myeloid Leukemia

### Northampton

#### Northampton High School

**Hunter, Harrison Alexander, 16**

Gamma-Aminobutyric Acid Channel Novel Modulators: Anesthetic Alternatives

### Sheffield

#### Berkshire School

**Quilty, Jenny, 18**

Identification and Characterization of Immunogenic Mutations in a Mouse Fibrosarcoma Model

## MICHIGAN

Beverly Hills

### Detroit Country Day School

**Jia, Randy Qingyu, 17, Rochester Hills**

Connectedness in Flip Graphs and Flip Complexes

### **Vijayakumar, Nithya Punitha, 17, Canton**

Exploring Sox10-Regulated Loci: Toward Identifying CMT1 Candidate Genes

### **Yuan, Allen Lambert, 17, Farmington Hills**

Linearly Many Faults in  $(n,k)$ -Star Graphs

Novi

### Novi High School

**Arora, Shubhangi, 17**

Investigating Multidrug Resistance and Cross-Pathway Gene Expression Changes in *Candida albicans* Conferred by Gene IPT1

## MINNESOTA

Eden Prairie

### Eden Prairie High School

**Liu, Jonathan Ziteng, 17, Chanhassen**

Design and Analysis of a Tunable Superlens

Plymouth

### Wayzata High School

**Agrawal, Rohit, 17**

Avoiding Paradoxes in Positional Voting Systems

### **Sun, Bo, 18**

Establishment of Long-term Cultures of Newt Cardiomyocytes for Use as an *in vitro* Model for Heart Regeneration

### **Xue, Lewin, 17, Maple Grove**

Microstructure Phase Evolution in Pentacene Thin Films Deposited on SiO<sub>2</sub> Substrate

Woodbury

### Woodbury High School

**Mukhopadhyay, Prithwis Kumar, 17**

Distinct Cellular Signaling Mechanism of Carrageenan-Induced Premalignant Transformation of Mammary Epithelial Cells

## MISSOURI

Fenton

### Rockwood Summit High School

**Zhang, Gechen, 18**

*Impatiens shimianensis* sp. nov. (Balsaminaceae): A New Species from Southwest China Based on Morphological and Molecular Evidence

## NEBRASKA

Omaha

### Brownell-Talbot High School

**Chen, Emily Li, 17**

A Novel, Dual Role of Cytokine-mediated Activation of STAT3 in Brain Inflammation and Neural Progenitor Cell Differentiation

## NEW HAMPSHIRE

Exeter

### Phillips Exeter Academy

**Cho, In Young, 18**

Assessment of Three Enzyme Classes for Their Role in Rhizopus Soft Rot

## NEW JERSEY

Hackensack

### Academy for Medical Science Technology

**Mensa-Kwao, Augustina, 17, Rochelle Park**

From the Frying Pan to the Fire

***Modi, Apexa, 17, Elmwood Park***

The Effects of Ginkgo Biloba and Ascorbic Acid on Smoking-Induced Pulmonary Disease

***Shah, Shivani Vinay, 17, Franklin Lakes***

Creating a Dead End for Cancer: The Role of LPA Receptors 1/3 and 2 in Ovarian Cancer Metastases

**Academy for the Advancement of Science and Technology**

***Choi, Junyoung, 17, Upper Saddle River***

Encapsulation of Paclitaxel with Fluorescently-Tagged Glycol Chitosan Nanoaggregates for *in vitro* Drug Delivery

***Upadhyay, Khushali Pranita, 17, Rutherford***

The Effects of *Azadirachta indica* Leaf Extract on the Immune System

***Wang, Austin Jeffrey, 17***

Incorporating Fill Pressure and Absorption Power in a Plasma Model for Study of the Magnetorotational Instability in the Laboratory

**Holmdel**

**Holmdel High School**

***Wood, Ryan Edward, 17***

Effect of Charge Remote Functionalities on Mass Spectrometric Collision-induced Dissociation Fragmentation of Sulfonate Anions

**Lawrenceville**

**The Lawrenceville School**

***Bocarsly, Joshua David, 18, Plainsboro***

Nanoscale Coating of PLLA for Use in Soft Tissue Implants

**Lincroft**

**High Technology High School**

***Gu, Janie Jia, 17, Morganville***

Towards Improving the Sensitivity of an Atomic Magnetometer

**Madison**

**Madison High School**

***Balfe, Jodi, 17***

Photometric Detection of Exoplanet Transits and Light Curve Analysis with Nanosatellite Constellations

**Millburn**

**Millburn High School**

***Bick, Alison Dana, 17, Short Hills***

Fabrication and Evaluation of Cell Phone Based Water Testing Apparatus

***Fitzpatrick, Haley Hannah, 17***

Cdk5 as a Suppressor of the Neuronal Cell Cycle and Its Therapeutic Implications

***Wasserman, Max Elliott, 18, Short Hills***

Effects of Myostatin Inhibition in the Absence of Testosterone on Limb and LA/BC Muscle Growth

***Wong, Derek Perseus, 17***

Fabrication and Performance of Dye-Sensitized Solar Cells Using High Surface Area Titania Powder

**North Brunswick**

**North Brunswick Township High School**

***Ebright, Katherine Yon, 17***

Target of the Cyclic-Peptide Antibiotic GE23077

**NEW MEXICO**

**Los Alamos**

**Los Alamos High School**

***Kendrick, Alexander Kent, 17***

Electromagnetic Detection of Aquifers

## NEW YORK

### Albany

#### The Albany Academies

**Rangwala, Alydaar, 17, Loudonville**

Dendritic Cell Migration towards UVA1 Light: Novel Basis for Potential Beneficial Phototherapy Treatment of Autoimmune Disease

### Armonk

#### Byram Hills High School

**Klugman, Madelyn Fay, 17**

The Effect of Adolescent Obesity on Knee Joint Powers and Double Limb Stance Time during Walking: A Pilot Study

### Bellmore

#### John F. Kennedy High School

**Cohen, Joshua Barry, 17, Merrick**

Atmospheric Properties of Biogenic Aerosols Produced by Mangroves

### Brentwood

#### Brentwood High School

**Cornejo, Kendra, 17, Bay Shore**

Revisiting *Centaurea* Phylogenetics with the Utilization of ITS Primers to Resolve the Phylogeny of *C. nigrescens* in the *Jacea* Clade

#### Brentwood High School - Sonderling Center

**Cao, Norman, 17, Bay Shore**

Probabilistic Path Planning in Cooperative Unmanned Aerial Vehicle Chasing

**Varghese, Sharon Mary, 17, Bay Shore**

Assessing Population Variation of the Introduced Plant Species *Centaurea nigrescens* (Tyrol Knapweed) in Eastern North America, Using cpDNA *trnT*(UGA), *trnL*(UAA), and *trnF*(GAA) Genes

### Bronx

#### Bronx High School of Science

**Cheng, Kezi, 17**

Photon Number Parity Oscillations in the Jaynes-Cummings Model: Field Parity Oscillations without Photon Exchange

**Harari, Janie Rae, 17, New York**

Self Perception of Empathic Traits in Children with Autism Spectrum Disorders after Various Interventions: A Pilot Study

**Morales, Mario Rafael, 17, College Point**

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