



## Winner Announcement

**\*\*Strict Embargo: Friday, May 18, 2007, 3:30 p.m. EDT\*\***

**\*\*Do Not Release Until This Time \*\***

### **Grand Awards Ceremony of the Intel International Science and Engineering Fair 2007 Presented by Agilent Technologies**

**Albuquerque, New Mexico, United States** - Science Service, in partnership with the Intel Foundation, today presented Grand Awards at the Intel International Science and Engineering Fair. Student winners are ninth through twelfth graders who earned the right to compete by winning a top prize at a local, regional, state or national science fair. The highlight of the week, the Intel ISEF Grand Awards are valued at nearly \$1 million in scholarships, tuition grants and scientific field trips.

The International Science and Engineering Fair is sponsored by Intel and has been administered by Science Service since its inception in 1950. Science Service is a non-profit organization dedicated to advancing the understanding and appreciation of science among people of all ages.

This information will be posted on the Science Service website at [www.sciserv.org/isef](http://www.sciserv.org/isef) immediately following the ceremony.

### **Intel Foundation Young Scientist Award**

**The winners of this award are the top three students at the Intel ISEF. They each receive a \$50,000 scholarship.**

#### **A Scholarship of \$50,000**

CB029

**Thrombospondin-1 Switches Nitric Oxide Function from Inhibitory to Stimulatory for Gene Expression of Human Tumor Endothelial Cell Markers**  
Dayan Li, 17, Eleanor Roosevelt High School, Greenbelt, Maryland

CH013      **Determining Carbon Nanotubes' Thermodynamic Solubility: The Missing Link to a Practical Supermaterial?**  
Philip Vidal Streich, 16, Homeschool, Platteville, Wisconsin

MA012      **The String Topology BV Algebra, Hochschild Cohomology and the Goldman Bracket on Surfaces**  
Dmitry Vaintrob, 18, South Eugene High School, Eugene, Oregon

The scholarship is awarded in eight equal installments to students enrolled at any accredited degree-granting institution of higher education, following their successful completion of high school. Students must provide proof of registration and good academic standing from the school's registrar each semester.

## Seaborg SIYSS Award

All expense-paid trip awarded to three senior finalists to attend the Stockholm International Youth Science Seminar during the Nobel Prize Ceremonies in December.

The SIYSS is a multi-disciplinary seminar highlighting some of the most remarkable achievements by young scientists from around the world. The students have the opportunity to visit scientific institutes, attend the Nobel lectures and press conferences, learn more about Sweden and experience the extravagance of the Nobel festivities.

EE060      **I Want a Holodeck**  
George Francis Hotz, 17, Bergen County Academies, Glen Rock, New Jersey

MA012      **The String Topology BV Algebra, Hochschild Cohomology and the Goldman Bracket on Surfaces**  
Dmitry Vaintrob, 18, South Eugene High School, Eugene, Oregon

PH029      **Period Analysis of Cataclysmic Variable X10 and Its Implications on the Origin of Low States**  
Temple Mu He, 18, Troy High School, Troy, Michigan

The SIYSS will be held in Stockholm, Sweden in December. Students must meet the 18-year age requirement to be considered. The history of SIYSS began as early as 1976 when the first seminar was organized by the Swedish Federation of Young Scientists together with the Nobel Foundation, with inspiration from Science Service. The award is named for the late Glenn T. Seaborg, Nobel Laureate in chemistry and Science Service trustee.

## European Union Contest for Young Scientists

For a top team project, an all-expense paid trip to attend the European Union Contest for Young Scientists held in Valencia, Spain in September 2007.

### Trip to the EU Contest

PS316      **The Secret in Mimosa's Leaf Folding Pattern**  
Natnaree Siriwon, 17, Trium Udom Suksa School, Bangkok, Thailand  
Korawich Niyomsatian, 18, Trium Udom Suksa School, Bangkok, Thailand  
Nathaphon Supokaivanich, 18, Trium Udom Suksa School, Bangkok, Thailand

The EU Contest for Young Scientists was developed to promote the ideals of co-operation and interchange between young scientists. The Contest is the annual showcase of the best of European student scientific achievement. The team project must pass the EU Contest jury review prior to attending, and must be first time participants in the EU Contest. Valid passport required.

## MILSET

For a top team project, a trip to the Expo Science International ESI 2007 to be held in Durban South Africa, July 8-13 where MILSET will celebrate its 20th Anniversary.

### **Trip to ExpoSciences International "ESI 2007"**

EN312

#### **Controlling Metal/Polymer Adhesion: The Enhancement of Microlithography and the Formation of Nanowires**

Jacob Charles Loewenstein, 17, Hebrew Academy of the Five Towns & Rockaway, Cedarhurst, New York

Brienne Ashley Kugler, 18, Jericho Senior High School, Jericho, New York

International Movement for Leisure in Science and Technology (MILSET) was founded in 1987 in Quebec. MILSET unites youth organizations, research associations and clubs from more than 60 countries.

Expo-Science Exhibition is a non-political event, contributing to peace, respect and better knowledge of all people. Valid passport and visa required.

## MIT Lincoln Laboratory

The Massachusetts Institute of Technology's Lincoln Laboratory has partnered with Science Service to promote science education through a program called the Ceres Connection. This program seeks to name minor planets after students through Science Service competitions, including the Intel ISEF. First and second place category award winner names will be sent to the International Astronomical Union (IAU) for naming rights of a near earth asteroid. Notification will be sent to the finalists when the name has been accepted and confirmed.

All Intel ISEF first place and second place category winners will receive a minor planet.

All minor planets named in the Ceres Connection program have been discovered by the Lincoln Near Earth Asteroid Research (LINEAR) program, operated by Lincoln Laboratory.

## Animal Sciences - Presented by New Mexico State University

Intel will present Best of Category Winners with a \$5,000 award and Intel® Core™2 Duo processor laptop computer. Additionally, a \$1,000 grant will be given to their school and the Intel ISEF Affiliated Fair they represent.

### **Intel ISEF Best of Category Award of \$5,000 for Top First Place Winner**

AS007

#### **Maternal Effects of Diet Restriction in Fruit Flies**

Yihe Dong, 16, Cedar Shoals High School, Athens, Georgia

### **First Award of \$3,000**

AS007

#### **Maternal Effects of Diet Restriction in Fruit Flies**

Yihe Dong, 16, Cedar Shoals High School, Athens, Georgia

AS060

#### **Gene Expression During Fin Growth in Zebrafish: The Role of the Gap Junction Protein Connexin43 in Vertebrate Bone Development**

Isha Himani Jain, 16, Freedom High School, Bethlehem, Pennsylvania

### **Second Award of \$1,500**

AS021

#### **Biological Control of a Common Corn Criminal, Phase Four: A Four-Year Study on the Effects of *Hetero rhabditis* Nematodes on the *Carpophilus lugubris* Dusky Sap Beetle**

D.J. Ray Horton, 18, Hotchkiss High School, Hotchkiss, Colorado

- AS029      **The Determination of Gender in Pacific and Atlantic Salmon for Improved Management of Threatened and Endangered Stocks**  
Susannah Lee Clary, 15, Los Lunas High School, Los Lunas, New Mexico
- AS035      **The Effect of the Reproductive Status of Adult Female Mice on Cognitive and Behavioral Performance During the Postpartum Weeks**  
Sonika Tyagi, 16, William Dickinson High School, Jersey City, New Jersey
- AS043      **Cellular and Molecular Mechanisms of Ethanol-Induced Developmental Toxicity**  
Michael Kapps, 18, Thornhill Secondary School, Thornhill, Ontario, Canada

**Third Award of \$1,000**

- AS004      **Histopathologic Investigation of Carcinogenesis in Planarians Secondary to Ultraviolet A, B, & C Exposure**  
James Edward Fichtelman, 17, Saint Edward's Upper School, Vero Beach, Florida
- AS008      **Intelligent Aviary II**  
Igor Germano Seibert, 19, Fundacao Liberato Salzano Vieira da Cunha, Novo Hamburgo, RS, Brasil
- AS022      **The Effect of Imidacloprid Resistance on the Immunocompetence of *Leptinotarsa decemlineata***  
Bushra Wazed, 17, Townsend Harris High School, Flushing, New York
- AS047      **An Ecological Stoichiometry Approach to Determining Predator-Prey Interactions of Streamside Animal Community Structure**  
Puja Jagdish Umaretiya, 18, Chandler High School, Chandler, Arizona
- AS057      **Calls in the Wild: Vocalizations of the Red-cockaded Woodpecker**  
Michael Tyler Wham, 17, Sterling Ridge Home School, Woodlands, Texas
- AS066      **The Effects of Imidacloprid Soil Drenching on Terrestrial Tardigrada of the Great Smoky Mountains National Park, TN: A Microfaunal Response to *A. tsugae* Insecticide Control**  
Ana Marie Lyons, 17, Mecosta-Osceola Math/Science/Technology Center, Big Rapids, Michigan

**Fourth Award of \$500**

- AS001      **The Equine Emotional and Physical Behavior Connection**  
Katlin Jayne Hornig, 15, Sargent High School, Monte Vista, Colorado
- AS020      **Agonism Between Two Epibenthic Freshwater Decapods**  
Alexander Mee-Woong Kim, 15, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia
- AS025      **Integrating Hirudin from *Hirudo medicinalis* into an Anticoagulative Medication for *Equus caballus*: Phase I, Collection and Purification**  
Alexandra Leigh McIe, 17, Brewster High School, Brewster, New York
- AS032      **The Effects of Electricity on Paralyzed Worms**  
Mustafa Mohammed Iqbal, 16, John Jay Science and Engineering Academy, San Antonio, Texas

- AS038      **Do Bumblebees Base Foraging Decisions on Those of Others?**  
Rachel Ellen Sitts, 18, Croton-Harmon High School, Croton-on-Hudson, New York
- AS052      **Tooth Structure Functionality of *Tyrannosaurus rex* vs. *Crocota crocuta***  
Nathan Robert Carroll, 18, Carter County High School, Ekalaka, Montana
- AS054      **The Role of Feed Additives in the Development and Production of *Sus scrofa***  
Adam Lee Hubrig, 18, Hankinson High School, Hankinson, North Dakota

## **Behavioral and Social Sciences - Presented by Intel Foundation**

Intel will present Best of Category Winners with a \$5,000 award and Intel® Core™2 Duo processor laptop computer. Additionally, a \$1,000 grant will be given to their school and the Intel ISEF Affiliated Fair they represent.

### **Intel ISEF Best of Category Award of \$5,000 for Top First Place Winner**

- BE031      **Behavioral and Physiological Changes Associated with the White Gene as a Phenotypic Marker in w1118 and *CS Drosophila melanogaster***  
Mary Martha Ferrari Douglas, 18, Manhasset High School, Manhasset, New York

### **First Award of \$3,000**

- BE031      **Behavioral and Physiological Changes Associated with the White Gene as a Phenotypic Marker in w1118 and *CS Drosophila melanogaster***  
Mary Martha Ferrari Douglas, 18, Manhasset High School, Manhasset, New York

- BE046      **Category Specific Semantic Deficits of Object Recognition in Adults with Neurological Damage**  
Mounir Ahmad Koussa, 17, Tucson High Magnet School, Tucson, Arizona

### **Second Award of \$1,500**

- BE035      **The Impact of Vision-Related Behavioral Factors on Myopia Development Across Levels of Parental Myopia**  
Tina Liu, 17, Ossining High School, Ossining, New York

- BE036      **Gender Differences in Hypersensitivity Behavior in a Rat Model of Autism**  
Sarah Kirsch, 17, Ward Melville High School, Setauket, New York

- BE039      **Psycho-social Effects Caused by Paternal Absence on Children 7-11 Years Old with Solution by Means of Exercises that Stimulate Dialogue**  
Scott Miguel Munguia, 17, Tecnologico de Monterrey Campus Guadalajara, Guadalajara, Mexico

- BE050      **Quinolinic Acid Induced Neurotoxicity and the Protection of Cognitive Function in Planarian Using Taurine**  
Lacey Nicole Stansill, 18, Seneca High School, Seneca, Missouri

### **Third Award of \$1,000**

- BE013      **Six Sigma Methodology Improves Employee Fund-raising Processes**  
Shiyu Xu, 17, Winona Senior High School, Winona, Minnesota

- BE018      **A Social Network Analysis: The Personal Interactions Between Teaching and Administrative Staff in a Secondary School Environment**  
Eric Russell Stipe, 18, West Salem High School, Salem, Oregon
- BE020      **The Efficacy of Selected Biofeedback Techniques in Mitigating Symptoms Associated with Autism Spectrum Disorder**  
Michael Joseph Berger, 18, The Bronx High School of Science, Bronx, New York
- BE042      **Association of Sibling Rivalry on Psychological Outcomes of Motivation and Emotion**  
Arthi Satyanarayan, 18, Hamilton High School, Chandler, Arizona
- BE062      **Smart Shoe for Blind People**  
Ahmed Khalid A. AlNuaimi, 16, Alansar Private School, Dammam, Saudi Arabia
- BE064      **The Affect of Color on Standardized Test Scores**  
Samuel Craig Furman, 17, Spruce Creek High School, Port Orange, Florida
- Fourth Award of \$500**
- BE002      **A Comparative Study Between Two Computer Platforms and the Paper/Pencil Version When Used by Nursing Students to Document Patient Records**  
Brian Michael Rollman, 15, Southwestern Educational Society, Mayaguez, Puerto Rico
- BE005      **Cachaza: Waste or Fertilizer? Social Impact**  
Adolfo Luis Soraire, 18, Escuela de Comercio La Trinidad, La Trinidad, Tucuman, Brasil
- BE012      **Effects of Context on Interior Scrambled Text**  
Stefan Joshua Coburn, 18, Fayette County High School, Fayetteville, Georgia
- BE017      **The Effects of Capsaicin on *Drosophila melanogaster***  
Ann Simone Cooper, 16, Lafayette Senior High School, Lexington, Kentucky
- BE037      **Learning of the Organizational Levels of the Matter Through an Interactive Museum with CBTis 119 Students**  
Karen Isabel Yada, 18, Center of Industrial Tecnologico Baccalaureate 119, Victoria, Tamaulipas, Mexico
- BE054      **The Effects of Video Game Experience on Laparoscopic Surgery Proficiency**  
Mark A. Vitale, 16, duPont Manual Magnet High School, Louisville, Kentucky
- BE060      **Ethnomathematics in the Geometric Patterns in Woven Fabrics of the Indigenous Kalingas of the Philippines**  
Hester Mana Docasao Umayam, 15, Philippine Science High School-Cagayan Valley Campus,

## Biochemistry - Presented by Agilent Technologies

Intel will present Best of Category Winners with a \$5,000 award and an Intel® Core™2 Duo processor laptop computer. Additionally, a \$1,000 grant will be given to their school and the Intel ISEF Affiliated Fair they represent.

### Intel ISEF Best of Category Award of \$5,000 for Top First Place Winner

BI039      **Zinc Finger of hDNMT1 Is Essential for Enzymatic Activity and Participates in Transcriptional Repression**  
Mihika Pradhan, 16, Hamilton-Wenham Regional High School, South Hamilton, Massachusetts

### First Award of \$3,000

BI039      **Zinc Finger of hDNMT1 Is Essential for Enzymatic Activity and Participates in Transcriptional Repression**  
Mihika Pradhan, 16, Hamilton-Wenham Regional High School, South Hamilton, Massachusetts

### Second Award of \$1,500

BI033      **Design and Development of a Novel DNA Computer System for Advanced Genetic Analysis**  
Adrian Veres, 17, College Jean-de-Brebeuf, Montreal, Quebec, Canada

BI044      **Curcumin Inhibits  $\alpha$ B4 Integrin-Dependent Breast Carcinoma Cell Motility**  
Huang Huang, 18, Caddo Parish Magnet High School, Shreveport, Louisiana

### Third Award of \$1,000

BI028      **Base Lesion Formation by Glycidamide on DNA Substrates**  
Lindsey Marie Hubley, 18, Woods Cross High School, Woods Cross, Utah

BI034      **Activity Based Proteomic Profiling of Lysophosphatidic Acid- treated Cancer Cells**  
Aryeh Benjamin Hillman, 18, Francis W. Parker Schol, San Diego, California

BI038      **Beta-amyloid Precursor Protein 1: Linking Protein Replacement Therapy as Treatment for Alzheimer's Disease and Melanoma, A Three Year Study**  
Melanie Paige Kabinoff, 16, Park Vista Community High School, Lake Worth, Florida

BI043      **The Effect of Green Tea EGCG on the Ability of p25-Activated Cyclin-Dependent Kinase 5 (cdk5) to Induce Cell Death in cos-7 Kidney Cells: Implications for Alzheimer's Disease**  
Shivani Brinda Agarwal, 15, Spring Valley High School, Columbia, South Carolina

### Fourth Award of \$500

BI013      **Structural Studies of the Inactive Form of Indoleamine 2,3-Dioxygenase**  
Ling Zhang, 16, The Nightingale-Bamford School, New York, New York

BI015      **A Novel Cyclodipeptide with a Significant Anti-tumor Activity from a Marine *Bacillus***  
Heng Jiao, 17, Shanghai Yanan High School, Shanghai, China

BI019      **The Synthesis and Characterization of Innate Immunity Inhibitors**  
Stacy Gail Feinsot, 17, Lawrence High School, Cedarhurst, New York

BI020      **The Identification of a Myostatin Signaling Pathway: An *in vitro* Study of Myotube and Myoblast Response**  
Marc Andrew Egerman, 17, Ossining High School, Ossining, New York

## Cellular and Molecular Biology - Presented by Intel Foundation

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### Intel ISEF Best of Category Award of \$5,000 for Top First Place Winner

CB029      **Thrombospondin-1 Switches Nitric Oxide Function from Inhibitory to Stimulatory for Gene Expression of Human Tumor Endothelial Cell Markers**  
Dayan Li, 17, Eleanor Roosevelt High School, Greenbelt, Maryland

### First Award of \$3,000

CB029      **Thrombospondin-1 Switches Nitric Oxide Function from Inhibitory to Stimulatory for Gene Expression of Human Tumor Endothelial Cell Markers**  
Dayan Li, 17, Eleanor Roosevelt High School, Greenbelt, Maryland

### Second Award of \$1,500

CB023      **Gene Expression Changes in Parkinson's Disease: Genes Mediating  $\alpha$ -synuclein Toxicity in a *Drosophila melanogaster* Model**  
Aaron Hakim, 15, Appleby College, Oakville, Ontario, Canada

CB033      **Suspended Animation: Elucidating the Anoxia Response Pathway**  
James R. Valcourt, 17, Wachusett Regional High School, Holden, Massachusetts

### Third Award of \$1,000

CB001      **Differentiation of Neural Progenitor Cells into Inner Ear Hair Cells: A Strategy for Treating Deafness**  
Sabrina Lakshmi Prabakaran, 16, Canterbury School, Fort Myers, Florida

CB016      **Pyrimidine Dimer Analysis: Caffeine Induced DNA Alterations in UV Susceptibility as a Potential for Red Tide Control**  
Eric Alan Sherman, 13, Ephrata Senior High School, Ephrata, Pennsylvania

CB018      **Identification of a Novel Regulatory Mechanism for Intracellular Degradation**  
Xin Guan, 16, Lincoln High School, Tallahassee, Florida

CB036      **Targeting TRAF Proteins as an Anti-tumor Strategy**  
Yi Cai, 18, duPont Manual Magnet High School, Louisville, Kentucky

### Fourth Award of \$500

CB002      **Entry of Plasmid-Encoded Toxin into the Eukaryotic Cell, Year Two**  
Kaitlin Elizabeth Burlingame, 17, Lake Brantley High School, Altamonte Springs, Florida

CB039      **Cancer: What Can Garlic Do for You?**  
Karthik Venkatanag Prasad, 16, Bellaire High School, Bellaire, Texas

CB043      **A Study on the Effects of *Nigella sativa* (Black Seed) and Its Main Constituent, Thymoquinone, on the Viability, Proliferation and Migration of SCC12F Epithelial Cells**  
Adam Akkad, 16, Albuquerque Academy, Albuquerque, New Mexico

CB044      **Identification and Characterization of Mutations Causing Amyotrophic Lateral Sclerosis**  
Arti Vikas Virkud, 17, Pine Crest School, Ft. Lauderdale, Florida

## Chemistry - Presented by Alcatel-Lucent

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### Intel ISEF Best of Category Award of \$5,000 for Top First Place Winner

CH013      **Determining Carbon Nanotubes' Thermodynamic Solubility: The Missing Link to a Practical Supermaterial?**  
Philip Vidal Streich, 16, Homeschool, Platteville, Wisconsin

### First Award of \$3,000

CH013      **Determining Carbon Nanotubes' Thermodynamic Solubility: The Missing Link to a Practical Supermaterial?**  
Philip Vidal Streich, 16, Homeschool, Platteville, Wisconsin

### Second Award \$1,500

CH015      **DNA Electrophoresis on Nanoporous Polyethersulfone Membrane Surfaces**  
Michael Ding, 17, Glen Cove High School, Glen Cove, New York

CH021      **Synthetic Analogs of Smoothened Intracellular Loop as Potent Inhibitors of Cancer Cells Growth**  
Jarrett Renn Remsberg, 17, Middletown Senior High School, Middletown, Maryland

CH039      **Bright, Luminescent Silicon Nanoparticles for Biological Applications**  
Alexandra Maria Courtis, 17, Davis Senior High School, Davis, California

### Third Award of \$1,000

CH006      **Development of a New Gasoline Detergent---NDEEC**  
Ye Tao, 18, Fuzhou No.1 Middle School, Fuzhou, Fujian, China

CH025      **Capillary Action in Continuously-tapered Narrow Gap Space**  
Clifford Byungho Kim, 17, North Allegheny Senior High School, Wexford, Pennsylvania

CH041      **A New Model for Hydrophobic Hydration**  
Sarah Elizabeth Marzen, 17, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia

CH046      **3-bromo-5,6-dihydro-[4H]-1,2-oxazine-N-oxides: Synthesis, Properties and Application**  
Leonid V. Romashov, 16, The State Educational Establishment Lyceum #1303, Moscow, Russia

**Fourth Award of \$500**

- CH008      **Synthesizing DMPC-capped Gold and Water-soluble Cadmium Sulfide Nanoparticles**  
Markrete Krikorian, 18, Townsend Harris High School, Flushing, New York
- CH009      **Hydrogenic Defects in Ice**  
Sophie Alice Renner, 17, James Allen, London, London, United Kingdom
- CH019      **Corrosion Mitigation Using Thin-film Coatings of Polyelectrolyte Multilayers**  
Samantha Kay Lawrence, 18, Christian Heritage High School, Riverdale, Utah
- CH024      **A Novel Approach to Rapid Diagnosis of Cancer**  
Richard J. Li, 16, Monte Vista High School, Danville, California
- CH030      **Synthesis of Supramolecular Self-assembling Macromolecular Structures**  
Matthew Bret Weiss, 18, Breck School, Golden Valley, Minnesota

**Computer Science - Presented by Intel Foundation**

Intel will present Best of Category Winners with a \$5,000 award and an Intel® Core™2 Duo processor laptop computer. Additionally, a \$1,000 grant will be given to their school and the Intel ISEF Affiliated Fair they represent.

**Intel ISEF Best of Category Award of \$5,000 for Top First Place Winner**

- CS012      **Computer Aided Instruction in the Modern Classroom**  
Raez Lorgat, 16, Rondebosch Boy, Cape Town, Western Cape, South Africa

**First Award of \$3,000**

- CS012      **Computer Aided Instruction in the Modern Classroom**  
Raez Lorgat, 16, Rondebosch Boy, Cape Town, Western Cape, South Africa

**Second Award of \$1,500**

- CS003      **Improper Fractional Base Encryption**  
John Wilson Dorminy, 16, Sola Fide Home School, McDonough, Georgia
- CS018      **Ping Me! Optimizing Code for Cluster Computing**  
Erika Alden DeBenedictis, 15, Saint Pius X High School, Albuquerque, New Mexico
- CS046      **Quantum Cluster Algorithms: Unsorted Database Search and Modular Exponentiation**  
Gabriel Joel Mendoza, 18, Americas High School, El Paso, Texas

**Third Award of \$1,000**

- CS009      **Making Waves: A 3D Software Simulation of Wave Creation and Propagation**  
James Daniel Brandenburg, 15, Cocoa High School, Cocoa, Florida
- CS013      **Construction of Virtual Axonal and Dendritic Morphology Based on Properties Extracted from Classes of Neurons**  
Katja Miller, 18, Christian-Gymnasium Hermannsburg, Hermannsburg, Germany
- CS014      **Applications of Multi-Valued Quantum Algorithms**  
Yale Wang Fan, 15, The Catlin Gabel School, Portland, Oregon

CS034      **Robot Vision: A Mutual Entropy-based Algorithm Through Scene Recognition from Image Sequences for Terrestrial and Planetary Exploration**  
Lucia Mocz, 16, Mililani High School, Mililani, Hawaii

**Fourth Award of \$500**

CS021      **Physics World**  
Israel Salazar Chavez, 17, CBTis 168, Aguascalientes, Ags., Mexico

CS022      **Aiding the Visually Impaired Through the Use of Integrated Computer Systems**  
Theodore Tzanetos, 17, Plainview-Old Bethpage John F. Kennedy High School, Plainview, New York

CS039      **Differentiating Random Sequences with a Genetic Algorithm**  
Neil Taylor Forrester, 16, Falmouth High School, Falmouth, Massachusetts

CS043      **Three-dimensional Scanning of Small Objects**  
Jason Andrew Monschke, 18, Krum High School, Krum, Texas

CS045      **Neural Network Topologies for Number Recognition**  
Thomas Benjamin Thompson, 16, Huron High School, Ann Arbor, Michigan

## Earth & Planetary Sciences - Presented by Shell Oil

Intel will present Best of Category Winners with a \$5,000 award and an Intel® Core™2 Duo processor laptop computer. Additionally, a \$1,000 grant will be given to their school and the Intel ISEF Affiliated Fair they represent.

**Intel ISEF Best of Category Award of \$5,000 for Top First Place Winner**

EA025      **On Shaky Ground: Probing Proximal Seismites Within the Epicenter of a Cretaceous Earthquake in Grand Staircase-Escalante National Monument, Utah**  
Hannah Louise Wolf, 16, Parkland High School, Allentown, Pennsylvania

**First Award of \$3,000**

EA025      **On Shaky Ground: Probing Proximal Seismites Within the Epicenter of a Cretaceous Earthquake in Grand Staircase-Escalante National Monument, Utah**  
Hannah Louise Wolf, 16, Parkland High School, Allentown, Pennsylvania

**Second Award of \$1,500**

EA020      **A Novel Design for Magnetic Levitating Seismograph**  
Rishin Behl, 17, Kendriya Vidyalaya, Mumbai, Maharashtra, India

EA023      **Chemical Aspects of the Impact Process**  
Terik Daly, 17, Oak Grove High School, San Jose, California

**Third Award of \$1,000**

EA001      **Improving Weather Technology for the Future: WDSS-II, Phase II**  
Michael William Kirlin, 16, Carroll High School, Dayton, Ohio

EA007      **Developing ESR Dating for Crocodylian Teeth: Geochemical Analyses of Iron Uptake in Crocodylian Hydroxyapatite**  
Hermain Suhail Khan, 17, Staten Island Technical High School, Staten Island, New York

**Fourth Award of \$500**

- EA015      **The Possible Effects and Predictive Capabilities of the El Niño Southern Oscillation and the North Atlantic Oscillation on Western Hemisphere Warm Pool Variability**  
John Christopher Turner, 18, Lincoln High School, Tallahassee, Florida
- EA019      **Temperature and Pressure Dependency of Carbon Monoxide's Absorption Cross-Section**  
Parv Aggarwal, 18, North Carolina School of Science and Mathematics, Durham, North Carolina
- EA022      **Seismic and Petrographic Analyses of the Victoria Island Structure (Phase II)**  
Samuel Charles Spevack, 16, Grossmont Middle College High School, El Cajon, California

**Electrical and Mechanical Engineering- Presented by Intel Foundation**

Intel will present Best of Category Winners with a \$5,000 award and Intel® Core™2 Duo processor laptop computer. Additionally, a \$1,000 grant will be given to their school and the Intel ISEF Affiliated Fair they represent.

**Intel ISEF Best of Category Award of \$5,000 for Top First Place Winner**

- EE060      **I Want a Holodeck**  
George Francis Hotz, 17, Bergen County Academies, Glen Rock, New Jersey

**First Award of \$3,000**

- EE060      **I Want a Holodeck**  
George Francis Hotz, 17, Bergen County Academies, Glen Rock, New Jersey
- EE066      **RCISS - Remote Computer Interface and Security System**  
Andrew John Nowell, 19, Nottingham High School, Nottingham, Nottinghamshire, United Kingdom

**Second Award of \$1,500**

- EE004      **Novel Corrugated Board Rejection System**  
Judith Black, 18, Sacred Heart Grammar School, Newry, County Down, Northern Ireland
- EE014      **Developing S.C.R.A.P.S.: The Self-Contained, Robust, Anthropomorphic Powered Skeleton: An Application in Flywheel Engineering**  
Ian Michael Bouligny, 16, Catholic High School, New Iberia, Louisiana
- EE044      **An Inexpensive Microgravity Environment**  
Alexandra Elizabeth Crook, 17, Box Elder High School, Brigham City, Utah
- EE071      **TUG**  
David Charles Griffiths Badger, 18, Birkdale School, Sheffield, South Yorkshire, United Kingdom

**Third Award of \$1,000**

- EE010      **The Dirt on Baseball: Standardizing the Baseball Mudding Process**  
Cameron Kruse, 17, Homeschool, Colorado Springs, Colorado

- EE018      **Design and Development of Automated Angling Device**  
Tomas Nezval, 19, The Secondary Industrial School, Prostejov, Czech Republic
- EE022      **An Optical Sensor to Assess High Intensity Discharge Lamp Age Through Spectral Analysis**  
Carl A. Turner, 18, New Prague Senior High School, New Prague, Minnesota
- EE039      **Alarm System for Drowning in Swimming Pools**  
Jie Jin, 18, The High School Affiliated to Renmin University, Beijing, China
- EE046      **Effect of Underwater Barrier on Speeds of Tsunami Wave**  
Narges Kaynia, 19, Berg Videregaende Skole, Oslo, Norway
- EE047      **Image Processing and Computer Vision Algorithms for Smart Mosaicing: An Application for Automatic Image Recognition and Tracking**  
Peter Bao-Phuc Nguyen, 17, Fort Walton Beach High School, Fort Walton Beach, Florida

**Fourth Award of \$500**

- EE006      **Development of a Rocket Launched Parafoil Controlled Aerial Imaging Platform**  
Spencer Wolf Greaves, 18, University School of Milwaukee, Milwaukee, Wisconsin
- EE032      **Virtual Woodwind**  
Colby Anne Wilkason, 16, Warner Robins High School, Warner Robins, Georgia
- EE041      **Self-Constructed Portable Wheelchair Lift**  
Matthew Kyle Smith, 18, West Noble High School, Ligonier, Indiana
- EE042      **L.I.S.S.A. 2.0: Light Intensity & Sonar Sensing Assistant, Evolved**  
Sophia Alexandra Goreczky, 17, Plano West Senior High School, Plano, Texas
- EE051      **MEMS Accelerometer Pointing Device**  
Christopher Thomas Phare, 17, Jefferson County International Baccalaureate, Birmingham, Alabama
- EE059      **Smart Swim: A Drowning Alert System**  
Jordan Michael Krell, 17, Plankinton High School, Plankinton, South Dakota
- EE072      **Investigation of the Mechanics and Optimization of a Planar Valveless Piezoelectric VR Pump**  
Yichi Zhang, 19, Dunlap High School, Dunlap, Illinois
- EE074      **Cutting and Dosing Machine of Pills for Mosquitoes**  
Pedro Francisco Vignolo, 18, Consejo de Educacion Tecnico Profesional, Paysandu, Uruguay

## Materials and Bioengineering - Presented by Intel Foundation

Intel will present Best of Category Winners with a \$5,000 award and an Intel® Core™2 Duo processor laptop computer. Additionally, a \$1,000 grant will be given to their school and the Intel ISEF Affiliated Fair they represent.

### Intel ISEF Best of Category Award of \$5,000 for Top First Place Winner

EN031 **Cooling High Power Density Microprocessors: Employment of a Liquid Gallium-Indium-Tin Eutectic Coolant within a Magneto hydrodynamic Heat Transfer Pump**  
William Campbell Martin, 18, Saginaw Arts & Sciences Academy, Saginaw, Michigan

### First Award of \$3,000

EN031 **Cooling High Power Density Microprocessors: Employment of a Liquid Gallium-Indium-Tin Eutectic Coolant within a Magneto hydrodynamic Heat Transfer Pump**  
William Campbell Martin, 18, Saginaw Arts & Sciences Academy, Saginaw, Michigan

EN045 **Platinum Nanoparticles: From Hydrogen Storage to Cancer Treatment**  
Daniel Scott Katz, 18, Hebrew Academy of the Five Towns & Rockaway, Cedarhurst, New York

### Second Award of \$1,500

EN005 **Science Thwarts Insurgents: Improvements in Ceramic Armor Systems Design Using Composites for Tensile Reinforcement in Ceramic Plates**  
Melissa Nicole Carvell, 16, Bartlesville High School, Bartlesville, Oklahoma

EN024 **Design and Synthesis of a Polyvinyl Alcohol Hydrogel for Controlled Release of Phosphate**  
Alexandra L. Ghaben, 14, Central York High School, York, Pennsylvania

EN055 **Carbon Fiber Makes a Pointe!**  
Harper-Grace Niedermeyer, 16, Catholic High School, Huntsville, Alabama

### Third Award of \$1,000

EN013 **Creation of Ultra High-Temperature Cermets:  $ZrB_2 + Mo$  and  $ZrB_2 + W$**   
Erin Marissa Hopke, 18, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia

EN029 **Rebuilding Lives in Post-Catastrophic Disaster and War Torn Areas: A New Technology for Portable Construction Beams and a Process for Their Production and Use**  
Micah Lathaniel Toll, 18, Cedar Crest High School, Lebanon, Pennsylvania

EN036 **An Extra Spin on Nerve Regeneration: Synthesis of an Electrospun Spinal Cord Nerve Conduit**  
Amardeep Singh Grewal, 18, Detroit Country Day School, Beverly Hills, Michigan

EN044 **Yielding to Pedestrians**  
Nicholas Samir Ekladyous, 15, Cranbrook Kingswood School, Bloomfield Hills, Michigan

EN053 **Encapsulation of Single-walled Carbon Nanotubes in Microgels**  
Amelia Heyi Lin, 18, Texas Academy of Mathematics and Science, Denton, Texas

**Fourth Award of \$500**

- EN003      **Analysis of Aerodynamic Lift Generated by Storm Winds with Applications to Reducing Structural Roof Failure**  
Katherine Elizabeth Reichert, 16, Columbia High School, Lake City, Florida
- EN016      **Designing and Analyzing a New Shrinkage-Reducing Admixture**  
Michael Jeffrey Loy, 16, Oregon Episcopal School, Portland, Oregon
- EN037      **Concrete Paving and Maintenance in Michigan**  
Lukas Adam Gordon, 17, Marysville High School, Marysville, Michigan
- EN042      **On Tumor Targeting Bacteria and the Construction of a Novel Population Control Circuit**  
Nirav Vanraj Lakhani, 18, North Carolina School of Science and Mathematics, Durham, North Carolina
- EN048      **Application of Slime Molds to Information Engineering**  
Sho Yoshida, 18, Ritsumeikan Senior High School, Kyoto, Japan
- EN050      **Plant Kingdom as a Natural Alternative for Car Motor Oil**  
Katia Yarie Hernandez-Gomez, 16, Jose Campeche High School, San Lorenzo, Puerto Rico

**Energy and Transportation - Presented by New Mexico Oil & Gas Association**

Intel will present Best of Category Winners with a \$5,000 award and Intel® Core™2 Duo processor laptop computer. Additionally, a \$1,000 grant will be given to their school and the Intel ISEF Affiliated fair they represent.

**Intel ISEF Best of Category Award of \$5,000 for Top First Place Winner**

- ET058      **African Space: Fuelling Africa's Quest to Space**  
Siyabulela Lethuxolo Xuza, 18, St. John's College, Johannesburg, Gauteng, South Africa

**First Award of \$3,000**

- ET041      **Cyanobacterial Fuel Cells: Conversion of Light Energy into Electricity by Coupling Photosynthetic CO<sub>2</sub> Sequestration with Respiration in a Fuel Cell**  
Kartik Madiraju, 17, Marianopolis College, Montreal, Quebec, Canada
- ET058      **African Space: Fuelling Africa's Quest to Space**  
Siyabulela Lethuxolo Xuza, 18, St. John's College, Johannesburg, Gauteng, South Africa

**Second Award of \$1,500**

- ET007      **Solving the Hydrogen Storage Problem: Metal Ammines as a High Density, Carbon-Neutral Hydrogen Carrier**  
Ariah Aram Klages-Mundt, 17, Winona Senior High School, Winona, Minnesota
- ET020      **Genetic Modification of *Clostridium thermocellum* and *Thermoanaerobacterium saccharolyticum* for Efficient Cellulose Degradation and Ethanol Production**  
Sujay Tyle, 13, Pittsford Mendon High School, Pittsford, New York

ET042            **Biodiesel Fuel from Surf Diatoms**  
Ashiyah Melyne Cays Vesterby, 16, Sequim High School, Sequim, Washington

**Third Award of \$1,000**

ET006            **Development of an Efficient Thermoacoustic Engine, Year III: Optimizing Components of a Traveling Wave Engine**  
Daniel Lawrence Murphy, Jr., 17, Episcopal High School of Jacksonville, Jacksonville, Florida

ET028            **Sol-Tile: The Power of Green--Modelling Dye-Sensitized Solar Cells to Develop a Solar Roofing Tile**  
David Anthony Joseph Castelino, 16, Saint Aloysius Gonzaga Secondary School, Mississauga, Ontario, Canada

ET029            **Aqua-Flight**  
Steven Adam Gasior, 17, St. Joseph Secondary, Mississauga, Ontario, Canada

ET036            **It's a Wonderful Light: An Experimental Study of a Fluorescent Solar Concentrator**  
Bryce William Cronkite-Ratcliff, 16, Crystal Springs Uplands School, Hillsborough, California

ET046            **The Development of a Localized Finite Differencing Computational Fluid Dynamics Program**  
Robert M. Parrish, 17, George D. Chamberlain High School, Tampa, Florida

**Fourth Award of \$500**

ET002            **The Effects of a Sailor's Mass on the Speed of a Laser Radial Sailboat in Various Wind Conditions**  
Reguli Elisabeth Granger, 15, Science Center Home School, St. Petersburg, Florida

ET008            **Final Fabrication and Testing of a Full-Scale Working Prototype Landsailer that Uses a Set of Paired Symmetrical Self-Adjusting Wings for Sails, Phase III**  
Christopher Brennan Long, 17, Angel's Rest Homeschool, Pearisburg, Virginia

ET022            **Study on Stability Device of Unmanned Radio Control Helicopter in Changing Flight Attitude (Pitch and Roll)**  
Zhen Bao, 17, The High School Affiliated to Renmin University of China, Beijing, China

ET025            **Improvement of a Single-Chamber Microbial Fuel Cell Utilizing a Novel Concept for a Hydrophobic Coating at the Cathode and the Incorporation of Graphite Granules at the Anode**  
Sikandar Singh Porter-Gill, 16, Gaithersburg High School, Gaithersburg, Maryland

ET037            **Glycerin Increasing the Burn in Biomass**  
Shelby Marie Sieren, 16, Keota High School, Keota, Iowa

ET039            **Comparing Vertical-Axis and Horizontal-Axis Wind Turbines**  
Nicolas A. Aguilar, 17, Solon High School, Solon, Iowa

## Environmental Management - Presented by University of New Mexico

Intel will present Best of Category Winners with a \$5,000 award and Intel® Core™2 Duo processor laptop computer. Additionally, a \$1,000 grant will be given to their school and the Intel ISEF Affiliated Fair they represent.

### Intel ISEF Best of Category Award of \$5,000 for Top First Place Winner

EM017 **Miracle Bioplastics from Cellulose Waste**  
Chan Ka Kin, 18, Hong Kong Chinese Women School, Hong Kong, Region of China

### First Award of \$3,000

EM017 **Miracle Bioplastics from Cellulose Waste**  
Chan Ka Kin, 18, Hong Kong Chinese Women School, Hong Kong, Region of China

### Second Award of \$1,500

EM004 **Feasibility and Recycling of Chicken Feathers into Paper Products**  
Kulsum Bilal, 13, Govt. Kinnaird High School for Girls, Lahore, Punjab, Pakistan

EM029 **A Comparison of the Flammability of Southwestern Oregon Woody Plants and the Effectiveness of Zeolite as a Fire Retardant**  
Laurie Lea Fletcher, 17, Gold Beach High School, Gold Beach, Oregon

### Third Award of \$1,000

EM013 **A Unit to Decrease the Pollution Caused by Chimneys**  
Layan Mazen Kazem Kutob, 17, Modern Montessori School, Amman, Jordan

EM015 **Boards and Branches, Year Six: A Multivariate Study of Impacts of Snow Fences on Water Conservation for Reclamation**  
Erica Elizabeth David, 17, Pinedale High School, Pinedale, Wyoming

EM025 **Environmentally Friendly Delivery System for Pesticides**  
Nikhita Singh, 15, A.B. Lucas Secondary School, London, Ontario, Canada

EM039 **A Study on Rhizofiltration with *Helianthus annuus* and Its Effect on Coal Bed Methane Produced Water Quality**  
Eric Lee Keeling, 18, La Veta Senior High School, La Veta, Colorado

### Fourth Award of \$500

EM005 **Comparison of the Phytodegradation of Trichloroethylene Using *Salix nigra* and *Salix caroliniana***  
Meredith Celeste Boulos, 15, Episcopal High School of Jacksonville, Jacksonville, Florida

EM007 **Turning Waste to Gold: Substitution of Synthetic Binders with Recycled Biopolymers in Large Scale Erosion Control**  
Dhanur Damodar, 16, duPont Manual High School, Louisville, Kentucky

EM018 **EMMA: Determining the Effects of Environmental Disasters on Ecosystems**  
Elisabeth Ann Baseman, 17, Brewster High School, Brewster, New York

EM032      **Removal of Heavy Metal Water Pollutants Using Magnetite Nanoparticles**  
Helen Tressa D'Couto, 16, Clear Lake High School, Houston, Texas

## Environmental Sciences - Presented by Intel Foundation

Intel will present Best of Category Winners with a \$5,000 award and an Intel® Core™2 Duo processor laptop computer. Additionally, a \$1,000 grant will be given to their school and the Intel ISEF Affiliated Fair they represent.

### Intel ISEF Best of Category Award of \$5,000 for Top First Place Winner

EV061      **Pyrethroids and Neurodegeneration: The Absorption of Pyrethroids into *S. domesticus* (pig) Lungs and the Effect of the Recovered Pyrethroid Levels on PC12 Neurite Retraction**  
Graham William Wakefield Van Schaik, 17, Spring Valley High School, Columbia, South Carolina

### First Award of \$3,000

EV032      **Toxicity and Bioaccumulation of Nanomaterials in Aquatic Species**  
Jingyuan Luo, 18, Hamilton High School, Chandler, Arizona

EV061      **Pyrethroids and Neurodegeneration: The Absorption of Pyrethroids into *S. domesticus* (pig) Lungs and the Effect of the Recovered Pyrethroid Levels on PC12 Neurite Retraction**  
Graham William Wakefield Van Schaik, 17, Spring Valley High School, Columbia, South Carolina

### Second Award of \$1,500

EV003      **Evaluating the Impact of Trivalent Arsenicals on Selenium Metabolism Using *E. coli* as a Model System, Phase II**  
Daniel Kenneth Cook, 17, Lake Highland Preparatory School, Orlando, Florida

EV005      **Waging War Against Annie, Fannie, and Mike**  
Leighton Marie Norvell, 17, Lincoln Park Academy, Fort Pierce, Florida

EV006      **Filtering PM10 from Agricultural Dust: Cyclone Efficiency, A Third Year Study of Agricultural Air Pollution**  
Tara Ellen Gloyna, 17, Temple High School, Temple, Texas

### Third Award of \$1,000

EV016      **Effects of P450 Inhibitors on *Fundulus* Development and CYP1 Expression**  
Hallie Louise Freyaldenhoven, 17, Mississippi School for Mathematics and Science, Columbus, Mississippi

EV020      **Design, Construction, and Testing of a Novel, Rapid, Inexpensive Coliform Detection System**  
Dayton T. Horvath, 16, Newtown High School, Sandy Hook, Connecticut

EV039      **Use of Epilithic Diatoms as Biological Indicators of Pharmaceutical Runoff**  
Ronit Batya Roth Abramson, 15, Canyon Crest Academy, San Diego, California

EV046      **A Survey of Cadmium Adsorption onto Soil Surfaces**  
Melissa Ann Baranay, 18, Marian High School, Mishawaka, Indiana

EV062            **Geomicrobiology of New Mexican Travertine Springs**  
Kristina Graham Dahm, 17, Rio Rancho High School, Rio Rancho, New Mexico

**Fourth Award of \$500**

EV002            **What Are the Effects of Temperature and Salinity on Oyster Hemocyte Activity?**  
Gene Bonnette Rodrick, 16, Oak Hall High School, Gainesville, Florida

EV021            **The Effect of Pesticides on Brine Shrimp and *Daphni* Embryo Development and Reproductive Behavior**  
Gillian Caldwell Collins, 14, Hunter College High School, New York, New York

EV028            **The Effects of Cimetidine on Stream Ecosystems**  
Amatul Aziz Salma, 16, Niles North High School, Skokie, Illinois

EV040            **Visualizing the Invisible: A Long-term Water Quality Study of the Red River of the North and an Assessment of Data Using Microsoft Visual Basic**  
Benjamin Chang Sun, 14, Red River High School, Grand Forks, North Dakota

EV043            **Feeding Preferences Between Quagga and Zebra Mussels**  
Tim Walter Wilke, 18, Liverpool High School, Liverpool, New York

EV058            **The Physiological and Ethological Effects of Environmental Fluoxetine from Human Waste Water Sources on *Procambrarus clarkii*, Phase V**  
Alexander Lynn Thurmon, 18, Chillicothe High School, Chillicothe, Missouri

## Mathematical Sciences - Presented by Alcatel-Lucent

Intel will present Best of Category Winners with a \$5,000 award and an Intel® Core™2 Duo processor laptop computer. Additionally, a \$1,000 grant will be given to their school and the Intel ISEF Affiliated Fair they represent.

**Intel ISEF Best of Category Award of \$5,000 for Top First Place Winner**

MA012            **The String Topology BV Algebra, Hochschild Cohomology and the Goldman Bracket on Surfaces**  
Dmitry Vaintrob, 18, South Eugene High School, Eugene, Oregon

**First Award of \$3,000**

MA012            **The String Topology BV Algebra, Hochschild Cohomology and the Goldman Bracket on Surfaces**  
Dmitry Vaintrob, 18, South Eugene High School, Eugene, Oregon

**Second Award of \$1,500**

MA030            **Short Billiards**  
Daniel Karoly Bezdek, 17, Notre Dame High School, Calgary, Alberta, Canada

MA034            **Infinite Product Expansions of the  $n$ th Root**  
Ardit Kroni, 16, Synge Street CBS, Dublin, Ireland

MA044            **Tree-realizability of a Distance Matrix**  
Arkajit Dey, 17, The Harker School, San Jose, California

**Third Award of \$1,000**

- MA015      **Reconnaissance Mechanism for the Polygonal Numbers**  
Joel Antonio Morales-Rosado, 17, Escuela Florencia Garcia, Las Piedras, Puerto Rico
- MA023      **Function Pools**  
Hagai Helman, 18, Reut School, Jerusalem, Israel
- MA026      **EASE Polygons Are Not Easy**  
Cheng-Tao Chung, 17, Taipei Municipal Jianguo High School, Taipei, Taiwan,  
Chinese Taipei
- MA035      **Investigations in Analysis**  
Akhil Mathew, 15, Madison High School, Madison, New Jersey

**Fourth Award of \$500**

- MA011      **Mathematical Determinism in the Creative Process of Musical Composition**  
Prachi Janardan Pai, 16, School of Science and Technology, Beaverton, Oregon
- MA025      **Endless Propagation--the Arithmetic Rules of Regular Pentagons**  
Albert Chiehyang Liu, 16, Kaohsiung Municipal Kaohsiung Senior High School,  
Kaohsiung City, Taiwan, Chinese Taipei
- MA029      **Mathematical Modeling of the Speed of Evolution in Asexual Populations**  
John Imbrie-Moore, 14, Charlottesville High School, Charlottesville, Virginia
- MA039      **Prime Magic Square: Possible or Impossible?**  
Sarah Lee Sellers, 16, Hedgesville High School, Hedgesville, West Virginia
- MA041      **Cryptology Using the "Butterfly Equation"**  
Mark Krummelbein, 20, Lemvig High School, Lemvig, Denmark

**Medicine and Health Sciences - Presented by Intel Foundation**

Intel will present Best of Category Winners with a \$5,000 award and an Intel® Core™2 Duo processor laptop computer. Additionally, a \$1,000 grant will be given to their school and the Intel ISEF Affiliated Fair they represent.

**Intel ISEF Best of Category Award of \$5,000 for Top First Place Winner**

- ME026      **Lysosomal Dysfunction in Retinal Pigment Epithelium: A Possible Pathogenesis of Age Related Macular Degeneration (AMD)?**  
Patrick Ming Chen, 17, Oregon Episcopal School, Portland, Oregon

**First Award of \$3,000**

- ME007      **Development of a Novel Approach for Applications in Preimplantation Genetic Diagnosis of Duchenne Muscular Dystrophy**  
Amelia Nong Shin Chang, 18, Raffles Junior College, Singapore, Singapore
- ME026      **Lysosomal Dysfunction in Retinal Pigment Epithelium: A Possible Pathogenesis of Age Related Macular Degeneration (AMD)?**  
Patrick Ming Chen, 17, Oregon Episcopal School, Portland, Oregon

ME040      **Sophorolipids: A Novel Therapy for Asthma and Other Diseases of Altered IgE Regulation**  
Michael David Hagler, 17, Rambam Mesivta High School, Lawrence, New York

**Second Award of \$1,500**

ME030      **The Cholesterol Lowering Drug Statin Prevents Breast Tumor Growth**  
Nayana Ghosh-Choudhury, 15, Health Careers High School, San Antonio, Texas

ME035      **Paracrine Effects of Senescence-Upregulated p21 Induced Stromal Fibroblasts on Transformed Fibroblast Line C8**  
Arun Puttachi, 17, Shaker Senior High School, Latham, New York

ME047      **Bioproduction of a Pleiotropic Regulatory Cytokine for Oral Administration Against Human Autoimmune Diseases**  
David Jueyu Wang, 18, A.B. Lucas Secondary School, London, Ontario, Canada

ME049      **Probing for Cancer with Smart shRNA**  
Yale Stern Michaels, 15, Grant Park High School, Winnipeg, Manitoba, Canada

ME064      **Dendrimer-based Nanodevices for Drug Delivery Across the Blood Brain Barrier**  
Shravani Mikkilineni, 16, Detroit Country Day School, Beverly Hills, Michigan

**Third Award of \$1,000**

ME008      **Prevalence and Characterization of Primary Drug Resistance in Individuals with Newly Diagnosed HIV Infection**  
Brian E. Clement, 18, Lake Brantley High School, Altamonte Springs, Florida

ME015      **Characterization of Chromosome Rearrangement in Clones Surviving Ionizing Radiation Exposure**  
Danna Elisabeth Thomas, 17, Broadneck Senior High School, Annapolis, Maryland

ME022      **Role of Estrogen Receptor Beta (ER $\beta$ ) on Opioids and Opioid-Related Peptides in the Rodent Dorsal Hippocampal Formation**  
Sana Khalid, 18, Health Professions and Human Services High School, New York, New York

ME039      **Characterization of Monoclonal Antibodies Directed Against Hepatitis C Virus Envelope Glycoproteins E1 and E2**  
Supriya Mishra, 17, Ossining High School, Ossining, New York

ME046      **Integrated Microfluidic Device for the Development of Human Embryonic Stem Cells**  
Carol Yoon Joo Suh, 18, Palos Verdes Peninsula High School, Rolling Hills Estates, California

ME053      **Development of an Anticancer Drug Delivery System: A Novel Strategy for the Delivery of Therapeutic Macromolecules**  
Shivani Sud, 16, Charles E. Jordan Senior High School, Durham, North Carolina

ME056      **Developing a Cost-Effective Time-Released Discriminatory Insect Repellent**  
Emily Nicole Bick, 15, Millburn High School, Millburn, New Jersey

ME080 **Methionine Adenosyltransferase II (MAT II): A Potential Therapeutic Target in the Induction of Apoptotic Death in Leukemic T-Cells**  
Aditya Shirish Barve, 16, duPont Manual High School, Louisville, Kentucky

**Fourth Award of \$500**

ME010 **The Effects of *Pentalinon andrieuxii* Mueller-Argoviensis Root Extracts on Cancer Cell Death and Growth**  
Marie Louise Caligiuri de Jesus, 17, Upper Arlington High School,  
Upper Arlington, Ohio

ME024 **A Novel Model for the Glucocorticoid Mediated Regulation of Arterial Inflammation**  
Sheel Tyle, 15, Pittsford Mendon High School, Pittsford, New York

ME031 **Mechanisms of Inhibition and Apoptosis of Human Prostate Cancer Cells by Epigallocatechin-3-Gallate**  
Hang Richard Zou, 17, Albuquerque Academy, Albuquerque, New Mexico

ME048 **Predicting Drug Response in Alzheimer's Dementia**  
Ketaki Rawal, 16, Centennial Regional High School, Greenfield Park, Quebec, Canada

ME059 **Artificial Intelligence Insulin Delivery System**  
David Christopher Evans, 15, Albion Middle School, Sandy, Utah

ME062 **Investigating the Potential Role of Cardiovascular Risk Factors on Vascular Tissue Repair by Mesenchymal Stem Cells**  
Lia D'Abate, 16, The Sacred Heart School of Montreal, Montreal, Quebec, Canada

ME067 **A Quantification of Axon-Sprouting in the Mouse Spinal Cord After Motor Cortex Stroke**  
Kathryn Lynn Ayers, 17, Parkway West High School, Ballwin, Missouri

ME068 **Darkside of Anti-hormonal Therapies for Breast Cancer Treatment**  
Tejal Ulhas Naik, 17, The Charter School of Wilmington, Wilmington, Delaware

ME072 **Dynamic Herd Immunity Threshold Modeling**  
Nathan Thomas Georgette, 15, Allen D. Nease High School, Ponte Vedra, Florida

ME079 **Characterization of Structure and Effect of Disease-causing Mutation Y532H on the Role of ATP7B in Copper Metabolism**  
Katrina Anne Diaz, 17, Kalamazoo Area Mathematics and Science Center,  
Kalamazoo, Michigan

## Microbiology - Presented by Intel Foundation

Intel will present Best of Category Winners with a \$5,000 award and an Intel® Core™2 Duo processor laptop computer. Additionally, a \$1,000 grant will be given to their school and the Intel ISEF Affiliated Fair they represent.

### Intel ISEF Best of Category Award of \$5,000 for Top First Place Winner

MI033 **5'-methoxyhydnocarpin as an Inhibitor of Antibiotic Resistance in *E. coli***  
Eric Nelson Delgado, 17, Bayonne High School, Bayonne, New Jersey

**First Award of \$3,000**

- MI033      **5'-methoxyhydnocarpin as an Inhibitor of Antibiotic Resistance in *E. coli***  
Eric Nelson Delgado, 17, Bayonne High School, Bayonne, New Jersey
- MI046      **Cellular Translation Factors Required for Virion Host Shutoff (Vhs) Function of Herpes Simplex Virus: Effect of siRNA-induced Depletion of Cellular Factors on Vhs Activity**  
Nandini Sarma, 17, Shawnee Mission East High School, Prairie Village, Kansas

**Second Award of \$1,500**

- MI003      **Fractal Bacteria Colonies: Self-similar Aggregation Under Starvation Conditions**  
Kristina Lynn Buschur, 17, Carroll High School, Dayton, Ohio
- MI030      **The Effect of Green Tea Polyphenols on Levels of Nucleotide Excision Repair Gene Expression in and Survival Rate of *Dictyostelium discoideum***  
Lillian Lee Tsai, 16, Winston Churchill High School, Potomac, Maryland
- MI045      **A Novel Treatment Using Ultrasound Sonication to Remove Food-borne Microbes from Fresh-cut Produce**  
Ying Fan, 17, Cookeville High School, Cookeville, Tennessee
- MI049      **The Effects of Antioxidants on Lifespan Using the *C. elegans* Model**  
Alexandria Ocasio-Cortez, 17, Yorktown High School, Yorktown Heights, New York

**Third Award of \$1,000**

- MI007      **Maltose Utilization of *Escherichia coli* K12**  
Ganga S. Moorthy, 16, Alva High School, Alva, Oklahoma
- MI014      **Hypermotility in *Escherichia coli*: A New Regulatory Mechanism Characterized**  
Erin May Turingan, 17, Eau Gallie High School, Melbourne, Florida
- MI028      **The Study of Screening of the Feather Degradation Strain and Its Best Culture Conditions**  
Ang Li, 18, Jilin Provincial Experimental School, ChangChun, JiLin, China
- MI029      **Decontaminating Toothbrushes, Year Two: Evaluating the Effectiveness of Green Tea Spray by PCR**  
Jessica Kaycee Lam, 15, Keystone School, San Antonio, Texas
- MI063      **Human Cytomegalovirus Activates Phosphatidylinositol 3, 4, 5 Triphosphate Kinase to Inhibit Apoptosis in Monocytes**  
Alexander Todd Parmater, 18, Benton High School, Benton, Louisiana

**Fourth Award of \$500**

- MI019      **Correlation of Single and Multiple Species Biofilms and Antibiotic Resistance**  
Haleigh Jo White, 18, Mid-Buchanan R-5 High School, Faucett, Missouri
- MI023      **Investigation of New Mexico Lichens: Metabolic Products for Antibiotics**  
Rebecca Renee Alexander, 16, Grants High School, Grants, New Mexico

- MI034      **Ascorbic Acid and Naphthoquinone Inoculated Keratinocyte and Fibroblast Cultures Resistance to HSV-1, Continued**  
Derek Kurtis Smith, 18, Greenon High School, Springfield, Ohio
- MI043      **Microbial Eye Nuisance: The Response of *Serratia marcescens* to Various Sterilization Techniques**  
Katie Joan Nix, 15, Grove High School, Grove, Oklahoma
- MI051      **Evaluating the Effects of Selected Antibiotics on the Motility, Adherence, and Transformation Rates of *E. coli* and *Pseudomonas fluorescens***  
Alexandria Victoria McNeely, 17, Miami High School, Miami, Oklahoma
- MI055      **Fish Mucus: Its Potential Antimicrobial Effects on Human Pathogens and Possible Role in Innate Immunity**  
Melvyn Carlo Torres Barroa, 16, Capiz National High School, Roxas City, Capiz, Philippines
- MI058      **Cave Prescriptions? Seeking Anti-microbials from Extremophiles**  
Mary Lou Leone Hedberg, 15, North Attleboro High School, North Attleboro, Massachusetts

## Physics and Astronomy - Presented by New Mexico Tech

Intel will present Best of Category Winners with a \$5,000 award and an Intel® Core™2 Duo processor laptop computer. Additionally, a \$1,000 grant will be given to their school and the Intel ISEF Affiliated Fair they represent.

### Intel ISEF Best of Category Award of \$5,000 for Top First Place Winner

- PH029      **Period Analysis of Cataclysmic Variable X10 and Its Implications on the Origin of Low States**  
Temple Mu He, 18, Troy High School, Troy, Michigan

### First Award of \$3,000

- PH002      **Cosmic Rain: Investigating Particles from Space**  
Holly Reid Batchelor, 17, The Mary Erskine School, Edinburgh, Scotland, United Kingdom
- PH029      **Period Analysis of Cataclysmic Variable X10 and Its Implications on the Origin of Low States**  
Temple Mu He, 18, Troy High School, Troy, Michigan

### Second Award of \$1,500

- PH022      **Euvuvu -- the Air Messenger**  
Yen-Ting Liao, 14, Chiayi County Jhongpu Junior High School, Chiayi, Taiwan, Chinese Taipei
- PH036      **On the Propulsive Leidenfrost Phenomenon: Exploration of Theory, Experiment, and Applications**  
Nilesh Tripuraneni, 16, Clovis West High School, Fresno, California

PH048      **Neutron Activation Analysis Using an Inertial Electrostatic Confinement Fusion Reactor**  
Thiago David Olson, 17, Stoney Creek High School, Rochester Hills, Michigan

PH062      **Great Balls of Fire!**  
Caroline Julia von Wurden, 15, Los Alamos High School, Los Alamos, New Mexico

**Third Award of \$1,000**

PH006      **Testing the Mettle of Metallic Glass**  
Leslie Ann Spahr, 17, Satellite High School, Satellite Beach, Florida

PH015      **A New Technique in Fluorescence Microscopy: An Apparatus for Observing and Quantifying Chlorophyll Autofluorescence *in vivo***  
George James Hansel, 16, Greenwich High School, Greenwich, Connecticut

PH019      **Development of an Inverted Optical Tweezers with Full Motional Control**  
Hamsa Sridhar, 17, Kings Park High School, Kings Park, New York

PH033      **The Effects of Cosmic Microwave Background Radiation and Hawking Radiation on the Mass of a Schwarzschild Black Hole**  
Taylor Michael Sullivan, 17, Hamilton High School, Chandler, Arizona

PH034      **The Link Between Fluid Turbulence and Synchronized Chaotic Systems**  
Brandon John Campbell, 18, Fremont High School, Plain City, Utah

**Fourth Award of \$500**

PH005      **Brillouin Light Scattering**  
Matthew Jonathan Wenger, 17, Thomas B. Doherty High School, Colorado Springs, Colorado

PH011      **Propellantless Propulsion: Theoretical and Experimental Evidence for EHD Flow in Asymmetrical Capacitors**  
Stephen Jerome Trettel, 17, New Prague Senior High School, New Prague, Minnesota

PH028      **Galaxy Clusters: The Local Effects on Star Synthesis**  
Zackery Joseph Schroeder, 17, Grosse Pointe North High School, Grosse Pointe Woods, Michigan

PH035      **Lightning in the Laboratory: Electromagnetic Radiation from Red Sprites**  
Sarah Lynn McCuskee, 15, Campbell Collegiate, Regina, Saskatchewan, Canada

PH041      **Chaos in a Dripping Faucet**  
Aaron Thomas Criss, 17, The Learning Community International, Columbia, Maryland

PH055      **That Flocking Convection**  
Atticus Bergman, 17, Fairview High School, Boulder, Colorado

PH057      **Determining Surface Compositions of Kuiper Belt Objects Through Spectrum Matching**  
Morielle Mathanja Stroethoff, 16, Hellgate High School, Missoula, Montana

## Plant Sciences - Presented by Intel Foundation

Intel will present Best of Category Winners with a \$5,000 award and Intel® Core™2 Duo processor laptop computer. Additionally, a \$1,000 grant will be given to their school and the Intel ISEF Affiliated Fair they represent.

### Intel ISEF Best of Category Award of \$5,000 for Top First Place Winner

PS016 **Aloe - A Bitter Pill for Ticks to Swallow**  
Tanja Kellerman, 18, Citrusdal High School, Citrusdal, Western Cape, South Africa

### First Award of \$3,000

PS016 **Aloe - A Bitter Pill for Ticks to Swallow**  
Tanja Kellerman, 18, Citrusdal High School, Citrusdal, Western Cape, South Africa

PS045 **A Matter of Life and Death: Characterization of a Salt-inducible Lipase Gene from *Arabidopsis* Suggests a Link Between Programmed Cell Death and Salt Stress**  
David Andrew Levary, 17, Parkway Central High School, St. Louis, Missouri

### Second Award of \$1,500

PS003 **Characterization of Photoreceptor Genes Regulating Apothecial Morphogenesis of *Sclerotinia sclerotiorum***  
Kelly Michelle Chacon, 17, American Heritage School, Plantation, Florida

PS026 **Bioinformatic and Experimental Assessment of the Translational Control via uORF**  
Min-Chun Wu, 18, Taipei Municipal Jianguo High School, Taipei, Taiwan, Chinese Taipei

PS046 **The Relationship Between the Ecological Niche of Plants and the Factors Affecting the Germination of Their Seeds**  
Benjamin Fitzroy Hughes, 16, Sydney Church of England Grammar School, North Sydney, New South Wales, Australia

### Third Award of \$1,000

PS017 **Medium Optimization for *Acer palmatum*, *in vitro***  
Michael James Bernert, 17, West Linn High School, West Linn, Oregon

PS019 **A Comparative Study of Endophyte Transmittance vs. Environmental Influence in Leafy Spurge and Their Antimicrobial Properties**  
Angela Roberta Tomscheck, 18, North Toole County High School, Sunburst, Montana

PS041 **The Beneficial Effects of Tea on Wheat Cultivars**  
Megan Marie Meyer, 16, Hankinson High School, Hankinson, North Dakota

PS051 **One "Mite"y Mission: Biological Compensation Suppression of *Convolvulus arvensis* Implementing Host-Specific *Aceria malherbae***  
Kaitlyn Jeanne Lingus, 17, Branson High School, Branson, Colorado

PS054 **Host-bacterial Specificity During Legume-Rhizobium Symbioses**  
Sushant Sundaresh, 17, The Harker School, San Jose, California

### Fourth Award of \$500

PS002 **Characterization of the *Arabidopsis thaliana* Gene At1g79700**  
Ashley Elizabeth Foerst, 18, Lake Brantley High School, Altamonte Springs, Florida

- PS008      **It's Alive!!!**  
Steve Anthony Morgan, Jr., 18, H. L. Bourgeois High School, Gray, Louisiana
- PS013      **The Comparison of Aluminum Tolerance in Different *Triticum aestivum* L. Varieties, Phase III**  
Stacey Lee Vosters, 17, North Daviess High School, Elnora, Indiana
- PS028      **Analysis of the Arabidopsis FUSED Ortholog: Is It Required for Cell Division?**  
Scott Michael Peters, 17, John F. Kennedy High School, Bellmore, New York
- PS042      **Repelling Insects**  
Victoria Lynn Koupal, 15, Avon High School, Avon, South Dakota
- PS056      **An Approach to Clean the Environment Using *Arundo donax* L.**  
Shireen Dhir, 16, Houston County High School, Warner Robins, Georgia

## Team Projects - Presented by *Science News*

Intel will present Best of Category Winners with a \$5,000 award and an Intel® Core™2 Duo processor laptop computer. Additionally, a \$1,000 grant will be given to their school and the Intel ISEF Affiliated Fair they represent.

### Intel ISEF Best of Category Award of \$5,000 in Life Sciences

- AS304      **Searching the Gene Essential for *Drosophila* Development: Identification of Escargot**  
Tsai-Ta Lai, 19, Taipei Municipal Chien-Kuo Senior High School, Taipei, Taiwan, Chinese Taipei  
Hung-Jen Chen, 18, Taipei Municipal Chien-Kuo Senior High School, Taipei, Taiwan, Chinese Taipei

### Intel ISEF Best of Category Award of \$5,000 in Physical Sciences

- EN312      **Controlling Metal/Polymer Adhesion: The Enhancement of Microlithography and the Formation of Nanowires**  
Jacob Charles Loewenstein, 17, Hebrew Academy of the Five Towns & Rockaway, Cedarhurst, New York  
Brienne Ashley Kugler, 18, Jericho Senior High School, Jericho, New York

### First Award of \$3,000

- AS304      **Searching the Gene Essential for *Drosophila* Development: Identification of Escargot**  
Tsai-Ta Lai, 19, Taipei Municipal Chien-Kuo Senior High School, Taipei, Taiwan, Chinese Taipei  
Hung-Jen Chen, 18, Taipei Municipal Chien-Kuo Senior High School, Taipei, Taiwan, Chinese Taipei
- BI304      **An Integrated Smart Chip for the Early Diagnosis of Cancer: A New Take on Surface Molecular Imprinting**  
JinJu Yi, 17, Plainview Old-Bethpage John F. Kennedy High School, Plainview, New York  
Vijay Jain, 17, Herricks High School, New Hyde Park, New York

- CH308      **New Generation Solar Cells**  
Gunes Parlakgul, 17, FMV Isik High School, Istanbul, Turkey  
Burak Celik, 17, FMV Isik High School, Istanbul, Turkey
- EE306      **Fluorotype: A System to Transcode Info Embedded in UV-reactive Data Matrices**  
Brandon Lee Reavis, 17, Cody High School, Cody, Wyoming  
Brian Christopher Reavis, 17, Cody High School, Cody, Wyoming
- EN312      **Controlling Metal/Polymer Adhesion: The Enhancement of Microlithography and the Formation of Nanowires**  
Jacob Charles Loewenstein, 17, Hebrew Academy of the Five Towns & Rockaway, Cedarhurst, New York  
Brienne Ashley Kugler, 18, Jericho Senior High School, Jericho, New York
- ME312      **Detecting Cancer in Living Tissue with Single-Cell Precision**  
Alex Shlomo Ramek, 17, Hebrew Academy of the Five Towns & Rockaway, Cedarhurst, New York  
Adam Chaplin Fields, 17, Jericho High School, Jericho, New York
- PS316      **The Secret in Mimosa's Leaf Folding Pattern**  
Natnaree Siriwon, 17, Trium Udom Suksa School, Bangkok, Thailand  
Korawich Niyomsatian, 18, Trium Udom Suksa School, Bangkok, Thailand  
Nathaphon Supokaivanich, 18, Trium Udom Suksa School, Bangkok, Thailand

**Second Award of \$1,500**

- CB301      **Cdc42 Interaction with IRSp53 Induces Filopodia Formation and Localization of IRSp53 to the Leading Edge of Motile Cells**  
Du Ying Sewa, 17, National Junior College, Singapore, Singapore  
Navin Brian Ramakrishna, 17, National Junior College, Singapore, Singapore
- CH307      **A Novel Technique for the Fabrication of Alginate Microspheres for the Sustained Release of Lidocaine**  
Vikas Anand, 17, Jericho High School, Jericho, New York  
Esther Bora Kwak, 17, Jericho High School, Jericho, New York
- CS309      **CLAP(Componente de Laser Adaptado al Pie)**  
Jose Carlos Vega, 18, College of Scientific and Technological Studies, Chignahuapan, Puebla, Mexico  
Lucero Hernandez, 17, College of Scientific and Technological Studies, Chignahuapan, Puebla, Mexico  
Alejandro Arroyo, 12, College of Scientific and Technological Studies, Chignahuapan, Puebla, Mexico
- CS314      **Blinds' Leader Project**  
Deena Wafic Kaddoura, 17, Iman High School, saida, South, Lebanon  
Zahra Maarouf Moein Maarouf, 16, Iman High School, Saida, South, Lebanon  
Sana Abdul Halim Zeidan, 16, Iman High School, Saida, South, Lebanon
- EE309      **The Uno: Tomorrow's Transportation Solution**  
Jason Charles Morrow, 17, Westdale Secondary School, Hamilton, Ontario, Canada  
Benjamin Poss Gulak, 17, Chisholm Collegiate, Oakville, Ontario, Canada

- EM308      **Making Your Enemy Your Friend: A Novel Approach to Integrated Pest Management (IPM) Using Noxious Weed Extracts**  
Jonathan Kelvin Suncar, 16, Uniondale High School, Uniondale, New York  
Kemeisha Latoya Nastasia Patterson, 18, Uniondale High School, Uniondale, New York
- EN315      **The Study of Electrorheological and Thigmorheological Fluids and the Theories on the Causes of Their Rheology with Applications**  
Ji Yun Hyo, 17, Tianjin International School, Tianjin, China  
Gye Hyun Kim, 18, Tianjin International School, Tianjin, China  
Seung Jae Choi, 17, Tianjin International School, Tianjin, China
- ET306      **Optimization of Algal Culture Growth Parameters to Obtain Lipids for Biodiesel Mass-production**  
Julia Lynn Cohen, 16, Oregon Episcopal School, Portland, Oregon  
Lia Elgia Dawley, 17, Oregon Episcopal School, Portland, Oregon  
Rahael Rohini Gupta, 17, Oregon Episcopal School, Portland, Oregon
- EV316      **Purification of Water with Active Carbon Derived from Nutshells vs. Regular Active Carbon**  
Jakob Refer Thygesen, 20, Odense Technical High School, Odense M, Fyn, Denmark  
Kaare Thode Joergensen, 20, Odense Technical High School, Odense M, Fyn, Denmark
- MA304      **Mathematical Developments of the Contact Network Model**  
David Michael Price, 17, Liberal Arts and Science Academy, LBJ High School, Austin, Texas  
Stephanie Fulane Chan, 16, William P. Clements High School, Sugar Land, Texas  
Jacob J. Shapiro, 17, Upper Arlington High School, Upper Arlington, Ohio
- ME315      **A Study of Vitamin D Deficiency in Cross-Section of Women**  
Rachna Beeravolu Reddy, 16, Port Huron Northern High School, Port Huron, Michigan  
Elizabeth Wells Busdicker, 16, Port Huron Northern, Port Huron, Michigan
- MI303      **The Design and Evaluation of an Ultraviolet Light Apparatus for Sanitizing *Brettanomyces bruxellensis* in Wine Barrels, A Third Year Study**  
Arnaud Georges Sillis, 18, Oregon Episcopal School, Portland, Oregon  
Brian Furness Siperstein, 18, Oregon Episcopal School, Portland, Oregon
- PH310      **Reliability of CMOS Chips in Detecting Alpha Radiation**  
Sergio Lozano, 18, Weslaco High School, Weslaco, Texas  
Daniel Lozano, 17, Weslaco High School, Weslaco, Texas  
Jonathan Munoz, 17, Weslaco High School, Weslaco, Texas
- PS305      **Insecticidal Activity of Oleander Leaf Extract Against Diamondback Moth and Identification of Its Active Constituent**  
Liqing Yang, 18, Shanghai Lu Wan Senior High School, Shanghai, China  
Yuzhou Gu, 17, No.2 Secondary School attached to ECNU, Shanghai, China  
Zhaoxin Wang, 16, Pudong Foreign Languages School, Shanghai, China
- Third Award of \$1,000**  
AS302      **Investigating the Molecular Variance Relationships Between *Celleana exarata* Found on Gardener Pinnacle and Lanai**  
Romelynne Fernandez Lamosao, 17, Waipahu High School, Waipahu, Hawaii  
Sheryl Juan Acidera, 17, Waipahu High School, Waipahu, Hawaii

- BE303      **Differences In Mental and Physical Capabilities of Children Whose Parents Worked in Different Fields of Lake Apopka Area Agriculture, Phase II**  
Grant Fabian Chernoby, 18, Lake Brantley High School, Altamonte Springs, Florida  
Shahin Pourkaviani, 17, Lake Brantley High School, Altamonte Springs, Florida  
Francesca Xaviera Gaete, 18, Lake Brantley High School, Altamonte Springs, Florida
- BE312      **Examining Social Skills, Behavioral Adjustment, and Repetitive Behaviors in Parents and Siblings of Individuals with Autism**  
Nathalie Fay Tadena, 17, Ossining High School, Ossining, New York  
Jessica Susan Palmer, 16, Ossining High School, Ossining, New York
- BE325      **A Statistical Analysis of Dispositions in Teenage Affinity and Physical Intimacy Inspired by Sociological and Biological Disparities**  
Stephen Harper Odanovich, 17, Tom C. Clark High School, San Antonio, Texas  
Ian Maya Panchevre, 17, Tom C. Clark High School, San Antonio, Texas
- CS306      **Introducing Hadoop Algorithm and Implementing in 802.11 Wireless Network Security**  
Yizhou Wang, 17, Northeast Yucai School, Shenyang, Liaoning, China  
Tianyu Zhu, 19, Northeast Yucai School, Shenyang, Liaoning, China  
Gaonan Wang, 18, Northeast Yucai School, Shenyang, Liaoning, China
- EA301      **Waves of Destruction: Calculating and Validating Multiple Wave Inundation of Submergent Plains**  
Scott Edward Hasbrook, 16, Moore High School, Moore, Oklahoma  
Nathan Tyler Hasbrook, 16, Moore High School, Moore, Oklahoma
- EE307      **Increased Precision, Versatility and Control in Laser-based Surgeries Through the Intersection of Superimposed Varied Frequency Lasers**  
Fei Chen, 17, School of Science and Technology, Beaverton, Oregon  
William Decker Neiswanger, 16, School of Science and Technology, Beaverton, Oregon
- EE312      **Stirling Stack Engines**  
Thomas Richard McEvoy, 17, Hillcrest High School, Midvale, Utah  
Daniel Clemens Posch, 17, Waterford School, Sandy, Utah
- EM305      **From Waste to Fuel**  
Ka Long Yau, 18, Carmel Pak U Secondary School, Tai Po, Hong Kong, Region of China  
Ka Ki Kwan, 18, Carmel Pak U Secondary School, Hong Kong, Region of China  
King Wai Chiang, 19, Carmel Pak U Secondary School, Hong Kong, Region of China
- EM311      **Optimizing Recycled Polymer Blends Using Supercritical Carbon Dioxide**  
Emily Levine, 18, Stella K. Abraham High School for Girls, Hewlett, New York  
Danielle Lent, 17, Stella K. Abraham High School for Girls, Hewlett, New York
- EM313      **The Effect of *Mercenaria mercenaria*, Igneous Rock, *Ammophila breviligulata*, and Lucerne Hay Riparian Buffers on Nitrate Sequestration in Correlation to Ecological Health**  
Anup Myneni, 16, York High School, Yorktown, Virginia  
Gabrielle Marie Strike, 17, York High School, Yorktown, Virginia

- EN308      **Non-Classical Wetting Behavior of Various Liquids on Carbon Nanotube Substrates**  
 Hung-Bing Tan, 17, William G. Enloe High School, Raleigh, North Carolina  
 Anusuya Meenakshi Ramasubramanian, 18, William G. Enloe High School, Raleigh,  
 North Carolina  
 Benjamin C. Wang, 18, William G. Enloe High School, Raleigh, North Carolina
- ET302      **Reformation of Landfill Gas for Power Production with a Fuel Cell Using  
 Activated Charcoal**  
 Curtis James Peterson, 16, Crescent Valley High School, Corvallis, Oregon  
 Sean David Skyllingstad, 16, Crescent Valley High School, Corvallis, Oregon  
 Raymond James Ehlers, 15, Crescent Valley High School, Corvallis, Oregon
- ET310      **Homemade Biodiesel Production and Efficiency in a Tropical Climate**  
 Ilianell Marie Valle-Gutierrez, 16, Escuela San German Interamericana,  
 San German, Puerto Rico  
 Manuel H. Garcia-Cartagena, 15, Escuela San German Interamericana,  
 San German, Puerto Rico
- EV302      **Decline of the North American Lesser Scaup, Phase Three: Composition and Trace  
 Element Concentrations in Eggs and Prey Foods**  
 Mitchell Dale Weegman, 18, Winona Senior High School, Winona, Minnesota  
 Matthew Moraco Weegman, 18, Winona Senior High School, Winona, Minnesota
- EV319      **Search for Oil Biodegradation with Marine, Aquatic, and Terrestrial Symbiosis**  
 Shay Elyse Anderson, 15, Texico High School, Texco, New Mexico  
 Marques Ashton Pena, 15, Texico High School, Texico, New Mexico, New Mexico  
 Monique Ashley Pena, 15, Texico High School, Texico, New Mexico, New Mexico
- ME323      **C1q Binding Protein and Sex Hormones in Using Autoimmunity to Fight Cancer**  
 Richie Kimlong Huynh, 18, Champlin Park High School, Champlin, Minnesota  
 Ryan Kimlong Huynh, 18, Champlin Park High School, Champlin, Minnesota
- PH308      **Study of Vibrational Modes in DNA Using Terahertz Photonic Crystals**  
 Warren Cheng, 17, Townsend Harris High School, Flushing, New York  
 Erin Zeqja, 16, Townsend Harris High School, Flushing, New York  
 Ben Gonom Aronowicz, 16, Townsend Harris High School, Flushing, New York
- PS303      **A Comparative Study of Chlorophyll Fluorescence and Chlorophyll Density  
 of *dkg-1* and Wild Type *Ceratopteris richardii***  
 Natalie B. Alberman, 16, Forest Hills High School, Forest Hills, New York  
 Sofya V. Kalantarova, 15, Forest Hills High School, Forest Hills, New York
- PS304      **A Study of *psbA* Gene Cloning and Expression in the Leaves of Ginkgo Seedlings**  
 Chen-Chen Zhou, 17, No.7 Middle School of Chengdu City, Chengdu,  
 Sichuan Province, China  
 Wei Du, 17, No.7 Middle School of Chengdu City, Chengdu, Sichuan Province, China  
 Dian Zhang, 17, No.7 Middle School of Chengdu City, Chengdu,  
 Sichuan Province, China
- PS311      **Stay Away from My Territory!!! The Effect of *Eucalyptus leucoxylo* 'Rosea' on the  
 Growth of Radishes**  
 Elaine Quinne Trinh, 18, Silver Creek High School, San Jose, California  
 Hong Thanh Huynh, 18, Silver Creek High School, San Jose, California

**Fourth Award of \$500**

- AS301      **On the Luminescent Properties of *Mnemiopsis leidyi***  
Dmitri Viktor Skjorshammer, 18, South Fork High School, Stuart, Florida  
Thomas Burr, 15, South Fork High School, Stuart, Florida
- AS303      **Effect of Celastrol on the Activation of the Heat Shock Response and Longevity in *Caenorhabditis elegans***  
Chandrika Sridharamurthy, 15, Forest Hills High School, Forest Hills, New York  
Lusine Galoyan, 16, Forest Hills High School, Forest Hills, New York
- AS308      **Temperature & Sand Fly Development**  
Amanda Mary-Ruth Davenport, 18, Eleanor Roosevelt High School, Greenbelt, Maryland  
Christine Elisabeth Danielson, 17, Eleanor Roosevelt High School, Greenbelt, Maryland
- BE328      **Anemia: Pay Attention to It!**  
Yamil Joaquin Alali, 15, Colegio Bilingue San Antonio, Concordia, Entre Rios, Argentina  
Luis Costa, 16, Colegio Bilingue San Antonio, Concordia, Entre Rios, Argentina
- BI307      **Enzymatic Addition of Palmitic Acid to the Neuronal Protein SNAP-25**  
Elizabeth Carolina Flores, 17, Timpview High School, Provo, Utah  
Christina Satu Izatt, 17, Timpview High School, Provo, Utah
- BI309      **Screening, Isolation, and Characterization of Fluorescent Proteins from Nudibranchs**  
Ivy Razel Bernardo Ventura, 16, Philippine Science High School-Main Campus, Quezon City, Metro Manila, Philippines  
Janine Cindy Mendoza Santiago, 16, Philippine Science High School-Main Campus, Quezon City, Metro Manila, Philippines  
Mara Elaine Dator Villaverde, 16, Philippine Science High School-Main Campus, Quezon City, Metro Manila, Philippines
- CS304      **Wireless Integrated Security Extension (WISE): A Novel Approach for Securing Supervisory Control and Data Acquisition (SCADA) Systems Against Cyber Attacks**  
Arooshi Raga Kumar, 16, duPont Manual High School, Louisville, Kentucky  
Smriti Rajita Kumar, 16, duPont Manual High School, Louisville, Kentucky
- CS308      **Factors, Forces and Forecasting Stock Market Modeling and Simulation**  
Quinton Bernard Smith, 17, La Cueva High School, Albuquerque, New Mexico  
Tyrus LaVelle Sanders, 16, West Mesa High School, Albuquerque, New Mexico  
Christian Stephen Hammond, 17, Rio Rancho High School, Rio Rancho, New Mexico
- EE308      **Microfluidic Mixing by Segmented Flow**  
Lukasz Mosakowski, 16, Manhasset High School, Manhasset, New York  
David Chang, 17, Manhasset High School, Manhasset, New York

- EM314      **Diblock Copolymers and Epoxidized *Carthamus tinctorius* as Novel Polyvinyl Chloride Plasticizers**  
 Thomas Sun, 17, Sir Winston Churchill Secondary School, Vancouver, British Columbia, Canada  
 Robyn Pauline Thom, 17, Sir Winston Churchill Secondary, Vancouver, British Columbia, Canada
- EM315      **Lignin from Oil Palm Empty Fruit Bunches (EFB) as an Adsorbent for Heavy Metal Ion (Cu)**  
 Ijaz Khalif Abdul Malek, 18, MARA Junior Science College of Langkawi, Kuah, Langkawi, Kedah, Malaysia  
 Ahmad Amirul Aiman Samsudin, 18, MARA Junior Science College of Langkawi, Kuah, Langkawi, Kedah, Malaysia  
 Mohd Suhaimi Suib, 18, MARA Junior Science College of Langkawi, Kuah, Langkawi, Kedah, Malaysia
- EN307      **A Novel Method to Measure the Speed of Sound in the Cornea**  
 Aman Sarup, 17, Ossining High School, Ossining, New York  
 Palak Patel, 17, Sayville High School, West Sayville, New York
- EN310      **Engineering Synthetic Oscillatory Gene Networks at the Population Level**  
 Sagar Indurkha, 17, The North Carolina School of Science and Math, Durham, North Carolina  
 Nicholas Chen Tang, 17, The North Carolina School of Science and Math, Durham, North Carolina
- EN313      **Manufacturing a Ceramic Filter that Is Durable and Ecologic for Filtering Molten Metals**  
 Gurcan Gurses, 17, Izmir Private Fatih High School, Izmir, Turkey  
 Alper Yanilmaz, 16, Izmir Private Fatih High School, Izmir, Turkey
- ET308      **A Novel Advanced Brake Light Warning System to Prevent Vehicular Tailgating Accidents**  
 Nikhil Khosla, 15, Dhirubhai Ambani International School, Mumbai, Maharashtra, India  
 Tanay David Delima, 15, Dhirubhai Ambani International School, Mumbai, Maharashtra, India
- ET313      **Production of Ethanol from Recycled Paper**  
 Emilie Grace Gelpi, 16, Saint Joseph, Baton Rouge, Louisiana  
 Erin Elizabeth Contini, 16, Saint Joseph's Academy, Baton Rouge, Louisiana
- EV305      **The Effect of Varying Concentrations of Soy Isoflavone on the Fecundity of *Artemia salina***  
 Samantha Dodbele, 16, Hayfield Secondary School, Alexandria, Virginia  
 Elena Elizabeth Tenore, 16, Hayfield Secondary School, Alexandria, Virginia
- EV310      **The Effect of Temperature on Fecal Coliform Reproduction in Flint Creek Water**  
 Kirstin Denise Kramer, 17, Burlington Community High School, Burlington, Iowa  
 Whitney Marie Plein, 17, Burlington Community High School, Burlington, Iowa

- MA301      **New Class of Diophantine Equation with Infinitely Many Solutions**  
George Kukhalashvili, 16, Georgian-American High School, Tbilisi, Georgia Republic  
Nika Gigashvili, 16, Georgian-American High School, Tbilisi, Georgia Republic  
Giorgi Benashvili, 16, Georgian-American High School, Tbilisi, Georgia Republic
- MA303      **Optimizing Network Efficiency: On the Ramanujancy of Heisenberg Graphs Over Rings of Degree Six and Higher**  
Yang Ge, 17, Stanton College Preparatory High School, Jacksonville, Florida  
Vincent Huynh Dang, 18, Stanton College Preparatory School, Jacksonville, Florida
- MA311      **Sufficient Conditions for Solvability of Nevanlinna-Pick Problem in the Case of Non-negative Coefficients of Reproducing Kernel**  
Alexander V. Shchegolev, 16, Centre of Mathematical Education, Saint-Petersburg, Russia  
Konstantin S. Tyapochkin, 16, Centre of Mathematical Education, Saint-Petersburg, Russia
- MI310      **A Study of Latency Associated Nuclear Antigen and Cellular Apoptosis Through p21 Expression**  
Thomai Gastopoulos, 16, Central High School, Philadelphia, Pennsylvania  
Evangelia Amigthalia Athanasoula, 17, Central High School, Philadelphia, Pennsylvania
- PH306      **Heating the Rings: The Thermodynamics of the Rings of Saturn**  
Christopher Aaron Souvey, 15, Georgiana Bruce Kirby Preparatory School, Santa Cruz, California  
Micah Wylde, 16, Georgiana Bruce Kirby Preparatory School, Santa Cruz, California
- PH313      **On the Direct Detection of Dark Matter with LENS, a New Directionally Sensitive Low Energy WIMP Detector**  
Eric Casavant, 16, Monta Vista High School, Cupertino, California  
Alex Marshall, 16, Monta Vista High School, Cupertino, California
- PH319      **Magnetic Field Sensor Based on the Magnet/Piezoelectric/Magnet Sandwich Structure**  
Nikolai A. Beliovski, 15, Lyceum #1557, Zelenograd, Moscow, Russia  
Ivan M. Shchigrev, 16, Physik-Mathematiks Lyceum, Sergiev Passad, Moscow, Russia
- PS308      **An Analysis of Plants Used by American Indians for Antimicrobial Effectiveness, A Second Year Study**  
Shana Marie Wolff, 17, Cheyenne Central High School, Cheyenne, Wyoming  
Elizabeth Marie Cochran, 17, Cheyenne Central High School, Cheyenne, Wyoming
- PS309      **Phytoremediation**  
Annicka Kae Carter, 15, Hillcrest High School, Midvale, Utah  
Ellie Antonia Vawdrey, 15, Hillcrest High School, Midvale, Utah
- PS312      **Culture of Lichen-forming Fungi Isolated from Korean Lichens**  
Hwayeong Mun, 19, Chonnam Science Highschool, Naju, Chollanamdo, South Korea  
Namhun Kim, 19, Chonnam Science Highschool, Naju, Chollanamdo, South Korea