



## Winner Announcement

**\*\*Strict Embargo: Friday, May 16, 2008, 2:30 p.m. EDT\*\***

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

### **Grand Awards Ceremony of the Intel International Science and Engineering Fair 2008 Presented by Agilent Technologies**

**Atlanta, Georgia, United States** – Society for Science & the Public, 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 fairs. 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 Society for Science & the Public (SSP) since its inception in 1950. SSP is a nonprofit organization dedicated to the public engagement in scientific research and education. Our vision is to promote the understanding and appreciation of science and the vital role it plays in human advancement: to inform, educate, inspire.

This information will be posted on the SSP website at [www.societyforscience.org](http://www.societyforscience.org) immediately following the ceremony.



## Intel Foundation Young Scientist Award

The winners of this award are the top three finalists at the Intel ISEF. Each of these top three finalists receives a scholarship of \$50,000 from the Intel Foundation.

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

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|-------|---|
| CH014 | <b>Efficient Hydrogen Production Using Cu-Zn-Al Catalysts Prepared by Homogeneous Precipitation Method</b><br>Yi-Han Su, 17, Taipei Municipal First Girls' Senior High School, Taipei, Chinese Taipei |
| EV039 | <b>Development of Biosensors for Detecting Hazardous Chemicals</b><br>Natalie Saranga Omattage, 17, The Mississippi School for Mathematics and Science, Columbus, Mississippi                         |
| MA026 | <b>Computation of the Alexander-Conway Polynomial on the Chord Diagrams of Singular Knots</b><br>Sana Raof, 17, Jericho High School, Jericho, New York  |

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. Valid passport required for travel.

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|-------|--|
| BE018 | <b>The Ability to Learn: Learning and Communication between Comet Goldfish</b><br>Kaleigh Anne Eichel, 17, Strongsville Senior High School, Strongsville, Ohio |
| CS022 | <b>Real-Time Water Wave Simulation with Surface Advection</b><br>Dongyoung Kim, 17, Korean Minjok Leadership Academy, Anheung, Gangwon, South Korea            |
| MI034 | <b>Engineering a Novel Gram-Negative Effective Efflux Pump Inhibitor</b><br>Eric Nelson Delgado, 18, Bayonne High School, Bayonne, New Jersey                  |

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 Society for Science & the Public. This award is named for the late Glenn T. Seaborg, Nobel Laureate in chemistry and Society for Science & the Public 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 Denmark in September 2008.

Trip to the EU Contest.

ME309

**Protection of Neurons Against Injury Using Neuroreceptor-Targeting Nanoparticles**

Jared Vega Goodman, 17, Oak Hall School, Gainesville, Florida

Jonathan Wang, 16, Oak Hall School, Gainesville, Florida

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.

## MIT Lincoln Laboratory

The Massachusetts Institute of Technology's Lincoln Laboratory has partnered with Society for Science & the Public to promote science education through a program called the Ceres Connection. This program seeks to name minor planets after students through SSP's 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 Intel Foundation

Intel will present Best of Category Winners with a \$5,000 award and Intel® Centrino™ Duo Mobile technology-based notebook 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**

AS039

**Catch Me If You Can: A Robotic Simulation of Predator-Prey Co-Evolution**

Carlie Alexandra Scalesse, 18, London Central Secondary School, London, Ontario, Canada

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

AS039

**Catch Me If You Can: A Robotic Simulation of Predator-Prey Co-Evolution**

Carlie Alexandra Scalesse, 18, London Central Secondary School, London, Ontario, Canada

AS065

**The Role of Maternal Effects and Maternally-Transmitted Endosymbionts in the Diet Restriction Response in Fruit Flies**

Yihe Dong, 17, Cedar Shoals High School, Athens, Georgia

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

AS009

**The Effects of Serotonin on Circadian Patterns and Behaviors in Drosophila**

Ann Simone Cooper, 17, Lafayette Senior High School, Lexington, Kentucky

- AS025      **Refining the Establishment of Left/Right Asymmetry in the Nervous System of *Caenorhabditis elegans***  
Pukar Hamal, 16, Forest Hills High School, Forest Hills, New York
- AS032      **External Softening of Food Medium by Excreted Saliva of *Drosophila melanogaster* Larvae**  
Honami Sakaguchi, 17, Urawa Daiichi Jyoshi High School, Saitama, Japan
- AS040      ***Phoca hispida* Feeding Ecology and Contaminant Uptake: Insights from Elemental Analyses of Claws**  
Elizabeth Olson Ferreira, 16, Fort Richmond Collegiate, Winnipeg, Manitoba, Canada

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

- AS006      **The Effect of Habitat Loss on Survival Potential and Decreasing Salinity on Tenacity of the Foot in the Marine Snail, *Nerita atramentosa*: Possible Implications for Global Warming?**  
Nina Imalka Pinto, 16, Hornsby Girls High School, Hornsby, NSW, Australia
- AS010      **A Mosquito's Quest for Sugar: A Novel Approach in the Detection of Plant Species Affecting Mosquito Sugar Feeding Behavior and Its Implications in Adult Mosquito Control**  
Joseph Concepcion Roney, 17, Clay High School, Green Cove Springs, Florida
- AS013      **Histopathologic Investigation of Carcinogenesis in Planarians Secondary to Ultraviolet C, B & A Exposure, Year Two**  
James Edward Fichtelman, 18, Vero Beach High School, Vero Beach, Florida
- AS018      **DNA Gendering of Saw-whet Owls (*Aegolius acadicus*)**  
Catherine Elizabeth Ishitani, 16, Mayo High School, Rochester, Minnesota
- AS035      **The Win-Win Situation in Nature: The Mechanism of the Cotton Bollworm Cope with the Plant Defensive Response**  
Yuan Si, 18, The High School Attached to Shanghai Normal University, Shanghai, China
- AS064      **The Onion Thrip Trick: The *Heterorhabditis bacteriophora* Nematode as a Biological Control Agent for *Thrips tabaci***  
Lindsey McLaren Denison, 17, Paonia High School, Paonia, Colorado

**Fourth Award of \$500**

- AS022      **Repelling Sharks Through the Magnetic Stimulation of the Ampullae of Lorenzini**  
Brooks Daniel Ruder, 15, Keystone Upper School, San Antonio, Texas
- AS037      **Searching for a Trade-Off Between Reproduction and Stress Resistance in *Caenorhabditis elegans* by Using Lithium Chloride to Induce Longevity**  
Vipin Tyagi, 16, William L. Dickinson High School, Jersey City, New Jersey
- AS045      **Coping with Copepods: Prey Preference and the Functional Response to Suboptimal Lighting and Temperature by the Omnivorous Copepod *Macrocyclus albidus***  
Madeleine Amanda Ball, 15, Ursuline Academy of Dallas, Dallas, Texas

- AS046      **Biocontrol Potential of Five Freshwater Decapods for a Polyspecific Trematode Vector Snail (Thiaridae: *Melanoides tuberculata*)**  
Alexander Mee-Woong Kim, 16, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia
- AS056      **The Effect of the Antibiotics in Marine Sponges on Non-Pathogenic Bacteria**  
Bernadette Ann Hritz, 14, Villa Joseph Marie High School, Holland, Pennsylvania
- AS071      **Morphological Correlates of Communication Signals in Weakly Electric Fish**  
Michael William Helbig, 17, Christopher Columbus High School, Miami, Florida
- AS072      **Neuronal Distribution of Urocortin III in the Fire-bellied Toad, *Bombina orientalis***  
Robin Nichol Barawid, 18, Briarcrest Christian High School, Eads, Tennessee
- AS073      **Resilience/Survivorship of a Red Sea Fringing Coral Reef under Extreme Environmental Conditions: A Four-Year Study**  
Zaki Daniel Moustafa, 17, A.W. Dreyfoos High School of the Arts, West Palm Beach, Florida

## Behavioral and Social Sciences - Presented by Intel Foundation

Intel will present Best of Category Winners with a \$5,000 award and Intel® Centrino™ Duo mobile technology-based notebook 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

- BE018      **The Ability to Learn: Learning and Communication between Comet Goldfish**  
Kaleigh Anne Eichel, 17, Strongsville Senior High School, Strongsville, Ohio

### First Award of \$3,000

- BE018      **The Ability to Learn: Learning and Communication between Comet Goldfish**  
Kaleigh Anne Eichel, 17, Strongsville Senior High School, Strongsville, Ohio
- BE034      **The Effect of Musical Training on the Cerebral Lateralization of Musical Sequences**  
Alysha Harper Owen, 17, Dallastown Area High School, Dallastown, Pennsylvania

### Second Award of \$1,500

- BE005      **A Study of Varying Harmonic Spectrum Exposure on Students' Concentration during Spatial Reasoning Examination as Assessed via Fourier Analyses**  
Vivian Alice Lee, 17, Vista Ridge High School, Cedar Park, Texas
- BE025      **Que? Quoi? Do Languages with Grammatical Gender Promote Sexist Attitudes?**  
Benjamin David Wasserman, 17, Roslyn High School, Roslyn Heights, New York
- BE032      **The Devolution of Cooperation: An Examination of Excessive Noise in the Iterated Prisoner's Dilemma**  
Thomas McLean Burr, 16, South Fork High School, Stuart, Florida
- BE041      **Correlating Anatomical and Behavioral Asymmetry**  
Shauna Theresa Linn, 18, Baltimore Polytechnic Institute, Baltimore, Maryland

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

- BE008      **The Automatic Speech Translator for Disability (Deaf and Blind)**  
Mahmoud Emad Darawsheh, 17, Modern Systems Schools, Amman, Jordan
- BE011      **The Chronic Effects of Growth Hormone Deficiency on Quality of Life and Levels of Daytime Drowsiness**  
Michael Andrew Fairchild Harding, 15, Lake Highland Preparatory School, Orlando, Florida
- BE026      **The Neural Basis of the Decision to Reward or Punish in Parenting: An fMRI Investigation**  
Benjamin Julius Mueller, 18, John L. Miller - Great Neck North High School, Great Neck, New York
- BE027      **Making the Choice: An fMRI Analysis of Impulse and Strategic Decision-Making in Classification of Emotional Stimuli**  
Zachary Spencer Lorsch, 18, Oceanside Senior High School, Oceanside, New York
- BE030      **Cognitive and Implicit Measures of Acculturation in Adolescent Hispanic Americans**  
Mary Caitlin Williams, 17, Ossining High School, Ossining, New York
- BE062      **Comparing Attitudes Toward ADHD in the Workplace**  
Janelle Christina Thixton, 16, Eastern High School, Pekin, Indiana

**Fourth Award of \$500**

- BE017      **Crowding-Out or Crowding-In: What Is the Relationship between Government and Private Funding for Public Libraries?**  
Xiaomeng Zeng, 18, West High School, Iowa City, Iowa
- BE020      **Aim to Write**  
Taylor Hanna Fitch, 17, Belton-Honea Path High School, Honea Path, South Carolina
- BE029      **Independent Conflict-Driven and Expectancy-Driven Mechanisms of Cognitive Control**  
Caitlyn Rose Lia, 18, Ossining High School, Ossining, New York
- BE035      **It's A Guy Thing: How Fathers Affect Daughters' Dating Habits**  
Emily Rose Summerbell, 16, Collins Hill High School, Suwanee, Georgia
- BE040      **The Relationship Between Nail Biting and Obsessive-Compulsive Disorder**  
Alexander Laszlo Peterkin, 17, Oakton High School, Vienna, Virginia
- BE063      **Sociodominance and Sexual Self-Schema as Moderators in Sexist Reactions to Female Subtypes**  
Alyssa Frielle Fowers, 17, Maritime Science and Technology Senior High School, Key Biscayne, Florida
- BE068      **BEexplorerElectronic Flexible Solution for the Visually Impaired**  
Ahmed Khalid A Alnuaimi, 17, Alansar Private School, Dammam, Saudi Arabia

## Biochemistry - Presented by Agilent Technologies

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

BI011            **Isolation of the Role of Earthworms in the Chemical Alteration Trajectory of Lignin in Old and Young Forest Systems**  
Russell B. Conard, 18, William Henry Harrison High School, West Lafayette, Indiana

### First Award of \$3,000

BI011            **Isolation of the Role of Earthworms in the Chemical Alteration Trajectory of Lignin in Old and Young Forest Systems**  
Russell B. Conard, 18, William Henry Harrison High School, West Lafayette, Indiana

### Second Award of \$1,500

BI027            **Synthetic Analogs of IGF-1 Receptor Juxtamembrane Domain: Potent Inhibitors of Cancer Cell Growth**  
Liv Helena Johannessen, 17, Governor Thomas Johnson High School, Frederick, Maryland

BI029            **A Novel Smart shRNA System for Disease Diagnosis and Therapy**  
Yale Stern Michaels, 16, Grant Park High School, Winnipeg, Manitoba, Canada

### Third Award of \$1,000

BI001            **Searching the Fluorescent Color Protein Palette for Novel FRET Pairs**  
Xin Guan, 17, Lincoln High School, Tallahassee, Florida

BI014            **A Study on the Neuroprotective Properties of Epigallocatechin-3-Gallate (EGCG) in Relation to P25-Activated Cyclin-Dependent Kinase 5 (Cdk5): Implications for Alzheimer's Disease**  
Shivani Brinda Agarwal, 16, Spring Valley High School, Columbia, South Carolina

BI028            **Geometric and Amino Acid Computational Analysis of Cystic Fibrosis Proteins**  
Jane Fomina, 17, Westfield High School, Westfield, Massachusetts

BI035            **Enzymatic Hydrogen Production Using Pyrococcus furiosus: A Viable Solution for Renewable, Clean Energy, Phase II**  
Joseph Robert Stunzi, 18, Clarke Central High School, Athens, Georgia

### Fourth Award of \$500

BI005            **A Step Towards Curing Malaria: The Function and Potential Weakness of Heme Detoxification Protein**  
Laura Christine Vogelaar, 15, Blacksburg High School, Blacksburg, Virginia

BI009            **Proteomic Characterization of Extracellular Matrix Using Sonication-Assisted Digestion**  
Aarthi Shankar, 16, Rampart High School, Colorado Springs, Colorado

- BI010      **A High-Throughput, Economical, and Highly Sensitive Selection Method for De Novo Protein Engineering**  
David Andrew Levary, 18, Parkway Central High School, Chesterfield, Missouri
- BI020      **Unraveling the Functional Interaction of Dj-1, PINK1 and Parkin, Mutated Proteins Linked to Familial Forms of Parkinson's Disease and Set-up of a Cellular Model to Study PINK1 Mutant Toxicity**  
Jessica Marie May, 17, Northport High School, Northport, New York

## Cellular & Molecular Biology - Presented by Intel Foundation

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

- CB027      **The Novel Role of the GluCl- $\alpha$  Ion Channel and Diazepam-binding Genes in Alcohol Addiction**  
Kapil Vishveshwar Ramachandran, 16, Westwood High School, Austin, Texas

### First Award of \$3,000

- CB027      **The Novel Role of the GluCl- $\alpha$  Ion Channel and Diazepam-binding Genes in Alcohol Addiction**  
Kapil Vishveshwar Ramachandran, 16, Westwood High School, Austin, Texas

- CB035      **A Role in Hearing Mechanotransduction? Characterization & Localization of Lipid-Binding Protein StarD10**  
Patrick David Hsu, 16, Homeschool, Stanford, California

### Second Award of \$1,500

- CB005      **Programming of Adult Hematopoietic Stem Cells to Differentiate into Retinal Pigment Epithelium Cells Using RPE65 Gene: A Novel Mode of Cell Replacement Therapy for Tissue Specific Repair**  
Sabrina Lakshmi Prabakaran, 17, Canterbury School, Fort Myers, Florida

- CB011      **Antioxidant Enzyme Activities of *Drosophila melanogaster* Under the Exposure of WiFi 2.4GHz Electromagnetic Field**  
Arthur Kuan, 17, Stevenson School, Pebble Beach, California

- CB019      **A Numerical Model of Late-Spiking Neurons**  
Fiona Winifred Wood, 16, North Haven High School, North Haven, Connecticut

### Third Award of \$1,000

- CB009      **A Novel Small Molecule Inhibitor Reveals Essential Roles for GBF1 in Intracellular Transport**  
William Sun, 16, Parkway Central High School, Chesterfield, Missouri

- CB030      **How Inflammation Keeps Us Alive: The Superantigen Paradox**  
Nikhita Singh, 16, A.B. Lucas Secondary School, London, Ontario, Canada

- CB033      **Using Laminin to Promote the Reversal of Myelin Inhibition in Central Nervous System Neurons**  
Daniel George Barson, 17, John Jay High School, Cross River, New York
- CB042      **Metabolic Identification of Glycolytic-Dependent Phenotypes in GL261 Brain Tumor Cells**  
Brandon Matravers Law, 16, Wayzata High School, Plymouth, Minnesota
- CB047      **Confirming the Identity of a Population of CXCR3 Positive Cells in Celiac Tissue**  
Molly K. Hritz, 17, Villa Joseph Marie High School, Holland, Pennsylvania
- Fourth Award of \$500**
- CB006      **Exon Prediction Using a Simple Neural Network Approach**  
Amy Tai, 16, Oklahoma School of Science and Mathematics, Oklahoma City, Oklahoma
- CB021      **Combating Muscle Atrophy: A Novel Study of Myofibril Turnover in *Sternopygus macrurus***  
Harrison Phu Nguyen, 17, Detroit Catholic Central High School, Novi, Michigan
- CB028      **Determination of the Effects of Thymoquinone on Cancerous and Precancerous Cell Lines**  
Adam Akkad, 16, Albuquerque Academy, Albuquerque, New Mexico
- CB031      **Efferent Synaptic Development Influenced by Target Signaling**  
Omar Osama Abudayyeh, 18, Kalamazoo Area Math and Science Center, Kalamazoo, Michigan
- CB038      **Mathematical Modeling of a Eukaryotic Circadian Clock**  
Alexander Chi-Jan Huang, 17, Plano Senior High School, Plano, Texas
- CB044      **Overexpression of Aquaporin-1 in Non-Small Cell Lung Cancer**  
Sushma Kola, 17, Illinois Mathematics and Science Academy, Aurora, Illinois

## Chemistry - Presented by Intel Foundation

Intel will present Best of Category Winners with a \$5,000 award and an Intel® Centrino™ Duo Mobile technology-based notebook 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

- CH014      **Efficient Hydrogen Production Using Cu-Zn-Al Catalysts Prepared by Homogeneous Precipitation Method**  
Yi-Han Su, 17, Taipei Municipal First Girls' Senior High School, Taipei, Chinese Taipei

### First Award of \$3,000

- CH014      **Efficient Hydrogen Production Using Cu-Zn-Al Catalysts Prepared by Homogeneous Precipitation Method**  
Yi-Han Su, 17, Taipei Municipal First Girls' Senior High School, Taipei, Chinese Taipei

**Second Award \$1,500**

- CH013 **Fundamental Insight into Carbon Nanotube/Solvent Interactions Leads to the Discovery of a Novel Method for Maximizing Solubilities in General**  
Philip Vidal Streich, 17, Homeschool, Platteville, Wisconsin
- CH018 **A Novel Thermodynamic Model for the Synthesis of Multi-Walled Carbon Nanotubes**  
Christopher Allen Zimmerman, 18, Muhlenberg High School, Laureldale, Pennsylvania
- CH025 **Just Say "NO": A Novel Delivery System for the Bioregulatory Agent Nitric Oxide**  
Camden Y Miller, 16, Allen High School, Allen, Texas

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

- CH015 **The Controlled Release of Lipase from PCL Electrospun Fibers**  
Angela Ying Lau, 17, Plainview-Old Bethpage John F. Kennedy High School, Plainview, New York
- CH032 **Multiple Analyte Imprinting in One Monomer Molecularly Imprinted Polymers vs. Traditional Molecularly Imprinted Polymers**  
Andrew C. Meng, 16, Louisiana State University Laboratory School, Baton Rouge, Louisiana
- CH040 **Synthesis of a Linker Molecule for Self-Assembled Monolayers**  
Philipp Zagar, 18, Hoehere Technische Lehranstalt Wels, Wels, Upper Austria, Austria
- CH042 **Impact of Orbital Localization on One-Electron Basis Set Convergence**  
Vinay Venkatesh Ramasesh, 18, Texas Academy of Mathematics and Science, Denton, Texas

**Fourth Award of \$500**

- CH001 **Iron Catalyst of Polymeric Schiff Bases for Ethylene Polymerization**  
Yi Hui Lim, 17, National Junior College, Singapore, Singapore
- CH005 **New Routes to Nylon Synthesis**  
Katherine Elizabeth Robertson, 17, Wells Cathedral School, Wells, Somerset, United Kingdom
- CH008 **Fingerprinting with Genipin: A Green Reagent for Protein Detection in Solution and on Surfaces**  
Shamik Mascharak, 15, Santa Cruz High School, Santa Cruz, California
- CH037 **Synthesis and Catalytic Behaviour of Layered Double Hydroxides**  
Alexander James White, 17, The King's School Chester, Chester, United Kingdom
- CH043 **Design and Synthesis of Peptidomimetic Antimicrobial Agents**  
Lyndon Nuoxi Zhang, 17, Mission San Jose High School, Fremont, California

## Computer Science - Presented by Intel Foundation

Intel will present Best of Category Winners with a \$5,000 award and an Intel® Centrino™ Duo mobile technology-based notebook 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

CS022      **Real-Time Water Wave Simulation with Surface Advection**  
Dongyoung Kim, 17, Korean Minjok Leadership Academy, Anheung,  
Gangwon, South Korea

### First Award of \$3,000

CS022      **Real-Time Water Wave Simulation with Surface Advection**  
Dongyoung Kim, 17, Korean Minjok Leadership Academy, Anheung,  
Gangwon, South Korea

### Second Award of \$1,500

CS004      **Retrieving Regions-of-Interest from Videos on the Fly Without Transcoding**  
Timothy Bauman, 16, Central Catholic High School, Portland, Oregon

CS036      **A Simplicial Homology-Based Hole Detection Algorithm for Wireless  
Sensor Networks**  
Vinayak Ramesh, 17, Oak Ridge High School, El Dorado Hills, California

CS043      **A New Model of See-through Vision: Image Reconstruction in Scattering  
Media from Quantum Exit Probabilities for Aerial, Terrestrial, and Underwater  
Robot Inspection**  
Lucia Mocz, 17, Mililani High School, Mililani, Hawaii

### Third Award of \$1,000

CS018      **An Optimization Algorithm for Space Mission Design: Dynamically Simulating  
Energy-Efficient Trajectories**  
Erika Alden DeBenedictis, 16, Saint Pius X High School, Albuquerque, New Mexico

CS028      **Content-Based Image Retrieval**  
David C. Liu, 16, Lynbrook High School, San Jose, California

CS031      **Parallel Computer Processing: An Emulation Model**  
Ariel Yehuda Wexler, 17, Massachusetts Academy of Math and Science,  
Worcester, Massachusetts

CS045      **Pathfinder: A Java Based Program to Optimize Dispersion of Multiple Items  
through Any Field of Travel Using a Genetic Algorithm**  
Jeremy David Fein, 17, Dr Michael M. Krop Senior High School, Miami, Florida

### Fourth Award of \$500

CS026      **Application of Real Time Neural Networks for Use with Data Gloves**  
Colby Anne Wilkason, 17, Warner Robins High School, Warner Robins, Georgia

CS027      **MindMouse: A Mind Computer Interface Without Pattern Recognition Based  
on Biofeedback Training**  
Nitin Kitchley Egbert, 17, Bellarmine College Preparatory, San Jose, California

- CS029      **Multi-touch @ Home**  
Bridger James Maxwell, 17, Utah County Academy of Sciences, Orem, Utah
- CS030      **Virtual Tour Guide: An Application of the Scale Invariant Feature Transform to Image-Based Landmark Identification**  
Mark Jacob Pritt, 17, Homeschool, Walkersville, Maryland
- CS040      **Do You 'ear Wha' I 'ear'? Redigitizing Voice Signals into Lower Frequencies to Revolutionize Hearing Assistance Technology**  
Nicholas Mycroft Christensen, 16, Wetumpka High School, Wetumpka, Alabama

## Earth & Planetary Sciences - Presented by Shell Oil

Intel will present Best of Category Winners with a \$5,000 award and an Intel® Centrino™ Duo Mobile technology-based notebook 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

- EA022      **Gulf Hypoxic Zones: Forecasting with Mathematical and Laboratory Simulations**  
Bonnie Joyce McLindon, 16, St. Joseph's Academy, Baton Rouge, Louisiana

### First Award of \$3,000

- EA022      **Gulf Hypoxic Zones: Forecasting with Mathematical and Laboratory Simulations**  
Bonnie Joyce McLindon, 16, St. Joseph's Academy, Baton Rouge, Louisiana

### Second Award of \$1,500

- EA010      **Montana Evidence of an Extra-Terrestrial Impact Event that Led to the Extinction of the Mammoths in North America**  
Katelyn Elizabeth Gibbs, 15, Great Falls High School, Great Falls, Montana
- EA011      **Evidence for a Tsunami Generated by an Impact Event in the New York Metropolitan Area Approximately 2300 Years Ago**  
Katherine Thompson Cagen, 17, Horace Mann School, Riverdale, New York

### Third Award of \$1,000

- EA017      **Changes in Lake Superior Ice Cover at Bayfield, Wisconsin**  
Forrest Larsen Howk, 18, Bayfield High School, Bayfield, Wisconsin
- EA019      **Boxing Day Tsunami: The Last of the Knockouts? Testing the Effects of Coastal Configuration and Seawall Designs on Tsunami Strength**  
Richa Thakur, 16, Clark High School, Plano, Texas

### Fourth Award of \$500

- EA002      **The Marvelous Magnetosphere III**  
Gavin Gregory Reen, 16, La Plata High School, La Plata, Maryland
- EA006      **Analyzing Arctic Solar Flux and Ice Extent Loss Projections**  
Gwyneth R. Glissmann, 17, Peak to Peak Charter School, Lafayette, Colorado
- EA014      **Is Earth an Extrasolar Planet?**  
Samantha Emily Keith, 16, Weber High School, Pleasant View, Utah

## Electrical & Mechanical Engineering - Presented by Intel Foundation

Intel will present Best of Category Winners with a \$5,000 award and Intel® Centrino™ Duo mobile technology-based notebook 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

EE010 **Developing Scraps IV: The Self-Contained, Robust, Anthropomorphic, Powered Skeleton–Hybridizing a Prototype for Increased Energy Efficiency**  
Ian Michael Bouligny, 17, Catholic High School, New Iberia, Louisiana

### First Award of \$3,000

EE010 **Developing Scraps IV: The Self-Contained, Robust, Anthropomorphic, Powered Skeleton–Hybridizing a Prototype for Increased Energy Efficiency**  
Ian Michael Bouligny, 17, Catholic High School, New Iberia, Louisiana

EE020 **Propellantless Propulsion: Designing a Voltage Dependent Directional Control System for Asymmetrical Capacitors**  
Stephen Jerome Trettel, 17, New Prague High School, New Prague, Minnesota

### Second Award of \$1,500

EE032 **Research on Autonomous Flight Controller and Low-altitude Robotic Aircraft**  
Jun Qiu, 18, Shenzhen Senior High School, ShenZhen, Guang Dong, China

EE040 **Optimizing Wind Power: Design of a Hybrid Wind Turbine Using Active Solidity Control for Low Wind Speed Power Capture**  
Parker Owan, 17, Owan Homeschool, Tucson, Arizona

EE053 **Intelligent Task Coordination with Multiple Robots**  
Canin Quinn Christell, 18, Christell Home School, Springfield, Missouri

EE068 **What a MES: Mars Environment Simulator, II**  
Julie Emily Walker, 17, Leonardtown High School, Leonardtown, Maryland

### Third Award of \$1,000

EE005 **Reducing Lawnmower Emissions Using E-85, Phase Three: A Catalyst for Change**  
Kate Elizabeth Weegman, 17, Winona Senior High School, Winona, Minnesota

EE021 **The Effect of Foucault Current Isolation on Induced Magnetic Levitation**  
Dru Harrington Knox, 16, Roanoke Valley Governor's School, Roanoke, Virginia

EE038 **Electromagnetic Levitation: A Digital Control System**  
Chris James King, 17, Creek Wood High School, Charlotte, Tennessee

EE044 **Practical Motion Capture for Mixed-Reality Applications**  
William Brewton McGrath, 17, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia

EE051      **The Optimization of a Linear Reluctance or Induction Motor**  
Duncan C. Townsend, 17, Albemarle High School, Charlottesville, Virginia

EE067      **Why Drop the Fun When the Drip Is On?**  
Tobias Maduro Noerbo, 20, Ishoj Technical High School - CPH West, Ishoj, Denmark

**Fourth Award of \$500**

EE013      **The Two Inch Problem, an Ingenious Solution for Pumping Small Wells**  
James Lee Clark, 15, Mayfield High School, Las Cruces

EE014      **Universal Screwdriver Head**  
William Decker Neiswanger, 17, School of Science and Technology, Beaverton, Oregon

EE023      **Engineered Anaerobic Digestion Utilizing a Thermophilic Media**  
Barnett Samuel Koven, 17, Millburn High School, Millburn, New Jersey

EE029      **Designing an Autonomous Tracking System for Efficient Solar Energy Collection**  
Jeffrey Daniel Fahland, 16, Wrenshall High School, Wrenshall, Minnesota

EE039      **A Self-Navigating Balloon-Payload Recovery System**  
Andrea Esther Kuklenyik, 17, Collins Hill High School, Suwanee, Georgia

EE046      **Robotic Navigation Three: Taking Control**  
Jonathan Edward Dumm, 18, Penn Hills Senior High School, Pittsburgh, Pennsylvania

EE047      **Bio-MEMS Radio Frequency Identification (RFID) Device for Systolic and Diastolic Blood Pressure Monitoring**  
Joshua Michael Schwartz, 16, Oceanside High School, Oceanside, New York

EE071      **A Low Cost Water Based Evaporative Cooling Device for Computers**  
Ambud Sharma, 15, Sunbeam School, Bhagwanpur, Varanasi, Uttar Pradesh, India

## Materials Science & Bioengineering - Presented by Intel Foundation

Intel will present Best of Category Winners with a \$5,000 award and an Intel® Centrino™ Duo mobile technology-based notebook 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**

EN010      **Asymmetric Underpass Which Leads Convection Current**  
Xing Fang, 17, Fujian Xiamen Shuangshi High School, Xiamen, Fujian, China

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

EN010      **Asymmetric Underpass Which Leads Convection Current**  
Xing Fang, 17, Fujian Xiamen Shuangshi High School, Xiamen, Fujian, China

EN038      **Development and Optimization of a Polyvinyl Alcohol Hydrogel for Controlled Release of Phosphate**  
Alexandra L. Ghaben, 15, Central York High School, York, Pennsylvania

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

- EN015      **Developing a Novel pH Buffer Methodology to Inhibit Concrete Corrosion**  
Michael Jeffrey Loy, 17, Oregon Episcopal School, Portland, Oregon
- EN020      **Evaluation and Measurement of the Frictional Properties of Graphene by Atomic Force Microscopy**  
William B Kalb, 17, Horace Mann School, Riverdale, New York
- EN054      **A Novel Approach for Mathematically Modeling Pretargeted Radioimmunotherapy as a Treatment for Colon Cancer**  
Ananth Ram, 18, Texas Academy of Mathematics and Science, Denton, Texas

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

- EN006      **Hard-Templating Synthesis and Characterization of Mesoporous and Electrically Conductive Carbon Nanofibers**  
Jianyang David Yin, 18, Raffles Junior College, Singapore, Singapore
- EN009      **Biocompatible Zirconia Nanopowders: The Scalable Synthesis of an Advanced Material for Dental Application**  
Yi Yang, 18, Beijing Huiwen Middle School, Beijing, Beijing, China
- EN022      **Characterization of Ionic Polymer Metal Composite (IPMC) Forces and Movement**  
Robert Brik, 18, Mills E. Godwin High School, Richmond, Virginia
- EN031      **Carbon Fiber Makes a Pointe, Part Deux**  
Harper-Grace Niedermeyer, 17, Catholic High School, Huntsville, Alabama
- EN033      **Thermal Analysis and Kinetic Modelling of a Nanotechnology-Based Bone Cement**  
Laurent Fradet, 17, Seminaire de Sherbrooke, Sherbrooke, Quebec, Canada

**Fourth Award of \$500**

- EN024      **Repairing America's Aging Concrete Highway Bridges with Cement Bio-Composites**  
Raymond Tan, 16, William Mason High School, Mason, Ohio
- EN032      **Regenerative Diesel Fuel Production in a Flex Fuel Vehicle Utilizing Vegetable Oil and Catalytic Hydrocracking**  
Andrew Michael West, 18, Conifer Senior High School, Conifer, Colorado
- EN034      **The Kudzu Question: A Useful, Renewable Resource?**  
Kathryn Ann LeCroy, 17, Jefferson County International Baccalaureate School, Birmingham, Alabama
- EN041      **Using Gel Encapsulation as a Vehicle to Isolate *Serratia marcescens* to Enable the Production of a Biosurfactant to Purify Contaminated Water, Year Two**  
Caleb Ryan Schneider, 18, O'Donnell High School, O'Donnell, Texas
- EN043      **Decreasing the Apoptotic Threshold of Hypoxic MCF-7 Cancer Cells through the Co-administration of Ceramide and Paclitaxel in Polymeric Nanoparticles**  
Ana Marie Lyons, 18, Mecosta-Osceola Math, Science & Technology Center, Big Rapids, Michigan

EN049

**Glass Bone Implants: The Effect of Surface Roughness on Cell Proliferation**  
Raina Himani Jain, 13, Freedom High School, Bethlehem, Pennsylvania

## Energy & Transportation - Presented by Shell Oil

Intel will present Best of Category Winners with a \$5,000 award and Intel® Centrino™ Duo Mobile technology-based notebook 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

ET037 **A Novel Process to Highly Improve the Bioethanol Production**  
Christoffer Norn, 20, Lyngby Technical High School, Kgs. Lyngby, Denmark

### First Award of \$3,000

ET037 **A Novel Process to Highly Improve the Bioethanol Production**  
Christoffer Norn, 20, Lyngby Technical High School, Kgs. Lyngby, Denmark

### Second Award of \$1,500

ET002 **Harnessing Solar Energy, Year Four: Increasing the Efficiency of a Hybrid Polymer Photovoltaic Cell with Zinc Oxide Nanofibers in Varying Lengths**  
Nathan McKay Monroe, 17, Episcopal High School of Jacksonville, Jacksonville, Florida

ET019 **The Sustainable Development of Ethanol from Biomass via Genes of Clostridia**  
Sujay Tyle, 14, Pittsford Mendon High School, Pittsford, New York

### Third Award of \$1,000

ET008 **The Effects of Water Electrolysis on an Internal Combustion Engine, Phase Two**  
Jonathan Boyd Soli, 18, Alden-Conger High School, Alden, Minnesota

ET015 **The Application of Humpback Whale Fin Morphology to a Standard Airfoil: Revolutionizing Slow Flight Aerodynamics**  
Andrew Kipling Miller, 17, Western Alamance High School, Elon, North Carolina

ET040 **From Biomass to Ethanol: Using Transformed Yeast *Saccharomyces cerevisiae* for Cellulosic Degradation and Ethanol Fermentation**  
Junxing Chen, 17, Clayton Valley High School, Concord, California

ET044 **Just a Drop in the Ocean? An Investigation into the Capacity of the Marine Algae *Dunaliella tertiolecta* to Sequester Atmospheric Carbon Dioxide and Produce Plant Biomass for Bio-Diesel Production**  
Storm Holwill, 15, Marist Regional College, Burnie, Tasmania, Australia

### Fourth Award of \$500

ET006 **Solving the Hydrogen Storage Problem: Compact Hydrogen Storage in NH<sub>3</sub> Complexes**  
Ariah Aram Klages-Mundt, 18, Winona Senior High School, Winona, Minnesota

ET025 **Kudzu: A Cellulosic Source for Ethanol? Glucose Levels of *Pueraria lobata* Plant Parts as Measured Through Enzyme Hydrolysis and DNS Glucose Assay**  
Lindsay Marie Stewart, 18, Grove High School, Grove, Oklahoma

ET026            **The Effect of Tidal Generator Design on Power Output**  
Michael S Finneran, 17, Chantilly High School, Chantilly, Virginia

ET043            **Maximum Delivered Specific Impulse**  
Richard William Bertrand, 18, Wellington High School, Wellington, Florida

## Environmental Sciences - Presented by Intel Foundation

Intel will present Best of Category Winners with a \$5,000 award and an Intel® Centrino™ mobile technology-based notebook 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

EV039            **Development of Biosensors for Detecting Hazardous Chemicals**  
Natalie Saranga Omattage, 17, The Mississippi School for Mathematics and Science, Columbus, Mississippi

### First Award of \$3,000

EV038            **Modeling the Toxic Effects of Silver Nanoparticles Under Varying Environmental Conditions**  
Joyce Sophia Chai, 17, Palos Verdes Peninsula High School, Rolling Hills Estates, California

EV039            **Development of Biosensors for Detecting Hazardous Chemicals**  
Natalie Saranga Omattage, 17, The Mississippi School for Mathematics and Science, Columbus, Mississippi

### Second Award of \$1,500

EV004            **Phytoremediation in Contaminated Environments Utilizing Assisted Hyper-accumulation Phytoextraction**  
Steven Richard McCommon, 17, Merritt Island High School, Merritt Island, Florida

EV005            **Assessing the Impact of Human Metabolites of Arsenic on Selenium Metabolism Using *E. coli* as a Model System**  
Daniel Kenneth Cook, 18, Lake Highland Preparatory School, Orlando, Florida

EV028            **Photocatalytic Reduction of Heavy Metals: Methodology and Efficacy of an Apparatus**  
Megan Moulding, 17, Fremont High School, Plain City, Utah

EV045            **Further Investigation of Diatoms as Biological Indicators of Pharmaceutical Runoff**  
Ronit Batya Roth Abramson, 16, Canyon Crest Academy, San Diego, California

### Third Award of \$1,000

EV007            **Study on the Influence of Mangrove Rhizosphere Ecosystem on Heavy Metals Transportations in Estuary Sediments**  
Qinhua Yan, 17, Xiamen No.1 Middle School, Xiamen, Fujian, China

EV010            **The Influence of Fish Communities on Diurnal Horizontal Migration of *Daphnia* Species in Deep Prairie Wetlands**  
Megan Marie Miller, 17, Lincoln High School, Thief River Falls, Minnesota

- EV026      **Numerical and Experimental Analysis of a Direct Solar-to-Thermal Energy Conversion System for the Treatment of Water Resources**  
Denilson Luz Freitas, 20, Centro Federal de Educacao Tecnologica da Bahia, Vitoria da Conquista, Bahia, Brasil
- EV030      **Exhaling CO2: Year Three**  
Joanne Kathleen Heslop, 18, Northern Nevada Homeschool, Incline Village, Nevada
- EV043      **Efficacy of a Radon Pump at Mitigating Background Radiation Level**  
Andre Sebastian Gerner, 17, George C. Marshall High School, Falls Church, Virginia
- EV070      **Methylmercury Induced Dysfunction of Blood Vessel Cells: Implications in Cardiovascular Diseases**  
Aaditya Ganesh Shidham, 17, Upper Arlington High School, Upper Arlington, Ohio

**Fourth Award of \$500**

- EV012      **The Viability of Green Cleaning: A Quantitative Assessment of the Phytoremediation of Copper Effluent Using *Lemna minor***  
Emily Felicia Schapira, 17, Nicolet High School, Glendale, Wisconsin
- EV013      **Toxicity of Agricultural Ditch Sediment to *Hyalella azteca***  
August James Steigmeyer, 18, Canterbury School, Fort Wayne, Indiana
- EV017      **Nitrate Leaching: Assessment and Prevention**  
Dharti Bhulabhai Bhakta, 18, Elko High School, Elko, Nevada
- EV023      **Assessment of Land Uses Effects on the Water Quality of Rural Areas in Southeast Brazil**  
Victor Paolillo Neto, 17, Colegio Sao Carlos, Sao Carlos, Brasil
- EV029      **The Sequestration of Carbon Dioxide from Coal-Fired Exhaust**  
Rachel Ann Bigos, 14, Holy Name High School, Reading, Pennsylvania
- EV046      **Motor Boat Wakes and Riverbank Erosion**  
Marcel Williams, 15, Savannah Arts Academy, Savannah, Georgia
- EV062      **Water Purification by *Cyperus papyrus* L. in a Simulated Sub-surface Wetland**  
Adria Katrin Schwarber, 18, Notre Dame Academy, Park Hills, Kentucky

**Environmental Management - Presented by Kendeda Fund**

Intel will present Best of Category Winners with a \$5,000 award and Intel® Centrino™ Duo Mobile technology-based notebook 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**

- EM007      **Kinetics of Bioremediation and Electricity Production in a Novel Microbial Fuel Cell**  
Timothy Zuchi Chang, 16, Stuyvesant High School, New York, New York

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

EM007      **Kinetics of Bioremediation and Electricity Production in a Novel Microbial Fuel Cell**  
Timothy Zuchi Chang, 16, Stuyvesant High School, New York, New York

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

EM008      **Use of Seashells to Detoxify Lead-contaminated Effluent and Groundwater**  
Theresa Ann Oei, 14, East Catholic High School, Manchester, Connecticut

EM012      **Removal of Water Pollutants Using Magnetite Nanoparticles, Part II**  
Helen Tressa D'Couto, 17, Clear Lake High School, Houston, Texas

EM013      **Tracing the Migration of Pesticides Through the Production of Southwestern Connecticut Honey**  
Eliza Helen McNitt, 16, Greenwich High School, Greenwich

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

EM009      **Mathematical Modeling of Conflagration Potential and Its Application in Versatile Detection Devices**  
Nima Ahmadi, 16, Westview High School, Portland, Oregon

EM016      **Inorganic Heat Isolating Panel: A Green Engineering Design**  
Roberto Carlo Soto, 16, Academia del Perpetuo Socorro, San Juan, Puerto Rico

EM041      **Synthesis of Silver Nanoparticle-Enabled Polymeric Membranes for Biofouling Mitigation**  
Hari Senthil Arul, 17, Detroit Country Day School, Beverly Hills, Michigan

EM049      ***Fusarium pallidroseum*, II: Can It Control Water Hyacinth?**  
Swathi Soman, 16, Bhavan's B.P. Vidya Mandir, Nagpur, India

**Fourth Award of \$500**

EM001      **Low Cost Single Chambered Microbial Fuel Cell for Harvesting Energy and Cleansing Wastewater**  
Ashutosh Patra, 16, Sunset High School, Portland, Oregon

EM025      **The Effects of *Artemia franciscana* as an Alternative Nitrogen Source for Composting Biodegradable Materials**  
Alexa A Lunt, 15, Orion Jr. High, Harrisville, Utah

EM032      **Great Invaders: Mercury Amplification and Bioremediation Through Methylation and Demethylation by *Escherichia coli* and the Development of a Biotic Osmotic Chambered Mercury Filtering System**  
Amanda Marie Bennett, 18, Marysville High School, Marysville, Michigan

EM040      **Recycling Carbon Dioxide for Biofuel Production with Algae**  
Miles Vincent Barnhart, 18, Greenwood Laboratory School, Springfield, Missouri

EM047      **Development of a Management-Focused, Environmental Simulation Engine for Elephant-Vegetation Dynamics of the Kruger National Park, South Africa**  
Rohit Thummalapalli, 16, American Heritage School, Plantation, Florida

## Mathematical Sciences - Presented by Intel Foundation

Intel will present Best of Category Winners with a \$5,000 award and an Intel® Centrino™ Duo Mobile technology-based notebook 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

MA026      **Computation of the Alexander-Conway Polynomial on the Chord Diagrams of Singular Knots**  
Sana Raof, 17, Jericho High School, Jericho, New York

### First Award of \$3,000

MA026      **Computation of the Alexander-Conway Polynomial on the Chord Diagrams of Singular Knots**  
Sana Raof, 17, Jericho High School, Jericho, New York

### Second Award of \$1,500

MA022      **Continued Fractions and Orbits of a Linear Fractional Transformation**  
Shravani Mikkilineni, 17, Detroit Country Day School, Beverly Hills, Michigan

MA034      **The Blaschke-Lebesgue Problem Revisited**  
Mate Jozsef Bezdek, 16, Notre Dame High School, Calgary, Alberta, Canada

MA039      **Evolutionary Patterns in the Influenza A Hemagglutinin Protein that Support Interspecies Transmission: A Bioinformatics and Computational Approach**  
Kevin Kyle Hawkins, 16, Glen Oak High School, Canton, Ohio

### Third Award of \$1,000

MA010      **On the Reducible Quintic Complete Base Polynomials**  
Alex Hao Chen, 17, York High School, Yorktown, Virginia

MA028      **Symmetric Algebras: The New Approach**  
Mikhail S. Shkolnikov, 16, Center of Mathematical Education, Saint-Petersburg, Russia

MA040      **Circuits Over Sets of Natural Numbers**  
Jason Saul Gross, 16, Commack High School, Commack, New York

MA042      **Eisenstein Prime Magic Square**  
Sarah Lee Sellers, 17, Hedgesville High School, Hedgesville, West Virginia

### Fourth Award of \$500

MA003      **Number Grid Potential**  
Clara Livingston Bailin, 16, Little Rock Central High School, Little Rock, Arkansas

MA011      **Quantitative Evaluation of Cancer Complexity: A Study of Fractal Morphometry, Year Two**  
Samuel Irvin Kornicks, 16, Vero Beach Senior High School, Vero Beach, Florida

MA031      **Description of the Identity Basis of Indicator Bernside Semigroups**  
Sergey V. Bakulin, 17, Centre of Mathematical Education (LCME), Saint-Petersburg, Russia

MA044            **Computing Perfect Numbers: The Search for Even and Odd Perfect Numbers**  
Vanessa Rivera-Quinones, 17, Escuela Especializada University Gardens,  
San Juan, Puerto Rico

MA046            **Restrictions and Generalizations on Comma-Free Codes**  
Alexander Lee Churchill, 18, Lincoln East High School, Lincoln, Nebraska

## Medicine and Health Sciences - Presented by Intel Foundation

Intel will present Best of Category Winners with a \$5,000 award and an Intel® Centrino™ Duo Mobile technology-based notebook 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

ME054            **Alternative Splicing Defects Linked to Amyotrophic Lateral Sclerosis**  
Alicia Marie Darnell, 17, Pelham Memorial High School, Pelham, New York

### First Award of \$3,000

ME031            **Genomic Strategy to Refine Prognosis and Treatment of Early Stage Colon Cancer**  
Shivani Sud, 17, Charles E. Jordan Senior High School, Durham, North Carolina

ME054            **Alternative Splicing Defects Linked to Amyotrophic Lateral Sclerosis**  
Alicia Marie Darnell, 17, Pelham Memorial High School, Pelham, New York

ME091            **Chains of Infection: A Sexual-Network-Based Model Evaluating the Impact of Human Papillomavirus Vaccination on Infection Prevalence in an Adolescent Population**  
Katie Elizabeth Everett, 18, Huron High School, Ann Arbor, Michigan

### Second Award of \$1,500

ME027            **Designing Adeno-Associated Virus Type 2 Nanoparticles as Multivalent Contrast Agents for Diagnostic Imaging**  
Kshitij A. Desai, 16, Michael E. DeBakey High School for Health Professions,  
Houston, Texas

ME033            **The Effect of Extracellular Signaling Molecules on Oligodendrocyte Differentiation, Morphology, Proliferation, and Survival**  
Jourdan Brandt Urbach, 16, Roslyn High School, Roslyn Heights, New York

ME041            **Identification of the Molecular Targets Affecting the Action of Amphetamine in the Dopaminergic Pathway**  
Charlie L Xie, 16, Martin Luther King Jr. Magnet, Nashville, Tennessee

ME043            **Effects of Epigallocatechin-3-Gallate on Inhibition of Metastatic Behavior of Prostate Cancer Cell Line PC-3**  
Hang Richard Zou, 18, Albuquerque Academy, Albuquerque, New Mexico

ME070            **Programming a Network Approach to Contain the Spread of Epidemics, Second Year Study**  
Nolan M.K. Kamitaki, 15, Waiakea High School, Hilo, Hawaii

ME075 **Multi-Modal Imaging Probes for in vivo Detection of Lymphoid Cancers**  
Zachary Jason Stauber, 17, Mira Loma High School, Sacramento, California

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

ME009 **Alleviating Diabetes Problems: Theoretical Treatments, Insulin Resistance, and Nanotube Devices, Year Three**  
Jared David Scholato, 17, Cocoa Beach Junior/Senior High School, Cocoa Beach, Florida

ME020 **Reaction Time to Touch Stimuli vs. Body Location**  
James Arthur Iocozzia, 17, Sherwood High School, Sandy Spring, Maryland

ME022 **Fractal Dimension of Fetal Monitor Tracings Revisited: Toward Development of Real-Time Measurement**  
Connor Gordon Mulcahy, 16, Whitewater High School, Whitewater, Wisconsin

ME036 **Investigating the Potential Implication of Mesenchymal Stem Cells in Vascular Calcification Through Exposure to Cardiovascular Risk Factors**  
Lia D'Abate, 17, The Sacred Heart School of Montreal, Montreal, Quebec, Canada

ME049 **The Role of Akt/PKB in the Regulation of Cholinergic Gene Expression by NGF**  
Sonia Vikram Shah, 17, Lecanto High School, Lecanto, Florida

ME061 **A Novel Anti-Microbial Bone Graft Comprising Microencapsulated Antibiotic within a Degradable Polymer Coating**  
David Christopher Evans, 16, Hillcrest High School, Midvale, Utah

ME072 **Identification of an Early Detection Method for Ovarian Cancer Utilizing the Honeybee (*Apis mellifera*) Olfactory System**  
Rajiv Jaisimha Iyengar, 16, Bellarmine Preparatory High School, Tacoma, Washington

ME087 **Survivin Correlates with Prognosis and Inhibits Drug-induced Apoptosis in Ewing Sarcoma Family Tumors**  
Sappho Zoe Gilbert, 18, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia

**Fourth Award of \$500**

ME017 **What Is that You're Putting in Your Baby's Mouth? The Effects of Bisphenol A from Polycarbonate Plastics on *Lumbriculus variegatus***  
Chace Daniel Carver, 16, Merino Junior-Senior High School, Merino, Colorado

ME021 **Development of Multimodal Confocal Microscopy to Enable Rapid Assessment of Skin Cancer Excisions during Mohs Micrographic Surgery**  
Billy Huang, 17, Bronx High School of Science, Bronx, New York

ME023 **The Effect of Myeloperoxidase on Myocardial Infarction and Survival in ApoE/SR-BI Knockout Animals**  
Suzanne Bobby Mazhuvanchery, 18, Hathaway Brown School, Shaker Heights, Ohio

ME024 **Green Tea's Anticancer Effect on SK-MEL-2 Human Melanoma**  
Chenguang Mu, 17, Ballard High School, Louisville, Kentucky

- ME035      **Analysis of Antibacterial Properties of Honey from the Genus Apis**  
Bora Kang, 17, Union Grove High School, McDonough, Georgia
- ME037      **Repair of Laser-Damaged Retina by Autologous Transplanted BDNF Gene Mesenchymal Stem Cells in vivo**  
Xingru He, 18, Shanghai High School International Division, Shanghai, China
- ME052      **The Molecular Analysis of the p53 Gene in the Buccal Mucosa of Smokers and Nonsmokers: A Second Year Study**  
Sanjeethan Christopher Baksh, 15, Lancaster Catholic High School, Lancaster, Pennsylvania
- ME058      **The Killing Game: Copper—A Possible Bactericide for Contact Surfaces**  
Michael Thomas Stockwell, 18, Tuscumbia High School, Tuscumbia, Missouri
- ME062      **Visual Adaptation to Low Light Levels: A Study of the Factors that Affect the Rate of Adaptation**  
Katie Joan Nix, 16, Grove High School, Grove, Oklahoma
- ME065      **Desert Desiccant: Low Humidity Therapy for Arthritis Pain Relief?**  
Mary Lucia Leone Hedberg, 16, North Attleborough High School, North Attleboro, Massachusetts
- ME069      **I Have Seen the Light, Two! A Model for Calculation of Treatment Time for Photodynamic Therapy**  
Romita Sur, 15, Hillfield-Strathallan College, Hamilton, Ontario, Canada

## Microbiology - Presented by Intel Foundation

Intel will present Best of Category Winners with a \$5,000 award and an Intel® Centrino™ Duo mobile technology-based notebook 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

- MI034      **Engineering a Novel Gram-Negative Effective Efflux Pump Inhibitor**  
Eric Nelson Delgado, 18, Bayonne High School, Bayonne, New Jersey

### First Award of \$3,000

- MI017      **Identification of Three New Target Genes for Malaria Vaccine Development by Differential Gene Expression Profiling**  
Benjamin Uri Hoffman, 16, Georgetown Day School, Washington, District of Columbia

- MI034      **Engineering a Novel Gram-Negative Effective Efflux Pump Inhibitor**  
Eric Nelson Delgado, 18, Bayonne High School, Bayonne, New Jersey

### Second Award of \$1,500

- MI004      **Synergistically Reversing Oxacillin-Resistance in MRSA by Inhibiting mecA Gene Product (PBP2a)**  
Maryam Khadijah Mohammed, 17, Niceville High School, Niceville, Florida

- MI030      **RpoN Regulon in the Virulence of a Cystic Fibrosis (CF) Pathogen**  
Chen Sun, 15, A B Lucas Secondary School, London, Ontario, Canada
- MI047      **Evolution of Marine Cyanobacteria in the Red Sea**  
Kevin Huang Lin, 17, Falmouth High School, Falmouth, Massachusetts
- Third Award of \$1,000**
- MI013      **The Effect of the S2 Pyocin on the Growth and Biofilm Formation of *Pseudomonas aeruginosa***  
Lindsey Elizabeth Hastings, 16, duPont Manual High School, Louisville, Kentucky
- MI016      **The Effect of UV-C Irradiation on the Growth and Survival of *Bacillus subtilis* Endospores and Vegetative Cells: Limitations Imposed on Panspermia by Solar Radiation**  
Parker Denys Vascik, 17, Roanoke Valley Governor's School/ Cave Spring, Roanoke, Virginia
- MI025      **The Effect of Clodronate on Conjugative Tetracycline Resistance Plasmid Transfer between *Escherichia coli* and *Salmonella typhimurium***  
Aaron Christopher Ramsey, 18, Jefferson Forest High School, Forest, Virginia
- MI038      **Study of 5FOA-Resistant Mutants in *Schizosaccharomyces pombe***  
Catherine Anna Hoffman, 17, Hamilton-Wenham Regional High School, South Hamilton, Massachusetts
- MI039      **Effects of *V. cyanococcus* on *E. coli* Biofilms and Morphology**  
Lauren Elizabeth Blake, 17, Hopkinton High School, Hopkinton, Massachusetts
- Fourth Award of \$500**
- MI003      **Isolating Honey Chemical Constituents Responsible for Anti-Microbial Properties**  
Nyssa Catherine Boyd, 18, Eastern High School, Pekin, Indiana
- MI015      **Rational Design of Novel Anti-HIV Peptides Containing Multi-Functional Domains**  
Na Xue, 17, Midwood High School at Brooklyn College, Brooklyn, New York
- MI033      **Effects of Water Quality on the Propagation and Growth of *Batrachochytrium dendrobatidis***  
Scott Paul Boisvert, 14, Basha High School, Chandler, Arizona
- MI035      **Evaluation of *Burkholderia pyrrocinia* (FL728) and *Paenibacillus lentimorbus* (FL97) for the Presence of *Bacillus subtilis* Antibacterial Genes**  
Stephanie Page Hoskins, 15, Lincoln Park Academy High School, Fort Pierce, Florida
- MI040      **Can We Trace Plant Pathogenic Bacteria? The Stability of pUC Origin Fluorescent Plasmids in *Pectobacterium* spp.**  
Woonjung Hur, 17, Korean Minjok Leadership Academy, Hoengseong, Gangwon, South Korea
- MI051      **Antibiotic Properties of *Protosnea poeppigii***  
Rocio Pellegrino Vidal, 18, Escuela de Nivel Medio Nuevos Horizontes, El Bolson, Rio Negro, Argentina

## Physics and Astronomy - Presented by Intel Foundation

Intel will present Best of Category Winners with a \$5,000 award and an Intel® Centrino™ Duo Mobile technology-based notebook 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**

PH020      **Great Balls of Fire II**  
Caroline Julia von Wurden, 16, Los Alamos High School, Los Alamos, New Mexico

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

PH020      **Great Balls of Fire II**  
Caroline Julia von Wurden, 16, Los Alamos High School, Los Alamos, New Mexico

PH042      **Rotation Curves in Five Dimensions**  
David Alex Rosengarten, 18, John L. Miller Great Neck North High School,  
Great Neck, New York

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

PH001      **A Quantum Computational Approach to the Atomic Many-Body Problem**  
Yale Wang Fan, 16, The Catlin Gabel School, Portland, Oregon

PH029      **Dancing Water Droplets**  
Te Hsin Tsui, 18, National Hsinchu Girls' Senior High School, Hsinchu,  
Taiwan, Chinese Taipei

PH040      **New Components in Accretion Disks: Evolution of the Lightcurve in WZ Sge**  
Matthew James Walentosky, 17, Oil City High School, Oil City, Pennsylvania

PH044      **Novel Characterizations of the Static and Kinetic Behavior of Liquid Marbles:  
A Potential Utility in Digital Microfluidics?**  
Nilesh Tripuraneni, 17, Clovis West High School, Fresno, California

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

PH013      **Low-Cost Total Internal Reflection Fluorescence Microscopy**  
Harikrishna Rallapalli, 16, Amador Valley High School, Pleasanton, California

PH015      **Detection of Biomolecules via Coupling of Type-I and Type-II Quantum Dots**  
Erin Zeqja, 17, Townsend Harris High School, Flushing, New York

PH028      **Correlation between Thermal Behavior and Molecular Network in Rubber**  
Yun-Chu Wang, 17, Taipei Municipal First Girls' Senior High School,  
Taipei, Chinese Taipei

PH049      **Temperature Dependent Diffusion Tensor Property of Porcine Cervical Spinal  
Cord Using DT-MRI**  
Oliver Barrom Jeong, 17, West High School, Salt Lake City, Utah

PH063      **A Study of Chaotic Behavior Utilizing the Non-Ohmic Properties  
of the P-N Junction**  
Michael Anthony Batista, 18, Melbourne Central Catholic High School,  
Melbourne, Florida

**Fourth Award of \$500**

- PH002      **Fabrication and Characterization of an Ionic Polymer Metal Composite Treated with Various Counter Ions**  
Malone Russell Locke, 15, Trinity Catholic High School, Ocala, Florida
- PH007      **Design and Construction of an Imaging Prism Spectrometer**  
Dominik Schubert, 17, Maria-Theresia-Gymnasium Munchen, Munchen, Bayern, Germany
- PH014      **What's Today's Forecast? High Energy Protons: An Investigation to Find the Predictability of High Energy Protons Emitted by X-Ray Solar Flares, and to Predict the Resulting Proton Density**  
Sophia Marie Mitchell, 16, duPont Manual Magnet High School, Louisville, Kentucky
- PH017      **The Study of Symbiotic Star BF Cygni**  
Lubomir Urbancok, 18, Gymnazium Filakovo, Filakovo, Slovakia
- PH030      **SQIF Setup for Measurements of Extremely Low Absolute Magnetic Fields**  
Anne Yuri Polyakov, 18, Ward Melville High School, East Setauket, New York
- PH039      **Correlations between Intergalactic Light and Super Massive Black Holes Shed Light on Galaxy Collisions in Compact Clusters**  
Keith Austin Hawkins, 16, GlenOak, Canton, Ohio
- PH046      **Intensity and Temperature Variance in Sonoluminescence**  
Lyric Elizabeth Gillett, 16, Cornerstone High Homeschool, Houston, Texas

**Plant Sciences - Presented by Intel Foundation**

Intel will present Best of Category Winners with a \$5,000 award and Intel® Centrino™ Duo Mobile technology-based notebook 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**

- PS028      **Risk Assessment of Bt Transgenic Brassica: Effect on Target and Nontarget Insects and Use of SSR Molecular Markers to Assess Cross-Compatibility and Outcrossing Potential of Brassica Accessions**  
Hemali Chandramohan Batra, 17, Central Campus, Des Moines, Iowa

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

- PS028      **Risk Assessment of Bt Transgenic Brassica: Effect on Target and Nontarget Insects and Use of SSR Molecular Markers to Assess Cross-Compatibility and Outcrossing Potential of Brassica Accessions**  
Hemali Chandramohan Batra, 17, Central Campus, Des Moines, Iowa

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

- PS022      **Power of a Biological Control Agent: Biological Compensation Suppression of *Convolvulus arvensis* Implementing Host-Specific *Aceria malherbae*: Phase IV**  
Kaitlyn Jeanne Lingos, 18, Branson High School, Branson, Colorado

PS026      **Anti-aging Effect and Its Mechanisms of the Extract of *Celastrus orbiculatus***  
Xuefei Bai, 17, NO.2 High School Attached to East China Normal University,  
Shanghai, Shanghai, China

PS033      **Towards Nitrogen-Fixing Symbioses without Mutual Consent: The Impact of  
Carbon Limitation on Endophytic Infection of Maize**  
Sushant Sundaresh, 18, The Harker School, San Jose, California

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

PS003      **Examination of Defensive Odours of Some Mint Family Plants**  
Marton Spohn, 18, Fazekas Mihaly Secondary Grammar School, Budapest, Hungary

PS008      **No Place to Hide: Mixed Nodules May Not Be a Refuge for Non-fixing  
Bradyrhizobium Mutants**  
Kyra Gene Underbakke, 18, Maranatha Christian Academy, Brooklyn Park, Minnesota

PS036      **Quantitative Proteomic Profiling of the Methyl Jasmonate Responsive Redox  
System in *Arabidopsis thaliana***  
Gordon Hirsch Wilson, 16, Spruce Creek High School, Port Orange, Florida

PS042      **Developing a System for the Effective Biosynthesis of Pharmaceuticals: A Novel,  
Plant-Based Approach via the Trichomes**  
Allan Jer-Yu Hsiao, 16, duPont Manual Magnet High School, Louisville, Kentucky

**Fourth Award of \$500**

PS015      **The Search for Genetic Links to Aluminum Tolerance in Various Varieties  
of *Triticum aestivum* L. by Use of the Hematoxylin Staining Method, A Four  
Year Study**  
Stacey Lee Vosters, 18, North Daviess High School, Elnora, Indiana

PS019      **Using Arugula to Manage the Northern Root-knot Nematode in Different Soil Types**  
Helen Yang, 17, Troy High School, Troy, Michigan

PS025      **Molecular and Cellular Responses under Hypoxic Stress in Rice Cultivars with  
Different Flooding Tolerance**  
Sonya Di-Chiao Juang, 17, Kaohsiung Municipal Girl's Senior High School,  
Kaohsiung, Chinese Taipei

PS030      **Soy Solution: Pre-Imbibitional Moisture Effects on the Injury Resistance  
of Soybeans**  
Joshua Kurt Segeren, 16, John McGregor Secondary School, Chatham, Ontario, Canada

PS040      **The Pesticidal Influence of Wildflowers on *Helianthus annuus***  
Emily Margaret Pankow, 18, Hankinson High School, Hankinson, North Dakota

## Team Projects - Presented by *Science News*

Intel will present Best of Category Winners with a \$5,000 award and an Intel® Centrino™ Duo Mobile technology-based notebook 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 Winners

- EN308      **Improving the Feasibility of Avalanche Gain X-Ray Detectors**  
Shai Matthew Chester, 17, Yeshiva University High School for Boys,  
New York, New York  
Elie Joshua Bochner, 18, Yeshiva University High School for Boys,  
New York, New York
- ME309      **Protection of Neurons Against Injury Using Neuroreceptor-Targeting Nanoparticles**  
Jared Vega Goodman, 17, Oak Hall School, Gainesville, Florida  
Jonathan Wang, 16, Oak Hall School, Gainesville, Florida

### First Award of \$3,000

- CH306      **Sylation of  $\alpha$ -Bromonitrocompounds: A New Approach for the Synthesis of Isoxazolines**  
Artem A. Zemtsov, 16, Moscow Chemical Lyceum #1303, Moscow, Russia  
Andrey A. Mikhaylov, 17, Moscow Chemical Lyceum #1303, Moscow, Russia
- CS310      **Developing Real-Time Visualization System of Physics Model**  
Maxim Gennadievich Gridnev, 17, Physical and Mathematical Lyceum #30,  
Saint-Petersburg, Russia  
Andrey Anatolievich Churinov, 16, Physical and Mathematical Lyceum #30,  
Saint-Petersburg, Russia  
Leonid Andreevich Mashinskiy, 16, Physical and Mathematical Lyceum #30,  
Saint-Petersburg, Russia
- EN303      **Nanofabrication with Focused Sunlight**  
Ye Zhao, 19, NUS High School of Mathematics and Science, Singapore, Singapore  
Weichao Zhai, 19, NUS High of Mathematics and Science, Singapore, Singapore
- EN308      **Improving the Feasibility of Avalanche Gain X-Ray Detectors**  
Shai Matthew Chester, 17, Yeshiva University High School for Boys,  
New York, New York  
Elie Joshua Bochner, 18, Yeshiva University High School for Boys,  
New York, New York
- ME309      **Protection of Neurons Against Injury Using Neuroreceptor-Targeting Nanoparticles**  
Jared Vega Goodman, 17, Oak Hall School, Gainesville, Florida  
Jonathan Wang, 16, Oak Hall School, Gainesville, Florida
- ME315      **Engineered Surfaces for Cell Differentiation and Biomineralization and Self Assembly of Fibrinogen Clots**  
Alexander Shlomo Ramek, 17, Hebrew Academy of the Five Towns and Rockaway,  
Cedarhurst, New York  
Adam C. Fields, 18, Jericho High School, Jericho, New York

- PS318            **Transforming *Ipomea batatas* via Direct Inoculation with *Agrobacterium Rhizogenes***  
 Leslie Marie Young, 16, Wentzville Holt High School, Wentzville, Missouri  
 Randall Scott Ray, 17, Wentzville Holt High School, Wentzville, Missouri
- Second Award of \$1,500**
- AS310            **The Genetic Variation within the Family of *Littorina saxatilis***  
 Johan Ingemar Bostrom, 19, Donnergymnasiet Gothenburg, Gothenburg, Sweden  
 Tobias Olof Hofving, 18, Donnergymnasiet Gothenburg, Gothenburg, Sweden
- BE308            **The Effects of SSRI Supplementation on the Formation of Conditional Long Term Memory in Dunce and Wild Type *Drosophila melanogaster***  
 Peter Hans Massey, 15, Manhasset High School, Manhasset, New York  
 Claire Elizabeth Drago, 16, Manhasset High School, Manhasset, New York
- BI303            **Biochemistry Action of the Spider Web of *Nephila clavipes* in the Haemostasia Process of *Lumbricus terrestris***  
 Alex Antonio Sanchez-Claudio, 17, Aurea E. Quiles Claudio High School, Guanica, Puerto Rico  
 Betsaira Sanabria-Rivera, 17, Aurea E. Quiles Claudio High School, Guanica, Puerto Rico
- BI304            **How to Obtain the Highest Yields of Diglycidyl Terephthalate and Diglycidyl Succinate Used for Building Biodegradable Scaffolds for Tissue Regeneration**  
 Le Hien Thi Phan, 17, Chamblee Charter High School, Chamblee, Georgia  
 Priscila Elena Llaverias, 17, Chamblee Charter High School, Chamblee, Georgia  
 Brian Gray Barnett, 18, Chamblee Charter High School, Chamblee, Georgia
- CH301            **Layered-Double Nickel Hydroxides as a Future of Alkaline Secondary Cells**  
 Vitaliy Mykhaylovych Klokun, 16, Chemical Ecological Liceum, Dnipropetrovsk, Ukraine  
 Maryna Yuriivna Meshkovych, 16, Chemical Ecological Liceum, Dnipropetrovsk, Ukraine
- CH303            **Synthesis, Characterization, and Application of  $[\text{Re}_6(\mu_3\text{-Se})_8(\text{PEt}_3)_{6-n}(\text{stpy})_n]^{2+}$  Rational Design and Synthesis of Precursors to Cluster Arrays by Photodimerization**  
 Eva Megan Nichols, 18, Catalina Foothills High School, Tucson, Arizona  
 Mary Xue Wang, 17, Catalina Foothills High School, Tucson, Arizona
- EE311            **21st Century Miracle Lock**  
 Tak Shing Lau, 14, Maryknoll Fathers' School, Hong Kong, Hong Kong  
 Tak Kin Lau, 15, Marknoll Fathers' School, Hong Kong, Hong Kong
- ET310            **Study of an Efficient Vertical Axis Windmill in a Light Wind: Development of a Variable Wing System Corresponding to the Wind Direction**  
 Daisuke Kiyomoto, 16, Nara Prefectural Oji Technical High School, Nara, Japan  
 Fumiya Yoshimura, 16, Nara Prefectural Oji Technical High School, Nara, Japan  
 Kazushige Taniguchi, 16, Nara Prefectural Oji Technical High School, Nara, Japan

- EV328      **Improved Exhaust System for Two-Stroke Engines: An Effective Way to Obtain Better Air Quality**  
Michael Kaergaard Madsen, 19, Vejle Technical High School, Vejle, Denmark  
Jesper Lykke Rasmussen, 19, Vejle Technical High School, Vejle, Denmark
- ME313      **Biosimulation of Avian Influenza: From Endemic to Pandemic**  
Alexander Chernyakhovsky, 16, William Mason High School, Mason, Ohio  
Tong Zhan, 15, William Mason High School, Mason, Ohio
- MI306      **A Novel Way of Producing Proteins Using ABC Transporter Protein Secretory Pathway in *Pseudomonas fluorescens*: Efficiency and Safety**  
Na Yeon Kim, 18, Korea Science Academy, Busan, South Korea  
Jung Min Ryoo, 18, Korea Science Academy, Busan, South Korea  
Hyunghoon Cho, 15, Korea Science Academy, Busan, South Korea
- PH303      **Development of Three Dimensional Photonic Integrated Circuits through a Bottom-Up Approach**  
Tinya Cheng, 17, Townsend Harris High School, Flushing, New York  
Nischay Kumar, 17, Townsend Harris High School, Flushing, New York
- PH304      **Creation of a Metropolitan Cosmic Ray Detector Array**  
Yvette Leung, 15, Jericho High School, Jericho, New York  
Pragya Kakani, 16, Jericho High School, Jericho, New York
- PS311      **Arbuscular Mycorrhizal Fungi in Southeast Alaska Muskegs**  
Joshua Tristan Vo, 17, Mount Edgecumbe High School, Sitka, Alaska  
Caleb John McGraw, 18, Mount Edgecumbe High School, Sitka, Alaska
- Third Award of \$1,000**
- AS302      **Impact of Dietary Restriction on Fecundity of *Drosophila melanogaster***  
Cole Taylor, 17, Episcopal High School, Jacksonville, Florida  
Micha'le Ricara Simmons, 18, Episcopal High School, Jacksonville, Florida
- BI309      **Kadok (*Piper sarmentosum*) as an Anti-Ulcerogenic Agent**  
Nur Farawahidah Mohd Yusof, 18, Tunku Kurshiah College, Seremban, Negeri Sembilan, Malaysia  
Fadhina Abdul Bashir, 16, Tunku Kurshiah College, Seremban, Negeri Sembilan, Malaysia  
Syahrina Hafiza Ahmad Salim, 18, Tunku Kurshiah College, Seremban, Negeri Sembilan, Malaysia
- CB302      **The Down-regulation of Complement Regulatory Protein CD59 and Anti-tumor Monoclonal Antibody Therapy**  
Melissa Hou, 16, duPont Manual High School, Louisville, Kentucky  
Ruowan Lucy Yan, 16, duPont Manual High School, Louisville, Kentucky
- CS311      **Extensible Environment for Cellular Automata Design**  
Michael V. Figurnov, 16, Lyceum of Information Technologies # 1533, Moscow, Russia  
Ruslan N. Bakeev, 17, Lyceum of Information Technologies # 1533, Moscow, Russia

- EA301      **An Examination of Chloride Deposition in Connate Water Isolated from Subterranean Rock Deposits in Oregon's Willamette Basin Comparatively Related to the Chloride Content of Present Day Ocean Water**  
Kerry Reid Streiff, 16, Oregon Episcopal School, Portland, Oregon  
Dennis Chen Shi, 16, Oregon Episcopal School, Portland, Oregon
- EE316      **On the Development and Construction of a Telepresence Amusement Park Ride**  
Jordan Shaquille Blyther, 18, W.J. Keenan High School, Columbia, South Carolina  
Baichard Ulrich Donald, 17, W.J. Keenan High School, Columbia, South Carolina  
Larry James Russell, 17, W.J. Keenan High School, Columbia, South Carolina
- EE317      **VSR-1: Talos**  
Adam Halverson, 16, Garretson High School, Garretson, South Dakota  
Anthony Paul Winterton, 17, Garretson High School, Garretson, South Dakota
- EM310      **The Biochemical Detoxification of Heavy Metals and Its Application to the Water-Soil Environment in the Agricultural Wetlands of the Pearl River Delta, China**  
Yang Guo, 18, Foshan NO.2 High School, Foshan, Guangdong, China  
Sisi Yu, 18, Foshan NO.2 High School, Foshan, Guangdong, China  
Junhong Wu, 19, Foshan NO.2 High School, Foshan, Guangdong, China
- EM314      **The Effective Nutrient Levels on the Bioremediation of Oil**  
Patrick Michael Jarvis, 17, Hopkinton High School, Hopkinton, Massachusetts  
Thomas Edward Coburn, 17, Hopkinton High School, Hopkinton, Massachusetts
- EM320      **Larvicidal and Insecticidal Properties of *Carica papaya* Leaf Extract Against Mosquitoes**  
Neha Avinash Kulkarni, 14, Modern English School, Mumbai, Maharashtra, India  
Divya Venkataraman, 14, Modern English School, Mumbai, Maharashtra, India
- EN304      **A Method for Fabricating Magnetic Powder Micro Magnets**  
Matthew Sterling Joubert, 16, Satellite High School, Satellite Beach, Florida  
Timothy Robert Joubert, 16, Satellite High School, Satellite Beach, Florida
- EN309      **Characterization of a Synthetic Microbial Pathway for the Production of Bioplastics**  
Shuo Cory Li, 18, North Carolina School of Science and Mathematics, Durham, North Carolina  
Mingjuan Lisa Zhang, 18, North Carolina School of Science and Mathematics, Durham, North Carolina
- EN312      **Remote Activated Chip-Based Drug Release System Using Nanoparticles as an Anti-Cancer Therapeutic**  
Sanchita Singal, 17, Herricks High School, New Hyde Park, New York  
Mili Mehta, 17, The Wheatley School, Old Westbury, New York  
Lara Arielle Fourman, 16, Plainview-Old Bethpage John F. Kennedy High School, Plainview, New York
- EN314      **Black Ice**  
Anna Lee Allcorn, 17, Olton High School, Olton, Texas  
Nicholas Flores, 18, Olton High School, Olton, Texas

- EN316      **Modification of Sunflower Stalk Extracts with Boric Acid and Their Usage as High Performance Insulation Material**  
Hasan Tahsin Azizagaoglu, 17, Private Cag Fatih High School, Istanbul, Turkey  
Alihan Zenginer, 16, Private Cag Fatih High School, Istanbul, Turkey
- EV327      **Optimization of Sustained Power Generation in Marine Sediment Microbial Photovoltaic Cells**  
Sumit Malik, 16, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia  
Joy Elisabeth Lee, 16, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia  
Phillip Thomas Grisdela, 17, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia
- MA308      **Chaos: An Analysis of Market Nonlinearity**  
Dhruv Kedar, 16, Chantilly High School, Chantilly, Virginia  
Shawn Mittal, 17, Chantilly high school, Chantilly, Virginia
- ME305      **Targeting the mTOR Pathway Enhances Chemosensitivity of Metastatic Melanoma to Paclitaxel**  
Gregory Thomas Kennedy, 18, Episcopal High School, Jacksonville, Florida  
William Powell Kennedy, 18, Episcopal High School, Jacksonville, Florida
- PS305      **The Water Extract of Alligator Weed Leaves Did Affect on the Seed Germination, Seedling Growth and Gene Expression of Rice**  
Jin-Ming Yang, 18, No.7 High School of Chengdu City, Chengdu City, Sichuan, China  
Wei-Xi Xiong, 17, No.7 High School of Chengdu City, Chengdu City, Sichuan, China
- PS307      **The Role of Calcium-Sodium Interactions in Promoting Salt-Tolerance in *Ceratopteris richardii* Wild-Type and STL2 Mutant**  
Christina Xiong, 17, Benjamin N. Cardozo High School, Bayside, New York  
Elizabeth Mary Whitman, 17, Benjamin N. Cardozo High School, Bayside, New York
- PS316      **Eco-Friendly Ink for Color Pens**  
Pooja Krishnakant Dholakiya, 14, Late Shree S.G. Dholakiya Memorial High School, Rajkot, Gujarat, India  
Riddhi Rajendrabhai Dasani, 14, Late Shree S.G. Dholakiya Memorial High School, Rajkot, Gujarat, India
- PS317      **Unfolding the Mystery of Tanglehead Grass Awn's Twisting Ability**  
Pradtana Chunhakhom, 18, Triam Udom Suksa School, Bangkok, Thailand  
Chaya Nimchinda, 18, Triam Udom Suksa School, Bangkok, Thailand  
Alisara Srinilta, 18, Triam Udom Suksa School, Bangkok, Thailand
- Fourth Award of \$500**  
AS301      **Determining Ploidy in *Diadegma insulare* Males Using Morphometrics**  
Emily Victoria Schock, 18, Lake Highland Preparatory School, Orlando, Florida  
Megana Sankaran, 17, Lake Highland Preparatory School, Orlando, Florida

- AS303      **Anthropogenic Influences on the California Sea Otter (*Enhydra lutris Nereis*) Population in Moss Landing Harbor**  
 Sanaya Raven Forbes, 16, San Lorenzo Valley High School, Felton, California  
 Emily Louise Dolson, 17, San Lorenzo Valley High School, Felton, California
- AS307      **Autotomy as a Means of Survival in the Sea Cucumber, *Holothuria glaberrima***  
 Luis Angel Rodriguez-Reyes, 17, Escuela Especializada University Gardens, San Juan, Puerto Rico  
 Eric Rafael Rodriguez-Reyes, 17, Escuela Especializada University Gardens, San Juan, Puerto Rico
- BE304      **A Discussion About Equality: A Gender Study in the Classroom**  
 Mary Alysandra Patzel, 18, West Salem High School, Salem, Oregon  
 Jessica Rae Cummins, 17, West Salem High School, Salem, Oregon
- BE306      **Alcohol Disruption: Associative Learning Paradigm and Decision Making Test in *Drosophila melanogaster***  
 Hector E. Acaron, 17, Academia del Perpetuo Socorro, San Juan, Puerto Rico  
 Juan Ramon Deliz, 16, Academia del Perpetuo Socorro, San Juan, Puerto Rico
- CH304      **FtsZ Inhibitors as Novel Chemotherapeutic Agents for Drug-Resistant Tuberculosis**  
 Amanda Eryn Marinoff, 17, Plainview-Old Bethpage John F. Kennedy High School, Plainview, New York  
 Janelle Schlossberger, 18, Plainview-Old Bethpage John F. Kennedy High School, Plainview, New York
- CS305      **Simulation of Traffic Problems**  
 Marta Gatti, 19, Liceo Scientifico Statale "Gaspare Aselli", Cremona, Italy  
 Bernard Karaj, 19, Liceo Scientifico Statale "Gaspare Aselli", Cremona, Italy  
 Michele Pisaroni, 19, Liceo Scientifico Statale "Gaspare Aselli", Cremona, Italy
- CS308      **The Design and Implementation of Practical Algorithms for Automatic Composite Photographs**  
 Ken Miura, 17, Shizuoka-Prefectural Hamamatsu-Kita High School, Sizuoka, Japan  
 Mami Inoue, 17, Shizuoka-Prefectural Hamamatsu Kita High-School, Shizuoka, Japan  
 Mayu Suzuki, 17, Shizuoka-Prefectural Hamamatsu Kita High-School, Shizuoka, Japan
- EE301      **Personal Automated Ethanol Fermenter and Distiller**  
 Eric Ernest Hodnefield, 18, Jackson County Central High School, Jackson, Minnesota  
 Devin Michael Bezdicek, 18, Jackson County Central High School, Jackson, Minnesota
- EE304      **Engineering a Modular Infrared Tracking Sensor for Use with the Foster-Miller TALON, a Man-Portable Reconnaissance Robot**  
 Matthew Hobart Fairbank, 18, Keystone School, San Antonio, Texas  
 Jonathan Michael Rodriguez, 18, Keystone School, San Antonio, Texas
- EE320      **The Ultimate Vest: The Enhancement of Ballistic Plate Dispersal of Ballistic Projectiles**  
 Stanley Chunwing Chu, 16, Dutchtown High School, Hampton, Georgia  
 Tyler Dean French, 17, Dutchtown High School, Hampton, Georgia  
 Kirby Ryan Knowles, 17, Dutchtown High School, Hampton, Georgia

- EM318      **Aquaponics: Utilizing Phytoremediation to Reduce Nitrogenous Wastes in an Ecosystem**  
Tina Anh Thu Nguyen, 15, President William McKinley High School, Honolulu, Hawaii  
Daniel Wing Wo Hong, 16, President William McKinley High School, Honolulu, Hawaii
- EM324      **Biodegradable Films**  
Sandra Hernandez Escoto, 18, Centro de Bachillerato Tecnologico industrial y de servicios, Cortazar, Guanajuato, Mexico  
Jesus Enrique Tovar Quintana, 17, Centro de Bachillerato Tecnologico industrial y de servicios 172, Cortazar, Guanajuato, Mexico
- ET307      **Soak Up the Sun: A Second Year Study on Nanofibers in Solar Cells Using Semiconductive Polymers**  
Eva May Ng, 15, Shepton High School, Plano, Texas  
Elisa Bisi Lin, 16, Shepton High School, Plano, Texas
- EV319      **Association of Cattle Feedlots with the Presence of Antibiotic-Resistant Bacteria in Pond Ecosystems**  
Caitlin Marie Bolender, 17, Billings Central Catholic High School, Billings, Montana  
Lauren Elizabeth Gunderson, 16, Billings Central Catholic High School, Billings, Montana  
Megan Alexa Sovitsky Levis, 16, Billings Central Catholic High School, Billings, Montana
- EV320      **Ozone Pollution: Are Inversions a Factor?**  
Candice Fay Schwartzenburg, 15, St. Joseph's Academy, Baton Rouge, Louisiana  
Lynne Olivier Chapman, 16, St. Joseph's Academy, Baton Rouge, Louisiana
- EV325      **Filtration of Oil Which Spilled into the Sea After a Tanker Accident from the Sea Water**  
Fadime Erdogan, 17, Ozel Yamanlar Koleji, Izmir, Turkey  
Esra Cikikci, 17, Ozel Yamanlar Koleji, Izmir, Turkey
- EV326      **Marsh Madness**  
Reid William D'Amico, 15, Hilton Head Preparatory School, Hilton Head Island, South Carolina  
Patrick Connor Andrews, 15, Hilton Head Preparatory School, Hilton Head Island, South Carolina
- MA303      **The Chaos Theory Exhibited in Non-Linear Oscillating Systems: The Double and Triple Pendulums**  
Danielle Louise Erhard, 17, Coon Rapids High School, Coon Rapids, Minnesota  
Audrey Louise Bennett, 17, Coon Rapids High School, Coon Rapids, Minnesota
- MA305      **Relationship Between the Constants a and n in Some Polar Equations**  
Liann Marie Marquez, 16, Francisco Morales High School, Naranjito, Puerto Rico  
Nydia Lopez, 17, Francisco Morales High School, Naranjito Puerto Rico, Puerto Rico
- ME320      **Optimized Cell Migration Across Functionalized Surfaces**  
Dhruv Nandamudi, 17, Monte Vista High School, Cupertino, California  
Daniel Jay Stemp, 17, North Shore Hebrew Academy High School, Great Neck, New York

- ME322      **Prevalence of Community-Acquired Methicillin-Resistant *Staphylococcus aureus* in Two Populations**  
 Serena Lorin Au, 17, Bellarmine Preparatory School, Tacoma, Washington  
 Jocelyn Aubrey Wu, 18, Bellarmine Preparatory School, Tacoma, Washington
- ME325      **Effects of Chinese Herbs on the Metabolism of Cholesterol and Glucose**  
 Norman Nuo Zeng, 17, Ann Arbor-Huron High School, Ann Arbor, Michigan  
 Maggie Yunting Zhang, 17, Ann Arbor Pioneer High School, Ann Arbor, Michigan
- MI305      **Herbal Inhibition of *Escherichia coli***  
 Roderick Darnell Johnson, 16, The Mississippi School for Mathematics and Science, Columbus, Mississippi  
 Boram Lee, 16, The Mississippi School for Mathematics and Science, Columbus, Mississippi  
 Huaiying Wang, 16, The Mississippi School for Mathematics and Science, Columbus, Mississippi
- MI309      **Got Yogurt? The Effects of the Type of Yogurt on the Amount of Probiotic Bacteria Colonies Cultivated**  
 Janet Zhou, 14, Shepton High School, Plano, Texas  
 Vybhavi Bharadwaj, 15, Shepton High School, Plano, Texas
- PS303      **Development of a Rapid Assay Test to Identify Potential Sources of Salt Tolerance in Wild Oregon Strawberry (*Fragaria sp.*) Populations**  
 Hanna Rose Lorenz, 17, Crescent Valley High School, Corvallis, Oregon  
 Robert Michael Livesay, 17, Crescent Valley High School, Corvallis, Oregon  
 Elliott Chad Finn, 16, Crescent Valley High School, Corvallis, Oregon
- PS306      **Pine Beetle Outbreaks: Spatial Analysis and Pheromone Population Control**  
 Anika Rose Petach, 16, Fairview High School, Boulder, Colorado  
 Tanya Nicole Petach, 14, Fairview High School, Boulder, Colorado
- PS315      **Integrated System for Irrigation and Protection**  
 Mohammad Ibrahim Alzorgan, 16, Altafilah School for Boys, Tafilah, Jordan  
 Abdel Rahman Ibrahim Mahmoud Alzorgan, 18, Altafilah School for Boys, Tafilah, Jordan