



Winner Announcement Intel ISEF 2012 Grand Awards Ceremony

May 18, 2012, Pittsburgh, Pennsylvania – Society for Science & the Public, in partnership with the Intel Foundation, announced Grand Awards of the Intel ISEF 2012. Student winners are ninth through twelfth graders who earned the right to compete at the Intel ISEF 2012 by winning a top prize at a local, regional, state or national science fair.

The Gordon E. Moore Award

The Gordon E. Moore Award recognizes the Best of the Best of Category among the outstanding students from around the world who participate in the Intel ISEF. The finalist with the winning project is selected on the basis of outstanding and innovative research, as well as on the potential impact of the work-in the field and on the world at large.

Gordon E. Moore Award \$75,000

ME028

A Novel Paper Sensor for the Detection of Pancreatic Cancer

Jack Thomas Andraka, 15, North County High School, Glen Burnie, Maryland

Intel Foundation Young Scientist Award

These Finalists were selected for their commitment to innovation in tackling challenging scientific questions, using authentic research practices, and creating solutions to the problems of tomorrow.

Young Scientist Award of \$50,000

CS049

Apodora: Markov Chain-Inspired Microsearch

Nicholas Benjamin Schiefer, 17, Holy Trinity School, Richmond Hill, Ontario, Canada

PH033

Analysis of Photon-Mediated Entanglement between Distinguishable Matter Qubits

Ari Misha Dyckovsky, 18, Loudoun County Academy of Science, Sterling, Virginia

The award is disbursed in four 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.

Dudley R. Herschbach SIYSS Award

All-expense-paid trip awarded to three Intel ISEF finalists to attend the Stockholm International Youth Science Seminar (SIYSS) (www.fuf.org/siyss), which includes attendance at the Nobel Prize ceremonies in Stockholm, Sweden. The Dudley R. Herschbach SIYSS Award 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. A valid passport required for travel.

- CH042 **Visible Light Deoxygenation**
Raghavendra Ramachanderan, 17, St. John's International Residential School, Chennai, Tamil Nadu, India
- EM039 **Euglena: The Solution to Nanosilver Pollution**
Adam Joel Noble, 18, Lakefield District Secondary School, Lakefield, Ontario, Canada
- PS038 **Root Nutrient Foraging: A Morphometric Approach to Quantifying the Developmental Plasticity Space of Arabidopsis Ecotypes in Laboratory and Natural Environments**
Huihui Fan, 17, Stuyvesant High School, New York City, New York

The SIYSS will be held in Stockholm, Sweden in December. Winning projects will be chosen from the natural sciences categories (biology, chemistry, environmental sciences, and medicine). Students must have a valid passport and be 18 years old prior to the Nobel ceremony in December 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 Dudley R. Herschbach, Harvard Professor and 1986 Nobel Laureate in chemistry. He is Emeritus Chair of the Board of Trustees at Society for Science & the Public.

European Union Contest for Young Scientists

An all expense paid trip enables attendance at the European Union Contest for Young Scientists, located in a new city each year.

Trip to the EU Contest

- CB001 **Towards the Cure: Abnormal Protein Interactions between Amyloid Beta and Tau as a Therapeutic Target for Alzheimer's Disease**
Raghav Tripathi, 16, Westview High School, Portland, Oregon
- EE034 **Design and Creation of Small Wind-Power Engines for Low Wind Speeds Based on Magnus Effect**
Assiya Kussainova, 16, Specialized School for Gifted Children Daryn, Karagandy, Kazakhstan
- EV006 **An Experimental Study of the Impact of Target Volatile Organic Compound (VOC) Emissions on Lung Health PLUS a Novel Risk Assessment Model to Predict Their Effect on the Peak Expiratory Flow Rate (PEFR); and the Development of a New VOC Adsorption Filter**
Naomi Chetan Shah, 16, Sunset High School, Portland, Oregon

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.

Animal Sciences - Presented by Intel

Intel will present Best of Category Winners with a \$5,000 award. 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

AS045 **Transcriptional Changes in *Borrelia burgdorferi* that Cross the Blood Brain Barrier in Neurological Tick-Borne Lyme Disease**
Lucy Michelle Hritz, 16, Villa Joseph Marie High School, Holland, Pennsylvania

First Award of \$3,000

AS012 **Repelling Effect of Plant Extracts on Bees-A Study on Preventing Bees from Pesticide Toxicity**
YiHua Xu, 19, Bengbu No.3 High School, Bengbu, Anhui, China

AS045 **Transcriptional Changes in *Borrelia burgdorferi* that Cross the Blood Brain Barrier in Neurological Tick-Borne Lyme Disease**
Lucy Michelle Hritz, 16, Villa Joseph Marie High School, Holland, Pennsylvania

Second Award of \$1,500

AS013 **A Study of the Endogenous Activity Rhythms of the Marine Isopod *Exosphaeroma truncatitelson***
Sasha Carmen Holloway, 15, Springfield Convent School, Cape Town, Western Cape, South Africa

AS021 **Identification of Ocellar Developmental Genes in *Drosophila***
Tyng-Shiuan Hsieh, 17, Taipei First Girls High School, Taipei City, Chinese Taipei

AS052 **Effect of Food Types on Quantity and Nutritional Quality of Weaver Ant, *Oecophylla smaragdina*, Larvae**
Kitthanaet Thanaroungrochthawee, 18, Kanthararom School, Kanthararom District, Sisaket, Thailand

AS311 **Effects of Siamese Snail (*Cryptozona siamensis*) on Natural Rubber Coagulation**
Jatuporn Chaweeapak, 17, Suratpittaya School, Suratthani, Thailand
Nattapong Chinnara, 17, Suratpittaya School, Suratthani, Thailand
Nantakan Longlod, 17, Suratpittaya School, Suratthani, Thailand

Third Award of \$1,000

AS006 **Investigation *Rhacodactylus gecko* Adhesion Using Computer Image Analysis**
Holly Jeanne Flann, 17, InTech Collegiate High School, North Logan, Utah

AS022 **We Come in Peace! *Orconectes rusticus* Displays Minimally Aggressive Behaviors When Competing with Appalachian Crayfish in Mesocosms**
Vincent Jacob O'Leary, 16, Wheeling Central Catholic High School, Wheeling, West Virginia

- AS025 **A Behavioral Comparison of Laboratory Reared Stock and Recently Captured Fruit Flies (*Drosophila melanogaster*) Using Upward Movement, Phototactic, and Starvation Assays**
Trinity Russell, 16, Commack High School, Commack, New York
- AS038 **Identification of *Drosophila melanogaster* Gustatory Receptor 23a (gr23a) Response in Olfaction and Gustation for Potential Insect Repellent Synthesis**
Anirudh Chandrashekar, 16, Jericho High School, Jericho, New York
- AS050 **The Global Invasion and Settlement of the Japanese Oyster, *Crassostrea gigas*: Assessing the Oyster as a Bio-engineer-and Its Potentially Harmful Influence**
Kei Landin, 19, Kitas Senior High School of Natural Sciences, Gothenburg, Vastra Gotalands lan, Sweden
- AS056 **Influence of Different Ecosystems on Reproduction of the Red Mason Bee (*Osmia rufa L.*) on the Example of a Meadow, an Orchard, a Forest and an Arboretum**
Anna Julia Kusnierczak, 18, Liceum Ogolnoksztalcece sw. Marii Magdaleny, Poznan, Poland
- Fourth Award of \$500**
- AS011 **The Effects of Round-Up® and Its Components on *Palaemonetes paludosus* through Various Means of Exposure**
Emily Catherine Seitz, 18, Melbourne Senior High School, Melbourne, Florida
- AS020 **What Stinks?**
Terrence A. Price, 17, Eleanor Roosevelt High School, Greenbelt, Maryland
- AS036 **The Effect of Pesticides on the Learning Capabilities of *Planaria***
Christina Yah-yun Lee, 16, Sherando High School, Stephens City, Virginia
- AS041 **The Effect of Coprophagous Beetles (*Coleoptera: Scarabaeidae, Geotrupidae, and Hydrophilidae*) on Methane Emission Rates from Cattle Dung and a Six-month Species Composition Survey of Coprophagous Beetles in Lake City, Michigan**
Rachel Joy Rounds, 16, Mecosta-Osceola Math/Science/Technology Center, Big Rapids, Michigan
- AS043 **Differences in the Primary Songs of Blue-gray (*Traupis episcopus*) and Palm Tanagers (*Traupis palmarum*): Consequences for Hybridization**
Jonathan Michael Galka, 15, North Broward Preparatory School, Coconut Creek, Florida
- AS301 **Energy Square for Cattle**
Mahnoor Hassan, 17, Institute of Computer and Management Sciences, Peshawar, Khyber Pakhtunkhwa, Pakistan
Shiza Gulab, 17, Institute of Computer and Management Sciences, Peshawar, Khyber Pakhtunkhwa, Pakistan
Bushra Shahed, 17, Institute of Computer and Management Sciences, Peshawar, Khyber Pakhtunkhwa, Pakistan

- AS303 **Parasites Inside Thorns: Morphological and Genetic Characterization of the Crab *Pinnaxodes chilensis***
 Javier Romanos Zambrano, 16, Instituto Inmaculada Concepcion Valdivia, Valdivia, Region de Los Rios, Chile
 Mariana Larroulet Santander, 17, Instituto Inmaculada Concepcion Valdivia, Valdivia, Region Los Rios, Chile
- AS305 **Investigating the Spread of the Influenza A Virus: A Phylogenetic Analysis of the H1N1 Subtype**
 Surya Narayanaraju Bhupatiraju, 16, Lexington High School, Lexington, Massachusetts
 Hao Shen, 16, Lexington High School, Lexington, Massachusetts

Behavioral and Social Sciences - Presented by Intel

Intel will present Best of Category Winners with a \$5,000 award. 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

- BE021 **OMG: Look Who Joined Facebook! The Relationship between Parenting and Adolescent Risk Behaviors**
 Benjamin Jake Kornick, 17, Roslyn High School, Roslyn Heights, New York

First Award of \$3,000

- BE021 **OMG: Look Who Joined Facebook! The Relationship between Parenting and Adolescent Risk Behaviors**
 Benjamin Jake Kornick, 17, Roslyn High School, Roslyn Heights, New York

- BE046 **Characterizing the Behavior and Genetics of Headplugging in *C. elegans***
 Mimi Yen, 17, Stuyvesant High School, New York, New York

Second Award of \$1,500

- BE001 **Analyzing the Effectiveness of the Projective Inkblot and Multiple Intelligences Test Correlation in a Clinical Setting**
 Katlyn Marie Firkus, 18, Rockdale Magnet School for Science and Technology, Conyers, Georgia
- BE005 **A Psychophysiological Analysis of Sonification Comprehension: A Fourth Year Study**
 Neel S. Patel, 17, Oviedo High School, Oviedo, Florida
- BE023 **Optogenetic Interrogation of Prefrontal Cortex Dopamine D1 Receptor-Containing Neurons as a Technique to Restore Timing: A Novel Approach to Treat Prefrontal Disorders**
 John Edward Solder, 18, Staples High School, Westport, Connecticut
- BE032 **Boosting the ADHD Brain: Effects of Gum Chewing and Caffeine on Cognition and Memory in Adolescents with ADHD**
 Zarin Ibnat Rahman, 15, Brookings High School, Brookings, South Dakota
- BE038 **Predicting Real World Characteristics from Virtual Behavior**
 Athman Ramana Adishesan, 15, Ramana Academy, San Jose, California

Third Award of \$1,000

- BE006 **A Spectrum of Triangulation: ADHD, Circadian Rhythmicity, and Bipolar Symptoms**
Travis Coleman Sigafos, 18, Champlin Park High School, Champlin, Minnesota
- BE028 **An Investigation of the Economic, Social, and Consequential Factors that Affect Moral Decision-Making: A Behavioral and fMRI Study**
Katherine Michelle Mangialardi, 18, Ossining High School, Ossining, New York
- BE029 **The Effect of Group Therapy on Communication in Aphasia**
Laura Marie Anderson, 18, Yorktown High School, Yorktown Heights, New York
- BE031 **The Effects of Mindful Decision Making on Post Decision Regret**
Emily Katherine Hu, 16, Lexington High School, Lexington, Massachusetts
- BE048 **Environmental Factors Influencing Post Stroke Recovery**
Jessica Sarah Lauren Garrett, 15, Telopea Park School, ACT, Australia
- BE301 **A Superior Brain-Computer Interface Paradigm for Communication in Normal and Aphasic Stroke Patients**
Kevin Daniel Shih, 16, Stanton College Preparatory High School, Jacksonville, Florida
Ryan Matthew Shih, 16, Stanton College Preparatory High School, Jacksonville, Florida
- BE314 **The Relationship between Impact Force, Neck Strength and Neurocognitive Performance in Soccer Heading**
Catherine Marie Conte, 17, Ossining High School, Ossining, New York
Adam Zachary Illowsky, 15, Ossining High School, Ossining, New York

Fourth Award of \$500

- BE014 **The Effect of Coffee Extract & Caffeine on the Locomotory Rate and Basal Slowing Response of a LRRK2 Transgenic Caenorhabditis elegans (G2019S Mutation) Model of Parkinson's Disease**
Megan Smith, 17, Shawnee Mission West High School, Overland Park, Kansas
- BE015 **Compilation of Social Media Political Conversations, Linguistic Twitter Profile Analysis, and Media Bias to Accurately Reflect Regional Political Climates**
Shawn David Meacham, 18, West Salem High School, Salem, Oregon
- BE017 **Utilization of Audio and Visual Prompting to Aid Dementia Patients with Daily Tasks**
Divya Koyyalagunta, 16, Clear Lake High School, Houston, Texas
- BE020 **Are Some Disabilities More Handicapping than Others? A Comparison of Teacher Grading of Children with Medical, Physical and Behavioral Disabilities**
Brett Evan Gossett, 18, John F. Kennedy High School, Bellmore, New York
- BE022 **The Effects of Multi-Talker Background Noise on Overt Spontaneous Speech Production**
Josh Feng, 16, Sheboygan North High School, Sheboygan, Wisconsin
- BE027 **Does Tetris Make You Smarter? A Longitudinal fMRI Study**
Courtney Kate Guo, 15, International School of Beijing, Beijing, China

- BE036 **Role of the Basal Forebrain in Mediating Selective Attention**
Apoorva Mylavarapu, 15, Torrey Pines High School, Encinitas, California
- BE039 **Differential Effects of Caffeine in Working and Reference Memory
on an Alzheimer's Model**
Leanna Lorraine Rivera, 15, Clint High School, Clint, Texas
- BE052 **Quantifying Implicit Stereotypes through the Cognition of Ambiguous Speech
Associated with Visual Meanings**
Nicholas Joseph Corpuz, 17, Academy for Math Engineering and Science, Murray, Utah

Biochemistry - Presented by Intel

Intel will present Best of Category Winners with a \$5,000 award. 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

- BI020 **The Membrane Mutational Effect Classifier (MMEC): A Novel Structure-Based
Approach to Predicting the Functional Effects of Mutations in Membrane Proteins**
Rebecca Faye Alford, 18, Commack High School, Commack, New York

First Award of \$3,000

- BI010 **Exploration of Antidiabetic Compound in Foxglove and Its Molecular Mechanism
of Action**
Peiyan Duan, 17, No. 2 Secondary School Attached to East China Normal University,
Shanghai, China

- BI020 **The Membrane Mutational Effect Classifier (MMEC): A Novel Structure-Based
Approach to Predicting the Functional Effects of Mutations in Membrane Proteins**
Rebecca Faye Alford, 18, Commack High School, Commack, New York

Second Award of \$1,500

- BI012 **Determination of Binding Energy Hotspots on a Broadly Neutralizing Antibody
Against HIV-1**
Nina Jessica Lu, 17, Montgomery Blair High School, Silver Spring, Maryland
- BI019 **DNA Repair Mechanisms: Investigations of Base Excision Repair Pathway in
Differentiated and Proliferative Neuronal CAD Cells**
April Pun, 17, Jericho High School, Jericho, New York
- BI027 **Novel Strategies for the PET Imaging of Colorectal Cancer Using the A33 Antibody**
Priya Mohindra, 17, Yorktown High School, Yorktown Heights, New York

Third Award of \$1,000

- BI003 **Smart Conotoxin Detection Kit Based on Novel Single-Chain Fragment
Variable Antibody**
Shengxing Yu, 17, Fuzhou No.1 Middle School, Fuzhou, Fujian, China
- BI018 **Life Is Short When Sweet: Dietary Fructose Decreases Lifespan and Fertility**
Alexandra Andreevna Sourakov, 16, Eastside High School, Gainesville, Florida

- BI031 **Correction of F508del-CFTR by the Small Molecule C18 and Its Synergy with Other Corrector Compounds**
Mu Xuan Zhang, 17, Bayview Secondary School, Richmond Hill, Ontario, Canada
- BI037 **Use of Titanium Dioxide Nanoparticles as a Novel, Inexpensive Alternative to Current Therapies for Leishmania Infection**
Brian Patrick Lei, 17, Arlington High School, LaGrangeville, New York
- BI301 **Improving the Life Conservation: New Purposes to Separate Lactobionic Acid and Sorbitol**
Eduardo Thadeu Rodrigues, 19, Fundacao Escola Tecnica Liberato Salzano Vieira da Cunha, Novo Hamburgo, Rio Grande do Sul, Brasil
Juliana Hoch, 18, Fundacao Escola Tecnica Liberato Salzano Vieira da Cunha, Novo Hamburgo, Rio Grande do Sul, Brasil

Fourth Award of \$500

- BI016 **Weaving Health: The Weaving of New Drugs from the Web Silk of Spiders, III**
Leonardo de Oliveira Bodo, 17, Colegio Dante Alighieri, Sao Paulo, Brasil
- BI026 **The Role of VEGF-R2 Regulation in VEGF's Vascular Effects in the Status Epilepticus Model**
Maite Angela Antola, 18, Ossining High School, Ossining, New York
- BI032 **Understanding the Pathogenesis of Acid-Resistant *E. coli*: Computational Modeling of pH-Dependent Conformational Changes in GadB**
Hannah Schaefer Kenagy, 18, Half Hollow Hills High School East, Dix Hills, New York
- BI039 **Medicinal Profiling of Colletotrichum boninense, a Fungal Endophyte Derived from Clermontia parviflora, an Endemic Hawaiian Plant**
Shalila Shek de Bourmont, 17, Hilo High School, Hilo, Hawaii
- BI040 **The Regulation of Length-Dependent Myosin Light Chain Phosphorylation in Bladder Smooth Muscle**
Alec Kaipo Takeshi Matsumoto, 17, Kamehameha Schools Kapalama High School, Honolulu, Hawaii
- BI041 **Synthesis of Trimethylguanosine Cap Analogues with the Potential Use in Gene Therapy**
Jakub Nagrodzki, 16, XXXIII Liceum Ogolnoksztalcace Dwujezyczne im. Mikolaja Kope, Warsaw, Mazowieckie, Poland

Cellular and Molecular Biology - Presented by Intel

Intel will present Best of Category Winners with a \$5,000 award. 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

- CB001 **Towards the Cure: Abnormal Protein Interactions between Amyloid Beta and Tau as a Therapeutic Target for Alzheimer's Disease**
Raghav Tripathi, 16, Westview High School, Portland, Oregon

First Award of \$3,000

CB001 **Towards the Cure: Abnormal Protein Interactions between Amyloid Beta and Tau as a Therapeutic Target for Alzheimer's Disease**
Raghav Tripathi, 16, Westview High School, Portland, Oregon

CB012 **A Prebiotic Thermally-Driven RNA Replication Mechanism**
Stanley Paul Palasek, 17, Sonoran Science Academy, Tucson, Arizona

Second Award of \$1,500

CB016 **The Missing Genome: Mitochondrial DNA Deletions in Stem Cells**
Joshua Abraham Meier, 16, Academy for the Advancement of Science and Technology, Hackensack, New Jersey

CB023 **Elucidating Pathways in Cancer Pathogenesis**
Nithin Reddy Tumma, 17, Port Huron Northern High School, Port Huron, Michigan

CB032 **A Microfluidic-Based Single Cell Analysis Identifies a Critically Depleted Vasculogenic Subpopulation in Diabetic Mesenchymal Stem Cells**
Shubha Srinivas Raghvendra, 18, Saint Francis High School, Mountain View, California

CB050 **Inhibiting Class A Scavenger Receptor in Antigen Facilitated Activation for the Development of a Novel Autoimmune Therapy**
Matthew Joseph Bruck, 18, Fox Lane High School, Bedford, New York

Third Award of \$1,000

CB021 **Human Mutations Associated with Heart and Pancreatic Disease Cause Adipogenesis Defects in Mice and in a Cell Culture Model**
Edgar Ferrer-Lorenzo, 17, East Chapel Hill High School, Chapel Hill, North Carolina

CB030 **Mast Cell Prevention of Life-threatening Blood Coagulation in Tissues: Trypsase-heparin Complexes Exocytosed from Activated Mast Cells Hinder Blood Coagulation Internally by Proteolytically Destroying Fibrinogen**
Dominick Zheng, 17, Boston Latin School, Boston, Massachusetts

CB037 **Combined Antitumor Effect of Cetuximab and Docosahexaenoic Acid in Squamous Cell Carcinoma of the Head and Neck**
Chareeni Eesha Kurukulasuriya, 17, Pittsburgh Allderdice High School, Pittsburgh, Pennsylvania

CB039 **Evaluating the Interaction between LRRK2 and N-MAP as a Pathway to Neuronal Degeneration in Parkinson's Disease**
Raymond Zhu, 17, Monte Vista High School, Danville, California

CB040 **Pancreatic Cancer Differentiation Markers Identify Risk Groups**
Ryan Dz-Wei Chow, 17, Leland High School, San Jose, California

Fourth Award of \$500

CB009 **Adipose Become Neurons with a Helping Hand from Nanog**
Jacob Kimmel, 18, Satellite High School, Satellite Beach, Florida

- CB024 **Inflammatory Impact of p38 Inhibition in Human Monocytes Infected with *Borrelia burgdorferi*, the Causative Agent of Lyme Disease**
Kathleen Rose Bashant, 18, Burnt Hills - Ballston Lake High School, Burnt Hills, New York
- CB033 **Interrogation of Cancer: Development of a Novel Biomarker Discovery Tool to Identify Clinical Signatures from Statistically Deconvoluted Expressions**
Natalie Ng, 16, Monta Vista High School, Cupertino, California
- CB045 **The Insufficiency of Biomarkers in the Identification of Breast Cancer Stem Cells: Hybrid Spheroids as an Alternative Assay**
Talal Syed, 17, The Bronx High School of Science, Bronx, New York
- CB046 **Bisphenol A (BPA) Promotes Adipogenesis in 3T3-L1 Cells**
Bansri Manesh Patel, 15, Sussex Technical High School, Georgetown, Delaware
- CB047 **Characterizing the Last Universal Common Ancestor of Life**
Justin Krish Williams, 17, Henry W. Grady High School, Atlanta, Georgia
- CB301 **Discovery of a Mechanism for the Glucocorticoid Chemotherapy Resistance in Cancer**
Benjamin Tyler Cobb, 18, Chantilly High School, Chantilly, Virginia
John Conor Moran, 18, Chantilly High School, Chantilly, Virginia

Chemistry - Presented by Intel

Intel will present Best of Category Winners with a \$5,000 award. 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

- CH042 **Visible Light Deoxygenation**
Raghavendra Ramachanderan, 17, St. John's International Residential School, Chennai, Tamil Nadu, India

First Award of \$3,000

- CH016 **The Electrochemical Effects of Saccharides on the Voltage Output of a Microbial Fuel Cell Using *Penicillium chrysogenum***
Jack Erdozain, Jr., 17, Westminster Christian School, Palmetto Bay, Florida
- CH042 **Visible Light Deoxygenation**
Raghavendra Ramachanderan, 17, St. John's International Residential School, Chennai, Tamil Nadu, India

Second Award \$1,500

- CH043 **Fabrication and Manipulation of One-Dimensional Photonic Crystals**
Michael Leonard Janner, 16, Redlands East Valley High School, Redlands, California
- CH301 **The Development of Novel Sutures that Store and Deliver Nitric Oxide for Wound Healing**
Kevin Anh Nguyen, 17, Plano East Senior High School, Plano, Texas
Punya Chittajallu, 16, Plano East Senior High School, Plano, Texas

- CH311 **Polyaniline Multi-detecting Toxic Gas Sensor**
 Kin Hong Yuen, 16, King's College, Hong Kong, Hong Kong
 Tsun Hong Wai, 19, King's College, Hong Kong, Hong Kong
 Edmond Yat Man Lui, 16, King's College, Hong Kong, Hong Kong
- CH312 **The New Magic Formula for Eliminating Bad Breath: C42H70O35**
 Gabriel Alexander Salg, 17, Hanns-Seidel-Gymnasium Hosbach, Hosbach, Bavaria, Germany
 Nicolas Christian Scheidig, 17, Hanns-Seidel-Gymnasium Hosbach, Hosbach, Bavaria, Germany
- Third Award of \$1,000**
- CH009 **Asymmetric Conjugate Addition of Ortho-Quinone Methides as a Pathway to the Core of Nomofungin**
 Joshua Moses Kubiak, 18, Louisiana School for Math, Science, and the Arts, Natchitoches, Louisiana
- CH010 **Carbon Nanotube Synthesis & Characterization, II**
 Neerja Aggarwal, 18, L.V. Hightower High School, Missouri City, Texas
- CH015 **Synthesis of Triazene Compounds and Their Application in Spectrophotometric Determination of Cadmium**
 Peter Horvath, 18, High School of Jan Chalupka, Brezno, Slovakia
- CH033 **Spectroscopic Characterization of the Reactivity of Substrate Water Molecules in Bio-inspired Catalysts for Water Oxidation**
 Aneesh Shah, 17, Half Hollow Hills High School East, Dix Hills, New York
- CH035 **Predicting Bandgap of Semiconductors to Synthesize the Most Efficient Solar Cell**
 Jennifer Lam, 18, Stuyvesant High School, New York, New York
- CH054 **Hydration and Photocatalytic Properties of Layered Perovskite Titanates**
 Iuliia Sokolova, 16, Anichkov Lyceum, St. Petersburg, Russia
- Fourth Award of \$500**
- CH007 **The Study of Conjugated Polymer Growth on Graphitic Surfaces and an Analysis of Their Interactions**
 Nicholas Anthony Buoniconti, 17, Lake Highland Preparatory School, Orlando, Florida
- CH008 **A Novel Microscale Spectrophotometric Assay to Monitor Hydrogen Evolution for the Characterization of Catalysts**
 Matthew Jay Goodman, 16, Liberal Arts & Science Academy, Austin, Texas
- CH025 **Synthesis and Analysis of Novel Phototriggers for Drug Delivery Systems**
 Sukjin Jang, 18, Commack High School, Commack, New York
- CH027 **N-Hydroxysuccinimide Ester of 4-pentynoic Acid: Bifunctional Reagent for the Synthesis of Neoglycoconjugates**
 Maria Panova, 17, Moscow Chemical Lyceum, Moscow, Russia

- CH032 **Computer-Aided Drug Discovery: Structure-Based Design and Evaluation of Small Molecule Botulinum Neurotoxin Inhibitors**
Sarah Rebecca Chapin, 17, Herricks High School, New Hyde Park, New York
- CH036 **Synthesizing Biogenic Compounds for the Sustainability of the Aqueous Suzuki-Mayura Reaction: A Novel Green Chemistry Approach**
Nayif Sohail Alhomoud, 18, Dhahran Ahliyya School, Dammam, Eastern, Saudi Arabia
- CH039 **Determining the Quantum Limit of Palladium and Gold Nanometallic Supercatalyst by Kinetic Method**
Mai-Anh Nguyen Vu, 16, McNeil High School, Austin, Texas
- CH040 **Polyoxovanadate-based Surfactants: The Search for an Effective Heterogeneous Catalyst**
Joy Yiran Wang, 16, Parkland High School, Allentown, Pennsylvania

Computer Science - Presented by Intel

Intel will present Best of Category Winners with a \$5,000 award. 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

- CS049 **Apodora: Markov Chain-Inspired Microsearch**
Nicholas Benjamin Schiefer, 17, Holy Trinity School, Richmond Hill, Ontario, Canada

First Award of \$3,000

- CS038 **Global Neural Network Cloud Service for Breast Cancer**
Brittany Michelle Wenger, 17, The Out-of-Door Academy, Sarasota, Florida
- CS049 **Apodora: Markov Chain-Inspired Microsearch**
Nicholas Benjamin Schiefer, 17, Holy Trinity School, Richmond Hill, Ontario, Canada

Second Award of \$1,500

- CS015 **Rootkit Detection via Kernel Monitoring**
Gregory Shika Bekher, 16, Chesapeake Science Point Public Charter School, Hanover, Maryland
- CS019 **Documents Confidential Cabinet Based on Mobile Phone Key**
BingChen Gong, 18, Middle School Attached to Northern Jiaotong University, Beijing, Beijing, China
- CS040 **Improving 3D Virtualization and Object Recognition in Real-Time Using Kinect Sensors**
Akash Krishnan, 17, Oregon Episcopal School, Portland, Oregon
- CS046 **Geolocation of Photographs by Horizon Matching with Digital Elevation Models**
Samuel Wye Pritt, 17, Pritt Home School, Walkersville, Maryland
- CS308 **Generalized Quantum Tic-Tac-Toe**
Ananya Kumar, 17, NUS High School of Mathematics and Science, Singapore
Yan Sheng Ang, 18, NUS High School of Mathematics and Science, Singapore

Third Award of \$1,000

- CS024 **Quantitative Modeling of Processing Cost and Energy Consumption for Cryptographically Enhanced Secure Internet Routing Protocol**
Vinay Kotikalapudi Sriram, 16, Poolesville High School, Poolesville, Maryland
- CS031 **IP Security: Improving the Border Gateway Protocol**
Andrew Luo, 15, York High School, Yorktown, Virginia
- CS052 **Navigation for the Visually Impaired**
Natalie Janet Nash, 17, Vincentian High School, Pittsburgh, Pennsylvania
- CS059 **Hands-Free Mouse Control Using Accelerometer Tilt**
Joseph Michael Malone, 18, Malone Homeschool, Edgewood, New Mexico
- CS064 **Real-Time Terrain Rendering with Dynamic Modification**
Varun Ramesh, 16, Hamilton High School, Chandler, Arizona
- CS305 **Webcam-based Fingertip Detection**
Nathanael Graham Christenson, 16, Chengdu International School, Chengdu, Sichuan, China
Luke Alexander Schuster, 15, Chengdu International School, Chengdu, Sichuan, China
Kevin Kaiyi Chow, 15, Chengdu International School, Chengdu, Sichuan, China
- CS309 **AVIO: Autonomous Vehicle for Independent Operations**
Patrick Marksteiner, 20, HTBLA Perg fur Informatik, Perg, Oberosterreich, Austria
Patrick Neulinger, 20, HTL (Hohere Technische Lehranstalt Perg), Perg, Upperaustria, Austria

Fourth Award of \$500

- CS004 **EMEPED 2: Software for Risk Assessment of Priority in the Pediatric Emergency**
Daniel Henrique Fiala, 19, Fundacao Escola Tecnica Liberato Salzano Vieira da Cunha, Novo Hamburgo, Rio Grande do Sul, Brasil
- CS013 **OpenCL Program that Utilises the Full Potential of Multiple Processors**
Henrik Bruesecke, 19, St. Columba's Comprehensive School, Glenties, Co. Donegal, Ireland
- CS020 **Weird Processing Units for New Programming and Applications**
Tomas Mariancik, 20, Stredni Prumyslova Skola Elektrotechniky, Informatiky a Reme, Frenstat pod Radhostem, Czech Republic
- CS025 **Hierarchical Automatic Image Based Human Age Estimation Using Relevance Vector Machine Regression and Multi-Classifer Fusion**
Pavleen Thukral, 17, Poolesville High School, Poolesville, Maryland
- CS048 **Caspar: A Natural Language Understanding Algorithm Based on Isomorphic Language Trees**
Sandro Alighiero Young, 17, Lisgar Collegiate Institute, Ottawa, Ontario, Canada
- CS051 **Modeling the Adaptive Venation Network of *Physarum polycephalum***
Hannah Louise Blumberg, 17, Paul D. Schreiber High School, Port Washington, New York

- CS056 **Evolving Chess Engines**
David L. Pan, 16, Canterbury School, Fort Wayne, Indiana
- CS062 **Novel Approach to Detection and Quantification of Malignant Biopsy Tissues by Image Analysis**
Onkar Singh Gujral, 15, La Martiniere For Boys School, Kolkata, West Bengal, India
- CS302 **Effective Prevention of Memory Error Exploitations through the Use of Memory Address Randomization**
Bailey Liao, 16, Half Hollow Hills High School West, Dix Hills, New York
Azaria Lev Zornberg, 16, Half Hollow Hills High School West, Dix Hills, New York

Earth & Planetary Sciences - Presented by Intel

Intel will present Best of Category Winners with a \$5,000 award. 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

- EA012 **A Geochemical and Geomicrobiological Examination of the Red Sea – Dead Sea Canal**
Mofeed Wael Sawan, 16, Oakridge Secondary School, London, Ontario, Canada

First Award of \$3,000

- EA012 **A Geochemical and Geomicrobiological Examination of the Red Sea – Dead Sea Canal**
Mofeed Wael Sawan, 16, Oakridge Secondary School, London, Ontario, Canada

Second Award of \$1,500

- EA003 **Using Resonance Frequency to Predict and Prevent Structural Failure**
Rohan Thakur, 17, Plano East Senior High School, Plano, Texas

Third Award of \$1,000

- EA014 **Developing a Parametric Model for Hurricane Wind and Storm Surge Prediction in the Gulf of Mexico**
Taide Ding, 17, Oxford High School, Oxford, Mississippi
- EA015 **A Device for Measuring the Vibrations and Earthquakes**
Mohamed Maamoon Sehimat, 16, Zaid Ben Hartheh, Al-karak, Al-Adnaniah, Jordan

Fourth Award of \$500

- EA010 **Morphological Disparity during the Ammonoid Recovery after the Permian Mass Extinction**
Rose Landis Leopold, 18, Pacific Collegiate School, Santa Cruz, California
- EA013 **Let There Be No Light! ESR Dating of the Quartz from the Bytham River Palaeochannel**
Edward Cho, 17, Stuyvesant High School, New York, New York

ENG: Electrical and Mechanical - Presented by Intel

Intel will present Best of Category Winners with a \$5,000 award. 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

EE034 **Design and Creation of Small Wind-Power Engines for Low Wind Speeds Based on Magnus Effect**
Assiya Kussainova, 16, Specialized School for Gifted Children Daryn, Karagandy, Kazakhstan

First Award of \$3,000

EE034 **Design and Creation of Small Wind-Power Engines for Low Wind Speeds Based on Magnus Effect**
Assiya Kussainova, 16, Specialized School for Gifted Children Daryn, Karagandy, Kazakhstan

EE060 **Real-Time Optical Ego-Motion Estimation through Robust Planar Tracking**
Christopher Stephen Nielsen, 18, Home School, Calgary, Alberta, Canada

EE326 **Desalination by Combining Solar Energy and Low Pressure Technique**
Trung Bach Tran, 17, Hanoi-Amsterdam High School, Hanoi, Vietnam
Vinh Anh Vu, 17, Hanoi-Amsterdam High School, Hanoi, Vietnam
Trang Thi Quynh Bui, 17, Hanoi-Amsterdam High School, Hanoi, Vietnam

Second Award of \$1,500

EE009 **Engineering an Inexpensive Mobile Electric Field Mill to Measure Changes in the Global Electric Circuit with the Goal of Tracking Global Climate Change**
Taylor Siobhan McCanna, 17, Breck School, Golden Valley, Minnesota

EE013 **Fine Motor Skills Using EEG Technology and Biomechanical Prosthesis**
Easton James LaChappelle, 16, Mancos High School, Mancos, Colorado

EE020 **RF Properties of Structured Thin Film Layers on Glass: Realization of Innovative Antennas**
Linn Bieske, 18, Goetheschule Ilmenau, Ilmenau, Thuringia, Germany

EE051 **RIIS-ED: Prototype of Wheelchair for Quadriplegic People Controlled by Neural Impulses**
Luis Gerardo Leon-Vega, 17, Colegio Jose Maria Gutierrez, Bagaces, Guanacaste, Costa Rica

EE064 **The Z-Engine: My Internal Combustion Rotary Engine with Only Four Moving Parts**
David Andrew Zarrin, 17, Saratoga High School, Saratoga, California

EE307 **Innovative Application of Facial Mask as Moisture Sensor for a Low Cost Debris Flow Warning System**
Jingjing Peng, 18, Chengdu Shude High School, Chengdu, Sichuan, China
Yuan Tian, 17, ChengDu ShiShi High School, Chengdu, Sichuan, China
Zhuoli Feng, 16, Chengdu No. 7 High School, Chengdu, Sichuan, China

EE309 **Ocular Computer Interface: Electrooculographic Eye Tracking with 6DOF Head Position Compensation**
David Alexandre Joseph Campeau, 16, Mayo High School, Rochester, Minnesota
Spencer August Berglund, 16, Mayo High School, Rochester, Minnesota

Third Award of \$1,000

EE007 **Wheelchair Controlled by Voice (CHAIRTEC)**
Richard Garre, 18, Instituto Tecnologico Superior Paysandu, Paysandu, Uruguay

EE025 **An Affordable Functional Prosthetic Hand**
Hearn Max Johnson, 18, Hoerskool Drie Riviere, Three Rivers, Guateng, South Africa

EE028 **Imbricated Compression Solar-Air Stirling Engine**
Cory Nicholson Owan, 17, Catalina Foothills High School, Tucson, Arizona

EE035 **Digital Leaf Color Chart**
Muhammad Luthfi Nurfakhri, 17, Bogor 1st State Senior High School, Bogor, West Java, Indonesia

EE042 **Direction Detection: A Novel Device for Detecting the Approach of Emergency Vehicles**
Kelles Diane Gordge, 17, Great Mills High School, Great Mills, Maryland

EE055 **Cooling without Electricity: Engineering a New Refrigerator**
Anish R. Athalye, 17, Massachusetts Academy of Math and Science at WPI, Worcester, Massachusetts

EE058 **Emergency Convulsive Seizure Detection and Notification System**
Richard Robert Housley, 17, Boston University Academy, Boston, Massachusetts

EE066 **High-Power, Frictionless Gear Reduction Using Magnetic Repulsion**
Jesse Samuel Martin, 18, Elizabethtown Area High School, Elizabethtown, Pennsylvania

EE080 **Intelligent Self-Sensing Composite Structures**
Abhishek C. Rajadas, 16, McClintock High School, Tempe, Arizona

EE303 **Autonomous Robotic System Engineered to Collect and Sterilize Microorganisms, Remove Allergens, and Monitor Environmental Conditions within Air Duct Systems**
Spencer Steven Tuttle, 17, Palm Bay High School, Melbourne, Florida
Dalton James Stanley, 17, Palm Bay High School, Melbourne, Florida
Zen River Campbell, 18, Palm Bay High School, Melbourne, Florida

Fourth Award of \$500

EE001 **An Innovative Method to Detect, Filter, Digitize, and Wirelessly Transmit Brainwaves to Control Electro-Mechanical Devices**
Rory G. Petersen, 13, Darnell-Cookman High School, School of the Medical Arts, Jacksonville, Florida

EE002 **A Novel Design for the Enhancement of Anti-Reflection in Crystalline Photovoltaic Cells**
William Yuan, 16, Westview High School, Portland, Oregon

- EE004 **An Amphibious Vehicle with Transformable Wheels**
Meilin Dong, 17, Beijing No.8 Middle School, Beijing, China
- EE015 **An Alternative Optical Analyzer II**
Nicholas Andrew McCoy, 17, Academy of Science and Technology, The Woodlands, Texas
- EE023 **Design and Analysis of a Fractal Antenna for Free OTA TV**
Sarah Elizabeth Van Sickle, 16, Satellite High School, Satellite Beach, Florida
- EE024 **Electricity-Independent, Life-Saving High-Rise Building Emergency Evacuator**
Andriy Sytnyk, 16, Netishyn Education Complex ôGeneral Secondary Education Scho, Netishyn, Khmelnytskyi, Ukraine
- EE027 **Holographic Light Filtering with Photovoltaic Concentrator Systems**
Ostin David Zarse, 16, Tucson High Magnet School, Tucson, Arizona
- EE032 **Automatic CPAP Hose & Mask Washer**
Andrew Gregory Przyjemski, 15, Governor Mifflin Senior High School, Shillington, Pennsylvania
- EE065 **The Synthesis of Quantum Dots for Application in Solar Cell Efficiency**
McKenna Pearl Duzac, 17, Oak Grove High School, San Jose, California
- EE079 **MARS ROVER SAMM**
Semen Tingishev, 16, Lyceum No. 110, Ekaterinburg, Russia
- EE302 **Alternative Kayaks: Design, Development, and Documentation**
Jeremy Michael Kuhn, 18, Southwest Virginia Governor's School, Pulaski, Virginia
Jiyun Nancy Chang, 18, Southwest Virginia Governor's School, Pulaski, Virginia
- EE304 **Technological Improvements on Aquaculture Facilities through a Fully Controlled Environment**
Martin Volpe, 18, Ingeniero Luis Augusto Huergo, Buenos Aires, Argentina
Sebastian Alonso, 19, Ingeniero Luis Augusto Huergo, Buenos Aires, Argentina
- EE322 **Reinventing the Wheel: The Omnidirectional Track System**
Andrew Kenneth Messing, 17, Hardin Valley Academy, Knoxville, Tennessee
Philip Christian Keller, 17, Hardin Valley Academy, Knoxville, Tennessee

ENG: Materials and Bioengineering - Presented by Intel

Intel will present Best of Category Winners with a \$5,000 award. 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

- EN015 **An Organic Thin Film Transistor and Elastic Organic Solar Cell Based Electronic Skin for Biochemical and Tactile Sensing**
Ryota Ishizuka, 18, Greenwich High School, Greenwich, Connecticut

First Award of \$3,000

- EN015 **An Organic Thin Film Transistor and Elastic Organic Solar Cell Based Electronic Skin for Biochemical and Tactile Sensing**
Ryota Ishizuka, 18, Greenwich High School, Greenwich, Connecticut
- EN022 **A New Frontier in Biomedical Engineering: Ex-situ Bioengineering of Hepato- & Neuro- Celloidosomes**
Samantha Marie Marquez, 16, Maggie L. Walker Governor's School for Government and International Relations, Richmond, Virginia

Second Award of \$1,500

- EN011 **The Use of an Inertial Electrostatic Confinement Fusion Reactor in Medical Treatment and Imaging**
William Wellborn Jack, 17, Hudson High School, Hudson, Ohio
- EN016 **Invention of the UView Protector: Reducing Your Risk of Skin Cancer**
Ethan Thomas Butson, 16, The Illawarra Grammar School, Mangerton, New South Wales, Australia
- EN021 **The Fabrication and Characterization of a High Permeability Iron- Nickel Thin Film Alloy for Giant Magneto Impedance Applications**
Harsha Sudarsan Uppili, 15, Oregon Episcopal School, Portland, Oregon
- EN028 **Effects of Polycaprolactone and UV Treated Poly (Methyl Methacrylate) Electrospun Fibers on Osteogenic Differentiation of Dental Pulp Stem Cells**
Manita Singh, 17, Canyon Crest Academy, San Diego, California

Third Award of \$1,000

- EN024 **Engineering a Novel Hydrogel Matrix for Bone Cell Regeneration**
Sneha Subramaniam, 18, Westborough High School, Westborough, Massachusetts
- EN035 **Application of a Novel Electrochemical Etching Method to Fabricate Nano-Scaled Probes for Functional Use in Scanning Probe Microscopy**
Hisham Khalid Al Falih, 18, Dhahran Ahliyya School, Dammam, Eastern, Saudi Arabia
- EN037 **Fabrication and Comparison of Plastic and Metal Ferroelectric Capacitors for Information Technology Applications**
Fatimah Ghassan Alajaji, 17, Alfaisaliah Islamic School for Girls, Alkhobar, Eastern, Saudi Arabia
- EN043 **Layer-by-Layer Self Assembly to Develop DNA Based Biomaterial for Fuel Cell Application**
Kimberly Renee McRae, 17, Spring Valley High School, Columbia, South Carolina
- EN048 **Analyses and Simulation of Human Skin Pigmentation Developing an Individual-based Model (IBM)**
Gloria Macia Munoz, 17, INS Escola Industrial d'Arts i Oficis de Sabadell, Sabadell, Barcelona, Spain

EN320 **Toward Artificial Endospores: Introducing Versatility and Functionality to Living Cells by Biomimetic Formation of SiO₂-TiO₂ Nanocomposite Shells**
Jimin Hwang, 16, Korea Science Academy of KAIST, Busan, South Korea
Yeonjung Yoon, 17, Korea Science Academy of KAIST, Busan, South Korea

Fourth Award of \$500

EN002 **Designing and Creating a Modular Concussion Detection and Alert System**
Ashton Rhys Wackym, 18, University School of Milwaukee, Milwaukee, Wisconsin

EN004 **Alumina Nanoparticle Mediated Pathways in Cancer Cells**
Amber Tang, 15, Lakeridge High School, Lake Oswego, Oregon

EN008 **Anti-bending Bionic Umbrella**
Xiuming Yu, 16, Senior High School Affiliated to Jiangsu Educational Institute, Nanjing, Jiangsu, China

EN013 **Get Your Head in the Game Again with ALARMS!**
Sara Bea Moore, 15, Great Mills High School, Great Mills, Maryland

EN017 **Design and Evaluation of a Cell-Phone Compatible Wireless Electrocardiograph**
Catherine Wong, 16, Morristown High School, Morristown, New Jersey

EN020 **The Ultimate Delivery Package: Implementing Composite Hydrogels for Use in Cell and Drug Delivery Applications**
Japbani Nanda, 17, Walter Tresper Clarke High School, Westbury, New York

EN032 **Heterologous Expression of Olefin Synthase Gene in *Escherichia coli***
Suman Gunasekaran, 17, James Madison Memorial Senior High School, Madison, Wisconsin

EN302 **Engineering an Optical Cell to Improve Lithium-ion Battery Safety**
Alejandro Jose Fenn, 17, Breck School, Minneapolis, Minnesota
William Andrew Engel, 18, Breck School, Golden Valley, Minnesota

Energy and Transportation - Presented by Intel

Intel will present Best of Category Winners with a \$5,000 award. 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

ET045 **Beyond the Nanostructure in Solar Cells**
Shyamal Buch, 16, Vista del Lago High School, Folsom, California

First Award of \$3,000

ET021 **Optimizing Algae Biofuels: Artificial Selection and Nitrogen Stress as Methods to Induce Lipid Synthesis**
Sara Ellen Volz, 16, Cheyenne Mountain High School, Colorado Springs, Colorado

ET045 **Beyond the Nanostructure in Solar Cells**
Shyamal Buch, 16, Vista del Lago High School, Folsom, California

Second Award of \$1,500

- ET026 **Polyvinylidene Fluoride (PVDF) Piezoelectric Generator: A Novel Approach to Harvesting Vibrations from Human Respiration to Power Biological Implant Devices**
Bridget Mary Oei, 16, East Catholic High School, Manchester, Connecticut
- ET048 **A Novel Solar Cell Combining Coordinated Metal Ion Substitution and Self-Assembly to Broaden the Absorption Spectrum and Efficiently Transform Light Energy into Electricity**
Nathan Sai Kondamuri, 17, Munster High School, Munster, Indiana
- ET054 **Algae to Oil in a Three Step Wet Process**
Evie Sobczak, 15, Shorecrest Preparatory School, St. Petersburg, Florida
- ET304 **A Study of Solar Paint**
Allison Rose Martin, 16, Academy of Science and Technology, The Woodlands, Texas
Toluwani Temiloluwa Soares, 16, The Academy of Science and Technology, The Woodlands, Texas
Shyamsunder Raghavan, 15, The Academy of Science and Technology, The Woodlands, Texas
- ET314 **Paper-like Photosynthetic Microbial Paper Fuel Cell**
Yiu Tak Wong, 15, The Chinese Foundation Secondary School, Hong Kong, Hong Kong
Chun Sang Pun, 16, The Chinese Foundation Secondary School, Hong Kong, Hong Kong
Yung Kin Samuel Tsui, 16, The Chinese Foundation Secondary School, Hong Kong, Hong Kong

Third Award of \$1,000

- ET010 **Optimization of a Dye-Sensitized Solar Cell**
Savannah Elizabeth Est, 16, Wentzville High School, Wentzville, Missouri
- ET029 **Algal Biofuels, Phase Three: A Quantitative Analysis of Algal Lipid Extraction Techniques and an Investigation into the Effect of Nitrogen Starvation on Lipid Yields and Acetyl Coenzyme A Carboxylase Levels in *Scenedesmus sp.***
Yanqi Chen, 17, Central York High School, York, Pennsylvania
- ET041 **Irradiation Based Single Stage Electro-Oxidation for Novel Enhancement of Direct Methanol Fuel Cells**
Dheevesh Arulmani, 16, Gordon Graydon Memorial Secondary School, Mississauga, Ontario, Canada
- ET055 **The Impact of Fungicides on Corn Growth and Ethanol Production**
Dre Erik Howard Steinwehr, 16, Hankinson High School, Hankinson, North Dakota
- ET058 **Wind: A New Spin on Things**
Caleb Kyle Meyer, 17, Hope-Page Public School, Hope, North Dakota

- ET308 **Au- and Pd-Nanoparticle Catalysts in Novel Nafion Composites for PEM Fuel Cell Power Enhancement**
 Matthew Rudin, 17, Half Hollow Hills High School West, Dix Hills, New York
 Hansen Qian, 17, Saratoga High School, Saratoga, California
 Yon Kyu Jang, 19, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia
- ET315 **Microfluidic Biodiesel Effectuator**
 Andy Law, 18, West High School, Salt Lake City, Utah
 David McKay Larkin, 18, West High School, Salt Lake City, Utah
- Fourth Award of \$500**
- ET002 **The Synthesis and Analysis of Various Sugar-Based Potassium Nitrate Rocket Propellants**
 Parth Chetan Thakker, 15, South Mecklenburg High School, Charlotte, North Carolina
- ET020 **Biodiesel Synthesis Using Waste Animal Adipose Tissue with Unconventional Catalysts and Small-dose Urea Cold Flow Improver**
 Ying Xiong, 16, Century High School, Rochester, Minnesota
- ET022 **Lithium-Ion Batteries for Electric Cars: A Study of Solid Electrolyte Interface Using Electrochemical Impedance Spectroscopy**
 Rohan Bodh Gupta, 15, Auburn High School, Auburn, Alabama
- ET027 **A Novel Method to Increase the Lipid Yield of *Chlorella vulgaris*: An Exploration of the Role of Cofactors on the Inhibition of Starch Synthase (E.C. 2.4.1.21)**
 Arrush Choudhary, 16, Chantilly High School, Chantilly, Virginia
- ET030 **The Effect of Electric Fields on Solar Power: Exploring a New Mechanism for Solar Cells**
 Kinga Janina Malkinska, 16, Benjamin Franklin High School, New Orleans, Louisiana
- ET035 **Design of a Home-Scale Biogas Digester/Microbial Fuel Cell System: Combining Alternative Energy Sources for Energy Independence**
 Katherine Rose Picchione, 17, Academy of the Holy Names, Albany, New York
- ET040 **Directing and Accelerating Natural Airflows to Increase Airfoil Circulation and Generate More Lift**
 Lauren Heather Reid, 16, O'Neill Collegiate & Vocational Institute, Oshawa, Ontario, Canada
- ET053 **A Study of the Practical Application of Non-equilibrium Plasma in Gas Turbine Engines to Enhance Combustion**
 Felipe Gomez del Campo, 18, Cypress Bay High School, Weston, Florida
- ET068 **Street Smart: Car Energy Harvesting Device**
 Eric A. Riehl, 17, Westminster Christian School, Palmetto Bay, Florida

Environmental Management - Presented by Intel

Intel will present Best of Category Winners with a \$5,000 award. 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

EM039 **Euglena: The Solution to Nanosilver Pollution**
Adam Joel Noble, 18, Lakefield District Secondary School, Lakefield, Ontario, Canada

First Award of \$3,000

EM003 **Improving Mine Reclamation through Continuing Innovation**
Travis Cole Sylvester, 18, Greybull High School, Greybull, Wyoming

EM039 **Euglena: The Solution to Nanosilver Pollution**
Adam Joel Noble, 18, Lakefield District Secondary School, Lakefield, Ontario, Canada

Second Award of \$1,500

EM011 **Pop Goes the Diesel: A Linoleic Acid/R. rhodochrous Mixture as a Bioremediation Agent of Diesel Contaminants in Contaminants in Saltwater and Freshwater Environments**
Morgan Walker Sinko, 17, John Jay Science and Engineering Academy, San Antonio, Texas

EM024 **Cutting Down Crude: An Ingenious Concept**
Justin Nicholas Krell, 15, Plankinton High School, Plankinton, South Dakota

EM033 **Improving Reverse Osmosis Membranes for Desalination: The Modification of Cellulose Nanofibers**
Rajkumar Shivraj Pammal, 16, Commack High School, Commack, New York

EM303 **'Polyfuel': A Novel Solution to Fuel Shortages and Disposal of ELPs**
Eoghan Thomas Flynn, 14, Blackwater Community School, Waterford, Munster, Ireland
Ruairi John O'Neill, 16, Blackwater Community School, Co. Waterford, Waterford, Ireland

Third Award of \$1,000

EM015 **Biodegradation of Toxic Dyes**
Vivienne Abigail Dames, 16, Victoria Girls' High School, Grahamstown, Eastern Cape, South Africa

EM020 **Tomato Induced DDT Disappearance**
William John O'Brochta, 18, Roanoke Valley Governor's School, Roanoke, Virginia

EM022 **Using Oxidation as a Advantage: Purifying Wastes and Producing Electricity**
Tushar Mittal, 15, Dutchtown High School, Hampton, Georgia

EM044 **The Impact of Varying Productivity Levels on Abundance and Feeding Patterns of Callinectes sapidus: What Does Blue Crab Behavior Tell Us About Wetlands Restoration?**
Jamie Rachel Odzer, 15, Dr. Michael M. Krop Senior High School, Miami, Florida

- EM048 **Treating Polluted Water and Oil Spillage by Cellulosic Waste**
Shui Yu Bertha Wong, 18, St. Paul's Convent School, Hong Kong, Hong Kong
- EM315 **Utility of a Transgenic *C. elegans* Matrix System as a Bioassay for Heavy Metal Pollution**
Christopher DiPreta, 16, Manhasset High School, Manhasset, New York
Sai Saravana Senthilkumar, 16, Manhasset High School, Manhasset, New York
- EM323 **Antileaks: A Device for Detection and Discontinuation of Leakages in Domestic Water Supply Systems**
Nerya Yair Stroh, 20, Torah & Science û Yeshivah High School at Machon Lev, Jerusalem, Israel
Gal Oren, 20, JCT Torah & Science Yeshiva High School, Jerusalem, Israel
- Fourth Award of \$500**
- EM002 **Increasing the Efficiency of Petrophilic Microbes**
Kern Khanna, 16, University School of Milwaukee, Milwaukee, Wisconsin
- EM007 **Feasibility Study of Utilizing Grass, Dandelions, and Leaves in Papermaking**
Lisa X. Fu, 15, John Marshall High School, Rochester, Minnesota
- EM010 **Duckweed's Salty: A Third Year Study of Duckweed and a Novel Approach to Desalination**
Sharjeel Ahmed Syed, 17, The National Society of Black Engineers, Converse, Texas
- EM021 **An Evaluation of Tannins and Their Metal Adsorption Properties for the Remediation of Wastewater**
Kirsten Rae Perry, 18, Elko High School, Elko, Nevada
- EM026 **Mycoremediation of PCB Soil Contaminants with *Pleurotus ostreatus***
Mallory Claire Madfes, 16, Greenwich High School, Greenwich, Connecticut
- EM029 **Biomining of Calcium-Based Plant Crystals as a Model for Phytoremediation**
Haley Roman Sproull, 17, Niles North High School, Skokie, Illinois
- EM031 **A Novel Apparatus for Catalytic Oxidation of Glycerol Produced During Biodiesel Synthesis**
Yohan Alexander Sumathipala, 17, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia
- EM037 **Flushed Away with Gray: The Gray Water Recycling Toilet**
Julia Spicer Knowles, 16, Massachusetts Academy of Math and Science at WPI, Worcester, Massachusetts

Environmental Sciences - Presented by Intel

Intel will present Best of Category Winners with a \$5,000 award. 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

EV006 **An Experimental Study of the Impact of Target Volatile Organic Compound (VOC) Emissions on Lung Health PLUS a Novel Risk Assessment Model to Predict Their Effect on the Peak Expiratory Flow Rate (PEFR); and the Development of a New VOC Adsorption Filter**
Naomi Chetan Shah, 16, Sunset High School, Portland, Oregon

First Award of \$3,000

EV006 **An Experimental Study of the Impact of Target Volatile Organic Compound (VOC) Emissions on Lung Health PLUS a Novel Risk Assessment Model to Predict Their Effect on the Peak Expiratory Flow Rate (PEFR); and the Development of a New VOC Adsorption Filter**
Naomi Chetan Shah, 16, Sunset High School, Portland, Oregon

EV019 **What Will Grow: Mining Reclamation-Establishing Plant Life on Abandoned Mine Site Waste Fields, II**
Serina Lee Pack, 17, Cliff High School, Cliff, New Mexico

Second Award of \$1,500

EV016 **Molecule Sorting and Highly Selective Methane Detector**
Zhendong Lei, 17, The High School Attached to Shanghai Normal University, Shanghai, China

EV020 **Macroinvertebrate and Nutrient Response to Stream Water Quality after a Wildfire in Medano Creek, Great Sand Dunes National Park & Preserve**
Tayler Ann Rocha, 16, Monte Vista High School, Monte Vista, Colorado

EV031 **Dig Deeper: Effect of Insecticides on Soil Components**
Eunice Linh You, 16, Laval Liberty High School, Laval, Quebec, Canada

EV047 **Acid Mine Drainage Remediation: A Novel Approach, Phase III**
John Tyler Barnes, 18, Northwestern High School, Kokomo, Indiana

EV306 **Mussels, a Natural Approach to Water Quality Improvement: Assessing the Impact of Environmental Factors on *P. americanus* and *G. demissa* Status in Long Island Bays and Applying *G. demissa* as Biofilters**
Ariane Elizabeth Papa, 18, Long Beach Senior High School, Lido Beach, New York
Jane Elizabeth Smyth, 18, Long Beach Senior High School, Lido Beach, New York

Third Award of \$1,000

EV005 **Bioremediation of Oil-Contaminated Water: Improved Delivery Mechanisms, Saline Impacts and Soil Interactions**
Jessica Fay Hunt, 18, Greybull High School, Greybull, Wyoming

EV026 **Enhanced Adsorption of Arsenic on Aquifer Solids and Soil, Phase II: Oxidative Treatment and Feasibility Assessment**
Jenna Reed Huling, 18, Ada High School, Ada, Oklahoma

- EV028 **Record Flood Impacts on Biodiversity in Upper Green River, Kentucky**
Aimee Michelle Turner, 17, Ballard High School, Louisville, Kentucky
- EV030 **Effect of Magnetic Fields on Viability of Cellular Structures**
Andrew Wei Chen, 14, Beaverton High School, Beaverton, Oregon
- EV050 **Home-Based Arsenic Bio-sand Water Filter Using Nanotechnology**
Thabit Farrukh Pulak, 16, Richardson High School, Richardson, Texas
- EV054 **Determining the Iron Concentration of Water Using Modern Technology:
How iOS Devices Can Indicate Water Quality**
Brandon Joseph Bocklund, 18, Battle Creek Area Math and Science Center, Battle Creek,
Michigan
- EV055 **Agro-Based Water Treatment for Rural Communities**
Benjamin Wong Ngie Xiong, 17, Sekolah Menengah Kebangsaan Batu Lintang,
Kuching, Sarawak, Malaysia
- Fourth Award of \$500**
- EV007 **Design and Fabrication of Fluorescent Silica Nanoparticle Based Probes for
Potential Detection of Toxic Heavy Metal Ions in Contaminated Drinking Water**
Rikhav Shah, 14, Lake Highland Preparatory School, Orlando, Florida
- EV009 **Determination of Rayleigh Scattering Measurements for Global Warming
Counteracting Atmospheric Aerosols R-14, HFC-125, HFC-216, HFC-227ea and
Halocarbon C-318**
Serena Zadoo, 18, L.C. Anderson High School, Austin, Texas
- EV021 **Big Business Environmental Impact: The Effects of Chlorinated Sugar in Water**
Lauren D. Walker, 17, Mid Buchanan RV, Faucett, Missouri
- EV032 **The Removal of Harmful Contaminants in Water
Using Low Temperature Microplasma**
Mervy Atif Michael, 18, Union City High School/ Academy For Enrichment and
Advancement, Union City, New Jersey
- EV043 **A Bioassay Method Using Bacterial Bioluminescence to Screen for Toxic Levels of
Chemical Water Contaminants**
Chengzhen Li Dai, 18, Detroit Country Day School, Beverly Hills, Michigan
- EV045 **Modeling Salinity to Evaluate Saltwater Intrusion: A Case Study of the
Loxahatchee River**
Christopher X. Wan, 16, Alexander Dreyfoos School of the Arts, West Palm Beach,
Florida
- EV303 **Assessing Oil Spill Cleanup: The Ecological Ramifications of Chemical Treatments**
Andrea Elise Green, 16, H-B Woodlawn Secondary Program, Arlington, Virginia
Catherine Rose Mitchell, 17, H-B Woodlawn Secondary Program, Arlington, Virginia

- EV309 **Utilization of Various Grades of Waste Paper for the Production of Ethanol and Bio-Products through Fermentation**
Vishal Reddy Nallanagulagari, 14, Upper Arlington High School, Upper Arlington, Ohio
Spandan Shah, 15, Upper Arlington High School, Upper Arlington, Ohio
- EV313 **Regenerating Coral Fragments on Bamboo Artificial Reefs**
Julian Paolo Talamera Biyo, 17, Philippine Science High School - Western Visayas Campus, Iloilo, Philippines
Paul Caesar Mason Flores, 16, Philippine Science High School- Western Visayas Campus, Iloilo, Philippines
Hazel Anne Jurado Hernandez, 16, Philippine Science High School - Western Visayas Campus, Iloilo, Philippines

Mathematical Sciences - Presented by Intel

Intel will present Best of Category Winners with a \$5,000 award. 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

- MA011 **Small Geometric Progressions Modulo N for Deterministic Polynomial Selection**
Aishwarya A. Vardhana, 17, Jesuit High School, Portland, Oregon

First Award of \$3,000

- MA011 **Small Geometric Progressions Modulo N for Deterministic Polynomial Selection**
Aishwarya A. Vardhana, 17, Jesuit High School, Portland, Oregon

- MA311 **(Almost) Unit-Distance Points in the Polychromatic Plane: Colorings of the n-Dimensional Space**
Fabian Henneke, 19, Kippenberg-Gymnasium, Bremen, Germany
Xianghui Zhong, 18, Kippenberg-Gymnasium, Bremen, Germany
Danial Sanusi, 19, Kippenberg-Gymnasium, Bremen, Germany

Second Award of \$1,500

- MA015 **Completing Graphs**
Katherine Leigh Cordwell, 16, Manzano High School, Albuquerque, New Mexico
- MA022 **Fractal Dimension Analysis to Predict Cancer**
Madhurima Das, 15, Plymouth High School, Canton, Michigan
- MA027 **Complexity of Interlocking Polyominoes**
Sidharth Dhawan, 18, Westview High School, Portland, Oregon

Third Award of \$1,000

- MA012 **Graph Theory and Locality Sensitive Hashing for DICOM Image Analysis**
Markus Robert Woltjer, 17, Wilsonville High School, Wilsonville, Oregon
- MA033 **A Unitary Group Relaxation of the Traveling Salesman Problem and Its Applications**
Anirudh Prabhu, 17, West Lafayette Junior/Senior High School, West Lafayette, Indiana

- MA034 **A Relationship between Quadratic Character and Repeating Decimals**
Junda Huang, 17, James Madison High School, Brooklyn, New York
- MA035 **Novel Optimized Runge-Kutta Methods to Increase Computational Accuracy in Numerical Integration of Differential Equations**
Pratheek Nagaraj, 18, Marjory Stoneman Douglas High School, Parkland, Florida
- MA037 **Novel Graph Theory Algorithms for Protein Structure Prediction and Design**
Jonah Milton Kallenbach, 17, Germantown Academy, Fort Washington, Pennsylvania

Fourth Award of \$500

- MA006 **Partially Conjugate-Permutable Subgroups and Their Applications**
Viachaslau I. Murashka, 17, Gymnasium No. 71, Gomel, Belarus
- MA023 **Classifying Generic Smooth Curves in the Projective Plane Related to Algebraic Curves of Degree 5**
Kevin Sherwin, 17, Roslyn High School, Roslyn Heights, New York
- MA032 **On Convexity-Preserving Set Structures**
Jeffery Brunson Holste, 17, Mills E. Godwin High School, Henrico, Virginia
- MA039 **Developing a Novel Test to Detect Cancer Genes from Microarray Data**
Shreya Mathur, 15, Oxford High School, Oxford, Mississippi
- MA305 **The s(n) Based One-Way Cripting Algorithm**
Gergo Kopenczei, 19, Bonyhadi Petofi Sandor Evangelical High School and Boarding School, Bonyhad, Hungary
Peter Enekes, 19, Bonyhadi Petofi Sandor Evangelical High School and Boarding School, Bonyhad, Hungary
- MA312 **Optimal Allocation of Global Constrained Resources Using the Hyperbolic Voronoi Diagram**
Caroline Jacqueline Shouraboura, 15, Forest Ridge School of the Sacred Heart, Bellevue, Washington
Shanthy Shanmugam, 17, Forest Ridge School of the Sacred Heart, Bellevue, Washington

Medicine and Health Sciences - Presented by Intel

Intel will present Best of Category Winners with a \$5,000 award. 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

- ME028 **A Novel Paper Sensor for the Detection of Pancreatic Cancer**
Jack Thomas Andraka, 15, North County High School, Glen Burnie, Maryland

First Award of \$3,000

- ME028 **A Novel Paper Sensor for the Detection of Pancreatic Cancer**
Jack Thomas Andraka, 15, North County High School, Glen Burnie, Maryland

ME047 **Spicing Up the Caspase Pathways: Novel Targeted Curcumin-Loaded Nanoparticles in Alzheimer's Treatment**
Aishwarya Raja, 17, Academy for Medical Science Technology, Hackensack, New Jersey

ME088 **Utility of the Spatial Peaks QRS-T Angle in Distinguishing Left Ventricular Hypertrophy from Athletic Heart Syndrome**
Kevin K. Lee, 15, University High School, Irvine, California

Second Award of \$1,500

ME003 **Identifying Novel Inhibitors of DNA Methyltransferase 1 as a Treatment for DNMT1 Overexpression Caused Tumors**
Alexander William Forsyth, 17, Episcopal School of Jacksonville, Jacksonville, Florida

ME006 **MITOCHONDRIA & ALZHEIMER'S: Modulating the GCLc Gene to Mitigate Redox Stress and ETC Complex Dysfunction**
Lisa P. Michaels, 16, Shepton High School, Plano, Texas

ME012 **Characterization of Cerebellar Phenotype in Mice with Mutated Rreb1**
Danielle Lyn Keahi, 18, Kamehameha Schools Kapalama High School, Honolulu, Hawaii

ME015 **How Inflammation Is Linked to Prostate Cancer (II): Novel Mechanism and Solution Targeting Cancer Stem Cells**
Diana T. Ruan, 15, Bellaire High School, Bellaire, Texas

ME046 **Dietary Alcohol Exposure Enhances Overgrowth Phenotypes Resulting from Disruption of the Hippo Pathway in *Drosophila melanogaster***
Anoj Ilanges, 18, Oceanside High School, Oceanside, New York

ME065 **Extracellular Histones Enhance LPS-Induced Cytokine Production**
Peter Zhou, 17, Jericho High School, Jericho, New York

ME303 **Novel Bioactivities and Mechanistic Insights of the Medicinal Fungus *Antrodia cinnamomea* against Human Breast Cancer Cells**
Tzu-Hsuan Su, 17, Taipei Municipal Chien-Kuo High School, Taipei City, Chinese Taipei
Kuang-Ming Shang, 17, Taipei Municipal Chien-Kuo High School, Taipei City, Chinese Taipei

Third Award of \$1,000

ME005 **An Ecological Management Research on Protection of Dung Beetles in Controlling Epidemic Disease in Affected Areas of Schistosome of the Dongting Lake of China**
Lingwei Xu, 17, Changjun Middle School, Changsha, Hu'nan, China

ME011 **Arterial Hemodynamics in Atherosclerosis Patients, a Mathematical Model**
Aprotim Cory Bhowmik, 15, Parkview High School, Lilburn, Georgia

ME039 **A Novel Use of AMD3100 as a Treatment for Metastatic Lung Cancer**
Brianna Pereira, 15, Bergen County Academies, Hackensack, New Jersey

- ME045 **Beta-catenin and E-cadherin: Novel Protein Biomarkers for Improved Diagnosis of Precancerous Lesions of the Cervix**
Ruchi Jayesh Shah, 17, Sachem High School North, Lake Ronkonkoma, New York
- ME061 **Assessing the Potential of Skin Derived Schwann Cells for Peripheral Nerve Remyelination**
Sarthak Sinha, 16, Henry Wise Wood High School, Calgary, Alberta, Canada
- ME063 **Citracil: The Anti-Colorectal Cancer Activity of an Essential Oil from Lemongrass**
Yichen Zhang, 16, Richmond Secondary School, Richmond, British Columbia, Canada
- ME067 **The Effect of Deer Antler on the Proliferation of Endothelial Cells in vitro**
Christina Ren, 15, Monte Vista High School, Danville, California
- ME084 **CCL2 Deficiency, BETA-Amyloidosis Acceleration and Neurocognitive Dysfunction in a Mouse Model of Alzheimer's Disease**
Mohit Jain, 17, Millard North High School, Omaha, Nebraska
- ME086 **Treatment of B-RAF(V600E) Colorectal Cancer**
Kay Yi Low, 17, Raffles Institution, Singapore, Singapore
- ME307 **Going Antiviral: An Evaluation of PI3 Kinase Inhibitor LY294002 as a Novel Class of Antiviral Drug**
David He Chen, 16, Little Rock Central High School, Little Rock, Arkansas
Alexander Zhang, 15, Little Rock Central High School, Little Rock, Arkansas

Fourth Award of \$500

- ME007 **All Clear of Nuclear? The Use of Antioxidants in Combating the Biological Effects of Nuclear Radiation**
Ahneesh Jayant Mohanty, 15, R.C. Clark High School, Plano, Texas
- ME008 **Cellular Therapy of Ovarian Cancer, Year Two: Impaired Cytokine-Induced Cytotoxic Activity of Mononuclear Cells from Ovarian Cancer Patients and Umbilical Cord Blood**
Collin Randall Edwards, 17, Lake Highland Preparatory School, Orlando, Florida
- ME025 **Synthetic Nanoparticle-Based Nanozymes for Pancreatic Cancer Therapy**
David D. Liu, 16, Eastside High School, Gainesville, Florida
- ME038 **Exogenous Retinoic Acid Supplements as a Novel Approach to Reduce the Negative Phenotypes of Fetal Alcohol Syndrome Using a Zebrafish Model of Development**
Ayana Jamal, 17, Niles North High School, Skokie, Illinois
- ME043 **Improving Cancer Therapy: A Novel Therapeutic Treatment Utilizing Cordycepin Synergy to Decrease Adverse Treatment Effects**
Jason Shao Cui, 16, Langley High School, McLean, Virginia
- ME064 **The Effects of Lycium barbarum on the Formation of Cataracts**
Christina Ding, 17, Sir John A. Macdonald Secondary School, Waterloo, Ontario, Canada

- ME081 **Optimization of Growth and Harvesting of *Bacillus sphaericus* and *Bacillus thuringiensis* for the Eradication of *Culex* genus Mosquito Larvae**
Shombit Roy Chaudhuri, 18, Unionville High School, Kennett Square, Pennsylvania
- ME092 **Why Organic? Organic vs. Non Organic Fruit's Effect upon *Drosophila melanogaster* Flies Reproduction with Implications on Human Health**
Arwa Akram, 18, Rutherford High School, Panama City, Florida
- ME093 **Cellular Pathways of Oxidation and Insulin Production in Type I Diabetic Beta Cells: What Mechanisms Does Rb2 Act through to Enhance Beta Cell Function?**
Wyatt Brody Horan, 17, The Wheeler School, Providence, Rhode Island
- ME099 **Surgeon Aid Device**
Radwan Mohamad Faisal El Othman, 17, Rawdat Al Fayhaa Secondary School, Tripoli, Lebanon
- ME302 **Carbonic Anhydrase IX Inhibitors: Discovery of Novel Therapeutic Cancer Agents**
Vanna Nga Hovanky, 16, James Bowie High School, Austin, Texas
Keyur Mayur Mehta, 17, Westlake High School, Austin, Texas
- ME309 **Linking Biomarkers to Behaviors for Novel Early Diagnosis, Treatment, & Prevention of Autism Spectrum Disorders**
Majd Abdulla Alabandi, 17, Dhahran Ahliyya School, Dammam, Eastern, Saudi Arabia
Saleem Abdulfattah Aldajani, 17, Dhahran Ahliyya School, Dammam, Eastern, Saudi Arabia
- ME314 **Tinnitus Masker Head-Set by Honeybee Magnetic Resonance**
Melek Danaci, 17, Kesan Anatolian Health Vocational High School, Edirne, Turkey
Betul Budun Budun, 17, Kesan Anatolian Health Vocational School, Edirne, Turkey

Microbiology - Presented by Intel

Intel will present Best of Category Winners with a \$5,000 award. 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

- MI023 **Investigating the Compatibility of Autoinducer Systems: One Molecule to Target Multiple Signal Transduction Pathways**
Felix F. Angelov, 18, Niles Township West High School, Skokie, Illinois

First Award of \$3,000

- MI023 **Investigating the Compatibility of Autoinducer Systems: One Molecule to Target Multiple Signal Transduction Pathways**
Felix F. Angelov, 18, Niles Township West High School, Skokie, Illinois

- MI041 **Creation of Alginate Microparticles as a Novel Drug Delivery Vehicle**
Melissa Rachel Fagan, 17, San Diego Jewish Academy, San Diego, California

Second Award of \$1,500

- MI022 **Novel Treatment Method of Biofilm-Involved *Staphylococcus epidermidis* Infection Through DNase I and Antimicrobial Combination Treatment**
Kevin Z. Xin, 17, Shanghai American School Puxi Campus, Shanghai, China
- MI030 **Irradiation Extermination, Part Three: A Portable System to Eliminate Waterborne Microorganisms**
Kelli Ann Lynch, 18, Rocky Mountain High School, Fort Collins, Colorado
- MI045 **Human Hemoglobin Polymorphisms Affect Recognition by *S. aureus* Receptor IsdB**
Jiahe Gu, 18, Martin Luther King, Jr. Magnet High School, Nashville, Tennessee
- MI311 **Saving Citrus Trees: Serological Detection of Bacteria Associated with Citrus Greening Disease, Year Two**
Nehaly Manoj Shah, 16, Martin Luther King High School, Riverside, California
Neera Manoj Shah, 16, Martin Luther King High School, Riverside, California

Third Award of \$1,000

- MI032 **Does Epstein-Barr Virus Play a Role in the Epidemic of Human Papilloma Virus Associated Head and Neck Cancers?**
Sean Jeffrey Nathan, 17, Caddo Parish Magnet High School, Shreveport, Louisiana
- MI035 **Effects of Green and Black Tea on the Growth and Viability of *Bacillus anthracis***
Shane David Falcinelli, 18, Middletown High School, Middletown, Maryland
- MI042 **Co-Inoculation of *S. oneidensis* and *G. sulfurreducens* for Novel Microbial Fuel Cell Enhancement**
Sruti Arulmani, 14, Glenforest Secondary School, Mississauga, Ontario, Canada
- MI044 **Bacterial Biofilms Are Influenced by Beta-Lactam Antibiotics**
Kathleen Rose Maguire, 18, Marlborough School, Los Angeles, California
- MI051 **The Effect of *Lactobacillus acidophilus* on the Survival and Motility of *Caenorhabditis elegans* against Pathogenic *Serratia marcescens***
Ananya Sureshkumar, 16, Biotechnology High School, Freehold, New Jersey
- MI308 **Isolation, Identification and Characterization of Endophytes from Cherokee Medicinal Plants: Yellowroot (*Xanthorhiza simplicissima*), Downy Rattlesnake Plantain (*Goodyera pubescens*), and Indian Tobacco (*Lobelia inflata*)**
Meredith Grace Tooley, 14, Brevard High School, Brevard, North Carolina
Erika Kate Williams, 17, Brevard High School, Brevard, North Carolina
Jenna Kristine Petterson, 17, Brevard High School, Brevard, North Carolina
- MI313 **Phosphate Solubilizing Action of *Bacillus subtilis* on bone meal: an eco-friendly bio-fertilizer for crop improvement**
Saral Baweja, 18, Maharaja Agarsain Public School, Delhi, India
Nishi Paliwal, 16, Maharaja Agarsain Public School, Delhi, India

Fourth Award of \$500

- MI003 **Utilizing the dgt Gene in . to Assess the Role of dGTP Pools in Mutagenesis: Possible Implications for Cancer and Virus Protection**
Maheetha Chandramouli Bharadwaj, 16, Thomas Jefferson School, St. Louis, Missouri

- MI012 **Characterization of the Relationship between Pseudomonas aeruginosa Acyl-homoserine Lactone Based Quorum Sensing and Innate Macrophage Function in vitro**
Spencer Michael Chang, 17, West Linn High School, West Linn, Oregon
- MI019 **Quantitative Polymerase Chain Reaction of Temporal Expression of Glucose Oxidase in Apis mellifera**
Corinne Marie Demler, 17, Pecatonica Area High School, Blanchardville, Wisconsin
- MI027 **Anti-Batrachochytrium dendrobatidis Bacterial Symbionts on Aneides aeneus Epidermal Tissue**
Sarah Katherine Johnson, 17, Brevard High School, Brevard, North Carolina
- MI028 **Cell Jamming: The Hydrolyzation of Dental Sealants during Biofilm Development and Inhibition of Quorum Sensing by Esculent Spices**
Azad Sunil Dhingra, 17, Springfield High School, Springfield, Ohio
- MI043 **Can Haloarchaea Replace Potassium for Cesium?**
Ha Young Shin, 18, Governor's School @ Innovation Park, Manassas, Virginia
- MI054 **A Comparative Study of the Antimicrobial Activity of Different Spices on the Shelf-Life of an Emergency Food Product**
Sarah Ariyan Sakha, 16, Xavier College Preparatory, Phoenix, Arizona
- MI303 **The Effects of Zinc Oxide Nanoparticles on Phenazine Production in Pseudomonas chlororaphis O6**
Jean-Luc Watson, 16, Logan High School, Logan, Utah
Tommy Fang, 16, Logan High School, Logan, Utah

Physics and Astronomy - Presented by Intel

Intel will present Best of Category Winners with a \$5,000 award. 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

- PH033 **Analysis of Photon-Mediated Entanglement between Distinguishable Matter Qubits**
Ari Misha Dyckovsky, 18, Loudoun County Academy of Science, Sterling, Virginia

First Award of \$3,000

- PH033 **Analysis of Photon-Mediated Entanglement between Distinguishable Matter Qubits**
Ari Misha Dyckovsky, 18, Loudoun County Academy of Science, Sterling, Virginia

- PH055 **A Novel Process for the Production of Medically Relevant Radioisotopes**
Taylor Ramon Wilson, 17, Davidson Academy of Nevada, Reno, Nevada

Second Award of \$1,500

- PH018 **A Generalized Holographic Model of Cosmic Accelerated Expansion**
Henry Wanjune Lin, 16, Caddo Parish Magnet High School, Shreveport, Louisiana

- PH022 **Building Bridges with Water: The Floating Waterbridge**
 Carolin Charlotte Lachner, 18, Hans-Thoma-Gymnasium, Loerrach, Baden-Wuerttemberg, Germany
- PH051 **Neuronal Nonlinear Dynamics: From an Optical Illusion to Parkinson's Disease**
 Sara Kornfeld Simpson, 15, Patrick Henry High School, San Diego, California
- PH063 **A Novel Universal Photon and Radioactive Beta Particle Detector: Multifunctionality Enabled by Wavefunction Engineering, Photomodulated Electron Tunneling, and Quantum Confinement of Charge Carrier Motion in Nanowires**
 Saumil Bandyopadhyay, 17, Maggie L. Walker Governor's School for Government and International Relations, Richmond, Virginia
- PH067 **Quantum Bridge**
 Armin Erik Tavakoli, 18, Kungsholmens Gymnasium/Stockholms Musikgymnasium, Stockholm, Sweden
- Third Award of \$1,000**
- PH026 **Characterizing the Effects of Asteroid Belt Perturbations on the Orbits of the Inner Planets**
 Nikita Michael Bogdanov, 18, Albuquerque Academy, Albuquerque, New Mexico
- PH034 **Inferring Shape and/or Attitude from Non-resolved Photometric Measurements of Geosynchronous Satellites**
 Travis Crockett, 18, V. Sue Cleveland High School, Rio Rancho, New Mexico
- PH038 **The Novel Determination of the Stopping Power and Other Characteristics of Quark Gluon Plasma Based on Several Jet Modification Measurements**
 Shannon Phelan Wetzler, 18, Kings Park High School, Kings Park, New York
- PH040 **Carbon Nanostructures via Dry Ice Exposed to High Temperature**
 Kevin Murray Frink, 17, Isaac Bear Early College High School, Wilmington, North Carolina
- PH042 **N-Body Computational Simulations of Planetesimal Agglomeration in Early System Gas Giant Formation**
 Ian A. Sohl, 17, DaVinci Academy of Science and the Arts, Ogden, Utah
- PH070 **Tribomagnetic Connection System**
 Tansel Baran Yasar, 18, Bahcesehir High School for Science and Technology, Istanbul, Turkey
- PH308 **Searching for Exomoons Orbiting Kepler Mission Exoplanets Using Transit Timing and Transit Duration Variation Signals**
 William Chan, 16, Syosset High School, Syosset, New York
 Hunter Dong, 16, Manhasset High School, Manhasset, New York
- Fourth Award of \$500**
- PH005 **Photometric and Spectroscopic Analysis for the Determination of Physical Parameters of an Eclipsing Binary Star System**
 Piper Michelle Reid, 15, Dripping Springs High School, Dripping Springs, Texas

- PH020 **Deuterium Fusion Using Inertial Electrostatic Confinement**
Michael Joseph Kovalchick, 17, Dallastown Area High School, Dallastown, Pennsylvania
- PH029 **PT-Symmetric Boundary Conditions in Quantum Mechanics**
Anirudh Dasarathy, 17, Hawken School, Gates Mills, Ohio
- PH035 **The Effect of Channel Geometry on Microfluidic Vortex Flow Inside of Droplets**
Vipul Anjan Nandigala, 14, Walled Lake Western High School, Walled Lake, Michigan
- PH037 **The Development of Low Voltage, Solid-State Plasma Focus Devices for Portable Radiation Sources**
Adam Joseph Bowman, 16, Montgomery Bell Academy, Nashville, Tennessee
- PH045 **Shining Like the Sun: A Novel Quantum Mechanical Approach to Property Analysis and Energy Efficiency Algorithm for White-Light LEDs**
Valerie S. Ding, 15, The Catlin Gabel School, Portland, Oregon
- PH060 **Amateur Laser Physics: Engineering Affordable Gas Lasers to Discover What Affects Output Power**
Joseph Patrick Lee, 15, Saint Peter's Academy, New Market, Alabama
- PH062 **Unidirectionalization of Particulate Distributions in Isotropic D+D -> He3+n Reactions Utilizing Differential Ion Velocities**
Benjamin Craig Bartlett, 17, Lexington High School, Lexington, South Carolina
- PH303 **Study of Techniques of Ring Electromagnetic Drive and Its Model Design**
Jiajun Cao, 17, High School Affiliated to Shanghai Jiaotong University, Shanghai, China
Wei Li, 16, High School Affiliated To Fudan University, Shanghai, China
Yifan Wu, 17, High School Affiliated to Shanghai Jiao Tong University, Shanghai, China

Plant Sciences - Presented by Intel

Intel will present Best of Category Winners with a \$5,000 award. 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

- PS038 **Root Nutrient Foraging: A Morphometric Approach to Quantifying the Developmental Plasticity Space of Arabidopsis Ecotypes in Laboratory and Natural Environments**
Huihui Fan, 17, Stuyvesant High School, New York City, New York

First Award of \$3,000

- PS038 **Root Nutrient Foraging: A Morphometric Approach to Quantifying the Developmental Plasticity Space of Arabidopsis Ecotypes in Laboratory and Natural Environments**
Huihui Fan, 17, Stuyvesant High School, New York City, New York

PS046 **Impact of Allelic Diversity of Wx and ALK Genes on the Nutritional Characteristics of Rice and the Evaluation of Rice Starch Biosynthesis in the Hybrid Y58S Male Sterile Breeding Line**
Pavane Lakshmi Gorrepati, 18, Rivermont Collegiate, Bettendorf, Iowa

Second Award of \$1,500

PS007 **Interactions between Piriformospora indica and Glomus intraradices on Maize**
Michael Allen Mann, 18, Westwood High School, Austin, Texas

PS031 **Mendel's Lentils: Identification and Analysis of the Zero-Tannin Gene in Lentil**
Rui Song, 16, Walter Murray Collegiate Institute, Saskatoon, Saskatchewan, Canada

PS043 **An Inquisition of Natural and Commercial Insecticides on Wheat**
Tanner John Coppin, 18, Hankinson High School, Hankinson, North Dakota

PS044 **Utilizing Assorted Monosaccharides from Foliar Application for Glycoside Linkage to Enhance *Triticum aestivum* Yields**
Jordan Ray Cadle, 17, Paoli Junior/Senior High School, Paoli, Indiana

Third Award of \$1,000

PS009 **Triforine Sensitivity in Lettuce, Year Two**
Aradhana Sinha, 15, Salinas High School, Salinas, California

PS026 **DNA-Binding Protein in Xcv Bacteria Manipulates Plant bHLH Gene to Promote Pathogen Growth during Infection: A Genetic Study**
Moniyka Sachar, 16, Irvington High School, Fremont, California

PS032 **Probing the Role of Nutrient Activity in Magnetically Induced Plant Growth**
Lilia Tchavdarova Popova, 16, Ann Arbor-Huron High School, Ann Arbor, Michigan

PS034 **Effect of Primary Light on Photosynthetic Pigments, Absorption, and Reproduction of Anabaena, After Being Returned to White Light for Multiple Generations**
Jacob Norman Pardee, 18, Carter County High School, Ekalaka, Montana

PS303 **The Selection of Submergence-tolerant Germplasms and Expression Analysis of the Related Genes under Submergence Stress at the Seed Germination in Rice**
Hang Gao, 17, Hubei Wuchang Experimental High School, Wuhan, Hubei, China
Luyu Zhang, 17, Hubei Wuchang Experimental High School, Wuhan, Hubei, China
Keren Luo, 17, Hubei Wuchang Experimental High School, Wuhan, Hubei, China

PS312 **The Effects of Growing Microalgae Chlamydomonas reinhardtii in Municipal Secondary Effluent Wastewater on Biomass Yield for Biofuel Production**
Sumedha Ravishankar, 17, Empire High School, Tucson, Arizona
Sirtaj Bir Singh, 17, Empire High School, Tucson, Arizona

Fourth Award of \$500

PS002 **The Effects of Pheromones on Diaprepes Root Weevils**
Evan Cliff MacKay, 15, Vero Beach High School, Vero Beach, Florida

PS003 **Improving the Oryza sativa's Abiotic Stress Tolerance Based on the Genetic Engineering of the Osmoregulated Trehalose Synthase A Gene, Year Three**
Andrew Michael Joseph, 17, Episcopal School of Jacksonville, Jacksonville, Florida

- PS006 **Reuse of Plastic Bottles in the Construction of a Subsurface Irrigation System**
Ana Luisa Lopes Marques Coutinho, 15, Colegio Paraiso, Juazeiro do Norte, Ceara,
Brasil
- PS019 **The Development of a Novel Sodium Polyacrylate Seed Treatment**
Kira Elizabeth Powell, 17, Odessa High School, Odessa, Washington
- PS048 **Novel Genes and Mutations in Arabidopsis thaliana**
Ashley Marie Bianco, 17, River Springs Charter School, Temecula, California
- PS049 **HPLC Extraction of Noni (*Morinda Citrifolia*) Compounds and Its Inhibition of *E. coli***
Peter Huang Leng, 16, Father Duenas Memorial School, Chalan Pago, Guam
- PS301 **Banana Vinegar: A New Alternative to Catch the Fruit Fly**
Felipe Soares Wolff, 17, Instituto Federal Catarinense Campus Camboriu, Camboriu,
Santa Catarina, Brasil
Hilario Zornitta Junior, 19, Instituto Federal Catarinense Campus Camboriu, Camboriu,
Santa Catarina, Brasil
- PS307 **Carbon ù Soil Sensor**
Aseel Yacoub Shehadeh, 17, Wedad Naser Aldeen High School, Hebron, Palestine
Rawan Khalil Askafi, 17, Wedad Naser Aldeen High School, Hebron, Palestine