

## **Intel ISEF 2014 Grand Awards**

May 16, 2014, Los Angeles, California – Society for Science & the Public, in partnership with the Intel Foundation, announced Grand Awards of the Intel ISEF 2014. Student winners are ninth through twelfth graders who earned the right to compete at the Intel ISEF 2014 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 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 their work on the field and on the world at large.**

**Gordon E. Moore Award \$75,000**

**ME037 Characteristics of Deleterious Mutations in Tumor Suppressor Genes**

Nathan Han, 15, Boston Latin School, Boston, Massachusetts

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**

**ET014 Nature Derived Carbon Microsheets as Efficient Electrocatalyst for Energy Storage**

Shannon Xinjing Lee, 17, National Junior College, Singapore, Singapore

**MA054 Dynamic Mathematics on Smartphones and Tablets**

Lennart Julian Kleinwort, 15, Friedrich-Koenig-Gymnasium, Wurzburg, Germany

**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 finalists to attend the Stockholm International Youth Science Seminar (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. The SIYSS is a multi-disciplinary seminar highlighting some of the most remarkable achievements by young scientists from around the world.**

**EE078 An Innovative Approach to Improve Spin Polarization in  $\text{Co}_2\text{FeAl}_{0.5}\text{Si}_{0.5}$  Thin Films for Spin Transport Electronics**

Sarah Nicole Galvin, 18, Corona del Sol High School, Tempe, Arizona

**MI005 The Conjugative Plasmid RK2 as a Delivery System for Artificial AnatheriaH Genes: A Novel Synthetic Biology Alternative to Traditional Antibiotics**

Logan Collins, 17, Fairview High School, Boulder, Colorado

**PS013 Mechanistic Characterization of a Transcription Factor bZIP16 in Regulating Arabidopsis Flowering Pathways**

Yi-Hsuan Huang, 17, Taipei Municipal Jianguo High School, Taipei City, Chinese Taipei

**The SIYSS will be held in Stockholm, Sweden in December. Winning projects were chosen from the natural sciences categories. 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 Board Chair of Society for Science & the Public.**

**Innovation Exploration Award**

**From the first rocket research in 1936, to the first US satellite in 1958, to the many missions to learn about Venus, Neptune, Jupiter and most recently the Mars Curiosity Lander in 2012, the Jet Propulsion Laboratory, California Institute of Technology is a place where science, technology and engineering intermix to produce iconic robotic space explorers sent to every corner of the solar system helping us to discover how the universe, the solar system, and life formed and evolved. JPL was established by the California Institute of Technology (Caltech) in 1944, a prestigious university whose mission is to expand human knowledge and benefit society through research integrated with education.**

**Innovation Exploration Award, California Institute of Technology.**

**EN011 The Fabrication and Characterization of Short and Long Term Memory Proton Induced Thin Film Synaptic Transistors**

Harsha Sudarsan Uppili, 18, Oregon Episcopal School, Portland, Oregon

**EN025 Growing Spine Implant and Test Method**

Harry Paul, 17, Paul D. Schreiber High School, Port Washington, New York

**PH044 Fabricating an Artificial Nose using Mesoporous Photonic Crystals**

Achal James Fernando-Peiris, 16, Mount Vernon High School, Mount Vernon, Ohio

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**

**CS016 A New Optical Computing Method with Combination of Colored Lights Realizing Balanced Ternary Computation**

Yue Yao, 16, High School Affiliated to Shanghai Jiao Tong University, JiaDing Campus, Shanghai, China

**EA005 Increase in Tropical Cyclone Intensity and Ocean Subsurface Warming in the Western North Pacific Ocean**

Yu-Hsin Chen, 17, Taipei First Girls High School, Taipei, Chinese Taipei

**EM006 Bio-Waste Materials as Eco-Friendly Mordant in Fabric Dye Process**

Faye Jong-Sow Fei, 15, Sekolah Menengah Kebangsaan Batu Lintang, Kuching, Malaysia

**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.**

Intel Foundation Cultural and Scientific Visit to China Award

**The Intel Foundation believes that cultural experiences can help shape and strengthen scientific research. This year for the first time, the Intel Foundation is partnering with the China Adolescents for Science and Technology Organization to award an 11-day trip to the Chinese cities of Beijing, Chengdu and Shanghai. The winners will attend the China Adolescent Science and Technology Innovation Contest, the largest national science competition in China. They will also have the opportunity to visit the Chengdu Panda Research Base, other science education institutes, research centers, middle schools and universities in China. Finalists will exchange ideas with Chinese scientists and like-minded peers, gaining a better understanding of China's science programs.**

#### **Cultural and Scientific Visit to China Award**

AS304 **Rubus ellipticus: An effective solution against Giardiasis**

Abhishek Verma, 15, Maharaja Agarsain Public School, Delhi, India

Daksh Dua, 16, Maharaja Agarsain Public School, Delhi, India

BE013 **The Paradox of Emotional Dimensionality: The Effect of the Dimensionality of Audio Stimuli on the Brain's Electrical Activity, a Neuroscience Study**

Michelle Marie Marquez, 15, Math and Science High School at Clover Hill, Midlothian, Virginia

BI016 **Interrogating SGK3 Function in Cancer**

Ken Aizawa, 17, Jericho Senior High School, Jericho, New York

PH081 **The Leidenpump: A Non-Mechanical Means of Fluid Delivery**

John Chapman Alexander Caddell, 16, Stevenson School, Pebble Beach, California

London International Youth Science Forum - The Philip V. Streich Memorial Award

**The London International Youth Science Forum is a two-week program held annually for 300 young scientists from more than 50 countries. LIYSF offers a unique opportunity to participate in an international event attracting science students from around the world. Philip V. Streich was an alumnus of the Intel International Science and Engineering Fair in 2007 and 2008; and he won third place at the 2009 Intel Science Talent Search, both programs of the Society for Science & the Public.**

**Participation in the two week London International Youth Science Forum July 23 - August 6, 2014**

**CH305 Mechanism of Chinese Silver Staining Diagnosis and Its Application as Rapid Test for Chronic Renal Failure**

Tai Hei Chan, 18, King's College, Hong Kong, China, Hong Kong Special Administrative Region

Er Hai Fang, 17, King's College, Hong Kong, China, Hong Kong Special Administrative Region

**EV028 Novel Renewable Filter for Heavy Metal Removal: A Practical Application of Functionalized Multi-Walled Carbon Nanotubes**

Perry Alagappan, 17, Clear Lake High School, Houston, Texas

**This two-week summer experience that gathers high-achieving students from around the world embodies Philip's spirit of social gathering around the sciences.**

Animal Sciences

**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**

**AS304 Rubus ellipticus: An effective solution against Giardiasis**

Abhishek Verma, 15, Maharaja Agarsain Public School, Delhi, India

Daksh Dua, 16, Maharaja Agarsain Public School, Delhi, India

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

AS001 **Distribution and Patterns of Movement of the Weevil *Diaprepes abbreviatus* in Eucalyptus (*Corymbia torelliana*), a Fast-Growing Biofuel Crop**  
Evan MacKay, 17, Vero Beach High School, Vero Beach, Florida

AS304 ***Rubus ellipticus*: An effective solution against Giardiasis**  
Abhishek Verma, 15, Maharaja Agarsain Public School, Delhi, India  
Daksh Dua, 16, Maharaja Agarsain Public School, Delhi, India

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

AS012 **Leg Proposes, Antennae Disposes: Antennae Ultimately Determine the Turn Direction of the Pill Bug**  
Yasuhito Hayashi, 17, Toyama Prefectural Takaoka High School, Takaoka-city, Japan

AS057 **A Study of the Effects of Transplantation of Tissue from Planarian Flatworms Conditioned with Light-Shock Therapy into Naïve Planarian Flatworms**  
Chloe Sherry, 17, John Adams High School, South Bend, Indiana

AS308 **Olfactometer and GC/MS Evidence for (E)-2-hexenal as a Semiochemical in the Defensive Secretions of the Kudzu Bug, *Megacopta cribraria***  
Abigail Anne Williams, 16, Brevard High School, Brevard, North Carolina  
Carly Onnink, 16, Brevard High School, Brevard, North Carolina

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

**AS004 Autism in Fruit Flies II: Behavior of *Drosophila* mGluR Pathway Mutants**

Elise Nicole Paietta, 16, Carroll High School, Dayton, Ohio

**AS006 Hot Biology: Use of Thermal Imaging to Detect Nesting Behaviors of the Endangered Hawaiian Coot**

Sarah 'Alohilani Jenkins, 16, Molokai High School, Ho'olehua, Hawaii

**AS040 L-Leucine: a Novel Growth Factor of Adult Stem Cell Differentiation in *Dugesia tigrina***

David Lu, 16, Mills E. Godwin High School, Richmond, Virginia

**AS047 Quantitative Analysis of the Role of Mitochondria in *Drosophila melanogaster* Lifespan**

Caleb Smith, 16, Palos Verdes Peninsula, Rolling Hills Estates, California

**AS305 Investigating a Sleep Inducing Gene Found in *Drosophila melanogaster***

Daniel Tang, 17, International School of Beijing, Beijing, China

Taylor Moor Sun, 16, International School of Beijing, Beijing, China

JoonHee Leo Lee, 16, International School of Beijing, Beijing, China

### **Fourth Award of \$500**

**AS019 Optimal Equine Balance: Application of Biophysics to Assess and Reduce Equine Injury, Phase II**

Erika Nicole Mueller, 16, Clearfield High School, Clearfield, Utah



AS020 **Effect of Turmeric on Memory Curves of Planarians: An Investigation into Chemical Memory**  
Supraja Chittari, 18, George C. Marshall High School, Falls Church, Virginia

AS022 **The Ipomoea batatas Leaf: Isolation and Identification of Its Mosquito Larvicidal Agent**  
Margaret Donovan Doyle, 17, Yorktown High School, Arlington, Virginia

AS023 **Developmental Effects of Correlated Color Temperature of Artificial Lights on Painted Lady Butterflies Vanessa cardui**  
Simiao You, 19, Holyoke Catholic High School, Chicopee, Massachusetts

AS031 **Effects of Genetically Engineered Maize and Glyphosate on Eisenia fetida Growth and Reproduction**  
Brett Douglas Winters, 17, Dutch Fork High School, Irmo, South Carolina

AS038 **Unintended Consequences of Mosquito Pesticides on the Marine Environment: Potential Effects on the Threatened Staghorn Coral, Acropora cervicornis**  
Chandler Ilsa Precht, 18, Westminster Christian School, Palmetto Bay, Florida

AS056 **Cashew Tree (Anacardium occidentale): An Effective Treatment for Cattle Dermatitis**  
Deeksha P. Hebbar, 14, Vivekananda English Medium School, Puttur, India

Behavioral and Social Sciences

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**Intel ISEF Best of Category Award of \$5,000**

**BE013 The Paradox of Emotional Dimensionality: The Effect of the Dimensionality of Audio Stimuli on the Brain's Electrical Activity, a Neuroscience Study**  
Michelle Marie Marquez, 15, Math and Science High School at Clover Hill, Midlothian, Virginia

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

**BE013 The Paradox of Emotional Dimensionality: The Effect of the Dimensionality of Audio Stimuli on the Brain's Electrical Activity, a Neuroscience Study**  
Michelle Marie Marquez, 15, Math and Science High School at Clover Hill, Midlothian, Virginia

**BE015 Role of Somatostatin Interneurons in Alzheimer's Disease**  
Divya Koyyalagunta, 18, Clear Lake High School, Houston, Texas

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

**BE012 A Comprehensive Study of Dollar Hegemony, Quantitative Easing, and the Foreign Exchange Market**  
Justin Chase Lafazan, 17, Syosset High School, Syosset, New York

**BE035 Linking Expression and Function of FoxP2 in Adult Songbirds Using Operant Preference Testing**  
Petra Luna Grutzik, 18, Redondo Union High School, Redondo Beach, California

**BE304 Capacity Limits of Working Memory: The Impact of Multitasking on Cognitive Control and Emotion Recognition in the Adolescent Mind**

Alexandra Ulmer, 17, Oregon Episcopal School, Portland, Oregon  
Sarayu Caulfield, 16, Oregon Episcopal School, Portland, Oregon

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

- BE005 **The Changing Face of Education: Development of a Pedagogic Computer Application and Its Effect on Student Cognition, Motivation, and Performance, Year Four**  
Caitlyn Mary Ralph, 17, Lake Howell High School, Winter Park, Florida
- BE011 **Host Preferences of Wild Northern and Southern Ixodes scapularis**  
Hannah Frankie Stewart, 17, Plainview-Old Bethpage John F. Kennedy High School, Plainview, New York
- BE031 **Using Google Trends to Enhance Predictive Models of Mortgage Delinquency to Mitigate Risk in the Loan Lending Process**  
Soham Daga, 17, Stuyvesant High School, Manhattan, New York
- BE040 **Self-induced Sleep Loss: A Novel Risk Factor for Nighttime Food Desire in Adolescents and the Association with Brain Dopamine Signaling and Obesity**  
Zarin Ibnat Rahman, 17, Brookings High School, Brookings, South Dakota
- BE044 **Cognitive Performance in Schizophrenia & Bipolar Disorder & their First-Degree Relatives**  
Miribel Xuan Vy Tran, 17, Marina High School, Huntington Beach, California

#### **Fourth Award of \$500**

**BE002 Hand Hygiene Gone Viral? A Study of Student Involvement in a Social Media Campaign as a Method of Bringing Hand Hygiene to the Masses**

Timothy James Fossum Renier, 16, Duluth East High School, Duluth, Minnesota

**BE016 Differences in Word Usage Patterns between "Well-Recovered" Aphasic Patients and Control Subjects on a Picture Description Task**

Daniela Ida Ganelin, 17, Montgomery Blair High School, Silver Spring, Maryland

**BE024 "Are You Sure?" A Multi-Factor Analysis: Are Eyewitness Testimonies Dooming the Innocent?**

Ansley Elizabeth Lynn, 16, Glenwood School, Smiths, Alabama

**BE033 Effect of Interruptive Facebook Use on Working Memory in the 21st Century Learning Environment**

Laela Rabab Zaidi, 18, Joplin High School, Joplin, Missouri

**BE038 Healthy Youth: Effect of Physical Activity and Sleep Patterns on Physical and Mental Well-Being in Adolescents**

Grace Hwang, 16, Hershey High School, Hershey, Pennsylvania

**BE309 Psychosocial Variables Affecting Breast Cancer Patient Quality of Life**

Alyson Winter, 17, Ossining High School, Ossining, New York

Abigail E. Kamen, 17, Ossining High School, Ossining, New York

Biochemistry

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**Intel ISEF Best of Category Award of \$5,000**

**BI016 Interrogating SGK3 Function in Cancer**

Ken Aizawa, 17, Jericho Senior High School, Jericho, New York

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

**BI001 Organic Foods? Buy or Bypass: A Comparative Study Analyzing the Effects of Pesticides on Nutritional Content, Heavy Metal Toxicity and Pesticide-Induced Diseases**

Ria Chhabra, 17, Plano Senior High School, Plano, Texas

**BI016 Interrogating SGK3 Function in Cancer**

Ken Aizawa, 17, Jericho Senior High School, Jericho, New York

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

**BI012 A Drug Discovery Project: Allosteric Inhibition of Indolethylamine N-Methyl Transferase**

Sevahn Kayaneh Vorperian, 17, West High School, Madison, Wisconsin

**BI013 Novel Inorganic Metallacarborane Inhibitors of HIV-1 Protease**

Robin Krystufek, 18, Gymnazium Na Vitezne Plani, Prague, Czech Republic

- BI044 **Novel Design and Evaluation of Chitosan Nanoparticle Ocular Drug Delivery System**  
Sriram Somasundaram, 16, The Harker School, San Jose, California
- BI048 **A Novel Treatment for Stroke, Traumatic Brain Injury, Alzheimer's, and other Neurodegenerative Disease: Sildenafil Promotes Axonal Outgrowth in the CSPG Inhibitory Environment through Modulation of miRNA Levels**  
Guangning An, 18, International Academy, Troy, Michigan

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

- BI005 **L- Asparaginase Production from Kefir: An Alternative for the Treatment of Acute Lymphoblastic Leukemia**  
Barbara Carolina Federhen, 19, Fundacao Escola Tecnica Liberato Salzano Vieira da Cunha, Novo Hamburgo, Brazil
- BI026 **Evidence of Toll-like Receptor Nine-Mediated Amelioration of Amyloid Pathology in a TgSwDI Mouse Model of Alzheimer's Disease**  
Charlotte Sophia Herber, 17, Fox Lane High School, Bedford, New York
- BI041 **Elucidating of the Role of Reactive Oxidative Species (ROS) in TGF- $\beta$ 1 Activation of TRPV1 in the Corneal Keratocyte**  
Abrar Ali Nadroo, 16, Syosset High School, Syosset, New York
- BI054 **Understanding the Mechanism behind Nanoparticle Enhanced Oral Absorption of Chemotherapeutic Drugs**  
Priyanka R. Narayan, 18, Wayzata High School, Plymouth, Minnesota

- BI313 **Cardiolipin-Targeted Peptides Block Alzheimer's Beta-Amyloid Oligomer Toxicity through a Two-Hit Approach: Fibril Formation and Inhibition of Newly Characterized Oxygenase Activity**  
Margarita Ren, 18, Hunter College High School, New York, New York  
Yinge Zhao, 16, The Dalton School, New York, New York

**Fourth Award of \$500**

- BI008 **The Toxicity of Kavalactones and Flavokavain A and B from Different Plant Areas of Kava on HepG2 Liver Cells**  
Keanu Dean Pinner, 16, Hilo High School, Hilo, Hawaii
- BI028 **Ethanol Production through Biological Pretreatment of Miscanthus sinensis using Pleurotus ostreatus**  
Srinath Vijay Seshadri, 14, Village Academy, Delaware, OH, Ohio
- BI029 **Mechanism of Apoptotic Action of Colloidal Silver and Bromelain on PC12 Cells**  
Marcelina Puc, 17, Lane Technical College Prep High School, Chicago, Illinois
- BI037 **Structural Snapshots of K. lactis Purine Nucleoside Phosphorylase Trapped with Transition State Analog Inhibitors**  
Samuel Arturo Goldman, 16, Pelham Memorial High School, Pelham, New York
- BI045 **A Comparison of the Mechanism and Effects of HIF-Targeting Oligonucleotides on Normal and Cancerous Breast Cells**  
Katharine Elizabeth Adams, 16, duPont Manual High School, Louisville, Kentucky

**BI046 Development of a Therapeutic Drug for Alzheimer's Disease: A Chemical Approach to Cease Amyloidosis**

Yarim Lee, 17, Townsend Harris High School, Flushing, New York

**BI310 Novel Analysis of Oxidative Stress and Inflammation on Amyloid-beta, Tau, and Motility in Transgenic C. elegans models: Targeting Potential Therapeutics for Alzheimer's Disease**

Kimberly Alexis Te, 16, Manhasset High School, Manhasset, New York

Austen Gregory Te, 17, Manhasset High School, Manhasset, New York

Jinyu Wu, 17, Manhasset High School, Manhasset, New York

Cellular and Molecular Biology

**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**

**CB022 Control of Induced Pluripotent Stem Cell Aging by Modulation of Mitochondrial DNA Deletions**

Joshua Abraham Meier, 18, Academy for the Advancement of Science and Technology, Hackensack, New Jersey

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

**CB022 Control of Induced Pluripotent Stem Cell Aging by Modulation of Mitochondrial DNA Deletions**

Joshua Abraham Meier, 18, Academy for the Advancement of Science and Technology, Hackensack, New Jersey



**CB034 Synthetic Biology Approach for Development of a Monosodium Glutamate Detector, Phase II**  
Jodie Leigh Tinker, 17, Covenant Christian Academy, Huntsville, Alabama

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

**CB004 Overcoming Resistance**  
Yasmine Sapphire Zubi, 18, Satellite High School, Satellite Beach, Florida

**CB024 In Search of Genomic Dark Matter: A Novel Method for the Global Identification of Active Regulatory Elements**  
Carlo Bocconcelli, 17, Falmouth Academy, Falmouth, Massachusetts

**CB038 A Genome-Wide Analysis Tool to Identify Functional Regulatory Single Nucleotide Polymorphisms (rSNPs) Impacting Disease**  
Natalie Ng, 18, Monta Vista High School, Cupertino, California

**CB052 Targeting Brain Tumor Stem Cells through Natural Antioxidants**  
Iman Mahoui, 16, Eman Schools, Fishers, Indiana

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

**CB010 Universal, MHC-E Restricted Killer T Cell Responses: Identification of a Novel Immune Response against HIV**

Reesab Pathak, 16, Camas High School, Camas, Washington

**CB016 Does BPA Cause Hearing Loss? Assessing the Potential Ototoxicity Induced by Bisphenol- A in Danio rerio (Zebrafish) Lateral Line**

Meghal Sheth, 16, Camas High School, Camas, Washington

**CB021 The Hidden Hazard of Infant Formula: Evaluating the Effect of Food Additive Carrageenan on Blastemal Cell Growth and Development in a Dugesia tigrina Model**

Akshayaa Kethinni Chittibabu, 16, Massachusetts Academy of Math and Science at WPI, Worcester, Massachusetts

**CB023 Dysregulation of MicroRNA Expression in Diabetes**

Audrey Isomi Lang, 16, Edward M. Kennedy Academy for Health Careers, Boston, Massachusetts

**CB037 Characterization of T Cell Receptor Clonotypes in an SIV Infected Pigtailed Macaque**

Darius Andrew Johnson, 18, Baltimore Polytechnic Institute, Baltimore, Maryland

#### **Fourth Award of \$500**

**CB013 Investigating MeCP2 Regulation of L1CAM Gene Expression in Neural Stem Cells Derived from a Patient with Rett Syndrome**

Ohyoon Kwon, 16, West Windsor-Plainsboro High School South, West Windsor Township, New Jersey

**CB014 Activation-induced Cytidine Deaminase and its Role in Reliving the Promethean Dream**

Ritayan Chakraborty, 16, Syosset High School, Syosset, New York

**CB017 The Synthesis of Colicin M using Cell-Free Protein Synthesis**

Reyvin Michael Reyes, 17, Niles Township West High School, Skokie, Illinois

**CB036 VEGF-3 Antibody Functionalized Gold Nanoshells for Near Infrared Photothermal Ablation of Lymphatic Endothelial Cells**

Morni A. Modi, 17, Caddo Parish Magnet High School, Shreveport, Louisiana

**CB045 Lights, Nanocarrier, Crosslink! A Novel Nanocarrier for Drug Delivery in Cancer Treatment**

Nancy Wang, 16, Hershey High School, Hershey, Pennsylvania

**CB050 Trail Avoidance, Spatial Pattern Recognition, and Tubule-crossing Efficiency in the True Slime Mold *Physarum polycephalum***

Hannah Leah McShea, 18, North Carolina School of Science and Mathematics, Durham, North Carolina

**CB056 Reprogramming Hair Follicle Stem Cells into Cardiomyocytes**

Manotri Chaubal, 17, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia

Chemistry

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**Intel ISEF Best of Category Award of \$5,000**

**CH305 Mechanism of Chinese Silver Staining Diagnosis and Its Application as Rapid Test for Chronic Renal Failure**

Tai Hei Chan, 18, King's College, Hong Kong, China, Hong Kong Special Administrative Region

Er Hai Fang, 17, King's College, Hong Kong, China, Hong Kong Special Administrative Region

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

**CH014 Improved Efficiency of Steam Generation Using Carbon Nanoparticles**

Carolyn Kay Jons, 16, Eden Prairie High School, Eden Prairie, Minnesota

**CH305 Mechanism of Chinese Silver Staining Diagnosis and Its Application as Rapid Test for Chronic Renal Failure**

Tai Hei Chan, 18, King's College, Hong Kong, China, Hong Kong Special Administrative Region

Er Hai Fang, 17, King's College, Hong Kong, China, Hong Kong Special Administrative Region

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

**CH018 Stoichiometric Laser-Induced Breakdown Spectroscopy for Simple and Cost-Effective Laser Material Fabrication: A Case Study of Polycrystalline Yttrium Aluminum Garnet Ceramics**

Matthew Leong Chun, 17, Jericho Senior High School, Jericho, New York

**CH042 Novel Synthesis and Characterization of Antimony and Lithium Doped Tin Dioxide Nanocrystals Achieving Record Gas Sensor Performance**

Nikhil Murthy, 14, Catlin Gabel School, Portland, Oregon

**CH053 New Approach to the Block Synthesis of Alginate Fragments: The Molecular Geometry and Stereo Selectivity of the Mannuronyl Donors**

Ekaterina Kutsenok, 17, Moscow Chemical Lyceum No. 1303, Moscow, Russian Federation

**CH301 Synthesis of Periodic Mesoporous Organosilicas (PMOs) for Radiotherapeutic and Chemotherapeutic Treatments**

Jessica Hong, 17, Plano Senior High School, Plano, Texas

Alicia Danielle DSouza, 16, Plano East Senior High School, Plano, Texas

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

**CH022 Electronic Tongue: Tastes of Toxic Metal Ions in Water**

Seung Hye (Beatrice) Choi, 15, University High School, Fresno, California

**CH030 The Effectiveness of Guanidine Functionalized Polymers in Carbon Dioxide Capture and Utilization**

Sarah Hasan Al Abdullatif, 17, Dhahran Ahliyya Schools, Dammam, Saudi Arabia

**CH040 Factors that Influence Energies of Simple Hydrocarbons**

Tingyue Cui, 15, Terre Haute South Vigo High School, Terre Haute, Indiana

**CH055 Supramolecular Host-Guest Complexes as Fluorescent Markers in Tumor Diagnostics**

Gabriel Salg, 19, Hanns-Seidel-Gymnasium Hosbach, Hoesbach, Germany

**CH056 Graphene Oxide and Reduced Graphene Oxide Coated Nafion Membranes for Enhanced Performance in Hydrogen Fuel Cells**

Cameron Akker, 17, Redmond High School, Redmond, Washington

**CH303 On the Synthesis and Predictive Modeling of Thermostable Pigments Utilizing Silica Extracted from Rice Husk Biowastes**

Caroline Fang Gao, 16, Plano West Senior High School, Plano, Texas  
Lily Xu, 17, Liberal Arts and Science Academy High School, Austin, Texas  
Susan Xu, 16, Kingwood High School, Kingwood, Texas

#### **Fourth Award of \$500**

**CH002 Modification of the Oxygen Evolution Reaction Using Iridium (IV) Oxide Combined with Precious Metals through the Dip-Coating/Calcination Reaction, a Sixth Year Study**

Albert Scott Halbing, 18, Cocoa Beach Junior-Senior High School, Cocoa Beach, Florida

**CH007 Synthesizing a STAT3 Dimerization Inhibitor Molecule via Retrosynthetic Analysis**

Maria Andrea Jurado, 18, Waipahu High School, Waipahu, Hawaii

**CH011 A Study of Preparation of Fire-Retardant Exterior Wall Thermal Insulating Foam with a New Type of Raw Material**

Qiaochu Wang, 16, Zhengzhou No.1 High School, Zhengzhou, China

**CH012 Synthesis and Applications of Reusable Solid Acid Catalysts for Biofuels Production**

Yu-Hsuan Shen, 18, Taipei First Girls High School, Taipei, Chinese Taipei

**CH016 Novel Iron-Catalyzed Hetero Diels-Alder Reaction directed towards Natural Product Synthesis**

Andre Sanchez, 17, Manatee High School, Bradenton, Florida

**CH020 Building a Library of Difluoro- and Trifluoro- Artemisinin, Year Two**

Shreya Sundaresh Ramayya, 16, Palos Verdes Peninsula, Rolling Hills Estates, California

**CH052 The Synthesis of Thiophene Derived Conductive Copolymer and the Analysis of the Properties of Electrochromic Devices**

Busra Ban, 18, Cakabey Schools, Izmir, Turkey

**CH309 A Unique Kit for Detection and Removal of Pesticides from Fruits and Vegetables**

Shreya Nandy, 16, Amity International School, Mayur Vihar, New Delhi, India

Kopal Gupta, 16, Amity International School, Mayur Vihar, New Delhi, India

Computer Science

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**Intel ISEF Best of Category Award of \$5,000**

**CS016 A New Optical Computing Method with Combination of Colored Lights Realizing Balanced Ternary Computation**

Yue Yao, 16, High School Affiliated to Shanghai Jiao Tong University, JiaDing Campus, Shanghai, China

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

**CS016 A New Optical Computing Method with Combination of Colored Lights Realizing Balanced Ternary Computation**

Yue Yao, 16, High School Affiliated to Shanghai Jiao Tong University, JiaDing Campus, Shanghai, China

**CS037 Development of a Novel Machine Learning Algorithm to Monitor Vascular Tissue Transfers Using Speech Recognition Techniques**

Ariel Benjamin Kanevsky, 17, Ossining High School, Ossining, New York

**CS074 Indium: Using Novel Machine Learning Algorithms to Develop a Nondisease-specific Personalized Medicine Engine**

Yousuf Mounir Soliman, 17, Canyon Crest Academy, San Diego, California

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

**CS031 Train the Artificial Brain II: Computer-Aided Diagnosis and Treatment Plan of Alzheimer's Disease using Neural Networks**

Roma Vivek Pradhan, 17, Friendswood High School, Friendswood, Texas

**CS033 A Novel Computational Agent-Based Model for the Outbreak, Spread, and Containment of Tuberculosis**

Parth Chopra, 17, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia

**CS053 Indoor Navigation with Maximum Likelihood Classification of Wi-Fi Fingerprints**

Noah Christian Pritt, 17, Pritt Home School, Walkersville, Maryland

**CS054 An Enhanced Method for Fusing Multiple Exposure Images for High Dynamic Range Scenes**

Jihyeon (Janel) Lee, 17, Amador Valley High School, Pleasanton, California

**CS073 Semantic Multilayer SVM: Novel Artificial Intelligence and Computer Vision Applied to Prostate Cancer Grading and Breast Cancer Diagnosis**

William C. Hang, 16, Scripps Ranch High School, San Diego, California



**CS076 A Novel Eye Blinking Based HCI with Statistical Prediction for Wearable Computing**  
Jenny Lynn Wang, 16, North Carolina School of Science and Mathematics, Durham, North Carolina

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

**CS005 SNAP: A Novel Algorithm for Fast Global Sequence Alignment and Database Search**  
Venkatesh S. Sivaraman, 16, Caddo Parish Magnet High School, Shreveport, Louisiana

**CS015 Detecting Heart Disease Faster**  
Jiacheng Jason He, 16, Texas Academy of Mathematics and Science, Denton, Texas

**CS017 A Novel Implementation of Image Processing and Machine Learning for the Early Diagnosis of Melanoma**  
Elizabeth Zhao, 18, Jesuit High School, Portland, Oregon

**CS019 Panthera: Caching and Cache-based Scheduling in Distributed Computing Systems**  
Dhaivat Nitin Pandya, 16, Appleton North High School, Appleton, Wisconsin

**CS025 Diagnosis of Abnormalities in 3-Dimensional Mammograms via an Artificial Neural Network**  
Joshua Michael Zweig, 18, Commack High School, Commack, New York

**CS065 Search Engine to Map FDA Approved Drugs to Diseases Based on Microarray Data Mined from GEO**  
Axel Stephan Feldmann, 17, Hunter College High School, New York, New York

**CS075 High Dimensional Clustering Algorithms Applied to Face Recognition of Obscured Faces**

Kalyani Ramadurgam, 15, Torrey Pines High School, San Diego, California

**CS078 A Novel Approach to Genetic Interaction Research with an Integrated Repository of Gene Regulatory Networks**

Shrey Gupta, 17, BASIS Scottsdale, Scottsdale, Arizona

**CS305 Trailblazer: Cooperative, Infrastructure-Independent Generation of Indoor Floor Maps using Handheld Android Mobile Devices**

Andrew Zhou, 18, Raleigh Charter High School, Raleigh, North Carolina

Sanjay Kannan, 17, Raleigh Charter High School, Raleigh, North Carolina

Elish Mahajan, 18, Raleigh Charter High School, Raleigh, North Carolina

**Fourth Award of \$500**

**CS023 Artificial Intelligence Sense for the Blind to Play Video Games using Their Tongue**

Nipun Nipun Kavishka Silva, 15, De Mazenod College, Kandana, Sri Lanka

**CS032 iClick: The Development of a Vision-Based Virtual Mouse**

Selena Chun Feng, 15, Albemarle High School, Charlottesville, Virginia

**CS035 Design and Performance Analysis of Optimization Algorithms for Efficient Cryptographic Processing in Secure Internet Routing Protocol**

Vinay K. Sriram, 18, Poolesville High School, Poolesville, Maryland

**CS038 Come Code with Codester: A Novel Educational App that Teaches Computer Science**

Gili Rusak, 17, Shaker High School, Latham, New York

CS040 **Optimizing Digital Content for Color-Blind Audiences Using Enhancement Algorithms**

Animesh Tripathi, 17, Sanskriti School, New Delhi, India

CS041 **A Novel Approach to Biometric Identification Using an Iris Scanner**

Sophia Demetriou, 18, Selly Park Secondary Convent, Rustenburg, South Africa

CS046 **What's Your Problem? Automatically Summarizing Scientific Research with Open Problems**

Cassidy Laidlaw, 17, Barrington High School, Barrington, Rhode Island

CS055 **Modifying the One-Time Pad Cryptosystem for Practical Use**

Gavin Rees, 15, Germantown Academy, Fort Washington, Pennsylvania

CS060 **Twinsight: A Novel Multifactor Behavioral Analysis Algorithm for Social Media**

Daniel Mogilny, 15, Holy Trinity School, Richmond Hill, Canada

CS062 **Predicting Cancer Drug Response Using Nuclear Norm Multi-Task Learning**

Ivan Paskov, 18, Edgemont High School, Scarsdale, New York

CS310 **Translator of Gestures: Human Interface Software**

Anna Dmitrievna Kustareva, 17, Municipal Budget Educational Institution "Lyceum No.165," Nizhny Novgorod, Russian Federation

Maxim Alexeevich Sokolov, 17, Municipal Budget Educational Institution "Lyceum No.165," Nizhny Novgorod, Russian Federation

Earth & Planetary Sciences

**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**

**EA005 Increase in Tropical Cyclone Intensity and Ocean Subsurface Warming in the Western North Pacific Ocean**

Yu-Hsin Chen, 17, Taipei First Girls High School, Taipei, Chinese Taipei

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

**EA005 Increase in Tropical Cyclone Intensity and Ocean Subsurface Warming in the Western North Pacific Ocean**

Yu-Hsin Chen, 17, Taipei First Girls High School, Taipei, Chinese Taipei

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

**EA001 Lunar Tide Contribution to Thermosphere Weather**

Jesse Tan Zhang, 16, Fairview High School, Boulder, Colorado

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

**EA015 Geographic Belts for Hurricane Landfall Location Prediction**

William Wu, 17, Clear Lake High School, Houston, Texas

**Fourth Award of \$500**

**EA009 Comparison between Pleistocene Horse (*Equus*, *Perissodactyla*) Populations from Sonora, Mexico and Rancho La Brea, Southern California and Testing Bergmann's Rule using Second Phalanges**  
Zeeshan Jawaid, 14, Carpe Diem Collegiate High School, Yuma, Arizona

**EA011 Development of a Cost-Effective Flowable Fill Material for the Stabilization of Underground Cavities**  
Chase Kicker, 18, Carlsbad High School, Carlsbad, New Mexico

Engineering: Electrical and Mechanical

**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**

**EE078 An Innovative Approach to Improve Spin Polarization in  $\text{Co}_2\text{FeAl}_{10.5}\text{Si}_{0.5}$  Thin Films for Spin Transport Electronics**  
Sarah Nicole Galvin, 18, Corona del Sol High School, Tempe, Arizona

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

**EE063 Nanofluid CPU Cooling: Novel Block Design**

Duncan Bayard Stothers, 16, St. George's School, Vancouver, Canada

**EE076 An Artificial Neural Network for Controlled Force Augmentation in an Electromyographic Exoskeleton Arm**

Joshua Kopel Hellerstein, 17, Suncoast Community High School, Riviera Beach, Florida

**EE078 An Innovative Approach to Improve Spin Polarization in Co<sub>2</sub>FeAl<sub>10.5</sub>Si<sub>0.5</sub> Thin Films for Spin Transport Electronics**

Sarah Nicole Galvin, 18, Corona del Sol High School, Tempe, Arizona

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

**EE016 Poker Robot**

Donat Sandor Hegyesi, 19, Toth Arpad High School, Debrecen, Hungary

**EE025 Personal Physiological Sensor Network Device**

Marek Novak, 19, Gymnazium Ceske Budejovice, Jirovcova 8, Ceske Budejovice, Czech Republic

**EE029 Versatile Field Construction Machine for Paddy Cultivation**

Namal Namal Udara Piyasiri, 18, Tabuththegama Central College, Thambuththegama, Sri Lanka

**EE064 The Hollow Flashlights: Head and Hand**

Ann Stasia Makosinski, 16, Saint Michaels University School, Victoria, Canada

EE074 **Generalized Decision Functions for Synthesis of Multi-level Logic Circuits Realized by Memristor Imply Gates**

Anika Raghuvanshi, 17, Jesuit High School, Portland, Oregon

EE079 **Hunka Hunka Hybrid Luv, Phase II: Design and Construction of a Multipurpose Scalable Power Electronics Module for Electric or Hybrid Electric Vehicles**

Drew Prevost, 16, Covenant Christian Academy, Huntsville, Alabama

EE320 **Ice Bot: A Deep Sea Diving Apparatus**

Mirae Leigh Parker, 18, West High School, Salt Lake City, Utah

Ema Linnea Parker, 16, Wasatch Academy, Mount Pleasant, Utah

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

EE006 **Passive Auto-Tracking Heliostat**

Brayton Miles, 17, Niceville High School, Niceville, Florida

EE026 **VoltX 2.0: A Rescue Robot that Can Locate and Extract Victims**

Jason Jerome Sylvestre, 17, Benilde-St. Margaret's, St. Louis Park, Minnesota

EE048 **More than a Feeling: A 3D Haptic Vest for the Visually Impaired**

Sean Alexander Benson, 17, Satsuma High School, Satsuma, Alabama

EE049 **Mideumi Weather Capsule**

Young-Woon Song, 17, Daegu Science High School, Daegu, South Korea

- EE056 **Demonstration and Characterization of Split Ring Resonators as Terahertz Waveguides**  
Brandon Cui, 17, Hillcrest High School, Midvale, Utah
- EE071 **An Integrated Software Platform for Intelligent, Autonomous Control of Hyper-Redundant Modular Robotic Systems using Simultaneous Localization and Mapping**  
Puneeth Naga Sai Krishna Meruva, 16, Homestead High School, Fort Wayne, Indiana
- EE073 **Sustainable Energy for Sustainable Water: Solar Heat Driven Desalinating System for Providing Clean and Safe Water for Rural Areas**  
Vladislav Sevostianov, 16, Las Cruces High School, Las Cruces, New Mexico
- EE082 **Development of a Teleoperation Robot**  
Mina Fahmi Fahmi, 17, Great Mills High School, Great Mills, Maryland
- EE089 **Single-Walled Carbon Nanotubes/Silicon Based Solar Cells**  
Nimit Rajesh Gandhi, 16, Little Rock Central High School, Little Rock, Arkansas
- EE318 **Renovated Cane to Aid Indoor Travel for the Visually Impaired**  
Amber Elizabeth Gibson, 18, Hewitt Trussvile High School, Trussville, Alabama  
Billy Dalton Smith, 17, Hewitt Trussvile High School, Trussville, Alabama  
Isaac Daniel Searcy, 18, Hewitt Trussvile High School, Trussville, Alabama

#### **Fourth Award of \$500**

- EE021 **Parking Space Search and Vehicle Guidance Technology in Parking Lots with Quadrotor Unmanned Aerial Vehicle**  
Jiayan Chen, 18, Shanghai High School, Xuhui District, China



- EE028 **VOICE-O-NATOR: An Aid for the Speech Impaired**  
Amrit Sahu, 14, Dav Public School, Bhubaneswar, Odisha, India
- EE031 **Breaking Point**  
Danika Louw, 14, Holy Spirit Catholic High School, Tuscaloosa, Alabama
- EE032 **What Type of Wing Design Creates the Greatest Lift? "Dimpled Airfoil"**  
Nathan Roy Martus, 16, Oakleaf High School, Orange Park, Florida
- EE040 **Mobile Inverted Pendulum Testing Platform**  
Taylor Boardman, 17, Delta High School, Delta, Utah
- EE046 **Fone2Find**  
John Neill, 16, Down High School, Downpatrick, Northern Ireland
- EE090 **To Design and Manufacture a Device to Maximize the Performance of Rowers**  
Conor Richard Foy, 17, Colaiste Chiarain, Limerick, Ireland
- EE092 **The Engineering and Programing of a Novel Robotic Exoskeletal Joint Enhancement Apparatus**  
Matthew Campagna, 17, Lancaster Catholic High School, Lancaster, Pennsylvania
- EE093 **Cube Satellites: Miniature Satellite Design and Operations for Pulsed Plasma System Applications**  
Matthew Hileman, 16, The Classical Academy, College Pathways, Colorado Springs, Colorado
- EE303 **Solid State Fan**  
Eliot Lim, 18, NUS High School of Mathematics and Science, Singapore, Singapore  
Shiyang Yu, 18, NUS High School of Mathematics and Science, Singapore, Singapore  
Zhong Liang Ou Yang, 18, NUS High School of Mathematics and Science, Singapore, Singapore

**EE312 Intelligent Road Signage and Traffic Monitoring System**

Jose David Porras Solano, 17, Colegio Tecnico Profesional Santa Lucia, Cartago, Costa Rica

Paulo Andres Diaz-Hernandez, 20, Colegio Tecnico Profesional Santa Lucia, Cartago, Costa Rica

**EE330 Development of a Muscle Rigidity Measurement System for an Early Diagnosis of Parkinson's Disease**

Hyeongkeun Lee, 17, Korea Science Academy of Kaist, Busan, South Korea

Sangjin Yun, 17, Korea Science Academy of Kaist, Busan, South Korea

**EE334 Electronic Braille Display for the Visually Impaired**

Dieu Lien Thi Tran, 17, Le Hong Phong High School for the Gifted, Ho Chi Minh, Viet Nam

Du Nam Nguyen, 18, Le Hong Phong High School for the Gifted, Ho Chi Minh, Viet Nam

**EE337 Target Designation with Infrared Laser and Tracking System**

Mustafa Erdogan, 20, Deniz Harp Okulu Komutanligi, Istanbul, Turkey

Omer Ozbekler, 20, Deniz Harp Okulu Komutanligi, Istanbul, Turkey

Environmental Management

**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**

**EM006 Bio-Waste Materials as Eco-Friendly Mordant in Fabric Dye Process**

Faye Jong-Sow Fei, 15, Sekolah Menengah Kebangsaan Batu Lintang, Kuching, Malaysia

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

**EM006 Bio-Waste Materials as Eco-Friendly Mordant in Fabric Dye Process**

Faye Jong-Sow Fei, 15, Sekolah Menengah Kebangsaan Batu Lintang, Kuching, Malaysia

**EM310 Effect of Antifreeze on a Keystone Species**

Allison Marie Raines, 15, South River High School, East Edgewater, Maryland

Sally Albright, 15, South River High School, East Edgewater, Maryland

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

**EM013 Biodegradable Breathable Band-Aids**

Wing Yi Kan, 15, Maryknoll Fathers' School, Hong Kong, China, Hong Kong Special Administrative Region

**EM017 Developing a Sustainable Water Filtration System for Use in Low Income Countries**

Bluyé DeMessie, 17, William Mason High School, Mason, Ohio

**EM018 Sustainable Future for Endangered Species? Predicting the Impacts of the Wilmar Policy on Bornean Orangutan Populations**

Emma R. Freedman, 15, Stanford University Online High School, Corralitos, California

**EM046 Passive Manipulation of Thermal Radiation: Dual Purpose Condensers to Provide Potable Water**

Calvin James Rieder, 17, Saint Thomas Aquinas Catholic Secondary School, Oakville, Canada

**EM321 Engineering a Novel Cimex Lectularius Trapping Mechanism Utilizing Electrospun Recycled Polymers**

Daniel Rudin, 17, Half Hollow Hills High School West, Dix Hills, New York

Michal Leibowitz, 17, Samuel H. Wang Yeshiva University High School for Girls, Holliswood, New York

Jacob Mitchell Plaut, 18, Rambam Mesivta High School for Boys, Lawrence, New York

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

**EM009 Waste Drinks to Biofuel: Using Glucose and Fructose in Fermentation and Anaerobic Digestion for the Production of Ethanol and Methane**

Vishal Reddy Nallanagulagari, 16, Upper Arlington High School, Upper Arlington, Ohio

**EM011 Responsible (at Home) Recycling of Disposable Diapers**

Salvador Alvarado-Olivo, 17, Escola Americana de Campinas, Campinas, Brazil

**EM019 Cadmium Ion Removal from an Aqueous Solution by Dried Water Hyacinth Biomass-Kinetic Studies: Effect Of pH, Time, Hyacinth Dosage, and Cadmium Concentration on Adsorption**

Rohan Mathew, 17, Mills E. Godwin High School, Richmond, Virginia

**EM028 Improving Seawater Membrane Distillation: The Development of Carbon Nanotube-coated Nickel Hollow Fiber Membranes**

Farah Essam Almulla, 17, Dhahran Ahliyya Schools, Dammam, Saudi Arabia

**EM055 Novel Hydrophobic/Hydrophilic Macro-Patterns for Enhancing Water Vapor Condensation**

Shixuan Justin Li, 16, Rutherford High School, Panama City, Florida

**EM307 A Model Approach to Harvesting Energy from a Marine Environment: The Engineering of Sediment Microbial Fuel Cells with a Modified Catalyst and Diffusion Layer**

Emma Jing Dong, 16, Manhasset High School, Manhasset, New York

Caitlin Noelle McCormick, 17, Manhasset High School, Manhasset, New York

Grace Karen Lee, 16, Manhasset High School, Manhasset, New York

**EM328 Vacuum Evaporator for Water Purification**

Mona El Sayed Abd El Gayed, 16, Maadi STEM School for Girls, Cairo, Egypt

Sara Ezat El Hanbaly, 16, Maadi STEM school for Girls, Cairo, Egypt

Hoda Mamdouh Shoman, 17, Maadi STEM School for Girls, Cairo, Egypt

**Fourth Award of \$500**

**EM010 Efficient Watering**

Connor A. Coughenour, 16, Natrona County High School, Casper, Wyoming

**EM031 Dispersing Oil Slicks: Impact of Droplets on a Floating Oil Layer**

Lambert Aryee, 17, Baltimore Polytechnic Institute, Baltimore, Maryland

**EM032 Hydraulic Fracturing Fluid Remediation in Water: Further Exploration of Mycoremediation Capabilities of Fungi**

Rachel Louise Rossi, 18, Durango High School, Durango, Colorado

**EM037 Emission Reduction Using an Activated Carbon Supplement**

Tyler Gordon Toepke-Floyd, 18, Wishek High School, Wishek, North Dakota

**EM038 The Efficiency of Ferromagnetic Nanoparticles and Chlorella Algae in the Remediation of Oil Spills**

Sahil Veeramoney, 14, Oregon Episcopal School, Portland, Oregon

**EM051 Removal of Pollutants from Wastewater Effluent using Activated Rice Husks**

Joshua Lin, 16, Houston High School, Germantown, Tennessee

**EM054 The Heavy Metal Movement: Measuring the Phytoextraction and Bioaccumulation of Heavy Metals by *Panicum virgatum* and *Schizachyrium scoparium* when Grown in Soil Collected at the Tar Creek Superfund Site**

McKalee S. Steen, 16, Grove High School, Grove, Oklahoma

**EM303 Singing in the Shower...Recovering Water**

Fabian Ignacio Lopez Caceres, 17, San Agustin de Atacama, Copiapó, Chile

Alicia Francisca Barrios- Cordova, 17, San Agustin de Atacama, Copiapó, Chile

**EM325 Environmental Stove**

Musbah Abdel hay Maraqa, 16, Alra'ed Al Arabi School, Amman, Jordan

Qusai Taysir Hussein, 17, Alra'ed Al Arabi School, Amman, Jordan

Engineering: Materials and Bioengineering

**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**

**EN025 Growing Spine Implant and Test Method**

Harry Paul, 17, Paul D. Schreiber High School, Port Washington, New York

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

EN011 **The Fabrication and Characterization of Short and Long Term Memory Proton Induced Thin Film Synaptic Transistors**

Harsha Sudarsan Uppili, 18, Oregon Episcopal School, Portland, Oregon

EN025 **Growing Spine Implant and Test Method**

Harry Paul, 17, Paul D. Schreiber High School, Port Washington, New York

EN066 **Magnetic Field Modulation for Assembly and Manipulation of Responsive Nanoscale Optical Systems**

Michael Janner, 18, Redlands East Valley High School, Redlands, California

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

EN014 **Optimizing Natural Gas Separation and the Haber-Bosch Process with Thermally Rearranged Polymers: Effects of Morphology and Chemical Structure on Free Volume and Transport Properties of HAB-6FDA Structures**

Advaith Anand, 17, Liberal Arts and Science Academy High School, Austin, Texas

EN049 **In-Fiber Emulsification of Biodegradable Polymers for Drug Delivery**

Catherine J. Li, 17, Lake Highland Preparatory School, Orlando, Florida

EN050 **iAid: A Novel Multimodal, Cloud-Based Navigation System for the Visually Impaired**

Alexander Matthew Deans, 17, Académie Ste Cécile International School, Windsor, Canada

EN302 **Anastomosis Robot Tool (ART)**

Yuki Trippel, 19, HTBLuVA Modling, Mödling, Austria

Dominik Kovacs, 19, HTBLuVA Modling, Mödling, Austria

Thomas Gunther Steinlechner, 20, HTBLuVA Modling, Mödling, Austria

EN320 **FISA: Film for Selective Absorption**

Raíssa Muller, 18, Fundacao Escola Tecnica Liberato Salzano Vieira da Cunha, Novo Hamburgo, Brazil

Gabriel Chiomento da Motta, 18, Fundacao Escola Tecnica Liberato Salzano Vieira da Cunha, Novo Hamburgo, Brazil

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

EN013 **Biofeedback Controller: Virtual Training for Myoelectric Transradial Prosthesis**

Matthew Lerdahl, 18, Coon Rapids High School, Coon Rapids, Minnesota

EN045 **A PEEK into the Future: Advanced Materials for Orthopedic Implants**

Ralph Ignacio Lawton, 15, PA Leadership Charter School, West Chester, Pennsylvania

EN048 **Novel Lateral Flow Test Design to Detect the Presence of Paralytic Shellfish Poisoning**

Taylor Jade Seitz, 16, Polaris K-12 School, Anchorage, Alaska

EN057 **Regulating Podocyte Redifferentiation Using Mechanical and Geometrical Constrains**

Mika Sarkin Jain, 16, Stuyvesant High School, Manhattan, New York



EN059 **A Microfluidic Device for Blood Separation and Cell Morphology Analysis using MicroVortex Technology**

Vick Cheung Liu, 16, Flintridge Preparatory School, La Cañada Flintridge, California

EN068 **Strongly Coupling the Electrical and Mechanical Dynamics of the Heartbeat in a Diffuse Interface Model**

Kevin K. Lee, 17, University High School, Irvine, California

EN312 **Green Refrigerant Box**

Muhtaza Aziziya Syafiq, 16, Sma Negeri 2 Sekayu, Musi Banyuasin, Indonesia

Anjani Rahma Putri, 17, Sma Negeri 2 Sekayu, Musi Banyuasin, Indonesia

EN324 **Optimization of Lithium-Sulfur Battery Cathode: Role of Sulfur-Carbon Interaction**

Madan A Subheeswar, 15, duPont Manual High School, Louisville, Kentucky

Matthew Carmel Raj, 14, duPont Manual High School, Louisville, Kentucky

Richard Nipun Gunasena, 15, duPont Manual High School, Louisville, Kentucky

#### **Fourth Award of \$500**

EN010 **Give a Hand: Designing and Developing a Neuroprosthetic Hand**

Vanessa Yun Han Tan, 17, Dunman High School, Singapore, Singapore

EN017 **Transformer Clepsydron: Deployable Support Framework with Varying Direction of Unfolding**

Temur Chichua, 16, Tbilisi #4 Public School, Tbilisi, Georgia

EN021 **The Effects of Barefoot and Shod Running on Risk of Injury in High School, Female, Recreational Runners**

Megan Boyer, 17, Manchester High School, Manchester, Connecticut

EN047 **Engineered Chitosan Based Multi-reservoir Devices for Effective Localization to Treat a Multifaceted Set of Diseases**

Vibhav Satsheel Altekar, 18, Lynbrook High School, San Jose, California

EN055 **Gold Nanoparticles: Efficient Synthesis of Catalytically Active Nanoparticles Using a One-Pot Method**

Justin Cheung, 17, Commack High School, Commack, New York

EN058 **Dependence of Silica Sol-Gel Thin Film Material Properties on Fabrication Methods**

Samantha Indunil Wathugala, 17, Palos Verdes Peninsula, Rolling Hills Estates, California

EN308 **Modified Quantum Dots for Improved Biocompatibility in the Detection of Cancer**

Ryan H. Huston, 17, Upper Arlington High School, Upper Arlington, Ohio

Spandan N. Shah, 18, Upper Arlington High School, Upper Arlington, Ohio

EN309 **Innovative Alternative Method for the Synthesis of Graphene**

Roberto Delgado Webb, 17, Colegio Vocacional Monsenor Sanabria, Desamparados, Costa Rica

Brandon Eduardo Montero Montoya, 16, Colegio Vocacional Monsenor Sanabria, Desamparados, Costa Rica

EN318 **Guns, Flames, and Steel 2.0: Creation of a Non-Newtonian Fluid-Based Body Armor**

Madison Diane Reed, 16, Park City High School, Park City, Utah

Elizabeth Marie Prucka, 16, Park City High School, Park City, Utah

EN327 **Lipid Production by Oleaginous Fungi Grown on Rice Straw for Potential Biodiesel Resource**

Lan Yen Dang, 17, Hanoi Amsterdam High School for the Gifted, Hanoi, Viet Nam  
Dat Tien Tran, 17, Hanoi Amsterdam High School for the Gifted, Hanoi, Viet Nam  
Tu Anh Dang, 17, Hanoi Amsterdam High School for the Gifted, Ha Noi, Viet Nam

Energy and Transportation

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**Intel ISEF Best of Category Award of \$5,000**

ET014 **Nature Derived Carbon Microsheets as Efficient Electrocatalyst for Energy Storage**  
Shannon Xinjing Lee, 17, National Junior College, Singapore, Singapore

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

ET014 **Nature Derived Carbon Microsheets as Efficient Electrocatalyst for Energy Storage**  
Shannon Xinjing Lee, 17, National Junior College, Singapore, Singapore

ET306 **Comparison of Organized and Randomized Multilayer Films**  
Andrew Moshova, 17, Manhasset High School, Manhasset, New York  
Jessica Kim, 17, Manhasset High School, Manhasset, New York

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

ET015 **Year II: Domestic Wastewater Clarification and Power Generation- Increasing the Conductivity of Permeated Electrodes in a Single-Celled Microbial Fuel Cell**

Nurul MohdReza, 18, Union Colony Preparatory School, Greeley, Colorado

ET021 **Development of Highly Efficient and Stable Dye-sensitized Solar Cells Using Natural Hydrangea macrophylla Dyes**

Mie Yamanaka, 17, Miyagi Prefectural Sendai Daini Senior High School, Sendai-City, Japan

ET044 **The Cooling of Solar Panels to Increase Power Output**

Christopher Rafael Botello, 15, John Jay High School, San Antonio, Texas

ET055 **Employing in situ Generated Peracetic Acid and Fungal Biosynthesis to Produce Biofuels**

Jonah Zachariah Butler, 16, Sibley East High School, Arlington, Minnesota

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

ET017 **Using Piezoelectronics to Convert Energy from a Nontraditional Source: Vibration**

Travis Benjamin Lysaght, 16, Hicksville High School, Hicksville, Ohio

ET026 **Next Generation Supercapacitor for Ultra-Fast Energy Harvesting**

Swetha Vanathy Shutthanandan, 16, Richland High School, Richland, Washington

ET030 **Riding the Wave: Energy in Motion**

Matthew Caffet, 17, The Academy of Science and Technology at The Woodlands College Park High School, The Woodlands, Texas

ET047 **Fun in the Sun! Increasing Grätzel Cell Efficiency Using Diatomaceous Earth**

Meagan Ann Fabel, 18, Walkerville Collegiate Institute, Windsor, Canada

ET056 **Infrared Alignment and Photon Densification Apparatus for Energy Optimization**

Andrew J. O'Neill, 18, Suncoast Community High School, Riviera Beach, Florida

ET057 **Wave-Powered Desalinators**

Mykhailo Lytovchenko, 16, Dnipropetrovsk Chemical Ecological Lyceum, Dnipropetrovsk, Ukraine

ET310 **A Continuation Study on Petroleum Recovery Rates: Creating a Pickering Emulsion in Oil Reservoirs to Increase the Accuracy of 4D Seismic Surveys**

Rund Essam Tawfiq, 17, Dhran School, Dammam, Saudi Arabia

Razan Samir Alfouzan, 18, Saad National School, Alkhobar, Saudi Arabia

**Fourth Award of \$500**

ET002 **Dye Sensitized Solar Cells: New Structures and Components for Greater Efficiency**

Mokshin Suri, 17, Plano West Senior High School, Plano, Texas

ET003 **Optimal Navigational Escape Routes for Collision Avoidance Using Multiple Object Tracking**

Alexis Rose Hopkins, 15, Fort Walton Beach High School, Fort Walton Beach, Florida

ET009 **A Novel Single Compartment Concentration Cell Powered by Natural Evaporation for Green Energy Harvesting and Storage, Year Two**

Andrew Yang, 17, Health Careers High School, San Antonio, Texas

ET024 **Mars Absolute Positioning System (MAPS): An Innovative Design to Advance the Exploration of Mars**

Matthew Russell, 17, Home School, Lexington, Kentucky

ET027 **Comparing Shroud Design on the Electrical Power Output of a Small-Scale Horizontal-Axis Wind Turbine**

Kelly Nicole Devens, 16, Roanoke Valley Governor's School for Science and Technology, Roanoke, Virginia

ET037 **Utilizing Pine Cone Briquettes as an Alternative Energy Source**

Lungelo Don Clerence Sigudla, 16, Newcastle High School, Newcastle, South Africa

ET050 **New Method for the Prediction of Carbon Nanostructures and the Application Towards Optimizing Electron Transfer Rates in Dye Sensitized Solar Cells**

Bailey Liao, 18, Half Hollow Hills High School West, Dix Hills, New York

ET062 **Cones, Chutes, and Coils: Novel Proposals to Ebb Wingtip Vortices**

Loren J. Newton, 16, La Sierra High School, Riverside, California

ET311 **Alternative Fuels for Future Engines: Investigating the Potential of FACE A, FACE C, and Farnasane as Novel Alternative Gasolines and Biofuels**

Mohammed Abdulfattah Aldajani, 17, Dhahran Ahliyya Schools, Dhahran, Saudi Arabia

Salam Hasan Alabdullatif, 17, Dhahran Ahliyya Schools, Dhahran, Saudi Arabia

Environmental Sciences

**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**

**EV028 Novel Renewable Filter for Heavy Metal Removal: A Practical Application of Functionalized Multi-Walled Carbon Nanotubes**

Perry Alagappan, 17, Clear Lake High School, Houston, Texas

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

**EV006 An Investigation of the Consequences of Aquatic Single-Walled Carbon Nanotube Exposure Concerning *Daphnia magna* at Varying Concentrations**

Jonathan James McCutchen, 14, Keystone School, San Antonio, Texas

**EV028 Novel Renewable Filter for Heavy Metal Removal: A Practical Application of Functionalized Multi-Walled Carbon Nanotubes**

Perry Alagappan, 17, Clear Lake High School, Houston, Texas

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

**EV021 Investigating the Efficacy of Bioluminescent Mushroom *Panellus stipticus* as a Biosensor to Detect the Toxicity of Water Contaminants**

Bridget Ann Oei, 18, East Catholic High School, Manchester, Connecticut

**EV024 P.A.H. (Polycyclic Aromatic Hydrocarbons) Mixtures: Using Zebrafish to Elucidate Mechanisms of Toxicity**

Meera Radha Srinivasan, 16, Interlake High School, Bellevue, Washington

**EV025 Effects of the Environmental Pollutant Acrylic Aldehyde on Renal Fibrosis**

Sanjana J. Rane, 16, duPont Manual High School, Louisville, Kentucky

**EV316 Grains of Gold**

Shamma Faisal Al Bastaki, 17, Al Ittihad Private School-Jumeira, Dubai, United Arab Emirates

Hayat Abdulredha Abu Alhassan, 16, Al Ittihad Private School-Jumeira, Dubai, United Arab Emirates

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

**EV005 Zero Valent Iron Nanoparticle Enhanced Polyethersulfone Membranes for Water Filtration: Isolating Casting Parameters for Global Applications**

Hope Alexis Weinstein, 17, Fairview High School, Boulder, Colorado

**EV009 Preventing the Global Reproductive Failure of Aquatic Life through the Catalytic Treatment of Endocrine Disrupting Compounds in Municipal Waste Water**

Zachary A. Loeb, 17, Viera High School, Viera, Florida

**EV018 Determination of Factors that Impact Clearance of Suspended Particulate Matter (Dust) in Air**

Alanna M. Bram, 16, John Marshall High School, Rochester, Minnesota

**EV019 To Choose or Not to Choose?: Investigating the Trophic Effects of Thiamethoxam on Euplectrus comstockii when Parasitizing Trichoplusia ni, Year Two**



Ashley Suzanne Wyrick, 16, Tuscumbia High School, Tuscumbia, Missouri

**EV053 H<sub>2</sub>O<sub>h</sub> No: Pharmaceuticals Contaminate Groundwater! Sulfamethazine Adsorption Isotherms and Kinetics with Hypercrosslinked Polymer MN250 in Acid and Alkaline Environments**

Maria Elena Grimmett, 15, Oxbridge Academy of the Palm Beaches, West Palm Beach, Florida

**EV311 New Discovery of Eco Plyfibre via Pineapple Leaf and Recyclable Plastic for Future Sustainability**

Nur Hanis Suriani Binti Mohd Zaini, 17, Mara Junior Science College Terendak, Melaka, Malaysia

Nurul Najiha Binti Mohd Roslan, 17, Mara Junior Science College Terendak, Melaka, Malaysia

#### **Fourth Award of \$500**

**EV023 Investigating the Use of Plant Xylem from Angiosperm Wood Species as Organic Water Filters**

Varsha Venkatesh, 18, Jericho Senior High School, Jericho, New York

**EV026 Diabetics Are More Susceptible to Air Pollution: Effects of Urban Particulate Matter with High Glucose on Human Monocytes**

Yue Zhang, 16, duPont Manual High School, Louisville, Kentucky

**EV029 Sustainable Water Purification System with UV Irradiation**

Hans Christian Pande, 17, Woods Cross High School, Woods Cross, Utah

**EV034 Improving Bioindicators: A New Weight-Length Model for Fish to Provide More Accurate Ecosystem Condition Assessment**

Ya'el Carmel Courtney, 17, Mount Carmel School, Aurora, Ohio

**EV040 Assessment of Thirdhand Exposure to Nicotine from Electronic Cigarettes**

Lily Wei Lee, 18, Stuyvesant High School, Manhattan, New York

**EV052 Investigating Relationships between Air Quality and Environmental Persistence of Fecal Indicator Bacteria at Recreational Beaches: A Molecular MST Approach**

Kristina Marie Thoren, 18, American Heritage School, Plantation, Florida

**EV054 The Selenoproteome Influences Vulnerability to Environmental Methylmercury: The Potential Perspectives in Relation to Human Diseases**

Davarshi Nikhil Patel, 17, Red River High School, Grand Forks, North Dakota

**EV306 Bioremediation of the Enbridge Oil Spill through Autochthonous Biostimulation**

Alexandra Marie Peirce, 17, Kalamazoo Area Math and Science Center, Kalamazoo, Michigan

Katherine Wu, 17, Kalamazoo Area Math and Science Center, Kalamazoo, Michigan

Mathematical Sciences

**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**

**MA054 Dynamic Mathematics on Smartphones and Tablets**

Lennart Julian Kleinwort, 15, Friedrich-Koenig-Gymnasium, Wurzburg, Germany

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

**MA024 Odd Dunkl Operators and nilHecke Algebras**

Ritesh Narayan Ragavender, 17, South Brunswick High School, Monmouth Junction, New Jersey

**MA054 Dynamic Mathematics on Smartphones and Tablets**

Lennart Julian Kleinwort, 15, Friedrich-Koenig-Gyumnasium, Wurzburg, Germany

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

**MA007 Continued Fractions of Quadratic Numbers**

Aranka Hruskova, 19, Gymnazium Christiana Dopplera, Prague, Czech Republic

**MA022 Base 1.5: Analysis of Properties and Relation to the Collatz Conjecture**

Jesse Martin Michel, 17, Massachusetts Academy of Math and Science at WPI, Worcester, Massachusetts

**MA034 On the Lower Central Series of PI-algebras**

Rumen Rumenov Dangovski, 18, Sofia High School of Mathematics, Sofia, Bulgaria

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

**MA020 Facility Location Problems and Non-Leibniz Analysis on Complex Plane**

Oleksandr Tytov, 17, School-Lyceum #3 named after A. S. Makarenko, Simferopol, Ukraine

**MA035 Covering Squares of Side Length  $n+e$  with Unit Squares**

Rayna Dimchova Gadzheva, 18, Mathematical High School 'Konstantin Velichkov,' Pazardzhik, Bulgaria

**MA040 The Impact of Demand Elasticity on the Downs-Thomson and Braess Paradoxes**

Rishi Suvir Mirchandani, 17, Fox Chapel Area Senior High School, Pittsburgh, Pennsylvania

**MA050 Functional Equations: Rational Functions and Their Matrix Isomorphism**

Joshua Alan Rhodes, 17, Saginaw Arts and Sciences Academy, Saginaw, Michigan

**MA056 Cohomology of Finite Groups without Homological Algebra**

Nikolai Mostovskii, 17, The Laboratory for Continuous Mathematical Education, St.Petersburg, Russian Federation

**Fourth Award of \$500**

**MA012 A Rational Story of Pi: From Asymmetrical Cut to Weighted Average**

Kuan-Yu Wang, 13, San Min Junior High School, Kaohsiung, Chinese Taipei

**MA025 Identification of the Impact of Obesity Treatments on Gene Expression using a Novel Statistical Test**

Shreya Mathur, 17, Oxford High School, Oxford, Mississippi

**MA032 A Monte Carlo Protein Folding Simulation using Energy Optimization with Novel Applications to Alzheimer's Disease Research**

Niranjan Balachandar, 17, Texas Academy of Mathematics and Science, Denton, Texas

**MA038 An Investigation of the p53 Ubiquitin-Proteasome System Using a Novel Non-Steady-State Enzyme Kinetic Model**

Prem Murali Talwai, 16, Mira Loma High School, Sacramento, California

**MA043 Characterizing the n-Division Points of Genus-0 Curves through Straightedge and Compass Constructions**

Nitya Mani, 16, The Harker School, San Jose, California

**MA045 Alternative Proof of 100 Inequalities: Method of Separating Tangents**

Adilsultan Lepas, 18, Republican Physics and Mathematics School named after O.Zhautikov, Almaty, Kazakhstan

**MA046 Explaining the Map and the Matrix of the Discrete Lambert Exponentiation**

Krishan Shashi Kumar, 18, Terre Haute South Vigo High School, Terre Haute, Indiana

Medicine and Health Sciences

**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**

**ME037 Characteristics of Deleterious Mutations in Tumor Suppressor Genes**

Nathan Han, 15, Boston Latin School, Boston, Massachusetts

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

**ME037 Characteristics of Deleterious Mutations in Tumor Suppressor Genes**

Nathan Han, 15, Boston Latin School, Boston, Massachusetts

**ME038 Early Cancer Diagnosis and Treatment through the Detection of Circulating Tumor Cells Using Drop-based Microfluidics**

Neil Davey, 18, Montgomery Blair High School, Silver Spring, Maryland

**ME101 Towards a Combination Antiviral Therapy for Flu: An Interdisciplinary Drug Discovery Effort**

Eric S. Chen, 18, Canyon Crest Academy, San Diego, California

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

**ME003 The Use of MnSOD in Combined Modality Therapy to Sensitize Lung Cancer Cells to Ionizing Radiation and Chemotherapy**

Ahneesh Jayant Mohanty, 17, Plano Senior High School, Plano, Texas

**ME004 Mela NO MORE: Creating Novel and Potent siRNA-based Biotherapies for the Treatment of Melanoma**

Robert M. Bacchus, 17, Lincoln Park Academy, Fort Pierce, Florida

**ME005 Nicotine and Genistein as Novel Therapeutic Agents for Alzheimer's Disease**

Meenakshi Bose, 16, Eastside High School, Gainesville, Florida

**ME011 MUC1 as a Biomarker for TGF- $\beta$ 1 Inhibition: Investigating the Role of MUC1 in the Switch of TGF- $\beta$ 1 Function from a Tumor Suppressor to a Tumor Promoter in Pancreatic Ductal Adenocarcinoma**

Emily Lorin Ashkin, 16, Providence Day School, Charlotte, North Carolina

**ME079 Isothermal Nucleic Acid Amplification System for Point-of-Care HIV Diagnosis**

Nicole Sabina Ticea, 15, York House School, Vancouver, Canada

**ME094 The SMART System: Stroke Management with Augmented Reality Technology**

Ethan Thomas Butson, 18, The Illawarra Grammar School, Mangerton, Australia

**ME306 Nanoparticle-Mediated Gene Delivery via Balloon Angioplasty to Suppress Intimal Hyperplasia**

Jenna Rose DiRito, 18, Academy for Medical Science Technology, Hackensack, New Jersey

Serena Margaret Tharakan, 17, Academy for Medical Science Technology, Hackensack, New Jersey

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

**ME009 Seeking a Cure II: Targeting ER $\beta$  in a Novel Cost-Effective Treatment for Ovarian Epithelial Cancer**

Jocelyn Elizabeth Hernandez, 17, STEM Academy at Robert E. Lee High School, San Antonio, Texas

**ME020 Development of a Novel Blood-Based Diagnostic for Canine Lymphosarcoma**

Golda R. Shaw, 17, George M. Steinbrenner High School, Lutz, Florida

**ME027 Quizartinib (AC220) Reverses ABCB1- and ABCG2-Mediated Multidrug Resistance**

Kanav Gupta, 16, Jericho Senior High School, Jericho, New York

**ME028 Too Much of a Good Thing? A Novel Role of Osteopontin as an Anti-Obesity Cytokine and Its Implication in Obesity-Related Disease**

Lelina T. Chang, 18, William A. Shine Great Neck South High School, Great Neck, New York

**ME030 A Natural Way to Improve Chemotherapy: Investigating the Effect of Biochanin A on the Efficacy of Thapsigargin in a *C. elegans* Cancer Model**

Audrey Lyn Francis, 17, Loudoun County Academy of Science, Sterling, Virginia

**ME043 Development of an Electroencephalography (EEG) Device for Evaluation of Mild Traumatic Brain Injury, Year Two**

Braeden Christopher Benedict, 17, Palos Verdes Peninsula, Rolling Hills Estates, California

**ME060 Treating GBM BTSCs through Growth Factor Stimulation and Drug-Polymer Conjugate Therapy**  
Sujay Nagaraj, 17, Western Canada High School, Calgary, Canada

**ME092 Loss of TDP43 in Motor Neurons Leads to Deficits in Axonal RNAs in an Animal Model of ALS**

Karan Desai, 17, Edgemont High School, Scarsdale, New York

**ME302 Enhancing Pancreatic Islet Function in an Obese Mouse Model**

Chelse-Amoy Alicia Steele, 17, Rockdale Magnet School for Science and Technology, Conyers, Georgia

Lawrence Conley Jacobs, 17, Rockdale Magnet School for Science and Technology, Conyers, Georgia

**ME315 Rational Discovery and Optimization of Synergistic Chemotherapy Combinations: A Novel Framework Integrating Gene Perturbation Analysis and Machine Learning Algorithms**

Steven Michael Wang, 17, The Harker School, San Jose, California

Andrew Cheng Jin, 17, The Harker School, San Jose, California

**Fourth Award of \$500**

**ME015 Investigating the Effect of Polyhydroxylated Small-Gap Fullerene as an Antioxidant for Amyloid $\beta$ -Induced Free Radicals in NT2 Cells**



Alexander Torres, 18, Seminole High School, Sanford, Florida

**ME034 Novel Single-Cell Screening: Optimized Droplet-Based Microfluidics for High-Throughput Screening of Adherent Cells**

Jason Shao Cui, 18, Langley High School, McLean, Virginia

**ME061 Evolution of Developing an Alternative Treatment for Candida albicans using Natural Plant Extracts**

Surabhi Gopal Mundada, 14, Olympia High School, Olympia, Washington

**ME063 Myoblast Encapsulation for Novelty Muscular Dystrophy Gene Therapy**

Marquise Walker, 17, Lindblom Math and Science Academy, Chicago, Illinois

**ME067 Fighting for the Orange Ribbon: Acute Myeloid Leukemia Type-3 Differentiation Triggered by Cisplatin**

Jumanah Marwan Alsawaf, 16, Dar AlFiker School, Jeddah, Saudi Arabia

**ME072 Effect of Bacterial Quorum Sensing Molecule N-3-oxo-Dodecanoyl-L-Homoserine Lactone on Human Pancreatic Carcinoma Cells**

Ashwath Kumar, 18, David H. Hickman High School, Columbia, Missouri

**ME074 Progressing Targeted Cancer Therapy and Diagnosis: Analyzing the Role of MiRNA Target Interactions and Expression Signatures for Glioblastoma Progression**

Vaishnavi Shrivastava, 17, Mission San Jose High School, Fremont, California

**ME077 A Wearable Ultrasonic Device for the Early Detection of Tumor Recurrence**

Milan Satch Gambhir, 15, Bellarmine College Preparatory, San Jose, California

**ME080 Personalized Medicine: A Novel Quantum Dot Bioconjugate Targeted Cancer Therapy**

Amit Scheer, 15, Colonel By Secondary School, Ottawa, Canada

**ME100 Cytochrome C Oxidase Activity and Chemoresistance**

Tahireh Markert, 17, Indian Springs School, Indian Springs, Alabama

**ME106 Multicomponent Drug Delivery Systems Based on PLCL Nanofibers and Modified Gold Nanoparticles in Cancer Treatment**

Joanna Michalina Jurek, 17, I Liceum Ogólnokształcące im. Bolesława Chrobrego w Piotrkowie Trybunalskim, Piotrków Trybunalski, Poland

**ME116 Hepatocyte Differentiation of hESC Cultured Under Xeno-Free and Feeder-Free Conditions**

Dhruba Biswas, 17, Mira Loma High School, Sacramento, California

**ME309 Dnmt3l: A New Genetic Factor in Obesity**

Andrew Richard Reilley, 17, The Maine School of Science and Mathematics, Limestone, Maine  
Roger Wolcott Van Peski, 18, The Maine School of Science and Mathematics, Limestone, Maine  
Abigail Harvey, 18, The Maine School of Science and Mathematics, Limestone, Maine

**ME313 Elucidating the Mechanism of the Ketogenic Diet as an Effective Adjuvant Therapy for Malignant Glioma: A Multiphase Study to Characterize Alterations in Tumor-Associated Inflammatory and Growth Factor Signaling**

Rajet Vatsa, 17, Brophy College Preparatory, Phoenix, Arizona  
Claire Jayne Woodrow, 18, Xavier College Preparatory, Phoenix, Arizona

Microbiology

**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**

**MI005 The Conjugative Plasmid RK2 as a Delivery System for Artificial AnatheriaH Genes: A Novel Synthetic Biology Alternative to Traditional Antibiotics**  
Logan Collins, 17, Fairview High School, Boulder, Colorado

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

**MI005 The Conjugative Plasmid RK2 as a Delivery System for Artificial AnatheriaH Genes: A Novel Synthetic Biology Alternative to Traditional Antibiotics**  
Logan Collins, 17, Fairview High School, Boulder, Colorado

**MI017 The Itch to Twitch: The Effects of DNA, DNase, and Degraded DNA on Twitching Motility in Acinetobacter baylyi**  
Rebecca Bloomfield, 15, William J. Palmer High School, Colorado Springs, Colorado

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

**MI020 Host-specific Binding of ClfB in Staphylococcal Nasal Carriage**  
Amy T. Xu, 17, Jericho Senior High School, Jericho, New York

- MI033 **Elucidating the Interactions between the Envelope Glycoprotein gp41 of HIV-1, gC1qR and C1q: Relevance to HIV-1 Pathogenesis**  
Stephanie Ying, 17, Manhasset High School, Manhasset, New York
- MI039 **What's on the Menu: Identification of the Hydrocarbon Transport Systems as a First Step in Marine Oil-Degradation by *Alcanivorax borkumensis***  
Swapnav Deka, 17, Plano East Senior High School, Plano, Texas
- MI064 **Novel Treatment of Chronic Bacterial Infection: Investigation and Multi-Compound Inhibition of Acyl-homoserine Lactone-Based Quorum Sensing in *Pseudomonas aeruginosa* and its Role in Biofilm Development in vitro**  
Nicholas Paul Miller, 17, West Linn High School, West Linn, Oregon
- MI065 **Developing Novel Protein Targets for *Bordetella pertussis* Antibiotics: Understanding Protein Interfaces and Domain-Domain Interactions**  
William Huang Jin, 18, Gwinnett School of Mathematics, Science, and Technology, Lawrenceville, Georgia

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

- MI006 **Analyzing the Complex Carbohydrate Structures on the Plasma Membrane of the Cultured Mosquito Cells Using Fluorescently Labeled Lectins**  
Carly Crump, 17, Episcopal School of Jacksonville, Jacksonville, Florida
- MI009 **Improved Multiplexed Automated Genome Engineering through Directed Evolution**  
Mark Kit Lim, 17, Raffles Institution, Singapore, Singapore

- MI010 **The Inception of Infection II: The Antimicrobial and Synergistic Efficiency of Antibiotic Ethambutol and Isoniazid and Bacteriophage D29 in Treating a Model Organism for Tuberculosis**  
Lucy Cai, 17, Texas Academy of Mathematics and Science, Denton, Texas
- MI030 **Determining Antimicrobial and Synergistic Properties of Silver Coated Carbon Nanotubes and Antimicrobial Peptides against Streptococcus pyogenes**  
Ruchir Rastogi, 16, Loveless Academic Magnet Program High School, Montgomery, Alabama
- MI034 **Utilizing UV-rays to Eradicate Micro-Organisms on Healthcare Workers Cellular Phones to Prevent Cross-Infection**  
Toni-Ann Black, 16, Roedean School SA, Johannesburg, South Africa
- MI051 **Mycobacteriophage TM4 Tape-Measure Protein Blocks Entry into Stationary Phase of Tuberculosis**  
Libby Ho, 17, Stuyvesant High School, Manhattan, New York
- MI309 **Elucidating the Metabolism and Toxicity of Host-Derived Toxin Methylglyoxal in Mycobacterium Tuberculosis and Mycobacterium Smegmatis**  
Zhun Che, 17, Pelham Memorial High School, Pelham, New York  
Julia Burns Kavanagh, 17, Pelham Memorial High School, Pelham, New York  
Luke E. Hellum, 16, Pelham Memorial High School, Pelham, New York

#### **Fourth Award of \$500**

- MI015 **Evaluating Resistance to Triclosan™ in Selected Bacteria and Aquatic Samples Isolated from Pre and Post Water Treatment Effluent**  
Gage Holleman, 18, Cascia Hall Preparatory School, Tulsa, Oklahoma

- MI025 **Resveratrol Biosynthesis in Genetically Engineered Microorganisms**  
Steven Ban, 18, Logan High School, Logan, Utah
- MI038 **Inhibition of Host-Cell Endosomal Acidification by H1N1 Influenza**  
Alex White, 17, Uplift North Hills Preparatory, Irving, Texas
- MI050 **Isolation of Escherichia coli O157 Proteins that Interact with the Bovine Recto-anal Junction Squamous Epithelial (RSE) Cells**  
Aparna Sai Ajjarapu, 17, Ames High School, Ames, Iowa
- MI053 **Effects of Pollutants and Changes in pH on the Bioluminescence of Vibrio fischeri: A Novel Bioassay for Water Pollution Detection**  
Shayan Daniel Farmand, 14, Methacton High School, Eagleville, Pennsylvania
- MI054 **Comparative Evaluation of Electrical Strategies for Eradication of Staphylococcus epidermidis Biofilms**  
Michelle Elisabeth Marie Campeau, 16, Mayo High School, Rochester, Minnesota
- MI057 **Creation of a CTX-M-14/CTX-M-15 Gene Fusion to Determine if an Intrinsic Structural Feature of CTX-M-15 Causes Upregulation of Its Expression**  
Archana Meera Varman, 16, Duchesne Academy of the Sacred Heart, Omaha, Nebraska
- MI059 **Identification of Novel Broad-Spectrum Antimicrobial Compounds in Curcuma amada**  
Varsha Jayasankar, 17, Sir Winston Churchill Secondary School, St. Catharines, Canada
- MI076 **From the Antibiotic Resistance Acquisition by Bacteria to the Impact of the Resistant Tuberculosis on Society through a Computer Modelling (IbM)**  
Sergi Macia Munoz, 16, INS Escola Industrial, Sabadell, Spain

**MI304 The State of Parental Mitochondria Influences the Replicative Lifespan of Zygotes of *Saccharomyces cerevisiae***

Pei-Ming Chen, 16, Taipei Municipal Jianguo High School, Taipei City, Chinese Taipei

Shao-Ting Chiu, 18, Taipei Municipal Jianguo High School, Taipei City, Chinese Taipei

Physics and Astronomy

**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**

**PH081 The Leidenpump: A Non-Mechanical Means of Fluid Delivery**

John Chapman Alexander Caddell, 16, Stevenson School, Pebble Beach, California

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

**PH044 Fabricating an Artificial Nose using Mesoporous Photonic Crystals**

Achal James Fernando-Peirís, 16, Mount Vernon High School, Mount Vernon, Ohio

**PH065 On Tycho Supernova Remnant Accelerating Cosmic-rays**

Michaela Brchnelova, 17, High School of Jura Hronca, Bratislava, Slovakia

**PH081 The Leidenpump: A Non-Mechanical Means of Fluid Delivery**

John Chapman Alexander Caddell, 16, Stevenson School, Pebble Beach, California

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

**PH036 An Application of Dean's Flow in Spiral Micro Channels for Particle Isolation**

Vipul Nandigala, 16, Walled Lake Western, Walled Lake, Michigan

**PH045 3D Hydrodynamic Simulation of Classical Nova Explosions**

Coleman J. Kendrick, 16, Los Alamos High School, Los Alamos, New Mexico

**PH072 A Kinetic Monte Carlo Study of the Scalability and Variability of the Forming Voltage of Transition Metal Oxide ReRAMs**

Namrata Ramya Balasingam, 16, Archbishop Mitty High School, San Jose, California

**PH311 Study of Two-dimensional Melting in a System of Small Magnets**

Martin Liscinsky, 18, Gymnazium Svateho Tomasa Akvinskeho, Košice, Slovakia

Michal Geci, 19, Gymnazium Svateho Tomasa Akvinskeho, Kosice, Slovakia

**PH314 Rising Water**

Marcel Neidinger, 17, Hans Thoma Gymnasium, Lorrach, Germany

Leonard Bauersfeld, 16, Hans Thoma Gymnasium, Lorrach, Germany

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



- PH024 **Evolution of Novel Magnetism in Single-Crystal Honeycomb Iridates: An Approach towards Quantum Spin Liquids**  
Vincent Shian Cao, 18, Paul Laurence Dunbar High School, Lexington, Kentucky
- PH028 **The Development of a Novel, Low Cost, High Power, Tunable UV Supercontinuum Laser Source**  
Joseph Patrick Lee, 17, Saint Peter's Academy, New Market, Alabama
- PH029 **Trapped Field Superconducting Magnets**  
Kavita Anjali Selva, 14, Clear Lake High School, Houston, Texas
- PH041 **Spectral Smartphone: Rapid Prototyping Mobile Platform Diffraction Spectrophotometry**  
Allen Jiang, 16, duPont Manual High School, Louisville, Kentucky
- PH057 **Fringe E-Fields of Flat and Cylindrical Deflectors and a New Proposal for the Proton EDM Experiment**  
Kevin Li Huang, 17, Jericho Senior High School, Jericho, New York
- PH060 **PT-Symmetry Breaking in Periodic Potentials**  
Charles Haohan Liang, 18, Carmel High School, Carmel, Indiana
- PH071 **Optimizing the Process of Single Photons Coupling into Single-Mode Fibers by Using a Genetic Algorithm and Spatial Light Modulation**  
Jerzy Krzysztof Szuniewicz, 17, Adama Mickiewicza High School in Poznan, Poznan, Poland
- PH302 **Observational Detection of Solar g-mode Oscillations Using Doppler Velocity Signals**  
Min Sung Kim, 16, Maui High School, Kahului, Hawaii  
Matthew Thomas Sturm, 17, Maui High School, Kahului, Hawaii

#### **Fourth Award of \$500**

**PH007 Rocks of the Rainbow: Asteroid Classification Using SDSS Filters**

Stephanie Hiromi Spear, 16, Henry J Kaiser High School, Honolulu, Hawaii

**PH013 Nova Delphini 2013: A Backyard Analysis of a Classical Nova**

Piper Michelle Reid, 17, Dripping Springs High School, Dripping Springs, Texas

**PH017 Experimental Investigation of Segregation Mechanisms in Horizontally Shaken Granular Media**

Mikiko Takato, 17, Hilo High School, Hilo, Hawaii

**PH019 Novel Automated Next-Generation Multijunction Quantum Dot Solar Panel Designs Using Monte Carlo-Based Modeling**

Valerie S. Ding, 17, Catlin Gabel School, Portland, Oregon

**PH022 A Novel Error Correction Scheme in Quantum Computing and Communication**

Kelvin Wang, 17, Academy for the Advancement of Science and Technology, Hackensack, New Jersey

**PH032 Kinematic Determinants of Success in the Fencing Flick: Logistic and Linear Multiple Regression Analysis**

Anya Noelle Michaelsen, 17, Lake Braddock Secondary School, Burke, Virginia

**PH050 An Analysis of the Feasibility of a Superconducting Maglev Launch System Based on the Meissner Effect**

Chan Sam Lee, 17, Central Virginia Governor's School/Rustburg High School, Lynchburg, Virginia

**PH062 Refining Preliminary Orbital Determination for Near-Earth Asteroids: Comparison of Fundamental Methods with n-Body Correction**

Benjamin Thomas Lei, 18, Arlington High School, LaGrangeville, New York

**PH077 Measuring Water Waves**

Daniel Pflueger, 19, Gymnasium Johanneum Lueneburg, Lueneburg, Germany

**PH316 A Low-Cost and High-Temperature Vibrating Sample Magnetometer**

Mehmet Ege Karaesmen, 18, Takev Ozel Anadolu Lisesi, Izmir, Turkey

Ahmet Berk Selvi, 19, Takev Ozel Anadolu Lisesi, Izmir, Turkey

Plant Sciences

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**Intel ISEF Best of Category Award of \$5,000**

**PS013 Mechanistic Characterization of a Transcription Factor bZIP16 in Regulating Arabidopsis Flowering Pathways**

Yi-Hsuan Huang, 17, Taipei Municipal Jianguo High School, Taipei City, Chinese Taipei

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

**PS010 Algae's Photoinhibition Sheds Light on Why Land Plants Evolved To Be Green, Not Black**

Ruomeng Wan, 18, Experimental High School Attached to Beijing Normal University, Beijing, China

**PS013 Mechanistic Characterization of a Transcription Factor bZIP16 in Regulating Arabidopsis Flowering Pathways**

Yi-Hsuan Huang, 17, Taipei Municipal Jianguo High School, Taipei City, Chinese Taipei

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

**PS022 Cellulose Binding Domains: Novel Implications in Agriculture and Biofuel Production**

Alon Millet, 16, Academy for the Advancement of Science and Technology, Hackensack, New Jersey

**PS043 An Eco-friendly RNA Interference-based Insect Control for Management of Citrus Greening Disease using a Model System**

Saumya R. Keremane, 17, Martin Luther King High School, Riverside, California

**PS315 Novel Iterative Methodologies in the Search for a Universally-Functional DNA Barcode for Plants**

Jaison Jain, 15, Hunter College High School, New York, New York

Julian Stefan Glowacz, 15, Hunter College High School, New York, New York

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

**PS036 Utilizing the Isolated Components, Variation in Mammals, and Treatment Processes of Milk for Grain Yield Enhancement**

Jordan Ray Cadle, 19, Paoli Junior/Senior High School, Paoli, Indiana

- PS042 **Examining Potential False Positives for Genetic Modification in Taro**  
Anuheha DeLude, 18, Kamehameha Schools Kapalama, Honolulu, Hawaii
- PS301 **Enhanced Third-Generation Biofuel Production from Genetically Modified Algae**  
Wenjia (Dara) Li, 16, Jasper High School, Plano, Texas  
Anoop Vemulapalli, 16, Plano West Senior High School, Plano, Texas
- PS310 **Use of Bio Ferments in the Biological Control of Moniliasis (*Moniliophthora roreri*) in Cocoa (*Theobroma cacao*)**  
Marcelo Guerra-Abrego, 19, Liceo Academico de Sixaola, Limon, Costa Rica  
Veronica Bustos-Guido, 17, Liceo Academico de Sixaola, Limon, Costa Rica  
Daylin Bryan Rodriguez, 16, Liceo Academico de Sixaola, Limon, Costa Rica
- PS321 **A Computational Model of Tree Growth to Maximize Carbon Sequestration**  
Eli J. Echt-Wilson, 17, La Cueva High School, Albuquerque, New Mexico  
Albert Zuo, 17, La Cueva High School, Albuquerque, New Mexico

#### **Fourth Award of \$500**

- PS004 **The Effects of Rhizobia Inoculation on *Moringa oleifera* Growth, a Fourth Year Study**  
Sarah Elizabeth Craig, 16, Niceville High School, Niceville, Florida
- PS006 **A Comparison of the Effects of Thermotherapy and Electrotherapy on Soybean Plants**  
Auriel Samone Wright, 17, Northeast Magnet High School, Macon, Georgia
- PS019 **Brassica juncea (Mustard) Flowers to Attract Pollinators for Better *Malus domestica* (Apple) Yield**  
Jaya Sagar, 16, Government Senior Secondary School- Manali, Manali, India

- PS033 **RNA-Guided Genome Editing in *Arabidopsis thaliana* Using CRISPR/CAS9**  
Nadine Mahdi Almadani, 18, Dahran School, Dammam, Saudi Arabia
- PS035 **The Fungicidal Impact of Detrimental Weeds on Soybeans**  
Grady Adam Mauch, 17, Hankinson Public School, Hankinson, North Dakota
- PS040 **Composting *Halyomorpha halys***  
Sinmisola Tinubu, 17, Eleanor Roosevelt High School, Greenbelt, Maryland
- PS319 **Novel Strategy for Controlling Population of Pest Snails Using Plant Extracts**  
Pattarapong Limpawattana, 16, Phanomsarakham "Phanom Adun Witthaya" School, Chachuengsao, Thailand  
Wanta Kamlang, 16, Phanomsarakham "Phanom Adun Witthaya" School, Chachuengsao, Thailand