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Winner Announcement Intel ISEF 2011 Grand Awards Ceremony

May 13, 2011, Los Angeles, California, USA – Society for Science & the Public, in partnership with the Intel Foundation, this morning announced awards at the Intel ISEF 2011 Grand Awards Ceremony. Student winners are ninth through twelfth graders who earned the right to compete at the Intel ISEF 2011 by winning top prize at a local, regional, state or national science fairs.

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 the work—in the field and on the world at large.

Gordon E. Moore Award \$75,000

ME316

Treatment of Simulated Cancer Cells with Compton Scattering-Produced Secondary Radiation

Matthew Troy Feddersen, 17, Acalanes High School, Lafayette, California

Blake Marggraff, 18, Acalanes High School, Lafayette, California

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

EM315

Bio-based Packaging Plastics from Fish Scale

Pornwasu Pongtheerawan, 16, Suratpittaya, Maung, Suratthani, Thailand

Tanpitcha Phongchaipaiboon, 17, Suratpittaya School, Meung district, Suratthani, Thailand

Arada Sungkanit, 17, Suratpittaya School, Meung district, Suratthani, Thailand

PH037 **Countering Nuclear Terrorism: Novel Active and Passive Techniques for Detecting Nuclear Threats**
Taylor Ramon Wilson, 17, The Davidson Academy of Nevada, Reno, Nevada

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) (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. Students have the opportunity to visit scientific institutes, attend the Nobel lectures and press conferences, learn more about Sweden, and experience the extravagance of the Nobel festivities. Valid passport required for travel.

BE057 **Epigenetic Factors Influence *Drosophila* Brain Function and Aggressive Behavior, Phase V**
Andrew Wooyoung Kim, 18, Cedar Shoals High School, Athens, Georgia

EV323 **Mimicking Wetting Behavior of Spider Silk: Studies on Water-Harvesting Efficiency According to the Fabrication of the Pattern of Wettability Gradient**
Jinyoung Seo, 18, Korea Science Academy of KAIST, Busan, Busan, South Korea
Dongju Shin, 18, Korea Science Academy of KAIST, Busan, Busan, South Korea

The SIYSS will be held in Stockholm, Sweden in December. Students must 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.

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
Trip to the EU Contest.

CS030 **Efficient Implementation of Tilt Compensated Compass and Depth Camera in Interactive Augmented Reality**
Lai Xue, 18, Chengdu International School, Chengdu, Sichuan, China

EA023 **Using Amino Acid Analysis to Distinguish Chondritic Meteorites from Rocks Launched into Space from Earth**
Jane M. Cox, 16, Timpview High School, Provo, Utah

MI030 **A Novel Approach to Mapping Protein Interactions during Pilus Biogenesis by Using in vivo Photocrosslinking**
Erica Brooke Portnoy, 17, Commack High School, Commack, New York

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

MIT Lincoln Laboratory

Lincoln Lab has partnered with SSP and the Intel ISEF to promote science education through the Ceres Connection. The names of first and second place category award winners at Intel ISEF will be submitted to the International Astronomical Union (IAU) for naming of a minor planet. All minor planets in the Ceres Connection have been discovered by the Lincoln Near Earth Asteroid Research (LINEAR) program, operated by MIT's Lincoln Laboratory.

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 for Top First Place Winner

AS062 **Effects of Food Types on Survival and Development of Larval California Spiny Lobsters, *Panulirus interruptus***
Adrienne Brooke McColl, 18, San Pedro High School, San Pedro, California

First Award of \$3,000

AS023 **The Effect of Urbanization on Occupancy and Detection Rates of Eastern Screech Owls in Suburban Areas**
Kyle Thomas Bardwell, 17, Ossining High School, Ossining, New York

AS062 **Effects of Food Types on Survival and Development of Larval California Spiny Lobsters, *Panulirus interruptus***
Adrienne Brooke McColl, 18, San Pedro High School, San Pedro, California

Second Award of \$1,500

AS044 **Extracting Necromone Repellents from Food Oils**
Chase Carter Gross, 15, Solon High School, Solon, Iowa

AS051 **Using Ecological Niche Modeling to Predict Current and Future Ranges of Cryptic Phylogeographic Lineages**
Helen Yao, 18, Staten Island Technical High School, Staten Island, New York

AS056 **Glial Contributions to Circadian Timekeeping in the *Drosophila* Brain**
Chengzhen Li Dai, 17, Detroit Country Day School, Beverly Hills, Michigan

- AS065 **Incipient Speciation of the Mustached Bat *Pteronotus parnellii* in the West Indies**
Bonnie Lei, 18, Walnut High School, Walnut, California
- Third Award of \$1,000**
- AS005 **The Effects of Nicotinic Acid, Resveratrol, and Rapamycin on the Life Span, Reproduction, and Ability to Cope with Temperature Stress of *Drosophila melanogaster***
Aaron Samuel Greenfield, 17, Keystone School, San Antonio, Texas
- AS014 **Seeing What You Want to See: Visual Experience and Top-down Processing in Honeybee**
Kevin Sean Chen, 17, The Affiliated Senior High School of National Kaohsiung Norm, Kaohsiung, Chinese Taipei
- AS022 **Biological Control of Ticks to Prevent Lyme Disease Using Entomopathogenic Nematodes**
Ryan Daniel Kerr, 16, Danbury High School, Danbury, Connecticut
- AS046 **Analysis and Characterization of the Bioactive Antimicrobial Natural Products from Marine Sponges**
Bernadette Ann Hritz, 18, Villa Joseph Marie High School, Holland, Pennsylvania
- AS055 **Developmental and Behavioral Analysis of Wild and Captive-bred *Tenodera sinensis***
Cameron Michael Jones, 18, Northwest Career and Technical Academy, Las Vegas, Nevada
- AS304 **Birds of the Santa Cruz Sandhills**
Alexander Michael Rinkert, 18, San Lorenzo Valley High School, Felton, California
Connor James Chesus, 19, San Lorenzo Valley High School, Felton, California
- Fourth Award of \$500**
- AS010 **The Urogenital System of Male Rhyacotritonidae: An Anatomical and Phylogenetic Study**
Emily Rachel Wilson, 17, Parkway Central High School, Chesterfield, Missouri
- AS021 **Copepod Culturing: Conditions for Maximum Yield per Generation**
Julian Ohiro Kimura, 17, Palos Verdes Peninsula High School, Rolling Hills Estates, California
- AS024 **A Continuing Study of Aggression during Shelter Competition between Invasive and Indigenous Species of Crayfish**
Vincent Jacob O'Leary, 15, Wheeling Central Catholic High School, Wheeling, West Virginia
- AS042 **Social Immunity of *Apis mellifera* as an Antimicrobial Indicator of CCD**
Ashley Nicole Sowder, 18, Southmoore High School, Moore, Oklahoma

- AS045 **In Search of the Causative Genetic Element(s) Affecting Entropion Eyelid Development in New-born Lambs: Is It OAR16_14874751?**
Aerin Erika Towle, 17, Sumner High School, Sumner, Washington
- AS049 **Population Census of Land Mollusks in a Xerophytic Forest Ecosystem: The Guanica State Forest in Puerto Rico**
Veronica Nieves, 16, Asuncion Rodriguez de Sala, Guayanilla, Puerto Rico
- AS306 **The Mechanism of Lysophosphatidic Acid-induced Procoagulation in Human Erythrocytes**
An Ji Hun, 17, Korea Science Academy of KAIST, Busan, South Korea
Junha Park, 17, Korea Science Academy of KAIST, Busan, South Korea
- AS307 ***Acmella oleracea*: A Naturally Growing Weed as Effective Pest Controller**
Akansha Verma, 16, Maharaja Agarsain Public School, Delhi, Delhi, India
Abhishek Khanna, 17, Maharaja Agarsain Public School, Delhi, Delhi, India

Behavioral and Social Sciences

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

- BE057 **Epigenetic Factors Influence *Drosophila* Brain Function and Aggressive Behavior, Phase V**
Andrew Wooyoung Kim, 18, Cedar Shoals High School, Athens, Georgia

First Award of \$3,000

- BE046 **GOOPLAY! The Effectiveness of Educational Video Game in Improving Web-Searching Skills for Children**
Bayan Mohammed Mashat, 16, Dar Altarbia, Jeddah, Central, Saudi Arabia

- BE057 **Epigenetic Factors Influence *Drosophila* Brain Function and Aggressive Behavior, Phase V**
Andrew Wooyoung Kim, 18, Cedar Shoals High School, Athens, Georgia

Second Award of \$1,500

- BE007 **Epidemiology of Sugar Dependence Amongst Adolescents**
Alessio Pio Giuricich, 16, Bishops Diocesan College, Cape Town,
- BE011 **An Analysis of Listener Perception and Visual Replication of Sonifications: A Third Year Study**
Neel Sanjay Patel, 16, Oviedo High School, Oviedo, Florida
- BE041 **Audio-Visual HIV/AIDS Education in a Tanzanian Adolescent Population**
Lori Kim, 18, West High School, Salt Lake City, Utah

BE310 **The Effects of the Initial Transition from Shod to Barefoot Running on Tibial Shock and Muscle Activation**
Evan Daniel Olin, 16, Ossining High School, Ossining, New York
Catherine Marie Conte, 16, Ossining High School, Ossining, New York

Third Award of \$1,000

BE012 **A Clinical and Epidemiological Approach to the Relationship between Attention Deficit Hyperactivity Disorder (ADHD) and Sleep/Wake Disorders**
Travis Coleman Sigafoos, 17, Champlin Park High School, Champlin, Minnesota

BE025 **An Investigation of the Economic, Social, and Consequential Factors that Affect Moral Decision-Making**
Katherine Michelle Mangialardi, 17, Ossining High School, Ossining

BE028 **Would You Do It for the Kids? Factors Involved in the Prediction of Intergenerational Preferences**
Sarah Susie Pak, 17, Roslyn High School, Roslyn Heights, New York

BE029 **Strategies Utilized by People with Autism and Neuro-Typical Individuals to Determine Emotion in Faces**
Samantha Michelle Phillips, 18, William A. Shine Great Neck South High School, Great Neck, New York

BE036 **Regulation of Life Span Extension and Varied Muscle Behavior from the Intake of 2-Propylpentanoic Acid through the Dietary Control of *Caenorhabditis elegans***
Eugene Kim, 15, Lexington High School, Lexington, Massachusetts

BE048 **Mosquitoes Be Gone!**
Ruchi Jayesh Shah, 17, Sachem High School North, Lake Ronkonkoma, New York

BE050 **Growing Up 'In Sync': Connecting a Bridge to an Autistic Mind's World**
Adelina Corina Cozma, 15, Bayview Secondary School, Richmond Hill, Ontario, Canada

Fourth Award of \$500

BE002 **Determining the Effect of Distractions Behind the Wheel on Teenagers through the Use of Driving Simulation**
Callie Marie Johnson, 15, St. Joseph's Academy, Baton Rouge, Louisiana

BE004 **Analyzing the Consistency of the Rorschach and Multiple Intelligences Correlation**
Katlyn Marie Firkus, 17, Rockdale Magnet School for Science and Technology, Conyers, Georgia

BE010 **The Influence of Phrase-Spaced Text on Reading Comprehension of Stroke Patients**
Lindsey Brooke Saunders, 17, Union County High School, Lake Butler, Florida

- BE044 **The Constitutionality Index: A Judiciary and Macroeconomic Guidance for International Entrepreneurs When Investing in National Economies**
Ana Sofia Cardoso Monteiro, 16, Colegio Marista Sao Luis, Recife, PE, Brasil
- BE054 **The Effect of Ear Dominance on Object Localization after Audio-Visual Conditioning**
Nadege Giraudet, 17, Institute for Collaborative Education, New York, New York
- BE304 **Is *Nephila clavata* a New Species of Social Spiders? A Preliminary Study on Behaviors of *Nephila clavata***
Jiaqi Duan, 16, Henan Experimental High School, Zhengzhou, Henan, China
Zihan Zhang, 18, Henan Experimental Middle School, Zhengzhou, Henan, China
Sihan Jiang, 17, Zheng Zhou Foreign Language School Campus, Zheng Zhou, HeNan, China
- BE319 **Impulsivity, Obsessiveness, and School Grades**
Christina R. Wassef, 17, Clear Lake High School, Houston, Texas
Audrey Claire Wassef, 17, Clear Lake High School, Houston, Texas
- BE321 **Sonification: A Novel Approach to Data Representation Differentiation of Multiple Streams of Data**
Danielle Nguyen, 17, Canyon Crest Academy, San Diego, California
Michelle Xie, 16, Canyon Crest Academy, San Diego, California

Biochemistry

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

- BI014 **Computational Analysis of Specific Missense Mutations in the SMN Tudor Domain**
Dianna Hu, 18, Half Hollow Hills High School West, Dix Hills, New York

First Award of \$3,000

- BI014 **Computational Analysis of Specific Missense Mutations in the SMN Tudor Domain**
Dianna Hu, 18, Half Hollow Hills High School West, Dix Hills, New York

- BI028 **From Models to Medications: Identification of Medication Leads for Treating Methamphetamine Addiction**
Yamini T. Naidu, 16, Valley Catholic High School, Beaverton, Oregon

Second Award of \$1,500

- BI018 **The Effects of Methyl Jasmonate on Crown Gall Regression and Protein Production in *Lycopersicon esculentum***
Chad Lawrence Harris, 18, Palm Bay High School, Melbourne, Florida
- BI031 **Regulation of Nitric Oxide Expression as a Form of Neurotransmitter Plasticity**
Vaishnavi Lakshminarasimha Rao, 15, Canyon Crest Academy, San Diego, California

BI301 **Research on Functional Dietary Fibre of Wheat Bran**
Fubin Li, 17, Zhengzhou No.11 Middle School, Zhengzhou, Henan, China
Yakang Li, 18, Zhengzhou No.2 Middle School, Zhengzhou, Henan, China
Zhongning Hao, 15, Henan Experimental High School, Zhengzhou, Henan, China

Third Award of \$1,000

BI011 **Determination of Estrogen as a Trigger of Protandric Colony Formation of *Amphiprion ocellaris***
Emily Marie Crisp, 18, Loudoun County Academy of Science, Sterling, Virginia

BI027 **Lipodystrophy Protein Seipin Functions in Lipid Droplet Biogenesis and Morphology**
Anita Sanjay Chandrahas, 18, Texas Academy of Mathematics and Science,
Denton, Texas

BI037 **Genetic and Genomic Analysis of TOR1 Signaling in Initiation of Cell Quiescence**
Lev Omelchenko, 18, Stuyvesant High School, New York, New York

BI050 **Effects of Fatty Acids on Skeletal Muscle Proliferation and Development**
Anji Li, 16, Pioneer High School, Ann Arbor, Michigan

BI303 **Evaluation of Fusarochromanone 101a: A Novel Fungus-Derived Anti-Cancer Drug**
Yoon Jee Kim, 18, Caddo Parish Magnet High School, Shreveport, Louisiana
Daniel Christopher Felty, 18, Caddo Parish Magnet High School, Shreveport, Louisiana

Fourth Award of \$500

BI020 **Grow Me Some Green!**
Brooke Suzanne Conley, 15, Hardee Senior High School, Wauchula, Florida

BI022 **Detection and Analysis of Point Mutations of the Oxidative Variety in the K-ras Gene**
Charles Preston Blakemore, 18, Academy for Math, Engineering and Science,
Salt Lake City, Utah

BI024 **Milkfish (*Chanos chanos Forsskal*) Serum as an Alternative Media Supplement for Culture of A549 (Human Lung) and HCT 116 (Colon) Carcinomas**
Angeli Joyce Yap Dy, 16, Capiz National High School, Roxas, Capiz Province,
Philippines

BI032 **Inhibition of the ATPase Activity of the Hepatitis C Virus NS3 Protein by Human Lactoferrin**
Sabrina Bouchard, 17, Seminaire de Sherbrooke, Sherbrooke, Quebec, Canada

BI040 **Gastro Microbial Fuel Cell: A Novel Implementation of a GMFC in Capsular Nanorobotics**
Raja Selvakumar, 16, Milton High School, Milton, Georgia

- BI302 **The Use of Click-Chemistry and the Tetrazine-Norbornene Complex to Synthesize Herceptin Radiolabelled to Zr-89 and Ga-67**
Gabriel Isaac Weissmann, 17, Horace Greeley High School, Chappaqua, New York
Priya Mohindra, 16, Yorktown High School, Yorktown Heights, 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 for Top First Place Winner

- CB004 **Identifying Novel Mechanisms of Cytochrome-P450 2E1 Regulation**
Nithin Reddy Tumma, 17, Port Huron Northern High School, Port Huron, Michigan

First Award of \$3,000

- CB004 **Identifying Novel Mechanisms of Cytochrome-P450 2E1 Regulation**
Nithin Reddy Tumma, 17, Port Huron Northern High School, Port Huron, Michigan

- CB011 **Correcting Dysregulated Splicing of the KLF6 Gene in Pancreatic Cancer Using Modified Antisense Oligonucleotides**
Blake Edward Smith, 17, Oceanside High School, Oceanside, New York

Second Award of \$1,500

- CB024 **Development of a Low Cost Electroporator for High School and Developing World Applications**
Timothy D. Trippel, 18, Marian High School, Mishawaka, Indiana

- CB029 **Novel Role of BAT3 in Regulation of Basal Macroautophagy**
Ishan Chatterjee, 16, Fox Chapel Area High School, Pittsburgh, Pennsylvania

- CB039 **Identification of Ezrin as a Colonic Substrate for Protein Tyrosine Phosphatase Sigma**
Howard Feng, 15, Bayview Secondary School, Richmond Hill, Ontario, Canada

Third Award of \$1,000

- CB006 **Genetic Targets in HPV-Induced Cancers**
Arun Brendan Dutta, 17, Western Albemarle High School, Crozet, Virginia

- CB012 **The Effects of Indoleamine 2, 3-dioxygenase Expression on Tumor-Induced Immunosuppression**
Bilal Ahmed Siddiqui, 17, Wellington C. Mepham High School, Bellmore, New York

- CB013 **CD24 Induced Muscular Regeneration: Unraveling the Mystery behind Satellite Cell Differentiation**
Evan M. Chen, 17, Wayzata High School, Plymouth, Minnesota

- CB301 **RNA Interference as an Effective and Environmentally-Friendly Method of Insect Population Control**
Joseph Corbett Ferguson, 18, Paul Laurence Dunbar High School, Lexington, Kentucky
Roshan Palli, 17, Paul Laurence Dunbar High School, Lexington, Kentucky
- CB304 **Expression of a Schizophrenia-Associated V321L-Nrg1 Protein Reduces Nrg1-ICD Nuclear Translocation and α -7 nicotinic Acetylcholine Receptor Expression**
Savina Dine Kim, 17, Commack High School, Commack, New York
Neil Mehta, 16, Jericho High School, Jericho, New York
- Fourth Award of \$500**
- CB002 **The Role of the Retinoid X Receptor in Astrocytes in Alzheimer's Disease**
Adriana Elysse Zinn, 17, Hathaway Brown School, Shaker Heights, Ohio
- CB019 **The Effect of Vincristine on Transposon Mobilization-Induced Mutation Rates in *Caenorhabditis elegans***
Smita Shukla, 18, Massachusetts Academy of Mathematics and Science at WPI, Worcester, Massachusetts
- CB020 **Strain-Dependent Expression of the Mast Cell-Restricted Tryptase mMCP-7: Implications for Innate Immunity, Acquired Immunity, Inflammation, and Blood Coagulation**
Dominick Zheng, 17, Boston Latin School, Boston, Massachusetts
- CB023 **Inter- α -Trypsin Inhibitor Heavy Chain 4 Promotes Lung Injury but Inhibits Cell Migration Post Endotoxin Exposure**
Greeshma Somashekar, 17, North Carolina School of Science and Mathematics, Durham, North Carolina
- CB035 **A Novel Combinational Therapy Targeting Purine Salvage Pathways of *Trichomonas vaginalis***
Mahmoud Motaz Ghulman, 16, Dar Al Thiker School, Jeddah, Makkah, Saudi Arabia
- CB303 **Second Life: Novel and Interspecies Reprogramming of Induced Pluripotent Stem Cells**
Won Ik Lee, 18, Academy for the Advancement of Science and Technology, Hackensack, New Jersey
Hong Joon Park, 16, Academy for the Advancement of Science and Technology, Hackensack, New Jersey

Chemistry

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

CH034 **Drug Synthesis: Braving Legendary Challenges**
Raghavendra Ramachanderan, 16, St. John's International Residential School,
Chennai, India

First Award of \$3,000

CH034 **Drug Synthesis: Braving Legendary Challenges**
Raghavendra Ramachanderan, 16, St. John's International Residential School,
Chennai, India

CH301 **Kinetic Analysis of Nanometallic Catalyst in Reduction of Nitrophenol: Investigation of a New Class of "Super Catalyst"**
Quoc-Bao Duy Nguyen, 16, Westwood High School and McNeil High School,
Austin, Texas
Mai-Anh N. Vu, 15, Westwood High School and McNeil High School, Austin, Texas

Second Award \$1,500

CH012 **Modeling Hydrogen Production Catalyzed by a Novel Electrocatalyst with Density Functional Theory**
Shubhro Saha, 18, Choate Rosemary Hall, Wallingford, Connecticut

CH016 **Polyfunctionalized Single-Walled Carbon Nanotubes as Novel Scaffolds for Multimodal Tumor-Targeted Therapy and Biological Imaging**
Neil Pathak, 18, Herricks Senior High School, New Hyde Park, New York

CH036 **Synthesis and Manipulation of Silver and Gold Nano-Mirrors**
Michael Leonard Janner, 15, Redlands East Valley High School, Redlands, California

Third Award of \$1,000

CH008 **The Electrochemical Effects of Glucose and Sucrose on the Voltage Output of a Microbial Fuel Cell Using *Saccharomyces cerevisiae***
Jack Erdozain, Jr., 16, Westminster Christian School, Palmetto Bay, Florida

CH010 **Lighting Insulin with Gold Nanodots**
Yun-Chen Chien, 17, Taipei First Girls' High School, Taipei, Taipei City, Taiwan (R.O.C),
Chinese Taipei

CH017 **The Investigation of the Key Steps of Detoxinine Total Synthesis**
Alexander Sergeevich Shved, 16, Moscow Chemical Lyceum 1303, Moscow, Russia

CH025 **Optimization and Mechanistic Investigation of a User and Eco-Friendly Protocol for Oxidative Cleavage of Alkenes**
Prem P. Thottumkara, 18, Macomb High School, Macomb, Illinois

CH030 **From Dusk to Dawn: Contact Lenses in the Night Tear Proteome**
Jack Huang, 17, Parkland High School, Allentown, Pennsylvania

Fourth Award of \$500

CH006 **Adventures in the Dendritic Crystallization of Potassium Bromide**
Jack Daniel Francis McCann, 16, Loreto College, Coleraine, Northern Ireland,
United Kingdom

CH011 **Photostabilization of an Organic Dye via Adsorption to Clay Minerals**
Maya Ellen Samuels, 17, Har Va'Gai Regional High School, Upper Galilee, Israel

CH015 **Investigation of Ideal Conditions to Retain Ascorbic Acid in Common
Cooking Methods**
Alexander Scott Powers, 16, Bellarmine College Preparatory, San Jose, California

CH018 **The Synthesis of Organometallic Complexes of Iridium (III) and Platinum (II) for OLED
Applications**
Marek Buchman, 18, School for Extraordinary Gifted Children, Bratislava, Slovakia

CH033 **Asymmetric Total Synthesis of GlaxoSmithKline's Potent
Phosphodiesterase Inhibitor**
Yaroslav Dmitrievich Boyko, 17, Moscow Chemical Lyceum 1303, Moscow, Russia

CH312 **A Study on the Photo-catalytic Disinfectant Effect of Substrate-Embedded,
Annealed, and Anodized TiO₂ Thin Films on *E. coli***
Pranav Nagaraj Haravu, 16, North Carolina School of Science and Mathematics,
Durham, North Carolina
Vipul Tushar Vachharajani, 17, North Carolina School of Science and Mathematics,
Durham, North Carolina

Computer Science

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

CS030 **Efficient Implementation of Tilt Compensated Compass and Depth Camera in
Interactive Augmented Reality**
Lai Xue, 18, Chengdu International School, Chengdu, Sichuan, China

First Award of \$3,000

CS009 **Composing Frusta to Fold Polyhedral Origami**
Herng Yi Cheng, 18, NUS High School of Mathematics and Science,

CS030 **Efficient Implementation of Tilt Compensated Compass and Depth Camera
in Interactive Augmented Reality**
Lai Xue, 18, Chengdu International School, Chengdu, Sichuan, China

Second Award of \$1,500

- CS004 **Eye-Controlled Cursor**
Filip Naiser, 18, Gymnazium Aloise Jiraska, Litomyšl, Czech Republic
- CS047 **Increase in Speed of Interprocess Interaction in Microsoft Singularity**
Gadzhi Shamil'evich Osmanov, 16, Lyceum #572, Center of Mathematical Education,
Saint Petersburg, Saint Petersburg, Russia
- CS303 **The Research on the Space Interactive 3D Mapping Method**
Yizheng He, 18, Northeast Yucai School, Shenyang, Liaoning, China
Haoyan Kang, 18, North East Yucai School, Shenyang, China, Liaoning, China
Jiayi Wang, 17, Northeast Yucai School, Shenyang, Liaoning, China
- CS309 **The Multimodal Real-Time Recognition of Emotion in Human Speech**
Akash Krishnan, 16, Oregon Episcopal School, Portland, Oregon
Matthew Philip Fernandez, 17, Oregon Episcopal School, Portland, Oregon

Third Award of \$1,000

- CS002 **Creation and Navigation of a 3D Environment with Stereo Vision, a Continuation**
Dylan Cooper Dalrymple, 16, Pensacola High School, Pensacola, Florida
- CS017 **Maintaining Viewing Quality with Lower Number of LEDs**
Yu-Jung Chen, 18, The Affiliated Senior High School of National Kaohsiung Norm,
Kaohsiung City, Chinese Taipei
- CS038 **Developing an Adaptive Disaster Evacuation Simulation**
Francis Xinghang Chen, 17, Penn High School, Mishawaka, Indiana
- CS052 **Monte Carlo Simulation of a Serial Dilution PCR Experiment**
Jonah Milton Kallenbach, 16, Germantown Academy Upper School, Fort Washington,
Pennsylvania
- CS056 **SEOR: Simulated Environment for Object Reconstruction**
Elliott Suk Chung, 18, Gwinnett School of Mathematics, Science, and Technology,
Lawrenceville, Georgia
- CS307 **Position and Vector Detection of Blind Spot Motion with Horn-Schunck
Optical Flow**
Mike Wu, 16, Torrey Pines High School, San Diego, California
Stephen Sia Yu, 17, Torrey Pines High School, San Diego, California

Fourth Award of \$500

- CS021 **AllLab - Scripting Language for Artificial Intelligence**
Ionut Alexandru Budisteanu, 17, High School "Liceul National Mircea cel Batran,"
Ramnicu Valcea, Valcea, Romania

- CS026 **Optical Music Recognition of Printed Music Score**
Hyunjoon Song, 16, Novi High School, Novi, Michigan
- CS036 **Virtual Private Network Using Peer-to-Peer Techniques**
Daniel Kasza, 18, Massachusetts Academy of Math & Science, Worcester,
Massachusetts
- CS040 **Enhanced Visual Acuity of Thalamic Visual Prosthesis Simulation Using Head
and Eye Tracking**
Sameer Kailasa, 15, American Heritage School Plantation, Plantation, Florida
- CS055 **Active Noise Cancellation in Human-Robot Speech Interaction**
Jao-ke Chin-Lee, 16, Stuyvesant High School, New York, New York
- CS305 **A Genetic Algorithm Approach to Minimizing Beam Loss in High Power Particle
Accelerators**
Scotty Allan Chung, 18, Oak Ridge High School, Oak Ridge, Tennessee
Yajit Kumar Jain, 17, Oak Ridge High School, Oak Ridge, Tennessee
Carlos E del-Castillo-Negrete, 17, Oak Ridge High School, Oak Ridge, Tennessee
- CS310 **Sound Wave Propagation: 3D Premises Model**
Konstantin Slavnov, 17, Lyceum of Information Technologies #1533, Moscow, Russia
Ilya S Shoshin, 18, Lyceum of Information Technologies #1533, Moscow, Russia
- CS311 **Dyadic Interaction Assistant for Tracking Head Gestures and Facial Expressions**
Varun Ramesh, 15, Hamilton High School, Chandler, Arizona
Shantanu Bala, 16, Barry Goldwater High School, Phoenix, Arizona

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 for Top First Place Winner

- EA023 **Using Amino Acid Analysis to Distinguish Chondritic Meteorites from Rocks Launched
into Space from Earth**
Jane M. Cox, 16, Timpview High School, Provo, Utah

First Award of \$3,000

- EA023 **Using Amino Acid Analysis to Distinguish Chondritic Meteorites from Rocks Launched
into Space from Earth**
Jane M. Cox, 16, Timpview High School, Provo, Utah

Second Award of \$1,500

- EA015 **Characterizing Engineered TiO₂ Nanoparticle Adhesion: Implications for
Environmental Transport and Remediation**
Eric E. Fein, 17, John Adams High School, South Bend, Indiana

EA019 **Tracking Quaternary Sealevel with Corals and Molluscs: Cosmic Dose Rate Modeling and ESR Dating on San Salvador, Bahamas**
Aislinn Deely, 17, Francis Lewis High School, Fresh Meadows, New York

Third Award of \$1,000

EA018 **Gap in the Deep Sea?: Reconstruction of Sedimentary Environment of the Kurotaki Unconformity, Central Japan Based on Foraminifers**
Riou Tanaka, 16, Chiba High School, Chiba, Chiba, Japan

EA024 **Using Paleotemperature to Search for the Effects of *El Nino* Southern Oscillation in the Red Sea Based on a Temperature Model Derived from the Sr/Ca Ratio in Coral**
Ryan Shockey Davis, 16, Falmouth Academy, Falmouth, Massachusetts

EA026 **Nonlinear Parametric Modeling of Hurricane Landfall Decay**
Taide Ding, 16, Oxford High School, Oxford, Mississippi

Fourth Award of \$500

EA009 **A Device for Measuring the Vibrations and Earthquakes**
Mohamed Maamoon Sehimat, 15, Zaud Bin Al- Hareth, Karak, Jordan

EA303 **CA.WA.LE.C. Cave Water Level Control**
Cristofer Pezzetta, 18, Istituto Statale d'Istruzione Superiore Arturo Malignani, Udine, Udine, Italy
Daniele Olivo, 19, Istituto Tecnico Arturo Malignani, Udine, Udine, Italy
Mattia Olivier, 19, Istituto Tecnico Industriale Arturo Malignani, Udine, Udine, Italy

EA304 **Characterization of Volcanic Lightning and Modeling How Volcanic Lightning Occurs at Sakurajima Volcano in Kagoshima, Japan**
Nobutada Kawazoe, 17, Kagoshima Prefectural Kinkowan Senior High School, Kagoshima, Kagoshima, Japan
Taiki Maehata, 17, Kagoshima Prefectural Kinkowan Senior High School, Kagoshima, Kagoshima, Japan
Rushia Kanai, 17, Kagoshima Prefectural Kinkowan Senior High School, Kagoshima, Kagoshima, Japan

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 for Top First Place Winner

EE322 **Inertial Electrostatic Confinement Fusion Using an Electrostatic Focusing Lens**
Demitri Joseph Hopkins, 18, Merlo Station High School, Beaverton, Oregon
Forrest Evan Betton, 18, Merlo Station High School, Beaverton, Oregon
Eric Michael Thomas, 18, Merlo Station High School, Beaverton, Oregon

First Award of \$3,000

- EE025 **Electromagnetic Detection of Aquifers**
Alexander Kent Kendrick, 18, Los Alamos High School, Los Alamos, New Mexico
- EE073 **Indoor Ground Manifold Tracking through Low-Cost Stereoscopy**
Christopher Stephen Nielsen, 17, Home School, Calgary, Alberta, Canada
- EE322 **Inertial Electrostatic Confinement Fusion Using an Electrostatic Focusing Lens**
Demitri Joseph Hopkins, 18, Merlo Station High School, Beaverton, Oregon
Forrest Evan Betton, 18, Merlo Station High School, Beaverton, Oregon
Eric Michael Thomas, 18, Merlo Station High School, Beaverton, Oregon

Second Award of \$1,500

- EE003 **Novel Oral Drug Inhaler Design to Optimize Drug Deposition in the Lungs**
Arnab Dey, 16, Arkansas School for Mathematics, Sciences and the Arts, Hot Springs, Arkansas
- EE006 **Ball Robot - An Instable System in Balance**
Jan Kaeberich, 18, Campe-Gymnasium Holzminden, Holzminden, Niedersachsen, Germany
- EE041 **Brain Computer Interface**
David Alexandre Joseph Campeau, 16, Mayo High School, Rochester, Minnesota
- EE071 **Acoustic Imaging Using Optimized Beamforming Techniques**
Andrew Beekman Feldman, 16, Manalapan High School, Englishtown, New Jersey
- EE088 **An Adsorption Chiller Prototype for Obtaining Green Refrigeration from Solar Heating**
Robert Huntington Verkuil, 16, Roy C. Ketcham High School, Wappingers Falls, New York
- EE307 **Fabrication and Impact Optimization of Angular and Hydrostatic Body Armor**
Atif Javed, 18, Fairfax High School, Fairfax, Virginia
Steven Donald Gillen, 17, Fairfax High School, Fairfax, Virginia

Third Award of \$1,000

- EE020 **Assistant of Walking Aid: Walking Aid Facility for the Old and the Relevant Patients**
Zehong Weng, 18, Guangdong Experimental High School, Guangzhou, Guangdong, China
- EE038 **A Robotic Assistant for the Visually-Impaired (RAVI): A Novel System Employing Digital Image Processing and Sonar Range Detection**
Ishwarya Ananthabhotla, 18, Kings Park High School, Kings Park, New York
- EE053 **A Stand-Off Seismo-Acoustic Method for Humanitarian Demining**
Marian Joan Bechtel, 16, Hempfield High School, Landisville, Pennsylvania

- EE064 **Electrowetting for Novel Electromechanical Applications**
Andrey Sushko, 17, Hanford High School, Richland, Washington
- EE065 **TouchingNotes II: Music for the Senses**
Vinicius Guilherme Muller, 19, Escola Tecnica Liberato Salzano Vieira da Cunha, Novo Hamburgo, RS, Brasil
- EE078 **Water for the World: Developing a Portable, Solar Powered Desalination Unit**
Ryan Christopher Erickson, 17, Los Alamos High School, Los Alamos, New Mexico
- EE085 **Autonomous Robotic Vehicle, Saving Lives, Preventing Accidents One at a Time**
Jessica Alexis Richeri, 17, Centennial High School, Corona, California
- EE089 **SunConditioning II**
Juan Carlos Gonzalez, 15, Fleming Island High School, Orange Park, Florida
- EE311 **The Design, Development, and Testing of a Robotic Duct Sterilization System, Year 4**
Spencer Steven Tuttle, 16, Palm Bay High School, Melbourne, Florida
Dalton James Stanley, 17, Palm Bay High School, Melbourne, Florida

Fourth Award of \$500

- EE002 **Design of Portable X-ray and Computed Tomography Scanner**
Tomas Svoboda, 20, High School of Electrotechnical Studies, Brno, Bohemia, Czech Republic
- EE016 **Set the Switch - Save Energy**
Oleg Dreval, 16, Kiev Lyceum #142, Kyiv, Ukraine
- EE026 **Humanoid Gripper Helps Level the Playing Field, Year II**
Rachel Ann Aaronson, 16, Satellite High School, Satellite Beach, Florida
- EE027 **The Liquid Piston Engine, Phase 3**
Kelly Maria Kleier, 18, Notre Dame Academy, Park Hills, Kentucky
- EE037 **Increasing the Efficiency of Solar Tracking Systems**
Michael Anthony Cerabona, 17, Yorktown High School, Yorktown Heights, New York
- EE040 **GNut, III: An A.I.R.V.I.S. (Anthropometric Interactive Robot with Vision Intelligence & Speech)**
Arjun Aggarwal, 16, Lexington High School, Lexington, South Carolina
- EE058 **Passive Solar Tracking**
Anthony Vladimir Surganov, 17, Albert Grannis Lane Technical College Preparatory High School, Chicago, Illinois
- EE063 **Don't Fear, It's Secure: Flexible and Secure RFID System Deployment**
Shayan J. Mohanty, 17, Plano Senior High School, Plano, Texas

- EE072 **TongueMove: Barrier Tree Tongue Controller**
Ka Chon Leong, 18, Keang Peng School, Macau, SAR of the People's Republic of China
- EE079 **Boosting Central Heat / Air Conditioning Efficiency through Evaporative Cooling Supplementation**
Trevor Kidder Monroe, 18, Chain of Lakes Collegiate High School, Winter Haven, Florida
- EE080 **Construction of a Feasible Einstein: Szilard Absorption Refrigeration System**
Spencer Wilson, 18, Colquitt County High School, Moultrie, Georgia
- EE319 **Enhanced Navigation System for Remotely Operated Underwater Vehicle**
Io Tong Chan, 18, Keang Peng School, Macau, Macau, SAR of the People's Republic of China
Chi Kit Cheong, 17, Keang Peng School, Macao, Macau, SAR of the People's Republic of China
Ka Hong Lao, 17, Keang Peng School, Macau, Macau, SAR of the People's Republic of China

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 for Top First Place Winner

- EN019 **Celloidosomes: A Journey toward the Bioengineering of Artificial Micro-Glands and Micro-Bioreactors**
Samantha Marie Marquez, 15, Maggie L. Walker Governor's School for Government and Intern, Richmond, Virginia

First Award of \$3,000

- EN019 **Celloidosomes: A Journey toward the Bioengineering of Artificial Micro-Glands and Micro-Bioreactors**
Samantha Marie Marquez, 15, Maggie L. Walker Governor's School for Government and International Studies, Richmond, Virginia

- EN301 **Algae-based Atmospheric Revitalization for Zero-G and Aerospace Application**
Alexander Raymond Crisara, 16, L. C. Anderson High School, Austin, Texas
Alexander Jahan Rabii, 14, L. C. Anderson High School, Austin, Texas

Second Award of \$1,500

- EN022 **Accounting for Cross-talk between Signaling Pathways Identifies Novel Model for Early and Late Post-transplant Acute Rejection**
Andrew Liu, 17, Henry M. Gunn Senior High School, Palo Alto, California

- EN023 **Synthesis, Characterization, and Biological Evaluation of a Novel Biomaterial for Post-Lumpectomy Breast Reconstruction**
Shyam Venkateswaran, 17, Herricks Senior High School, New Hyde Park, New York
- EN027 **Synthesis and Characterization of Composite Plastics from Thermoplastic Starch and Nano-sized Calcium Phosphate for Film Packaging**
Miguel Arnold Silverio Reyes, 16, Philippine Science High School- Main Campus, Quezon City, Metro Manila, Philippines
- EN034 **Developing a Thermo/Hydrochromic Roadway Paint Application to Increase Driver Awareness during Hazardous Conditions**
Nicholas Michael Huey, 18, Camdenton High School, Camdenton, Missouri
- Third Award of \$1,000**
- EN018 **An Investigation of the Porosity and Morphology of Fusion-Bonded Epoxy**
Rachel Alexandra Strauss, 17, Roanoke Valley Governor's School for Science and Technology, Roanoke, Virginia
- EN025 **Regulatory Signatures of Cancer Cell Lines Inferred from Gene Expression Data**
Jayanth Krishnan, 17, Mahopac High School, Mahopac, New York
- EN035 **Creating Porous TiO₂ Nanoparticles to Improve the Charge Carrier Efficiency of Photoelectrochemical Cells**
Ayush Gupta, 17, Oregon Episcopal School, Portland, Oregon
- EN302 **Study of Steels Suitable for Reactor Pressure Vessels**
Marek Kovar, 19, Gymnazium Karla Sladkovskeho, Prague, Czech Republic
Tomas Petak, 19, Gymnazium Karla Sladkovskeho, Prague, Czech Republic
- EN313 **Modeling and Characterization of Novel Heusler Magnetocaloric Effect Alloys**
Mathilda Marie Lloyd, 17, Oak Ridge High School, Oak Ridge, Tennessee
Yiwei Li, 18, Oak Ridge High School, Oak Ridge, Tennessee
- EN321 **The Plastic We Will Use in the Future (from Obtaining Bioplastics NOPAL Mucilage)**
Xhail Pineda Gonzalez, 17, Official Preparatory Annex to the Normal School of Teotihuac, Colony Nva., Teotihuacan, Mexico
- Fourth Award of \$500**
- EN009 **Towards More Efficient Very-Large-Scale Integrated Networks: Increasing the Degree of Parallelism and Semiconductance in Single-Walled Carbon Nanotube Devices**
Yosyp Shvab, 17, T. C. Williams High School, Alexandria, Virginia
- EN016 **Can Recycled Rubber Materials Be Used in Concrete to: Reduce Environmental and Landfill Waste, Reduce Petroleum Usage, and Reduce the Carbon Footprint While Improving the Infrastructure of Bridges, Roads and Buildings?**
John Charles Boykin, 17, St. Peter Chanel, Bedford, Ohio

- EN032 **The Algae-Mobile 3: Bioactive Energy and Carbon Dioxide Filtration in the Exhaust of a Car**
Param Jaggi, 17, Plano East Senior High School, Plano, Texas
- EN304 **Developing a Urine Test for Tularemia through the Use of Cibacron Blue-Core Shell Nanoparticles to Sequester the Bacterial Antigen Tul4**
Rithvik Raju Prasannappa, 17, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia
Sameer Kumar Singh, 17, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia
- EN306 **Preparation of Hyaluronic Acid Nanoparticles with *A. chica* for Applications in Wound Healing**
Lorraine da Silva Campos, 16, Escola Americana de Campinas, Campinas, Sao Paulo, Brasil
Vanessa Estefano Uriza, 16, Escola Americana de Campinas, Campinas, Sao Paulo, Brasil
- EN314 **Cellulose Crystals Clean and Cure**
Janelle Tam, 15, Waterloo Collegiate Institute, Waterloo, Ontario, Canada
Vivienne Tam, 18, Waterloo Collegiate Institute, Waterloo, Ontario, Canada
- EN316 **Utilization of Mucilage Derived from Lemon Basil Seeds as Coating Substance for Fruit Preservation**
Thanasup Gonmanee, 18, Princess Chulabhorn's College Phetchaburi, Cha-am, Phetchaburi, Thailand
Worrada Junmook, 18, Princess Chulabhorn's College Phetchaburi, Cha-am, Phetchaburi, Thailand
Narintadeach Charoensombut, 18, Princess Chulabhorn's College Phetchaburi, Cha-am, Phetchaburi, Thailand
- EN319 **Hatch an Egg with Insulation and Hot Pack Instead of Electricity**
Tae Young Roh, 16, Ju Yeop High School, Goyang-si, Gyeonggi-do, South Korea
Yeon Ji Kim, 17, Paik Yang High School, Goyang-si, Gyeonggi-do, South Korea
Beom Kwan Kim, 16, Ilsan Daejin High School, Goyang, Gyeonggi-do, South Korea

Energy and Transportation

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

- ET062 **A Novel Biofuel Cell Based on Direct Electron Transfer-Type Bioelectrocatalysis Incorporating Photophosphorylation to Efficiently Create Sustainable Electrical Energy**
Nathan Sai Kondamuri, 16, Munster High School, Munster, Indiana

First Award of \$3,000

- ET021 **Enhancing Algae Biofuels, Phase II: Stress Analysis of ACCase, an Enzymatic Factor of Lipid Production**
Sara Ellen Volz, 15, Cheyenne Mountain High School, Colorado Springs, Colorado
- ET062 **A Novel Biofuel Cell Based on Direct Electron Transfer-Type Bioelectrocatalysis Incorporating Photophosphorylation to Efficiently Create Sustainable Electrical Energy**
Nathan Sai Kondamuri, 16, Munster High School, Munster, Indiana

Second Award of \$1,500

- ET001 **The Engineering of a Novel Magnetic Levitation Train Propulsion System through the Application of a Coil Current Gradient**
Christopher Joseph Davlantes, 18, Bishop Kenny High School, Jacksonville, Florida
- ET002 **Effects of Dopants on the Morphology and Efficiency of Conjugated Polymer OPV Devices**
Arjun Mathur, 17, Lake Highland Preparatory School, Orlando, Florida
- ET009 **Acoustic Cavitation at the Solid Oxide Electrolysis Cell Cathode Layer for Sustainable Hydrogen Production**
Eric Lau, 16, Savannah Arts Academy, Savannah, Georgia
- ET055 **Hydrolize: Kinetics of the Hydrogen Production of the Magnesium-Water Reaction in Aqueous Solution**
Tyler Trettel Howard, 18, Olathe Northwest High School, Olathe, Kansas
- ET059 **Photoelectrochemical Approach to PEM Fuel Cells Using Hydrodynamic Voltammetry**
Dheevesh Arulmani, 15, Gordon Graydon Memorial Secondary School, Mississauga, Ontario, Canada

Third Award of \$1,000

- ET031 **Synthesis of Complex Nanostructures for Solar Cells: Analysis Using Novel D-SCOPEn**
Shyamal Buch, 15, Vista del Lago High School, Folsom, California
- ET032 **Optimization of a Microbial Fuel Cell to Drive a Bioelectrochemically Assisted Wastewater Treatment Reactor**
Ryota Ishizuka, 17, Greenwich High School, Greenwich, Connecticut
- ET048 **Synthesizing Hydrocarbon Derivatives as an Alternative Fuel Source Utilizing Effluent Gas from a Catalytic Converter in a Two Stage Induction System with Cobalt Molybdenum Copper in a Hydrodesulphurization Process to Reduce Carbon Emissions**
Justin Kenrick Ramsaran, 17, Palm Bay High School, Melbourne, Florida
- ET060 **Obtaining Bioethanol from Tuna (*Opuntia ficus*): An Alternative to the Use of Corn**
Clara Guadalupe Escarcega Ramirez, 19, Escuela Preparatoria Oficial Num. 19, Mexico, Estado de Mexico, Mexico

- ET068 **Maximizing Algal Growth and Lipid Yields through Varying Iron³⁺ Concentration and Bioavailability: A Continued Investigation on Finding Optimal Growing Conditions for *Scenedesmus sp.* for Biofuel Production**
Yanqi Chen, 16, Central York High School, York, Pennsylvania
- ET305 **Manufacturing an Improved Polymer Photovoltaic Cell Using Graphene and Graphene Oxide**
Nathan Akhavan, 18, Rambam Mesivta, Lawrence, New York
Benjamin Joseph Goldman, 18, Rambam Mesivta, Lawrence, New York
- ET308 **A Temperature-Controlled Investigation of Au/Pd Nanoparticle Catalysis for Applications in a PEM Fuel Cell**
Gurpreet Singh, 17, Half Hollow Hills High School West, Dix Hills, New York
Karan Singh Sikka, 17, Syosset High School, Syosset, New York
- Fourth Award of \$500**
- ET004 **Power Up!: Experimental Design and Mathematical Optimization of a Dual Rotor Wind Turbine**
Andrew Samuel Ylitalo, 15, Stillwater Area High School, Stillwater, Minnesota
- ET005 **The Creation and Testing of a Fully Submersible Geared Water Turbine for Alternative Energy Production**
Gavin Grant Ovsak, 17, Eden Prairie High School, Hopkins, Minnesota
- ET017 **Maximizing Hybrid Rocket Motor Efficiency for Evaluating Recyclable and Renewable Fuels**
Megan Lynn Perkins, 16, DuPont Manual Magnet High School, Louisville, Kentucky
- ET020 **Drag'n'ball: How the Humpback Whales Bumped Flippers Can Help Us to Renewable Energy**
Hanne Binder, 19, Vejle Technical High School, Vejle, Denmark
- ET024 **Generating Clean Electrical Tidal Power, Year Three of an Ongoing Study**
Kyle Scott Saleeby, 16, Niceville High School, Niceville, Florida
- ET033 **Algae as a Biofuel, Part II**
Daisuke Dennis Takeda, 19, Newman Smith High School, Carrollton, Texas
- ET035 **Effect of Various Metal Cofactors on the Catalyzation Rate of Pyruvate to Ethanol by Pyruvate Decarboxylase (EC 4.1.1.1) in *Saccharomyces cerevisiae* when Thiamine Pyrophosphate (TPP) Is Absent**
Arrush Choudhary, 15, Chantilly High School, Chantilly, Virginia
- ET040 **Analysis of Conducting Polymer PEDOT (Poly (3,4-Ethylenedioxythiophene)) and Nanostructured Titania for Solid-State Dye-Sensitized Solar Cells**
Akshai Baskaran, 18, Kennewick High School, WA, Washington

ET064 **Wave Power Plant**
Ennan Umerov, 15, Zagalno-osvitnya shkola I-III stupeniv, Mizhvodne, Crimea
Autonomous Republic, Ukraine

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 for Top First Place Winner

EM315 **Bio-based Packaging Plastics from Fish Scale**
Pornwasu Pongtheerawan, 16, Suratpittaya, Maung, Suratthani, Thailand
Tanpitcha Phongchaipaiboon, 17, Suratpittaya School, Meung District, Suratthani,
Thailand
Arada Sungkanit, 17, Suratpittaya School, Meung District, Suratthani, Thailand

First Award of \$3,000

EM305 **The Effects of Micro-algae Characteristics on the Bioremediation Rate of Deepwater
Horizon Crude Oil**
Xiuqi Cao, 16, Century High School, Rochester, Minnesota
Ying Xiong, 15, Century High School, Rochester, Minnesota

EM315 **Bio-based Packaging Plastics from Fish Scale**
Pornwasu Pongtheerawan, 16, Suratpittaya, Maung, Suratthani, Thailand
Tanpitcha Phongchaipaiboon, 17, Suratpittaya School, Meung District, Suratthani,
Thailand
Arada Sungkanit, 17, Suratpittaya School, Meung District, Suratthani, Thailand

EM330 **The Effect of Ocean Acidification and Oil Spills on *Emiliana huxleyi* Transparent
Exopolymer Particles**
Kunal Ashok Sangani, 16, Fayetteville Manlius High School, Manlius, New York
Mishka Gidwani, 17, Neuqua Valley High School, Naperville, Illinois

Second Award of \$1,500

EM007 **Clean Acres: Simulated *in situ* Bioremediation of Diesel Contaminated Soil Utilizing a
Linoleic Acid and *R. rhodochrous* on Soil Type in and Uncontrolled Environment**
Morgan Walker Sinko, 17, John Jay Science and Engineering Academy, San Antonio,
Texas

EM038 **Improving Pure Water Availability: Optimizing Flux in Reverse Osmosis Membranes**
Matthew Jaebol Kim, 17, Commack High School, Commack, New York

EM039 **Biochar Carbon Sequestration: The Effects of Feedstock and Temperature of
Pyrolysis on Chemical and Physical Stability of Biochar**
Meghana Vijay Rao, 15, Jesuit High School, Portland, Oregon

- EM312 **To Investigate the Adsorption Potential of Orange Peel Biosorbents for the Removal of Copper(II) Ions**
 Qin Xiang Ng, 18, Anglo-Chinese School (Independent), Singapore, Singapore
 Wei Liang Matthew Lee, 18, Anglo-Chinese School (Independent), Singapore, Singapore
- EM332 **Recycling Rexine Waste--A Novel and Economical Approach**
 Hetal Kanjibhai Vaishnav, 18, Late Shree S. G. Dholakiya Memorial High School, Rajkot, Gujarat, India
 Ankur Kanjibhai Vaishnav, 16, Shree P.V Modi High School, Rajkot, Gujarat, India
- Third Award of \$1,000**
- EM012 **The Impact of Anthropogenically Modified Wetlands on Anuran Populations: What Do Species Richness, Diversity, and Presence of Invasive Species Tell Us about Everglades Wetlands Restoration?**
 Jamie Odzer, 15, Dr. Michael M. Krop Senior High School, Miami, Florida
- EM014 **Determining the Starch Content of *Lemna minor* in Relation to Nitrate and Phosphate Levels, Year 2**
 Kristen Elaine Clayton, 15, Viera High School, Viera, Florida
- EM021 **The Effect of *E. crassipes* on the Nitrate and Ammonia Levels from Sewage Treatment Waste Water**
 Kelly M. Martins, 17, Langley High School, McLean, Virginia
- EM049 **Monitoring the Disturbance of Soil Micro-Ecosystems in Dormant Topsoil Using Nematodes and Studying the Methods to Rehabilitate Soil for Effective Site Restoration**
 Laura Bernadette Lane, 17, Aztec High School, Aztec, New Mexico
- EM306 **Detecting Oil Spills Using Synthetic Aperture Radar**
 Calvin Ling, 16, The Liberal Arts and Science Academy High School, Austin, Texas
 Mark Sands, 17, Liberal Arts and Science Academy High School, Austin, Texas
- EM308 **Bioremoving of Chrome in Leather Shavings**
 Marcelo Jung Eberhardt, 18, Fundacao Escola Tecnica Liberato Salzano Vieira da Cunha, Novo Hamburgo, Rio Grande do Sul, Brasil
 Patrick Comassetto Fuhr, 18, Fundacao Escola Tecnica Liberato Salzano Vieira da Cunha, Novo Hamburgo, Rio Grande do Sul, Brasil
- EM311 **A Quantitative Study of Marine Bacteria of Dispersed and Undispersed Crude Oil and Potential for Enhancement of Biodegradation**
 Rithika Marumagan Thirumal, 17, Ovey Comeaux High School, Lafayette, Louisiana
 Samantha Leigh Biddick, 17, Ovey Comeaux High School, Lafayette, Louisiana

EM331 **Eco-friendly Ink from *Terminalia chebula***
Pramoda Nekkare Vishnumurthy, 15, Sri Ramakrishna High School, Puttur, India
Bhargava Chakrakodii Subbanna, 14, Sri Ramakrishna High School, Puttur Karnataka,
Karnataka, India

Fourth Award of \$500

EM001 **Soil Amendment Variations: Their Role in Improving Surface Mine Reclamation**
Travis Cole Sylvester, 17, Greybull High School, Greybull, Wyoming

EM005 **Viability of Bioremediation of Lake St. Marys, Ohio via Reintroduction of Native Mussels**
Andrew Benedict Favorito, 17, Paulding High School, Paulding, Ohio

EM023 **Biobased Ferrite Nanoparticles: A Novel Approach to Extract Organic Solvents and Heavy Metals from Water**
Atreya Shilbhadra Dey, 17, Maharishi School of the Age of Enlightenment, Fairfield, Iowa

EM026 **Utilization of a Thermophilic Sulfate-Reducing Species for Bioremediation Purposes**
Kirsten Perry, 17, Elko High School, Elko, Nevada

EM027 **Investigating the Effectiveness of Indigenous Plant Solutions in Inhibiting Leaf Gall Insect Development**
Jorie Ann Moore, 16, Sanger High School, Sanger, California

EM028 **Dependence of Leaf Litter Decomposition and CO₂ Release on Tree Species and Temperature**
Vincent Huang Lin, 16, Falmouth High School, Falmouth, Massachusetts

EM037 **To Clay or Not to Clay? Management of Algal Growth through Clay and Chitosan Flocculation**
Shefali Prashant Shah, 17, Great Mills High School, Great Mills, Maryland

EM321 **A Fishy Detector**
Haleeda Hilmi, 17, Tunku Kurshiah College, Seremban, Negeri Sembilan, Malaysia
Nurul Amira Salehin, 17, Kolej Tunku Kurshiah, Seremban, Negeri Sembilan, Malaysia

EM326 **Oilchemistry: Recycling of Soybean Oil to Produce Alkyd Resins and Paint**
Adriana Ferreira Santana, 17, ETEC Getulio Vargas, Sao Paulo, SP, Brasil
Tiago Tolone Craveiro de Oliveira, 17, ETEC Getulio Vargas, Sao Paulo, SP, Brasil

EM334 **An Investigation Into Sea Lettuce Briquettes**
Muireasa Anne Carroll, 17, Sacred Heart Secondary School, Co. Cork, Cork, Ireland
Denise Marie Hurley, 17, Sacred Heart Secondary School Clonakilty, Co-Cork, Munster, Ireland
Mairead Maeve Kingston, 17, Sacred Heart Secondary School, Co.cork, Cork, Ireland

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 for Top First Place Winner

EV323 **Mimicking Wetting Behavior of Spider Silk: Studies on Water-Harvesting Efficiency According to the Fabrication of the Pattern of Wettability Gradient**
Jinyoung Seo, 18, Korea Science Academy of KAIST, Busan, Busan, South Korea
Dongju Shin, 18, Korea Science Academy of KAIST, Busan, Busan, South Korea

First Award of \$3,000

EV033 **An Experimental Study of the Impact of Airborne Pollutants on the Peak Expiratory Flow (PEF) Rate of Asthmatic Subjects PLUS A Novel Risk Assessment Model to Predict the Adverse Effect of PM10 and TVOCs on the PEF Rate**
Naomi C. Shah, 16, Sunset High School, Portland, Oregon

EV323 **Mimicking Wetting Behavior of Spider Silk: Studies on Water-Harvesting Efficiency According to the Fabrication of the Pattern of Wettability Gradient**
Jinyoung Seo, 18, Korea Science Academy of KAIST, Busan, Busan, South Korea
Dongju Shin, 18, Korea Science Academy of KAIST, Busan, Busan, South Korea

Second Award of \$1,500

EV001 **The Assessment of Silver Nanoparticles in the Environment on Gene Expression in *C. elegans***
Alexander Michael Cecil, 17, E.E. Waddell High School, Charlotte, North Carolina

EV021 **Embrace Air with Algae Repair**
Chloe Anassis, 15, The Study School, Westmount, Quebec, Canada

EV309 **Mussels, a Natural Approach to Sewage Treatment: Evaluating *Geukensia demissa* as Biofilters of Local Bay Pollution**
Ariane Elizabeth Papa, 17, Long Beach High School, Lido Beach, New York
Jane Elizabeth Smyth, 17, Long Beach High School, Lido Beach, New York

EV313 **A.W.S.S. (Autonomus Water Sanitization System)**
David Varlotta, 19, Escuela Tecnica N012 "Libertador General Jose de San Martin", Ciudad Autonoma de Buenos Aire, Buenos Aires, Argentina
Ruth Maurente Jamie, 17, Escuela Tecnica No12 D.E. 10 "Libertador General Jose de San, Ciudad Autonoma de Buenos Aire, Ciudad Autonoma de Buenos Aire, Argentina
Elisa Bustamante, 20, Libertador General Jose de San Martin, Ciudad Autonoma de Buenas Aire, Argentina

Third Award of \$1,000

EV015 **A Cheaper Alternative to a Cleaner Future II: A Study to Optimize the Efficiencies of Dye Sensitized Solar Cells**
Sirish Chandra Kamarajugadda, 17, Plano East Senior High School, Plano, Texas

- EV031 **Green Based Conductive Polymer Sensor**
Zawin Najah Binti Zulkefli, 17, Tuanku Syed Putra Secondary Science School, Kangar, Malaysia
- EV302 **Degradation of Environmental Pollutants with Nanocomposites**
Mehwish Ghafoor, 15, Federal Government College for Women G 10/4, Islamabad, Capital, Pakistan
Ambreen Bibi, 15, Federal Government College for Women G 10/4, Islamabad, Capital, Pakistan
- EV311 **Photoautotrophic Filtration: The Effects of *Chlorella pyrenoidosa* on the Reduction of CO₂ Emissions**
Andrew Quinn Ross, 16, Clearfield High School, Clearfield, Utah
Jed Donald Grow, 16, Clearfield High School, Clearfield, Utah
- EV312 **Activation of the Hexose and Amino Acid Transport Systems in *Chlorella protothecoides (vulgaris)* for Enhanced Biomass Production via Amphitropic (Mixotrophic) Reaction Using Alternative Organic Carbon Sources**
Michael James Hulick, 18, Morristown Hamblen High School East, Morristown, Tennessee
Andrew Michael Howington, 18, Morristown-Hamblen High School East, Morristown, Tennessee
- EV321 **The Effect of Pollutants on *Eisenia hortensis* (Earthworm) and It's Potential as an Indicator Species**
Gillian Claire Gundersen, 17, Herndon High School, Herndon, Virginia
Brenda Allison Perez, 17, Herndon High School, Herndon, Virginia
- Fourth Award of \$500**
- EV028 **Effects of Di-butyl phthalate (DBP) on Developing *Medaka* Embryos**
Yunqian Tang, 20, North Carolina School of Science and Mathematics, Durham, North Carolina
- EV035 **Nitrate Retention Chemistry - Development of an Environmentally-Friendly Manure**
Adam Joseph Dando, 16, Franklin Regional Senior High School, Murrysville, Pennsylvania
- EV038 **Long-wavelength Light as a Catalyst for MS2 Photoinactivation by Cationic Porphyrins**
Marc Herman Webb, 18, Josephine Dobbs Clement Early College High School, Durham, North Carolina
- EV039 **Red Tide Sensitivity to Ocean Acidification**
Matthew Philip Goldklang, 17, San Diego Jewish Academy, San Diego, California

- EV304 **Research on Effect of Urban Rainfall Runoff Pollution on Water Environment and Amount Accounting**
Yixin Zhang, 17, Anhui Bengbu No. 2 High School, Bengbu, Anhui, China
Yumeng Li, 16, Anhui Bengbu No. 2 High School, Bengbu, Anhui, China
Anqi Wang, 17, Anhui Bengbu No. 2 High School, Bengbu, Anhui, China
- EV305 **The Toxicity of Bioremediation Agents**
Catherine Rose Mitchell, 16, H. B. Woodlawn, Arlington, Virginia
Andrea Elise Green, 15, H. B. Woodlawn, Arlington, Virginia
- EV320 **Alternative Methods of Optimizing Food Production in “Red-Lined” and Urban Food Deserts Using Aquaponics and Hydroponics vs. Conventional Growing Methods**
Quantavious Yorel Griggs, 16, Benjamin E. Mays High School, Atlanta, Georgia
Nouhayla Houssaini, 17, Benjamin E.Mays High School, Atlanta, Georgia
- EV322 **The Way of CO₂ Storage Using Formation of Carbonate Minerals by Aboriginal Microbes**
Woongui Hwang, 18, Cheonnam Science Highschool, Naju, Cheonnam, South Korea
Doyeon Baek, 17, Cheonnam Science Highschool, Naju, Cheonnam, South Korea

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 for Top First Place Winner

- MA002 **Reformulating the Newton Direction Computation as a Linear Least Squares Problem for Smoothed Overdetermined L1 Functionals**
Matthew Russel Bauerle, 17, Bauerle Homeschool, Fenton, Michigan

First Award of \$3,000

- MA002 **Reformulating the Newton Direction Computation as a Linear Least Squares Problem for Smoothed Overdetermined L1 Functionals**
Matthew Russel Bauerle, 17, Bauerle Homeschool, Fenton, Michigan

- MA017 **Linearly Many Faults in (n,k) -star Graphs**
Allen Yuan, 17, Detroit Country Day School, Beverly Hills, Michigan

Second Award of \$1,500

- MA031 **A Novel Implementation of the Elliptic Curve Method, Stage 2: Using Weierstrass and Edwards Elliptic Curves for Faster Factorization**
Aishwarya Ananda Vardhana, 16, Jesuit High School, Portland, Oregon

- MA048 **Integer Partitions and Sequences**
Manosij G Dastidar, 18, South Point High School, Kolkata, India

MA051 **On the Patterns Existing among Carousel Primes in Base n**
Simanta Gautam, 15, Albemarle High School, Charlottesville, Virginia

Third Award of \$1,000

MA001 **Developing Analytical Approaches to Forecast Wind Farm Production, Phase II**
Kate Alexandra Geschwind, 16, Mayo High School, Rochester, Minnesota

MA019 **On the Second Eigenvalue and Expansion of Bipartite Regular Graphs**
Wenyu Cao, 18, Phillips Academy, Andover, Massachusetts

MA020 **Properties of Hawkins Primes**
Aaron Lawrence Zweig, 14, Randolph High School, Randolph, New Jersey

MA032 **Method of Optimizing the Monte Carlo Statistical Algorithm to Increase Computational Efficiency in Multidimensional Integration**
Pratheek Nagaraj, 17, Marjory Stoneman Douglas High School, Parkland, Florida

MA050 **Lower Bounds for Odd Perfect Numbers**
Anirudh Prabhu, 16, West Lafayette Junior-Senior High School, West Lafayette, Indiana

Fourth Award of \$500

MA026 **New Triangle Centers Associated with a Triad of the Simulated Circumcircles**
Kang-Ying Liu, 18, Saint Andrew's Priory School, Honolulu, Hawaii

MA029 **A Creative Solution for Division by Zero**
Markus Robert Woltjer, 16, Wilsonville High School, Wilsonville, Oregon

MA036 **Rational Approximants for Euler-Gompertz Constant**
Vasily Sergeevich Bolbachan, 17, Advanced Science and Education Center - A.N.Kolmogorov School, Moscow, Moscow Region, Russia

MA038 **Mathematical Flowers: Patterns in Dots Generated by Intersection Points**
Vahid Fazel-Rezai, 14, Red River High School, Grand Forks, North Dakota

MA052 **Braid Group Representations and Braiding Quantum Gates**
Rebecca Chen, 16, Park Tudor School, Indianapolis, Indiana

MA309 **From the Around the World Sailing Record to Black Holes: Strange Geometries**
Clement Martinez, 15, College Albert Camus, Miramas, France
Arnaud Vespa, 16, Adam de Craponne, Salon de Provence, France
Marine Auriol, 15, College Albert Camus, Miramas, France

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 for Top First Place Winner

- ME316 **Treatment of Simulated Cancer Cells with Compton Scattering-Produced Secondary Radiation**
Matthew Troy Feddersen, 17, Acalanes High School, Lafayette, California
Blake Marggraff, 18, Acalanes High School, Lafayette, California

First Award of \$3,000

- ME054 **New Smart Weapons: Theranostics-- A Novel NanoMedicine Approach to Combat Cancer**
Angela Zhang, 16, Monta Vista High School, Cupertino, California
- ME083 **Risk Assessment of Abdominal Aortic Aneurysm Rupture Using Fluid-Structure Interaction Simulations**
Sagar Hitendra Rambhia, 16, Jericho High School, Jericho, New York

- ME316 **Treatment of Simulated Cancer Cells with Compton Scattering-Produced Secondary Radiation**
Matthew Troy Feddersen, 17, Acalanes High School, Lafayette, California
Blake Marggraff, 18, Acalanes High School, Lafayette, California

Second Award of \$1,500

- ME004 **Inhibition of Plasminogen Activator Inhibitor-1: A Novel Therapeutic Approach for Diabetic Vascular Disease**
Samantha Renae Prabakaran, 15, Fort Myers High School, Fort Myers, Florida
- ME015 **The Effects of Zinc Gluconate and Two Other Divalent Cationic Compounds on Olfactory Function**
Christopher Anthony Duncan-Lewis, 18, Winter Springs High School, Winter Springs, Florida
- ME030 **Monocytic Gene Cell Therapy: Potential Treatment for Alzheimer's Disease**
Jasmine Samaiya Roberts, 18, Paul R. Wharton High School, Tampa, Florida
- ME071 **Neural Network Diagnostics for Breast Cancer**
Brittany Michelle Wenger, 16, The Out-of-Door Academy, Sarasota, Florida
- ME076 **A Novel Approach to Modeling Genetic Sensory Impairments through De Novo Prediction of Mutant Protein Structure**
Rebecca Faye Alford, 17, Commack High School, Commack, New York
- ME096 **Inflammation Is Skin Deep with Gingerol and Transfersomes**
Kishore Balasubramanian, 14, Klein Oak High School, Spring, Texas

Third Award of \$1,000

- ME017 **Seeking Cures: An Evaluation of the Toxicity of MAP Kinase Inhibitor U0126 in an Animal Model**
Alexander Zhang, 14, Little Rock Central High School, Little Rock, Arkansas
- ME049 **Using the Degree of End Organ Damage to Predict the Outcomes of Heart Failure Patients after Mechanical Circulatory Support Device Implantation**
Qiaoyi Li, 18, Briarcliff High School, Briarcliff Manor, New York
- ME053 **Silver Nanoparticles Affect Cell Messenger Delivery**
Anushua Bhattacharya, 16, East Ridge High School, Woodbury, Minnesota
- ME060 **Testing the Correlation between B7-H1 and PTEN Signal Expression in Kidney Cancer Cells**
Michael Charles Zaiken, 17, Century High School, Rochester, Minnesota
- ME063 ***In silico* Exploration of Aberrant Methylation**
Achutha Narayana Raman, 18, Dover-Sherborn Regional High School, Dover, Massachusetts
- ME068 **Effects of Diabetes Mellitus on Vasculogenesis Capacities of Mesenchymal Stem Cells**
Shubha Srinivas Raghvendra, 17, Saint Francis High School, Mountain View, California
- ME070 **Modeling of Human Non-Deletional Hereditary Persistence of Fetal Hemoglobin (HPFH) Conditions in Beta-Globin Locus Transgenic Mouse Models: The -175 (T to C) and -195 (C to G) A Gamma-Globin Gene Point Mutations**
Prarthana Jignesh Dalal, 17, Shawnee Mission East High School, Prairie Village, Kansas
- ME075 **KLF4 and KLF4- α : Working Together to Fight Pancreatic Cancer**
Jiawen Wei, 18, Bellaire Senior High School, Bellaire, Texas
- ME304 **Scaffolds that Baffle: A Study of in vitro Differentiation of Cells via Notch Signaling in a 2D/3D Biomaterial Environment**
Shantanu Abhishek Banerjee, 17, Westwood High School, Austin, Texas
Varun Akella Koneru, 17, Westwood High School, Ausin, Texas
- ME314 **Efficient Generation of Dopaminergic Neurons from Skin-derived Precursor Cells: Novel and Autologous Treatment for Parkinson's Disease**
Mohamed Reda Bensaidane, 18, Champlain College St. Lawrence, Quebec City, Quebec, Canada
Alexandre Lemieux, 18, Cegep de Sainte-Foy, Sainte-Foy, Quebec, Canada

Fourth Award of \$500

- ME009 **Intracellular Calcium and Prostate Cancer**
Dalia Martinez-Marin, 17, Lubbock High School, Lubbock, Texas

- ME023 **CTLA4 Levels in T-Cells of Celiac Disease Patients**
Mary Olivia Richardson, 16, duPont Manual Magnet High School, Louisville, Kentucky
- ME025 **Fabric to Health Treatments Impregnated of Zirconium Oxide and Silver Nanoparticles with Chitosan II**
Kawoana Trautman Vianna, 18, Fundacao Escola Tecnica Liberato Salzano Veira da Cunha, Novo Hamburgo, Rio Grande do Sul, Brasil
- ME036 **The Programming of and the Application of Automated Digital Microscopy in Analyzing Lung Inflammation and Cellular Imagery**
Joseph Darius Soltzberg, 18, Hawken School, Chesterland, Ohio
- ME048 **Erythrocyte Dysfunction and Amelioration in Hypercholesterolemic Conditions**
Siddhartha Gautama Jena, 17, International Academy, Bloomfield Hills, Michigan
- ME057 **A Novel Approach to Wound Therapy: The Effect of Plant Stem Cells on Mesenchymal Stem Cells When Exposed to UV Radiation**
Meagan-Helen Henderson, 16, Miss Edgar's and Miss Cramp's School, Westmount, Quebec, Canada
- ME069 **Loss of Chaos in Parkinson's Disease: Using Fractal Mathematics to Understand the Effects of the Decoupling of the Basal Ganglia from the Cortex in Parkinson's Disease**
Leah Avi Balay-Wilson, 18, Lincoln Park High School, Chicago, Illinois
- ME087 **Modulation of ERK5 in Inhibiting Breast Cancer Cell Migration and Invasion**
Grace Yang Wang, 17, A. B. Lucas Secondary School, London, Ontario, Canada
- ME091 **A Novel Discovery: Thalamic Neurodegeneration in Huntington's Disease**
Bowe Deng, 17, White Station High School, Memphis, Tennessee
- ME308 **3-Dimensional Bio-imprinting of Proteins and Viruses**
Kelsey Skyler McKenna, 17, South Side High School, Rockville Centre, New York
Alan Eyal Czemerinski, 18, The Wheatley School, Old Westbury, New York
Tom Jie Wang, 16, The Wheatley School, Old Westbury, New York
- ME310 **Neuroscience of Longevity: Effects of Stress and Antioxidant Genes on the Lifespan of Transgenic *Drosophila melanogaster***
Lisa P Michaels, 15, Shepton High School, Plano, Texas
Tess P Michaels, 17, Plano West Senior High School, Plano, Texas
- ME312 **A Search for Reliable Molecular Cytogenetic Markers of Prostate Cancer Prognosis**
Alison Nicole Tradonsky, 17, San Diego Jewish Academy, San Diego, California
Tammy Yetta Rubin, 18, San Diego Jewish Academy, San Diego, California

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 for Top First Place Winner

- MI030 **A Novel Approach to Mapping Protein Interactions during Pilus Biogenesis by Using *in vivo* Photocrosslinking**
Erica Brooke Portnoy, 17, Commack High School, Commack, New York

First Award of \$3,000

- MI030 **A Novel Approach to Mapping Protein Interactions during Pilus Biogenesis by Using *in vivo* Photocrosslinking**
Erica Brooke Portnoy, 17, Commack High School, Commack, New York

- MI041 **The Protective Effects of the Violacein Pigment against UV-C Irradiation in *Chromobacterium violaceum***
Andrew Nickolas Abboud, 18, Tippecanoe High School, Tipp City, Ohio

Second Award of \$1,500

- MI009 **Identification and Characterization of Bacterial Endophytes as Novel Bio-inoculants for *Jatropha***
Yuan Jin Tan, 17, Raffles Institution, Singapore, Singapore

- MI028 **A Solution to the Worldwide Malaria Epidemic: *T. gondii* Mitochondria-Associated Proteins as Potential Drug Targets of Tomorrow**
Matthew Karmen McIntyre, 18, Yorktown High School, Yorktown Heights, New York

- MI029 **Identification of the Target of the Antibiotic Salinamide A**
Katherine Yon Ebright, 17, North Brunswick Township High School, North Brunswick, New Jersey

- MI067 **Beta Lactam Antibiotics Stimulate Non Typeable *Haemophilus influenzae* Biofilm Formation *in vitro***
Kathleen Rose Maguire, 17, Marlborough School, Los Angeles, California

Third Award of \$1,000

- MI006 **Investigating Acyl-homoserine Lactone Based Quorum Sensing Dependency in Mucoic and Nonmucoic *Pseudomonas aeruginosa* Biofilm Development**
Spencer Chang, 16, West Linn High School, West Linn, Oregon

- MI024 **Evaluating the Role of the HOG1 and ESCRT Pathways in Host/Cell Interaction and Stress Response of *Candida albicans***
David Kenneth Tang-Quan, 18, Palos Verdes Peninsula High School, Rolling Hills Estates, California

- MI027 **Analysis of the Bacterial Heat Shock Response to Photodynamic Therapy-Mediated Oxidative Stress**
Tyler Gordon St. Denis, 17, John Jay High School, Cross River, New York
- MI040 **Plant Symbiotic Microfungi as Novel Forms of Cellulase and Ligninase Enzymes for Biofuel Production, a Two-Year Study**
Francisco Xavier Orozco, 18, Tucson Magnet High School, Tucson, Arizona
- MI050 **Functional Characterization of Green Tea-responsive Proteins in *Escherichia coli***
Peter Yin, 17, Ames High School, Ames, Iowa
- MI061 **Microbial Explorations of a New Window into the Death Valley Deep Hydrological Flow System**
Alexandra Elane Wheatley, 18, Northwest Career and Technical Academy, Las Vegas, Nevada
- MI305 **Bioengineered rASS Protein Treatment Mitigates Bacterial Lipopolysaccharide Toxicity**
Alvin Wang, 17, Oak Hall School, Gainesville, Florida
Gabriel Enrique Molina, 17, Oak Hall School, Gainesville, Florida
Apurv Suman, 17, Oak Hall School, Gainesville, Florida

Fourth Award of \$500

- MI014 **The Effect of Holy Basil on the Growth of Respiratory Viruses (Adenovirus and Respiratory Syncytial Virus)**
Sangamithra Vardhan, 15, West Shore Junior/Senior High School, Melbourne, Florida
- MI021 **FIGHTING BACII, Phase IV: The Isolation of Anti-proliferative Phytochemicals from Cranberries to Eradicate *Escherichia coli***
Jordan Mark Grainger, 18, Rio Rancho High School, Rio Rancho, New Mexico
- MI031 **Synthesis and Use of Gold Nanoparticle Therapeutics in Antibiotic-Resistant Bacteria**
Soyeun Yang, 16, Fairview High School, Boulder, Colorado
- MI032 **Epstein-Barr Virus-Induced Alterations to Cellular Chromatin: A Potential Mechanism for Hit and Run Oncogenesis**
Ethan Traveny Skaggs, 17, Caddo Parish Magnet High School, Shreveport, Louisiana
- MI037 **Investigating the Effects of Autoinducer Analogs on Quorum Sensing in *Vibrio harveyi***
Felix F. Angelov, 17, Niles Township West High School, Skokie, Illinois
- MI043 **Nipping Nephritis in the Bud**
Rahi Dilip Punjabi, 14, Advanced Math and Science Academy Charter School, Marlborough, Massachusetts

- MI046 **Interrupting Bacterial Conversation with Black Olive (*Bucida buceras*) Extracts**
Rohan Batra, 16, American Heritage School, Plantation, Florida
- MI312 **Testing the Effect of Variable Surface Adhesiveness on the Movement Velocity of "Gliding" Cyanobacteria to Test Bacterial Gliding Theory for Cyanobacterial Motility**
Kevin Timothy Keller, 17, Battlefield High School, Haymarket, Virginia
Abhinav Sai Venkat, 17, Battlefield High School, Haymarket, Virginia

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 for Top First Place Winner

- PH037 **Countering Nuclear Terrorism: Novel Active and Passive Techniques for Detecting Nuclear Threats**
Taylor Ramon Wilson, 17, The Davidson Academy of Nevada, Reno, Nevada

First Award of \$3,000

- PH010 **The Flow Feature around Insects and Bionic Wing Based on Wind Tunnel Test**
Yimeng Shi, 18, The High School Affiliated to Renmin University of China, Beijing, Beijing, China

- PH037 **Countering Nuclear Terrorism: Novel Active and Passive Techniques for Detecting Nuclear Threats**
Taylor Ramon Wilson, 17, The Davidson Academy of Nevada, Reno, Nevada

Second Award of \$1,500

- PH015 **Characterizing the Effects of Asteroid Belt Perturbations on the Orbits of the Inner Planets**
Nikita Michael Bogdanov, 17, Albuquerque Academy, Albuquerque, New Mexico
- PH027 **N-Body Computational Analyses of the Aerocapture of Planetesimals Using Symplectic Algorithms**
Ian Alexander Sohl, 16, DaVinci Academy of Science and the Arts, Ogden, Utah
- PH062 **Better Images, Fewer Samples: Optimizing Sample Distribution for Compressed Sensing in Radio Interferometry**
Clara Louisa Fannjiang, 17, Davis Senior High School, Davis, California
- PH304 **Studies of Cell Elasticity by Nonlinear Damping**
Janet Yun-Chen Sung, 18, Taipei First Girls High School, Taipei City, Chinese Taipei
Nai-Wen Hu, 16, Taipei First Girls High School, Taipei City, Chinese Taipei

Third Award of \$1,000

- PH020 **The Optimization of an Electrostatic Solar Sail through Three-Dimensional Plasma Simulation**
Austin Joseph Hess, 18, Mechanicsburg Area Senior High School, Mechanicsburg, Pennsylvania
- PH026 **The Construction of a Small Dense Plasma Focus Using a Novel Experimental Setup**
Adam Joseph Bowman, 15, Montgomery Bell Academy, Nashville, Tennessee
- PH038 **Characterizing the Spectral and Flow Characteristics of Microhollow Cathode Discharges**
Kamal Shah, 18, Dr. Ronald E. McNair Academic High School, Jersey City, New Jersey
- PH039 **The Close Binary Fraction: A Bayesian Analysis of SDSS M Dwarf Spectra**
Benjamin Mathias Clark, 15, Penn Manor High School, Millersville, Pennsylvania
- PH046 **Finding Harmonics in Plasma**
Dylan Edward Moore, 17, Alameda Community Learning Center, Alameda, California
- PH053 **Effects of Cathode Composition on Inertial Electrostatic Confinement Fusion Reactors**
Charles Douglas Ramey, 18, Northgate High School, Newnan, Georgia
- PH064 **Light Curve and Orbital Analysis of Amor Asteroid 2000NF5**
Weishuang Linda Xu, 17, Lynbrook High School, San Jose, California

Fourth Award of \$500

- PH002 **Size-Effects on Correlated Etching of Few-Layered Graphene Nanoribbons**
Arunita Kar, 17, Paul Laurence Dunbar High School, Lexington, Kentucky
- PH011 **Multifunctional Scanner of the Angular Spectrum**
Polina Vladimirovna Shalaeva, 16, Lyceum # 40, Nizhny Novgorod, Russia
- PH022 **Determining "Hot Spots" through Correlations of CMEs and Solar Flares**
Travis Le, 16, Punahou School, Honolulu, Hawaii
- PH029 **Nonlinear Modeling and Optimization of Opioid Peptide Delivery**
Stanley Paul Palasek, 16, Sonoran Science Academy, Tucson, Arizona
- PH041 **Isolation and Optimization of the Radial Electric Field for the Proton Electric Dipole Moment Experiment**
Sahir Raoof, 17, Jericho Senior High School, Jericho, New York
- PH048 **Extending the Motional Stark Effect Diagnostic to Low Magnetic Fields: Towards Implementing a Laser-induced Fluorescence Technique**
Nicole Yeechi Tsai, 17, High Technology High School, Lincroft, New Jersey

PH302 **The Desk Model of a Multilayer Magnetic Nanoparticle**
Lev Yurovskiy, 16, Lyceym #40, Nizhniy Novgorod, Nizhegorodskaya, Russia
Grigory Astretsov, 17, Lyceum # 40, Nizhny Novgorod, Nizhegorodskaya, Russia

PH310 **Determination and Modeling of the Shape of an Asteroid by Analysis of Its Light Curve**
Florian Livet, 17, LGT Leonard de Vinci, Montaigu, France
Corentin Pasquier, 17, LGT Leonard de Vinci, Montaigu, France
Titouan Coislier, 17, LGT Leonard de Vinci, Montaigu, France

Plant 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 for Top First Place Winner

PS011 **The Use of Sodium Polyacrylate to Increase Crop Production in Dry-Land Farming**
Kira Elizabeth Powell, 16, Odessa High School, Odessa, Washington

First Award of \$3,000

PS011 **The Use of Sodium Polyacrylate to Increase Crop Production in Dry-Land Farming**
Kira Elizabeth Powell, 16, Odessa High School, Odessa, Washington

Second Award of \$1,500

PS033 **Racing to Find Molecular Markers to Differentiate Pathogen Races
Attacking Lentil Crops**
Rui Song, 15, Walter Murray Collegiate Institute, Saskatoon, Saskatchewan, Canada

PS303 **Phyto Chemical and Ethnobotanical Studies of *Acmella spilanthoides* Cass
(Buttonwood) and Its Importance in Medicine**
Kelvin Russell Cespedes Nano, 15, Educational Institution Divina Pastora, Oxapampa,
Pasco, Peru
Angel Francisco Solis Gozar, 16, Educational Institution Divina Pastora, Oxapampa,
Pasco, Peru

Third Award of \$1,000

PS001 **Improving Environmental Stress Tolerance: The Genetic Engineering of the *Oryza
sativa* Plant Carrying the *Escherichia coli* Genes Producing Trehalose (Year Two)**
Andrew Michael Joseph, 16, Episcopal High School of Jacksonville, Jacksonville, Florida

PS020 **Enzyme-Mediated DNA Methylation in *Arabidopsis thaliana*: The Effect of Abiotic
Stress on MET1, DRM2, and CMT3 Gene Expression**
Afia Zarrin Khan, 16, Spring Valley High School, Columbia, South Carolina

PS030 **The Agricultural Impact of Curlycup Gumweed on Barley Cultivars**
Tanner John Coppin, 17, Hankinson High School, Hankinson, North Dakota

PS306 **Investigation of a Novel Herbal Anti-Inflammatory Agent: *Liquidambar formosana* Hance Exudate, Bornyl Cinnamate**
Justine Li, 16, Jericho High School, Jericho, New York
Serife E. Uzun, 16, Jericho High School, Jericho, New York

Fourth Award of \$500

PS002 **Efficacy of Chlorine on *Salmonella* Typhimurium LT2 in Irrigation Water on Produce Items**
Kelly Nicole Howard, 18, The Villages Charter High School, The Villages, Florida

PS004 ***Rubus* Endophytes: Application and Implication for Biological Control**
Ann C. Bernert, 18, West Linn High School, West Linn, Oregon

PS010 **The Effect of Intraspecific Cooperation in Sibling Plants Descended from the Same Parental Type on the Amount of Biomass Produced**
Kelsi Samantha Faley, 16, Heritage High School, Leesburg, Virginia

PS019 **Characterization of the Symbiotic Relationship between *Sinorhizobium meliloti* and Alfalfa Plants**
Fatima Nadeem Mirza, 17, Kalamazoo Area Mathematics and Science Center,
Kalamazoo, Michigan