

Intel ISEF 2019 Special Awards Winners Announced

May 16th, 2019, Phoenix, AZ — Society for Science & the Public, in partnership with the Intel Foundation, announced Special Awards of the Intel ISEF 2019. Student winners are ninth through twelfth graders who earned the right to compete at the Intel ISEF 2019 by winning a top prize at a local, regional, state or national science fair.

Association for the Advancement of Artificial Intelligence

AAAI is a scientific society devoted to advancing the scientific understanding of the mechanisms underlying thought and intelligent behavior and their embodiment in machines. AAAI promotes research in, and responsible use of, artificial intelligence, as well as public understanding of artificial intelligence. AAAI also strives to improve the teaching and training of AI practitioners, and provide guidance on the importance and potential of current AI developments and future directions.

First Award of \$1,500

ROBO059 — *Looking through Walls with Artificial Intelligence: An Innovative Solution for Real-Time Retrieval of the Human Figure behind Visual Obstruction*

- Kevin Meng, Plano West Senior High School, Plano, TX, United States of America

Second Award of \$1,000

ROBO022T — *The Development of a Holistic System for Broad-Spectrum Crop Disease Diagnosis and Treatment*

- Pranav Senthilvel, duPont Manual High School, Prospect, KY, United

States of America

- Shreshth Srivastava, duPont Manual High School, Prospect, KY, United States of America

Third Award of \$500

ROBO039 — *Real-Time Freespace Segmentation Using Deep Learning on Autonomous Robots for Detection of Negative Obstacles*

- Anish Singhani, Monte Vista High School, San Ramon, CA, United States of America

Honorable Mention

BEHA031 — *Diagnosing Autism with Machine Learning: Binary Classification for Eye Movement in Virtual Reality Environment*

- Rhythm Garg, Texas Academy of Mathematics and Science, Frisco, TX, United States of America

SOFT016 — *It's Break Time: An Iris-Based Eye Fatigue Monitor*

- Yufeng Sun, The Experimental High School Attached to Beijing Normal University, Beijing, China

SOFT041 — *Weight Friction: A Simple Method to Overcome Catastrophic Forgetting and Enable Continual Learning in Neural Networks*

- Gabrielle Kaili-May Liu, Ravenwood High School, Nashville, TN, United States of America

SOFT047T — *Design of Analytic Application for Music Therapy Focused on Function between EEG and Sound Using Machine Learning Approaches*

- Dongyeong Kim, Korea Digital Media High School, Hanam-si, Gyeonggi-do, South Korea

- Hyogi Kim, Ewha Womans University High School, Seoul, South Korea
- Minseo Eun, Gwangyang Jecheol High School, Gwangyang-si, Jeollanam-do, South Korea

SOFT067 — An Adaptive, Low-Cost Device for Automated & Offline Medical Analysis Utilizing Neural Networks with Reinforcement Learning Optimization

- Neil Deshmukh, Moravian Academy, Bethlehem, PA, United States of America

Association for Computing Machinery

ACM is widely recognized as the premier membership organization for computing professionals, delivering resources that advance computing as a science and a profession; enable professional development; and promote policies and research that benefit society. ACM hosts the computing industry's leading Digital Library and serves its global members and the computing profession with journals and magazines, conferences, workshops, electronic forums, and Learning Center.

First Award of \$4,000

ROBO056 — Design and Analysis of Fast Algorithms for Interactive Machine Learning

- Jagdeep Bhatia, Watchung Hills Regional High School, Green Brook, NJ, United States of America

Second Award of \$3,000

SOFT052 — Detecting Privacy Violations in Children's Apps Using HPCs

- Suha Sabi Hussain, Queens High School for the Sciences at York College, Ozone Park, NY, United States of America

Third Award of \$1,500

ROBO040 — *A Game of Jamming: A Multi-Agent Game Theoretic Learning Based Cognitive Anti-Jamming Communication System to Combat an AI Jammer*

- Milidu Jayaweera, La Cueva High School, Albuquerque, NM, United States of America

Fourth Award of \$500

ROBO059 — *Looking through Walls with Artificial Intelligence: An Innovative Solution for Real-Time Retrieval of the Human Figure behind Visual Obstruction*

- Kevin Meng, Plano West Senior High School, Plano, TX, United States of America

SOFT028 — *Exploring a Novel Method of Foveated Rendering in Virtual Reality with an Object Based Approach*

- Varun Neil Aggarwal, Lake Highland Preparatory School, Orlando, FL, United States of America

SOFT060 — *Periphery Sweep Algorithm: Conquering A* Algorithm at Graph Traversal Solutions*

- Richik Vivek Sen, Delhi Public School - Vasant Kunj, New Delhi, Delhi, India

American Chemical Society

The American Chemical Society Education Division promotes excellence in science education and science literacy through a number of activities supporting teachers and learners of chemistry. Through its participation in Intel ISEF, ACS encourages and supports high school students in their

exploration of the chemical sciences through research experiences.

First Award of \$4,000

CHEM040 – *Novel Colorimetric Sensors for Detecting Chemicals in Vapor, Liquid, and Solid Phases*

- Helena Jiang, F. W. Buchholz High School, Gainesville, FL, United States of America

Second Award of \$3,000

BCHM038 – *Anacardic Acid Analogs as Inhibitors of Matrix Metalloproteinase-2 for the Prevention of Cancer Metastasis*

- Maanasi R. Kademani, Martin Luther King High School, Riverside, CA, United States of America

Third Award of \$2,000

CHEM009 – *Experimentally Designing Sustainable Clay-Based Adsorbents to Remove Arsenic from Drinking Water*

- Rajat Kaushik Doshi, Henry B. Plant High School, Tampa, FL, United States of America

Certificate of Honorable Mention

BCHM008T – *The Development of Lactase Hydrogel to Alleviate Lactose Intolerance from Dairy Beverages*

- Ngai Ming Maisie Luk, St. Paul's Convent School, Hong Kong, China, Hong Kong Special Administrative Region
- Verena Yiu, St. Paul's Convent School, Hong Kong, Guangdong, China, Hong Kong Special Administrative Region

CHEM007 — *Sustainable Manufacturing of Gamma Butyrolactone*

- Tianyu Dong, Northview High School, Johns Creek, GA, United States of America

CHEM019 — *Water Purification by Capillary Action in Paper Towels*

- Vongayi Anesu Marazanye, High Achievers Coach Educational Centre, Harare, Zimbabwe

EGCH036T — *Novel Alternative Energy: Seawater Electric Generator Improved by the Catalyst from Waste Lard*

- Chawit Kaewnuratchadasorn, Kamnoetvidya Science Academy, Hatyai, Songkhla, Thailand
- Puttaranun Boonchit, Kamnoetvidya Science Academy, Pa Yup Nai Sub-district, Wangchan District, Rayong, Thailand
- Putuchon Vongvorakul, Kamnoetvidya Science Academy, Bangkok, Thailand

Fourth Award of \$1,000

BCHM033 — *Characterizing the Role of Nuclear Flap Endonuclease 1 as a Mitochondrial Long Patch DNA Base Excision Repair Enzyme in vitro*

- Tong Ye, Half Hollow Hills High School East, Dix Hills, NY, United States of America

Geological Society of America & American Geosciences Institute

The Geological Society of America (GSA) and the American Geosciences Institute (AGI) are two of the leading geoscience organizations in the world. GSA was founded in 1888 and supports the professional growth of earth scientists at all levels of expertise and from all sectors: academic, government, business, and industry. The Society unites thousands of earth

scientists from every corner of the globe in a common purpose to study the mysteries of our planet (and beyond) and share scientific findings. GSA is supported, in part, by funds donated to and raised by the GSA Foundation. AGI is a federation of geoscience societies founded by the National Academy of Sciences in 1948. The Institute provides information services to geoscientists, supports the shared interests of the geosciences, and plays a major role in geoscience education.

Third Award of \$750

EAEVo28 — A New Experimental Approach for Study Metasomatism of Peridotite in the Earth's Mantle

- Tal Blonder, Midrashiya Hartman, Jerusalem, ISRL, Israel

EAEVo65 — U-Pb Geochronology of Fluid Flow Events in the Barstow Formation, California

- Ethan Jacob Sontarp, Commack High School, East Northport, NY, United States of America

Second Award of \$1500

EAEVo06 — Real-Time Sinkhole Detection Using Civil Engineering Techniques, the Internet of Things (IoT), and Artificial Intelligence

- Sophia Joy Wang, Amity Regional High School, Woodbridge, CT, United States of America

First Award of \$2,000

EAEVo27 — A Geochemical and Petrographic Analysis of Metamorphic Lithologies Proximal to the Cripple Creek and Victor Alkaline Diatreme Complex

- Jenna Marie Salvat, Coronado High School, Colorado Springs, CO,

American Mathematical Society

The American Mathematical Society was founded in 1888, to further the interests of mathematical research & scholarship, as well as to serve the national/international community through its publications, meetings, advocacy & other programs. Friends and family of the late mathematician, Karl Menger, contribute to a fund in his memory, to be distributed by the AMS for annual awards at the Intel International Science and Engineering Fair.

First Award of \$2,000

MATH010 — *Geodesics in the Discrete Heisenberg Group*

- Ruslan Magdiev, School 564, Saint-Petersburg, Russian Federation

Second Award of \$1,000

MATH014 — *Finding Chebyshev-Type Functions*

- Zong-Hong Cheng, The Affiliated Senior High School of National Taiwan Normal University, Neihu Dist., Taipei City, Taiwan

MATH032 — *Dynamics of the Tangent Map*

- Andrei Mandelshtam, University High School, Irvine, CA, United States of America

Third Award of \$500

MATH011 — *On Stallings Geodesic Braids Conjecture*

- Geidar Mamedov, School 564, Saint-Petersburg, Russian Federation

MATH016 — *Generating Set for Nonzero Determinant Links under Skein*

Relation

- Aayush Karan, University School of Milwaukee, Muskego, WI, United States of America

MATH025T — On the Largest Axes-Parallel Rectangle among Points in a Square

- Seo Yeong Kwag, Blair Academy, Blairstown, NJ, United States of America
- Taeyang Park, Peddie School, Edgewater, NJ, United States of America

MATH028T — Jump Return Problem on the Circle

- Pin-Hsien Yang, National Feng-Shan Senior High School, Kaohsiung City, Taiwan
- Wei-Lun Chang, National Feng-Shan Senior High School, Kaohsiung City, Taiwan

Certificate of Honorable Mention

MATH012T — Geometric and Algebraic Properties of Twin Groups

- Aleksei Krivovichev, School 564, Saint Petersburg, Russian Federation
- Daniil Kudriavtsev, School 564, Saint Petersburg, Russian Federation

MATH017 — On the Application of Heat Diffusion across a Manifold for Dimensionality Reduction

- John Tadeusz Piwinski, BASIS San Antonio Shavano Campus, San Antonio, TX, United States of America

MATH018 — Geodesic Lines on Archimedean Solids

- Stepan Akinshin, Moscow South-Eastern School Named After V. I. Chuikov, Moscow, Russian Federation

MATH023 – Applications of Hyperdimensional Linear Algebra and Complex Analysis

- James Matthew Baker, Choctawhatchee High School, Fort Walton, FL, United States of America

MATH026 – Classifying Magic Squares and Their Associated Symmetries Using a Chord Diagram Approach

- AnaMaria Perez, Albuquerque Academy, Albuquerque, NM, United States of America

American Meteorological Society

The American Meteorological Society (AMS) is the nation's leading scientific and professional society advancing the atmospheric and related sciences, technologies, applications, and services for the benefit of society. Founded in 1919, the AMS has a membership of more than 14,000 professionals, students, and weather enthusiasts. AMS offers numerous scholarships and fellowships to support students pursuing careers in the field.

First Award of \$2,000

EAEV017T – Mobile Weather Station and Databank

- Asli Dogu, Private Anabilim Anatolian High School, Istanbul, Turkey
- Berk Alaattin Bektemur, Private Anabilim Anatolian High School, Istanbul, Turkey

Second Award of \$1,000

EBED002 – Particulate Raindrop Analysis for More Accurate Storm Forecasts

- Max von Wolff, Megina Gymnasium Mayen, Mayen, Rhineland Palatinate, Germany

Third Award of \$500

EAEV016 — *Long-Term Visual Monitoring Revealed Importance of Sea Wind in Causing Sudden Showers in Japanese Mountain Basin*

- Aihisa Kamijo, Matsumoto Fukashi Senior High School, Azumino-City, Nagano, Japan

Certificate of Honorable Mention

EAEV021T — *Remote Heavy Rainfall from Tropical Cyclone*

- Bo-Jhih Hsiao, The Affiliated Senior High School of National Taiwan Normal University, New Taipei City, Taiwan
- Chieh-Hsiang Fan, The Affiliated Senior High School of National Taiwan Normal University, Banqiao Dist., New Taipei City 220, Taiwan

EAEV058 — *Using a Collaborative Robot to Simulate How Topography Impacts Tornado Intensity*

- Joseph Walker, Berks Catholic High School, Morgantown, PA, United States of America

EAEV064 — *Evaluating Severe Weather Prediction Methods from Thermodynamic Profiles*

- Maria Geogdzhayeva, Hunter College High School, New York, NY, United States of America

American Psychological Association

The American Psychological Association is the largest scientific and professional organization representing psychology in the United States. APA is the world's largest association of psychologists, with over 117,500 researchers, educators, clinicians, consultants and students as its members. APA's mission is to advance the creation, communication and application of

psychological knowledge to benefit society and improve people's lives.

First Award of \$1,500

BEHA003 — *iSense: Artificial Intelligence Based Early Detection Tool to Identify Linguistic Bio-Markers of Mood Disorders and Recognize At-Risk Individuals*

- Divya Vani Nori, Milton High School, Roswell, GA, United States of America

Second Award of \$1,000

BEHA004 — *Real-Time Analysis of Emotions for Neurological Disorder Patients*

- Shreya Ramesh, Milton High School, Alpharetta, GA, United States of America

Third Award of \$500

BEHA001 — *Combating Stuttering via an Empowered Multi-modal Neural Network based on Facial and Audio Recognition Data*

- Ronald Bohan Xu, Winter Springs High School, Oviedo, FL, United States of America

BEHA015 — *The Neural Mechanisms Underlying the Other Race Effect for Expression Perception*

- Tsung-Tien Hsiung, Taipei First Girls High School, Taipei City, Taiwan

BEHA022 — *Effect of Bilingualism on Stroop Interference*

- Cameron Ryan Neidhard, Carroll High School, Dayton, OH, United States of America

BEHA026 — *FRUGGIE: Building Healthy Food Pyramids with Technology*

- Annika Huprikar, Deerfield High School, Deerfield, IL, United States of America

BEHA034 — *The Novel Volumetric Quantification of the Chemobrain Phenomenon within a Pediatric Population*

- Jessica Michelle Goldstein, Plainview-Old Bethpage John F. Kennedy High School, Plainview, NY, United States of America

Certificate of Honorable Mention

BEHA011T — *Clinical Approach to Predict Cognitive Disorders in Multiple Sclerosis: The Use of Biomarkers Generated by Eye Movement Disorders*

- Lana Mahmoud Alakhras, Al-Hasaad Al-Tarbawi School, Amman, Jordan
- Raseel Eyad Shwaiki, Al-Hasaad Al-Tarbawi School, Amman, Jordan

BEHA012 — *DRAWIT: Predicting Children Physiological State, Behavioral Tendencies and Personality Characteristics Using Guided Drawing*

- Dania Rasmi Almubiden, Al Ridwan Schools, Amman, Jordan

BEHA027 — *Sensory Integration in Adolescents with a History of Multiple Concussions*

- Giovanni Carmelo Santucci, Ossining High School, Ossining, NY, United States of America

BEHA031 — *Diagnosing Autism with Machine Learning: Binary Classification for Eye Movement in Virtual Reality Environment*

- Rhythm Garg, Texas Academy of Mathematics and Science, Frisco, TX, United States of America

BEHA036 – Evaluating the Relationship between Concussion Knowledge and Reporting Tendencies in High School Athletes

- Joseph David Atherall, Yorktown High School, Yorktown Heights, NY, United States of America

BEHA045 – A Card and Board Game to Reduce Gender-Based Implicit Biases using Perspective-Taking and Counter Stereotyping and Other Methods of Influence

- Prerna Magon, Police DAV Public School, PAP Campus, Jalandhar, India, Jalandhar, Punjab, India

BEHA047T – Anxiety Disorder Detection and EMDR Treatment Using Optical PCCR Eye Tracking

- Abhinav Gundrala, Olympia High School, Olympia, WA, United States of America
- Nicole Marie Gunderson, Olympia High School, Olympia, WA, United States of America
- Rachel Freeman, Olympia High School, Olympia, WA, United States of America

Acoustical Society of America

The purpose of the Acoustical Society of America (ASA) is to generate, disseminate, and promote the knowledge and practical applications of acoustics. The Acoustical Society of America awards three finalists with cash prizes for themselves, their schools, and their mentors as well as financial support to attend the ASA next meeting. These meetings offer opportunities for students and young researchers as well as experienced acousticians to share information.

First Award of \$1,500, plus student's School will be awarded \$200, and Mentor awarded \$500.

ANIM016T — *Novel Subtle Acoustic Communication: Successful Elucidation of the Cryptic Ecology of Runner Plant Bugs (Hallodapus spp.) with Emphasis on Their Stridulatory Mechanisms*

- Ayana Miyazaki, Nagasaki Prefectural Nagasaki Nishi High School, Nagasaki, Nagasaki, Japan
- Haruka Hinami, Nagasaki Prefectural Nagasaki Nishi High School, Nagasaki, Japan
- Yui Tamada, Nagasaki Prefectural Nagasaki Nishi High School, Nagasaki-city, Nagasaki-Pref, Japan

Second Award of \$1000, plus student's School will be awarded \$100 and Mentor awarded \$250.

EGPH024T — *SHOWPAM: System of High-efficiency Ocean Wave Power with Acoustic Metamaterial*

- Joonyoung Lee, Korea Science Academy of KAIST, Seoul, South Korea
- Mincheol Park, Korea Science Academy of KAIST, Seongnam-Si, Gyeonggi, South Korea

Third Award of \$600.00, plus students Mentor will be awarded \$150.

ROBO052 — *PhonoNet: Deep Learning for Raga Identification in Indian Classical Music*

- Sauhaarda Chowdhuri, Westview High School, San Diego, CA, United States of America

Honorable Mention

MATSo64T — *Hibla: An Alternative Sound Absorption Material*

- E'van Relle Matic Tongol, Angeles City Science High School, Angeles

City, Pampanga, Philippines

- Neil David Cortez Cayanan, Angeles City Science High School, Angeles City, Pampanga, Philippines
- Shaira Castro Gozun, Angeles City Science High School, Angeles City, Pampanga, Philippines

American Statistical Association

The American Statistical Association is the world's largest community of statisticians. The ASA supports excellence in the development, application, and dissemination of statistical science through meetings, publications, membership services, education, accreditation, and advocacy. Our members serve in industry, government, and academia in more than 90 countries, advancing research and promoting sound statistical practice to inform public policy and improve human welfare.

Second Award of \$1,000

PHYS007 — *Plotting New Horizons: A Statistical Analysis of Potential Factors Influencing the Probability of Planetary System Formation*

- Dahlia Dry, Fort Myers High School, Fort Myers, FL, United States of America

Third Award of \$250

ROBO062 — *Enhancing Wind Power Predictions by Using Weather Data and Improving LSTMs*

- Maximilian Du, Fayetteville-Manlius High School, Manlius, NY, United States of America

TMEDO20 — *A Novel Approach to Assessment and Classification of Pulmonary Function in Early Onset Scoliosis*

- Ananya L. Ganesh, The Westminster Schools, Sandy Springs, GA, United States of America

First Award of \$1,500

CHEM029 — *Improving Affinity-Based Drug Delivery with Convenient Computational Models*

- Alison Wenqing Xin, Hathaway Brown School, Solon, OH, United States of America

Certificate of Honorable Mention

BEHA049 — *Predicting Opioid Use Disorder (OUD) Using Machine Learning*

- Adway Suhrid Wadekar, Saint John's High School, Westborough, MA, United States of America

CBIO024 — *NMF-based Machine Learning for Alzheimer's Disease Biomarker Identification and Diagnosis*

- Aaron Varughese Abraham, Webber Academy, Calgary, Alberta, Canada

PHYS049 — *K-edge X-ray Absorption Near Edge Structure (XANES) Analysis Methodology: A Case Study on Thiophenic Sulfur Compounds*

- Kayla Lanting Huang, Whitney M. Young Magnet High School, Chicago, IL, United States of America

ROBO021 — *Autism Diagnostics Tool Using Gesture Recognition and Machine Learning*

- Alan Andrew Michael, Allen D. Nease High School, St. Augustine, FL, United States of America

TMEDo47T — *Kanna: A Deep Learning Approach for Screening Amblyopia Using Facial Images*

- Viswesh Krishna, National Public School, Indiranagar, Bangalore, Karnataka, India
- Vrishab Krishna, National Public School, Indiranagar, Bangalore, Karnataka, India

Arizona State University

Arizona State University is pleased to offer a comprehensive scholarship combining a monetary award and an environment focusing on knowledge, learning and research. The New American University Intel ISEF Scholarship is renewable for four years, Individuals and teams will be considered for these awards.

Arizona State University Intel ISEF Scholarship

BCHMo03T — *Study and Characterization of Zea mays Stigma Extract: An Alternative to Obtain Eugenol*

- Maria Helena Ferreira, Fundacao Escola Tecnica Liberato Salzano Vieira da Cunha, Sao Leopoldo, RS, Brazil
- Muriel Schiling Krohn, Fundacao Escola Tecnica Liberato Salzano Vieira da Cunha, Sao Leopoldo, RS, Brazil

BMEDo26 — *The Cure in an Algae: Arthrospira spirulina as a Suppressive Substance of Cell Line SKOV3 of Ovarian Cancer through Photodynamic Technique*

- Fabiola Nahir Moreu Muniz, Dr. Pedro Albizu Campus, Ponce, Puerto Rico

CBIO018 — *A Novel Method for Skeletal Age Estimation Based on Cranial Suture Analysis*

- Andrey Gizdov, Ackworth School, Sofia, Bulgaria

CHEM008 — *Controllable Synthesis and Photocatalytic Degradation to Organic Pollutants of Heterogeneous Cu₂O-Au-TiO₂ Nanocomposite*

- Jiajun Ren, The High School Affiliated to Xian Jiaotong University, Xian, Shaanxi, China

CHEM049T — *The Development of an Innovative Systemic Catalytic Mechanism for the Removal of Free Radicals Associated with Colorectal Cancer*

- Jackson Elliott Pool, Cascia Hall Preparatory School, Tulsa, OK, United States of America
- Jaxon Riley Henderson, Cascia Hall Preparatory School, Tulsa, OK, United States of America
- Zachary John Uhren, Cascia Hall Preparatory School, Tulsa, OK, United States of America

EAEV075 — *Mapping Arsenic Movement due to Tsunami Events: Developing a Comprehensive Hot Spot Map of Arsenic Contamination in Wailoa State Park in Hilo, Hawaii*

- Jared Juichi Keoni Goodwin, Hilo High School, Hilo, HI, United States of America

EBED011T — *Engineering a Portable, Low-Cost Refreshable Braille Display for Communication with the Deaf-Blind Population*

- Josh Nakka, Palmer Ridge High School, Monument, CO, United States of America
- Katelynn Ryenne Salmon, Palmer Ridge High School, Palmer Lake, CO, United States of America

EGCH007 — *Garbage Fermentation Fuel Cell: Participant of Electricity*

Generation and Soil Pollution Control

- Mian Affan Anwar, Siddeeq Public School, Rawalpindi, Punjab, Pakistan

EGCH017 — A Novel Approach to Renewable Energy: Light Stimulated Active Cation Transport Membrane via Covalent Modification with a Photoacid

- Matthew Lane Fosdick, Empire High School, Corona, AZ, United States of America

EGPH013 — Dual-Purpose Highway Turbine

- Sadaf Naushad, PakTurk International Schools and Colleges, Karachi, Sindh, Pakistan

ENBM006 — Solar Powered Ozone and UVC-Based Decontaminator

- Alyssa Nicole Keirn, Rocky Mountain High School, Fort Collins, CO, United States of America

ENEV016 — A Novel Environmentally Friendly Approach to Controlling Marine Growth Using Complex Ultrasonic Waveforms

- Isabela Victoria Perdomo, MAST at FIU Biscayne Bay Campus, Miami Beach, FL, United States of America

ENMC034T — Is Amplification of Rays Better than Creating New Light Sources?

- Ahmed Zafar, Generation's School, Karachi, Sindh, Pakistan
- Usaid Ahmed, Generation's School, Karachi, Sindh, Pakistan

MCRO069 — DNA Sequencing of Soil Microbiota from Mulching: A Novel Rotational Fragment Farming for Efficient Agriculture

- Pranav Chhaliyil, Maharishi School of the Age of Enlightenment, Fairfield, IA, United States of America

Ashtavadhani Vidwan Ambati Subbaraya Chetty Foundation

AVASC is an educational and medical service foundation dedicated to recognizing academic talent and providing services to the needy. AVASC will award projects that display outstanding creativity, ingenuity, and have the potential to alleviate the human condition or mark a substantive advancement in the scientific field.

First Award of \$1000

CELLO32 – ETM Is Indispensable to Endothelial Cell Physiology during Pathological Angiogenesis*

- Madhav Subramanian, Jericho High School, Jericho, NY, United States of America

CHEM058 – C60 Buckminsterfullerene Derivatives for DNA-Encoded Libraries, Fullerene-Supported Synthesis, and High-Throughput Screening

- John-Mark Andrew Phillips, Seminole Ridge Community High School, Royal Palm Beach, FL, United States of America

Second Award of \$500

BMEDO58 – Precision Care for Leukemia: Discovery of Novel Therapeutics for High-Risk ALL via Epigenetic and Computational Transcriptome Profiling

- Ruhi Sayana, The Harker School, Cupertino, CA, United States of America

EAEVO76 – Augura: Flood Risk Prediction Using Machine-Learning and Geographic Information Systems

- Sagnik Anupam, Delhi Public School, R. K. Puram, New Delhi, Delhi, India

ENBM007 — *A Novel Optical Diagnostic Method for Non-Invasive Detection of Blood Glucose Using Reverse Iontophoresis Modulation and Personalized Neural Networks*

- Rohan Ahluwalia, Westview High School, Portland, OR, United States of America

MATH043 — *Contradictions in the Banach-Tarski Paradox within Euclidean Space*

- Xander Jones, Navajo Preparatory School, Farmington, NM, United States of America

PHYS043 — *Effect of Epitaxial Compression on Structural and Electrical Transport Properties of 3D Topological Dirac Semimetal Cd₃As₂*

- Nikita Nitin Salunke, Evergreen Valley High School, San Jose, CA, United States of America

PLNT022 — *Farming on Mars: Potential Strategies for Sustainable Agriculture*

- Pooja Kasiviswanathan, Ames High School, Ames, IA, United States of America

ROBO066 — *myRadioloGIST: Early Detection of Lung Cancer from Hidden Gist Signals in CT Scans with Deep Neural Networks and Transfer Learning*

- Eshika Saxena, Interlake High School, Bellevue, WA, United States of America

TMED027 — *Sharks Take a Bite Out of Infection! An Antibacterial, Reusable Bandage for Post-Operative Patients*

- Hannah Herbst, Florida Atlantic University High School, Boca Raton, FL, United States of America

China Association for Science and Technology (CAST)

China Association for Science and Technology (CAST) is the largest organization of scientists and technologists in China. One of its missions is to promote public understanding of science. Having developed science education programs, CAST supports youth and adolescents in becoming citizens with high scientific literacy. CAST awards are given to the projects that best reflect the originality and innovation of the students' work in all scientific disciplines.

Award of \$1,200

ANIM003T — Developing Novel, Low-Cost Methods to Support Citizen Scientists in the Conservation of Bat Species

- Dylan Andrew Bagnall, The King's Hospital, Navan, Leinster, Ireland
- Richard Douglas Beattie, The King's Hospital, Dublin, Leinster, Ireland

BEHA010 — The Attachment Theory and Emotional Development: A Twin Study

- Paeon Luby, Benjamin Franklin High School, New Orleans, LA, United States of America

ENMCO14 — Development of a Fully Reusable and Autonomously Landing Suborbital Launch Vehicle

- Ryan Steven Westcott, Oregon Episcopal School, Portland, OR, United States of America

MATSO03 — The Flash Shade: Directional Darkening Technology

- Adrien Chen-Wei Jathe, Metropolitan School Frankfurt gGmbH,

Frankfurt am Main, Hessen, Germany

PHYS033 — Improving Particle Classification in WIMP Dark Matter Detection Experiments Using Neural Networks

- Brendon Franz Matusch, Lo-Ellen Park Secondary School, Sudbury, Ontario, Canada

PLNT064T — Novel Suction-Bait Trap to Manage Infestation of Melon Fruit Flies in Cucurbits

- Manya M. Kumar, Kendriya Vidyalaya No.1 Naval Base Kochi, Kochi, Southern , India
- Richard Joseph, Kendriya Vidyalaya No.1 Naval Base Kochi, Kochi, Kerala, India

PLNT066T — Development of Food Poisoning Resistant Lettuce Using Endophytes in Petasites Japonicus Leaves

- Jihyun Ra, Kangwon Science High School, Chuncheon-si, Gangwon-do, South Korea
- Yoonji Kim, Kangwon Science High School, Chuncheon-si, Gangwon-do, South Korea

SOFT002 — A Brain-Computer Interface Application for the Assessment of Cognitive Aging

- Saraswati Venkatasai Sridhar, Southwestern Educational Society, Mayaguez, PR, United States of America

TMED023 — The SMART System: Magnetic Deflection and Absorption Shielding of Treatment Contaminants to Enhance Radiotherapy Cancer Patient Outcomes by Reducing Normal Tissue Injuries

- Macinley Neve Butson, The Illawarra Grammar School, Mangerton, New

South Wales, Australia

TMEDo46T — *An Automated Microfluidic Platform for Food Safety and Human Allergy Analysis*

- Chun Hei Fong, Pui Ching Middle School, Macao, Macao Special Administrative Region, China, Macao Special Administrative Region
- Hoi Ian Hui, Pui Ching Middle School, Macao Special Administrative Region, China, Macao Special Administrative Region

Drexel University

Drexel University will award eight full scholarships valued at \$200,000 each to those students whose projects match Drexel's curriculum. Drexel is recognized for its focus on experiential learning through co-operative education, its commitment to cutting-edge academic technology and its growing enterprise of use-inspired research. Drexel Co-op enables students to balance classroom theory with practical, hands-on experience.

Full tuition scholarship \$200,000

CBIOo08 — *A Novel PCA-Based Wishart Filtering Method for Reduction of Unstructured Noise in fMRI and Connectomes to Improve Diagnosis of Neurodegenerative Diseases*

- Nikhil Vamsi Boddu, Marquette High School, Ballwin, MO, United States of America

CHEMo63 — *Novel Artificial Synthesis of Sugars from Non-Organic Compounds for Renewable Cellular Energy*

- Sky A. Harper, Navajo Preparatory School, Aztec, NM, United States of America

EAEVo10 — *The Role of Fluorescent Pigments in Protecting Zooxanthellae*

- Emma Wetsel, Oregon Episcopal School, Portland, OR, United States of America

EAEV033 — *The Introduction of Different Nitrogen and Phosphorus Levels to Regulate Phytoplankton Growth in Aquatic Habitats*

- Amelia Claire Cave, Edward Douglas White Catholic High School, Houma, LA, United States of America

ENBM038 — *Smart Microfluidics-based Impedance Aggregometry Biosensor for Detection of Platelet Hyperaggregation*

- Eeshani Behara, American Heritage School of Boca Delray, Delray Beach, FL, United States of America

ENEV046 — *Application of Microbial Fuel Cell Biosensors in Detecting Water Pollution*

- Anna Vargas, Tabb High School, Yorktown, VA, United States of America

ENMCO74 — *Saving One Child's Life at a Time*

- Elizabeth Aline Newberry, Jackson County High School, Red Boiling Springs, TN, United States of America

TMED049 — *A New Method to Study the Human Microbiome*

- Isabelle Louise Chambers, Woodhaven Academy, Fargo, ND, United States of America

Florida Institute of Technology

Florida Institute of Technology is a nationally ranked, doctoral degree granting research university. The university offers degrees in engineering, science, computing, aeronautics, business, psychology and liberal arts. Its location just south of the Kennedy Space Center provides incredible research

opportunities for students interested in engineering and science. Florida Tech will offer three presidential scholarships to ISEF participants that equal full tuition each year for four years upon fulltime enrollment at the university. Awardees must complete the FAFSA to be eligible.

Full Tuition Presidential Scholarship

EBED007 — Augmented Reality for Autism

- Albert Alexander Manrique, MAST at FIU Biscayne Bay Campus, Aventura, FL, United States of America

MATSO56 — Aluminum SiO₂ Coated Optical Mirror Deterioration with Epoxy Resin

- Shayla Elizabeth Wilhelm, Portville Central School, Portville, NY, United States of America

ROBO013 — Using a Computer Program Applied to an Electromagnetic Walking Apparatus to Simulate Earth's Gravity in Space

- Mary Alice Diana Young, Bishop Kenny High School, Jacksonville, FL, United States of America

University of Arizona

Established in 1885, the University of Arizona (UA) is the state's land-grant university. Recognized as a global leader, the UA is also a leader in research, bringing more than \$622 million in research investment each year, and ranking 21st among all public universities. UA offers over 300 undergraduate and graduate degree programs in 16 academic colleges. UA will award scholarships to outstanding awardees who have demonstrated robust research for the greater good of society.

Renewal Tuition Scholarship

ANIM015T — Bird Environmental DNA from the Air

- So Tsukamoto, Shizuoka Prefectural Kakegawa-Nishi High School, Fujieda city, Shizuoka Prefecture, Japan
- Yuma Okamoto, Shizuoka Prefectural Kakegawa-Nishi High School, Kikugawa City, Shizuoka Prefecture, Japan

ANIM023 — Nematode Caenorhabditis elegans': Population Growth Response to Various Sugar Solutions

- Louie Remijio Martinez, Grants High School, Grants, NM, United States of America

ANIM044 — A Solution to Varroa Mite Infestations Using RNA-interference

- Elizabeth Paige Wamsley, Timber Ridge Scholars, Pacific, MO, United States of America

BEHA021 — Effects of an Instructor's Ideology on a Student's Perspective

- Rose Marie Long, University High School, Tucson, AZ, United States of America

EAEV025 — Investigating How Water Vapor Emission Impacts the Temperature of the Troposphere

- Annalisa Minke, Immaculate Heart High School, Tucson, AZ, United States of America

EAEV035 — Metals and Metalloids in Corn Detected with the Inductively Coupled Plasma-Mass Spectrometer

- McKayla Taylor Gilbert, Farmington High School, Farmington, NM, United States of America

EGCH007 — Garbage Fermentation Fuel Cell: Participant of Electricity

Generation and Soil Pollution Control

- Mian Affan Anwar, Siddeeq Public School, Rawalpindi, Punjab, Pakistan

EGCH017 — A Novel Approach to Renewable Energy: Light Stimulated Active Cation Transport Membrane via Covalent Modification with a Photoacid

- Matthew Lane Fosdick, Empire High School, Corona, AZ, United States of America

EGCH030 — Perovskite Solar Cell: A Simple Hot Casting Method to Formulate High-quality, Lead-free, Sn-based Perovskite Films with Reduced Pinholes

- Smriti Manickam Somasundaram, Olympia High School, Olympia, WA, United States of America

ENBM004 — Development of a Novel Biohybrid Nanorobot for Detection and Treatment of Disease

- Akhil Kadamala Shiju, Lawton Chiles High School, Tallahassee, FL, United States of America

ENBM006 — Solar Powered Ozone and UVC-Based Decontaminator

- Alyssa Nicole Keirn, Rocky Mountain High School, Fort Collins, CO, United States of America

ENEV016 — A Novel Environmentally Friendly Approach to Controlling Marine Growth Using Complex Ultrasonic Waveforms

- Isabela Victoria Perdomo, MAST at FIU Biscayne Bay Campus, Miami Beach, FL, United States of America

ENEV027 — SymBead Aquatic Technologies: The Development of a Low-

Impact, Cost-Effective, Multi-Pollutant Bioremediation System

- Braden Nicholas Milford, Cascia Hall Preparatory School, Tulsa, OK, United States of America

ENEVo40 — Visible-light Responsive Multifunctional Membrane for the Separation of Oil-Water Mixtures and Simultaneous Water Decontamination Supported by Theoretical Models

- Shouq Faisal Madani, KFUPM Schools, Dhahran, Eastern Province, Saudi Arabia

ENMCo50 — Art or Science? String-Bow Interactions on a Novel Optoelectronic Cello

- Andrew T. Land, Carlmont High School, San Carlos, CA, United States of America

MCROo27T — A Comparison of the Biofilm Forming Potential of Native Microbiota of Various Leafy Greens on Different Food Contact Surfaces

- Jeremy Chen-Hao Wang, Catalina Foothills High School, Tucson, AZ, United States of America
- Meena Niveda Ravishankar, University High School, Tucson, AZ, United States of America
- Vishakk Rajendran, BASIS Tucson North, Tucson, AZ, United States of America

MCROo48 — Fishing for New Crop-Benefiting Soil Bacteria through Plant-Microbe Interactions

- Gary Zhan, Logan High School, North Logan, UT, United States of America

PHYSo23 — Chance of Non-Nucleated Light Source Superposition on Ultra-

Diffuse Galaxy Centers

- Max Amador Michaud, University High School, Tucson, AZ, United States of America

PHYSO65 — Asteroid Families Mechanics with Application to the Family Eunomia

- Adam Krivka, The St. Cyril and Methodius Comprehensive School and Pedagogical High School Brno, Brno, Southmoravian Region, Czech Republic

PLNT038 — Growth Promotion and Yield Enhancement of Crop Seeds with Plant Products: Effects of Extracts, Endophytic Symbionts, and Endosperm

- Damian Galasso, Galasso Homeschool, Tucson, AZ, United States of America

SOFT030 — Asguardian Cyber: A Customized Cybersecurity Program to Prevent Intrusions from Hackers

- Thor Gavin, Academy of Excellence, Sierra Vista, AZ, United States of America

*TMED017 — G-CSF as a Preventative Treatment for Traumatic Brain Injury in *Drosophila melanogaster**

- Beril Lara Saygin, Keystone School, Helotes, TX, United States of America

United States Environmental Protection Agency

From nanomaterials a billionth of a meter in size to global climate dynamics, EPA scientists and engineers are investigating every scale of our environment and the links between environment and human health. EPA conducts research that addresses the highest priority science needs of the nation. The

work performed by EPA scientists, engineers and their research partners improves the quality of the air we breathe, the water that sustains us, and the land upon which we live.

The Patrick Hurd Sustainability Award winner will travel to EPA's National Sustainable Design Expo

EAEV049 — Large-Scale Field Testing of Stropharia Mycelium Buffer Strips for Harmful Algae Bloom Prevention, Year 5

- Harshal Rajesh Agrawal, Dr. Ronald E. McNair Academic High School, Jersey City, NJ, United States of America

Alternate trip winner

MATSo79 — OceanBioplas: The Plasticity of Marine Exoskeleton-Inspired Materials and Their Degradability in the Environment (Soil and Seawater/Saltwater)

- Jacqueline Prawira, Mountain House High School, Mountain House, CA, United States of America

Fondazione Bruno Kessler

The Bruno Kessler Foundation (FBK) is a leading research center in Trento, Italy. WebValley is the FBK Summer School program for interdisciplinary scientific research. A team of enthusiastic and motivated high school students and FBK researchers accepts a project challenge, proposed by a visiting scientist. FBK's Board of Directors will award several Intel ISEF finalists full fellowships, 1 of them to include travel to Italy, to be part of the WebValley team in June.

Award to Travel to Trento, Italy to participate in summer school "Web Valley"

TMED035 – A Fast, Sensitive, and Non-Invasive Approach to Detecting Breast Cancer Using a Fully Convolutional Neural Network

- Ishana Shastri, Poolesville High School, Germantown, MD, United States of America

Award to participate in summer school "Web Valley" in Trento, Italy

CBIO031 – Using Three-Dimensional Modeling to Analyze the Vascular System and Radiation-Induced Lung Damage

- Karen Angela Copeland, Alexander W. Dreyfoos School of the Arts, Jupiter, FL, United States of America

ENBM008 – Utilizing Computer Vision and Machine Learning Systems to Develop a Live Time Navigational and Surgical Aid for Spinal Reconstructions

- Krithik Ramesh, Cherry Creek High School, Englewood, CO, United States of America

ENBM021 – Stereoscopic Three-Dimensional X-Ray Reconstruction Processing: A Low-Radiation Cost-Effective Versatile Medical Imaging Procedure for Safe and Rapid Scanning

- David Yue, Texas Academy of Mathematics and Science, Plano, TX, United States of America

GoDaddy

GoDaddy is the world's largest technology provider dedicated to small business. GoDaddy believes it has a responsibility to make a difference in the community. As part of that philosophy, GoDaddy contributes to nonprofit organizations that focus on causes meaningful to customers, employees and

to our community. GoDaddy will be presenting the following awards: the Web Innovator Award, the Mobile Application Award, the Open Source Award, the Data Award and the Forward Thinker Award.

\$1,500 Making the Best Use of Data Award

ROBO052 – *PhonoNet: Deep Learning for Raga Identification in Indian Classical Music*

- Sauhaarda Chowdhuri, Westview High School, San Diego, CA, United States of America

\$500 Working Fearlessly Award

SOFT025T – *Inclusive Translator for People with Hearing Impairment*

- David Monge Ricaurte, CTP Carlos Manuel Vicente Castro, Santo Domingo, Heredia, Costa Rica
- Diego Josef Reyes Caton, CTP Carlos Manuel Vicente Castro, Golfito, Puntarenas , Costa Rica
- Marcos David Mata Baltodano, CTP Carlos Manuel Vicente Castro, Golfito, Puntarenas, Costa Rica

\$1,500 Mobile Applications to the Rescue Award

SOFT023 – *A Deep Learning-Based Drowning Detection Method for Dynamic Swimming Pool Environments Using Spatiotemporal Neighborhood Analysis*

- Jessica Mengxin Yu, West Linn High School, Beaverton, OR, United States of America

\$1,000 Working Fearlessly Award

SOFT021T – *Classroom 2.0*

- Jhorch Quispe Laura, Luis Alberto Sanchez, Chincheros, Apurimac, Peru
- Karen Vanesa Huaman Quintana, Luis Alberto Sanchez, Andahuaylas, Apurimac, Peru

\$750 Joining Forces for the Community Award

SOFT044T — *The Fifth Sense: A Novel Aid Device for Visually Impaired People, Translating Computer Vision into Surround Sound for Obstacle Detection*

- Ian Benjamin Kaspi Langleben, Dawson College, Montreal, Quebec, Canada
- Liana Martins-Medina, Marianopolis College, Montreal, Quebec, Canada

SOFT048T — *SmartCane Mobile Application for the Wearable White Cane*

- Anna Clare Puca, Kalamazoo Area Mathematics and Science Center, Kalamazoo, MI, United States of America
- Julia Lillian Strauss, Kalamazoo Area Mathematics and Science Center, Kalamazoo, MI, United States of America

\$750 Make Your Own Way Award

SOFT006 — *Distributed Creation of Machine Learning Agents for Blockchain Analysis*

- Zvezdin Borisov Besarabov, National School of Mathematics and Natural Sciences, Sofia, Sofia-Town, Bulgaria

SOFT010T — *Preventing Left Turn Road Accidents Using Photosensory Technologies and Computer Vision*

- Humza Rayaan Salim, T.C. Jasper High School, Plano, TX, United States of America
- Yousuf Muneeb Ahmad, Jasper High School, Plano, TX, United States of

America

Making an Impact Award, GoDaddy products to help create awareness for their project, a value of over \$500.00.

SOFT002 — *A Brain-Computer Interface Application for the Assessment of Cognitive Aging*

- Saraswati Venkatasai Sridhar, Southwestern Educational Society, Mayaguez, PR, United States of America

IEEE Foundation

IEEE is the world's largest professional association dedicated to advancing technological innovation and excellence for the benefit of humanity. IEEE awards the \$10,000 Presidents' Scholarship to recognize a deserving student for an outstanding project demonstrating an understanding of electrical engineering, electronics engineering, computer science, or other IEEE field of interest. In addition to the scholarship, IEEE awards a \$600 Second Place Award and a \$400 Third Place Award.

The IEEE Foundation Presidents' Scholarship Award of \$10,000

ROBO053 — *WormBot: Mimicking Earthworm Locomotion*

- Ari Joseph Firester, Hunter College High School, New York, NY, United States of America

IEEE Foundation Second Place Award \$600

ENBM030 — *Rapid, Smartphone-Based Diagnosis of Skin Melanoma through Differences in Tumor Cell Thermal Regulation Combined with Diffuse Spectroscopic Analysis*

- Melissa Woo, Greenwich High School, Riverside, CT, United States of America

IEEE Foundation Third Place Award \$400

EGPH014 — *Sensory Solar Panels*

- Abigail Greenhalgh, Georgetown Visitation Preparatory School, Kensington, MD, United States of America

International Council on Systems Engineering - INCOSE

The International Council on Systems Engineering (INCOSE) is a not-for-profit membership organization founded to develop and disseminate the interdisciplinary principles and practices that enable the realization of successful systems. The INCOSE Best Use of Systems Engineering award is awarded to the best interdisciplinary project that can produce technologically appropriate solutions that meet societal needs. The INCOSE Special Systems Engineering Prosthesis award is awarded to the best use of Systems Engineering process used in the development of prosthesis

First Award of \$1,500

ENEV002 — *The Prototype of a Vehicle which Takes Preventive Measurement of Soil Conditions Autonomously*

- Piotr Lazarek, Zespól Szkól Ogólnokształcących Filomata, Pawłowice, Śląsk, Poland

Certificate of Honorable Mention

EBED008 — *Development of an Autonomous Aerial Vehicle Using Computer Vision and Artificial Intelligence to Assist First Responders in Dangerous Situations*

- Samuel M. Cadotte, Kalaheo High School, Kailua, HI, United States of America

ENBM012 — *Employing Computer Vision to Provide Artificial Eyes for the*

Visually Impaired and Blind

- Vincent Yang, Radford School, El Paso, TX, United States of America

ENBM030 — *Rapid, Smartphone-Based Diagnosis of Skin Melanoma through Differences in Tumor Cell Thermal Regulation Combined with Diffuse Spectroscopic Analysis*

- Melissa Woo, Greenwich High School, Riverside, CT, United States of America

ENBM036 — *Improving Spinal Fusions: Redesigned Pedicle Probe to Prevent Vertebral Breaches*

- Nicolas Paolo Fedrigo, Claremont Secondary School, Victoria, British Columbia, Canada

ENEV027 — *SymBead Aquatic Technologies: The Development of a Low-Impact, Cost-Effective, Multi-Pollutant Bioremediation System*

- Braden Nicholas Milford, Cascia Hall Preparatory School, Tulsa, OK, United States of America

ENEV086 — *Designing an in situ Soil Conductivity Monitoring System for Precision Agriculture and Water Management*

- Rohan Mahesh Wagh, Sunset High School, Portland, OR, United States of America

ENMCO14 — *Development of a Fully Reusable and Autonomously Landing Suborbital Launch Vehicle*

- Ryan Steven Westcott, Oregon Episcopal School, Portland, OR, United States of America

ENMCO16 — *Miniature Underwater Bridge Pier Cleaning Robot*

- Jingke Hu, Hangzhou Xuejun High School of Zhejiang Province, Hangzhou, Zhejiang, China

ENMC054 — *Welcome to "Sistance": A New Form of Base Communication for Deaf-Blind Children*

- Mackenzie Lee Hunt, New Tech Institute, Evansville, IN, United States of America

ROBO003 — *A Novel, Self-balanced Robot with Leading Technology in Crossing All Angles of Transmission Lines*

- Bradley Jiping Xu, Shanghai American School - Pudong Campus, Shanghai, China

ROBO021 — *Autism Diagnostics Tool Using Gesture Recognition and Machine Learning*

- Alan Andrew Michael, Allen D. Nease High School, St. Augustine, FL, United States of America

ROBO025 — *Robust Autonomous Micro Aerial Vehicle (MAV) Navigation with Onboard, Environment-Agnostic, Multi-Sensor SLAM*

- Parthiv Nandakumar Krishna, Minnetonka High School, Excelsior, MN, United States of America

ROBO039 — *Real-Time Freespace Segmentation Using Deep Learning on Autonomous Robots for Detection of Negative Obstacles*

- Anish Singhani, Monte Vista High School, San Ramon, CA, United States of America

ROBO066 — *myRadioloGIST: Early Detection of Lung Cancer from Hidden Gist Signals in CT Scans with Deep Neural Networks and Transfer Learning*

- Eshika Saxena, Interlake High School, Bellevue, WA, United States of America

Second award of \$500

ENBM027 — *Design and Construction of a Cost-Effective Full Arm Prosthetic with Computer Vision*

- Noam Yakar, Tenafly High School, Tenafly, NJ, United States of America

Mu Alpha Theta, National High School and Two-Year College Mathematics Honor Society

Mu Alpha Theta strives to promote the enjoyment and scholarship of mathematics. The Mu Alpha Theta Award is given to the most challenging, thorough, and creative investigation of a problem involving mathematics accessible to high school students. Components of the investigation often include mathematical proof, mathematical modeling, statistical analysis, visualization, simulation, and approximation.

Second Award of \$1,000

MATH034 — *Solving a Cryptography Problem Using the Master Pyraminx*

- Alexander Zhang, Lynbrook High School, San Jose, CA, United States of America

MATH038 — *A Trust Model in Bootstrap Percolation*

- Rinni Bhansali, Half Hollow Hills High School East, Melville, NY, United States of America

ROBO006 — *Fast MRI: Reconstructing MR Images Using Undersampled k -space and a GAN*

- Siddarth Ijju, Cherry Creek High School, Cherry Hills Village, CO, United

States of America

First Award of \$ 1,500

MATH013 — *Applied Mathematical Modeling of Continuous Dynamic Systems of Fluids in Pipe Flows*

- Anne Mae DeForge, Liberty High School, Hillsboro, OR, United States of America

MATH026 — *Classifying Magic Squares and Their Associated Symmetries Using a Chord Diagram Approach*

- AnaMaria Perez, Albuquerque Academy, Albuquerque, NM, United States of America

King Abdul-Aziz & his Companions Foundation for Giftedness and Creativity

King Abdul-Aziz & His Companions Foundation for Giftedness and Creativity, "MAWHIBA", is a national educational foundation in Saudi Arabia established to help cultivate a comprehensive environment of creativity. The organization seeks to build a sustainable future by encouraging youth around the world to search for innovative means toward developing concepts in relevant fields of study. To support this goal, MAWHIBA will award prizes in four distinct categories of the Fourth Industrial Revolution (4IR) that include machine learning in real-world chemistry applications, machine learning in real-world chemistry and environmental applications, robotics and cybersecurity. A total of fourteen awards will be given to students who excel in the evaluation criteria.

Award of \$1500 in Machine Learning in Real-World Chemistry or Environmental Applications

ENBM008 — *Utilizing Computer Vision and Machine Learning Systems to*

Develop a Live Time Navigational and Surgical Aid for Spinal Reconstructions

- Krithik Ramesh, Cherry Creek High School, Englewood, CO, United States of America

ENBM015 – The Intelligent Medical Stapler: Ending the Emergency Room Crisis

- Arnav Jain, Gwinnett School of Mathematics, Science, and Technology, Suwanee, GA, United States of America

ROBO003 – A Novel, Self-balanced Robot with Leading Technology in Crossing All Angles of Transmission Lines

- Bradley Jiping Xu, Shanghai American School - Pudong Campus, Shanghai, China

\$21000 Scholarship for Machine Learning in Real-World Chemistry or Environmental Applications

ENBM011 – Engineering a Novel Wearable Biosensing Mechanism through the Implementation of Microelectromechanical Systems and Machine Learning to Realize Anomalies Hinting towards Future Cardiac Episodes

- Prerit Choudhary, College Park High School, Shenandoah , TX, United States of America

\$21000 Scholarship for Machine Learning in Real-World Bio-engineering Applications

ROBO022T – The Development of a Holistic System for Broad-Spectrum Crop Disease Diagnosis and Treatment

- Pranav Senthilvel, duPont Manual High School, Prospect, KY, United States of America

- Shreshth Srivastava, duPont Manual High School, Prospect, KY, United States of America

\$21000 Scholarship for Practical Robotics Innovation

ENEVo82T — A Novel Computational Tool to Inform Cost-Effective Nutrition Interventions in Sub-Saharan Africa

- Garyk Jandl Brixi, Winston Churchill High School, Potomac, MD, United States of America
- Lillian Kay Petersen, Los Alamos High School, Los Alamos, NM, United States of America

\$21000 Scholarship for Intelligent-Based Solutions in Cyber-security

SOFTo13 — A Secure Implementation of Mendelian Randomization via Multi-Party Computation

- Divya Amirtharaj, Westview High School, Beaverton, OR, United States of America

Award of \$1500 in Machine Learning in Real-World Bio-engineering Applications

EBEDo03 — Natural Phenomena Early Warning System

- Aziz Hanafi, International School of Carthage, Tunis, Soukra, Tunisia

ROBOo07 — Fast Braille: Multi-Function Printer to Assist the Writing of the Visually Impaired II

- Bruna Da Silva Cruz, Fundacao Escola Tecnica Liberato Salzano Vieira da Cunha, Canoas, Rio Grande do Sul, Brazil

SOFTo06 — Distributed Creation of Machine Learning Agents for

Blockchain Analysis

- Zvezdin Borisov Besarabov, National School of Mathematics and Natural Sciences, Sofia, Sofia-Town, Bulgaria

Award of \$1500 in Practical Robotics Innovation

CHEM061 — *Using Molecular Dynamics Simulations to Study the Self-Assembly of Patchy Alkane-Tethered Nanoparticles*

- Caroline J. Spindel, Harpeth Hall, Murfreesboro, TN, United States of America

SOFT008 — *Blockchain Optimization Model Based on Consistent Hash Algorithm*

- Chang Su, Shimen Middle School, Shunde, Guangdong, China

Award of \$1500 in Intelligent-Based Solutions in Cyber-security

CHEM029 — *Improving Affinity-Based Drug Delivery with Convenient Computational Models*

- Alison Wenqing Xin, Hathaway Brown School, Solon, OH, United States of America

EAEV064 — *Evaluating Severe Weather Prediction Methods from Thermodynamic Profiles*

- Maria Geogdzhayeva, Hunter College High School, New York, NY, United States of America

National Aeronautics and Space Administration

The National Aeronautics and Space Administration (NASA) is the United States government agency responsible for the nation's civilian space program

and for aeronautics and aerospace research. Founded in 1958, NASA drives advances in science, technology, aeronautics, and space exploration to enhance knowledge, education, innovation, economic vitality, and stewardship of Earth.

Top Award of \$5,000

PHYS044 — Tatooine Found! Discovery, Confirmation, and Characterization of the First-Ever Circumbinary Planet Detected Using Doppler Spectroscopy

- Brian Yikang Wu, Horace Mann School, Scarsdale, NY, United States of America

Second Award of \$750

ANIM039 — Use of Pulsed Photobiomodulation in Nerve Regeneration after Injury-Induced Peripheral Neuropathy in Danio rerio: Effect of Mitochondrial Protein Genetic Variant, mpv17, in A Delta and C Nerve Fiber Growth

- Nadia Ansari, Sage Hill School, Tustin, CA, United States of America

BMED018 — Mitochondrial Effects of High Energy High Charge (HZE) Irradiation on the Liver

- Alexandra Tan, Ball High School, La Marque, TX, United States of America

EBED027T — BMCI-Net: A Novel Approach to Non-Invasive, Fully Mobile Prosthetic Control Using Robust Pattern Detection and Filtration of EMG and EEG Signals through Supervised Machine Learning

- Divjot Singh Bedi, Thomas Jefferson High School for Science and Technology, Centreville, VA, United States of America

- Rishabh Misra, Thomas Jefferson High School for Science and Technology, Chantilly, VA, United States of America

ENMCO14 — *Development of a Fully Reusable and Autonomously Landing Suborbital Launch Vehicle*

- Ryan Steven Westcott, Oregon Episcopal School, Portland, OR, United States of America

MATSO31 — *Novel Surface Passivated CsPbCl₃ Perovskite Nanocrystals for UV-Photodetectors*

- Nora Naji Aldossary, Dhahran Ahliyya School, AlKhobar, Eastern Province , Saudi Arabia

PHYSO20 — *Addressing Redshift Controversies through Non-Doppler Redshifts Induced by Light-Matter Interactions*

- Levon Tabirian, Trinity Preparatory School, Winter Park, FL, United States of America

PLNTO22 — *Farming on Mars: Potential Strategies for Sustainable Agriculture*

- Pooja Kasiviswanathan, Ames High School, Ames, IA, United States of America

ROBO037 — *Hardware Integrated LiDAR Simulation for the Development of Collision Avoidance Algorithms*

- Matthew Tan, Cranbrook Kingswood School, Stevensville, MI, United States of America

ROBO063 — *The Next Artificial Intelligence Revolution: AI Making Decisions without Human Models or Knowledge of Rules to Create Completely Independent Solutions*

- Michael Norman Brockman, Bartlesville High School, Bartlesville, OK, United States of America

Honorable Mention

ENEVo87 — *Value Added Sensors from Environmental and Industrial Waste*

- Ajlan Mohammed Al-Kaabi, Omar Bin Al-Khattab Secondary School, Doha, Qatar

ENMCo25 — *Bioinspired Submersible Dual Propulsion System: A Novel Approach to Ultra-Efficient Submarine Propulsion Utilizing Starting and Stopping Vortex Rings Mirroring Jellyfish Motion*

- Rachel M. SeEVERS, Paul Laurence Dunbar High School, Lexington, KY, United States of America

ENMCo64 — *The Mini-Workstation for Astronauts Redefined*

- Darryl Emmanuel Previlor, College Park High School, Spring, TX, United States of America

MATHo41 — *Planetary Transfer Calculator*

- Callum Lang Predavec, Mosman High School, Crows Nest, NSW, Australia

PHYSo13 — *Testing the Accuracy of the Tangent Point Method for Determining the Milky Way's Rotation Curve*

- Camille Chiu, College Station High School, College Station, TX, United States of America

PHYSo62 — *Graphene Solar-Photon Sail: A Novel Approach to the Application of Monolayer Graphene on Aluminumized Polyimide Film Using*

a Figure of Merit of a Solar-Photon Sail Membrane for Interstellar Space Exploration

- Morgan Elise Barkhurst, Florida SouthWestern Collegiate High School - Lee Campus, Cape Coral, FL, United States of America

PLNT034 — A New Spin on Botany: The Effect of Gravitational Resistance during Germination on Plant Growth

- Jacob Eric Bennett, Woods Cross High School, Bountiful, UT, United States of America

ROBO025 — Robust Autonomous Micro Aerial Vehicle (MAV) Navigation with Onboard, Environment-Agnostic, Multi-Sensor SLAM

- Parthiv Nandakumar Krishna, Minnetonka High School, Excelsior, MN, United States of America

ROBO053 — WormBot: Mimicking Earthworm Locomotion

- Ari Joseph Firester, Hunter College High School, New York, NY, United States of America

First Award of \$2500

BMED087T — Reverse Testing Chemotherapies on Drosophila Models to Determine Protein-Kinase Pathways Affected by Hypertrophic Cardiomyopathy

- Aditya Sood, Westview High School, Portland, OR, United States of America
- Himani Sood, Westview High School, Portland, OR, United States of America

PHYS029 — A Search for Exoplanets in High Metallicity Open Clusters Using a Large Scale Photometric Algorithm

- Ashini Ashish Modi, Caddo Parish Magnet High School, Shreveport, LA, United States of America

ROBO048 – *Developing a Novel, Accurate, and Rapid Computer Vision and Machine Learning Based Skin Disease Diagnosis Pipeline, Hardware Apparatus, and Mobile Application*

- Raghav Ganesh, Lynbrook High School, San Jose, CA, United States of America

National Anti-Vivisection Society

Since 1929, the National Anti-Vivisection Society has promoted greater compassion, respect and justice for animals. NAVS educational and advocacy programs advance better, more humane science; support the development of alternatives to the use of animals in research, testing and education; and effect changes which help to end the unnecessary suffering of animals.

Second Award of \$5,000

CELL036 – *Investigation of Aspects of Neuron Function in Schizophrenia Using hiPSC Cells*

- Ryan Michael Onatzevitch, Yorktown High School, Yorktown Heights, NY, United States of America

Third Award of \$2,500

CELL032 – *ETM* Is Indispensable to Endothelial Cell Physiology during Pathological Angiogenesis*

- Madhav Subramanian, Jericho High School, Jericho, NY, United States of America

First Award of \$10,000

CELL013 — *GATA6 and GATA4 CRISPR Cas-9 and shRNA Technology to Investigate Human Gastric Development and Disease Using Human Organoid Model Systems*

- Afiya Fatima Quryshi, University School of Milwaukee, Mequon, WI, United States of America

National Institute on Drug Abuse, National Institutes of Health & the Friends of NIDA

The Addiction Science Award is given by the National Institute on Drug Abuse (NIDA), part of the National Institutes of Health, and the Friends of NIDA, (a group that supports NIDA's mission) to three exemplary projects on the topic of addiction science.

First Award of \$2,500

TMED041 — *Tampr-X: A Novel Technology to Combat Prescription Opioid Abuse*

- Aditya Tummala, Brookings High School, Brookings, SD, United States of America

Second Award of \$1,500

CELL047 — *The Role of ALPHA5 Single Nucleotide Polymorphism on Nicotine Dependence*

- Sid D Thakker, James Madison High School, Reston, VA, United States of America

Third Award of \$1,000

BEHA020 — *Trends and Factors for Risky Behavior among Adolescents*

- Nikita Singh Rohila, Stuttgart High School, Stuttgart, AR, United States

of America

Honorable Mention

BCHM030 — *QuitPuff: A Point-of-Care Diagnostic for Early Risk Detection of Oral Pre-Cancer and Cancer in Chronic Smokers*

- Nikhiya Shahid Shamsheer, Greenwood High International School
Bangalore, Bangalore, Karnataka, India

SOFT064T — *Alcohol Sensor*

- Rufaro Nicole Mutogo, Chisipite Senior School, Harare, Mashonaland
East South , Zimbabwe
- Tinotenda Zimhunga, Chisipite Senior School, Harare, Zimbabwe

TMED043 — *Investigating the Role of the Cat-2 Gene in Substance Dependence*

- Zakwan Khan, Woodstock High School, Woodstock, GA, United States of
America

National Oceanic and Atmospheric Administration - NOAA

The National Oceanic and Atmospheric Administration (NOAA) is the United States government agency with a mission of science, service, and stewardship. Its mission touches the lives of every American, protecting life and property and conserving and protecting natural resources. NOAA's "Taking the Pulse of the Planet" awards recognize outstanding projects in ocean, coastal, Great Lakes, weather, and climate sciences with cash awards and a first prize summer internship.

Second Award of \$500

EAEV041 — *Algal Bioplastics: Developing a Sustainable Cycle of Compostable and Water-Soluble Plastics by Repurposing Waste Products of*

Algal Biofuel Production

- Melanie Elise Quan, Las Lomas High School, Alamo, CA, United States of America

EAEVo59T — The Bioaccumulation, Toxicity, and Electrical Discharge Plasma-Treatment of the Emerging Perfluorinated Contaminant, GenX

- Elizabeth Grace Kinsey, North Carolina School of Science and Mathematics, Wilmington, NC, United States of America
- Uma Loh Volety, John T Hoggard High School, Wilmington, NC, United States of America

EAEVo79 — Tsunami Forecasting and Risk Analysis

- Robert Russell Strauss, Los Alamos High School, Los Alamos, NM, United States of America

*EAEVo82 — Mitigation of Florida Red Tide (*Karenia brevis*) Blooms through Flocculation with Enhanced Local Sediments*

- Mark Ethan Leone, Estero High School, Bonita Springs, FL, United States of America

First Award of \$1500.00

EAEVo25 — Investigating How Water Vapor Emission Impacts the Temperature of the Troposphere

- Annalisa Minke, Immaculate Heart High School, Tucson, AZ, United States of America

EAEVo46 — Novel Unmanned Environmental DNA Collection Technique

- Angelina Marie Guerra, Edgewood Junior Senior High School, Merritt Island, FL, United States of America

National Security Agency Research Directorate

The NSA Research Directorate is one of the most established research organizations in the U.S. Intelligence Community. As a world leader in science and technology, Research engages with leading industries, universities, and national laboratories to both advance core competencies and to leverage work in overlapping disciplines. The ISEF Special Awards recognize exceptional research that demonstrates world-class skills in mathematics, computer science, cybersecurity, engineering, physics, and neuroscience while promoting research that can assure and protect cyberspace.

First Place Award "Science of Security" of \$3,000

SOFT052 — *Detecting Privacy Violations in Children's Apps Using HPCs*

- Suha Sabi Hussain, Queens High School for the Sciences at York College, Ozone Park, NY, United States of America

Second Place Award "Science Security" of \$1,000

ROBO044 — *Protection of Deep Neural Networks against Adversarial Attacks with Application to Facial Recognition*

- Alice Guo, Morgantown High School, Morgantown, WV, United States of America

SOFT013 — *A Secure Implementation of Mendelian Randomization via Multi-Party Computation*

- Divya Amirtharaj, Westview High School, Beaverton, OR, United States of America

SOFT041 — *Weight Friction: A Simple Method to Overcome Catastrophic Forgetting and Enable Continual Learning in Neural Networks*

- Gabrielle Kaili-May Liu, Ravenwood High School, Nashville, TN, United States of America

First Place Award "Mathematics" \$1,500

MATHo20 — *Loop Spaces, P-Curvature, and Homotopy*

- Daniel Alejandro Santiago, Centro Residencial de Oportunidades Educativas de Mayagüez, Anasco, Puerto Rico

Honorable Mention "Science of Security"

ROBOo63 — *The Next Artificial Intelligence Revolution: AI Making Decisions without Human Models or Knowledge of Rules to Create Completely Independent Solutions*

- Michael Norman Brockman, Bartlesville High School, Bartlesville, OK, United States of America

SOFTo49 — *Improved Gate Level Simulation of Quantum Circuits*

- Adam Kelly, Skerries Community College, Skerries, Co. Dublin, Ireland

SOFTo62 — *Non-Periodic Pseudo-Random Number Generator Using Sinai Billiards*

- Advay Koranne, Catlin Gabel School, West Linn, OR, United States of America

Honorable Mention Mathematics

MATHo16 — *Generating Set for Nonzero Determinant Links under Skein Relation*

- Aayush Karan, University School of Milwaukee, Muskego, WI, United States of America

PHYS033 — *Improving Particle Classification in WIMP Dark Matter Detection Experiments Using Neural Networks*

- Brendon Franz Matusch, Lo-Ellen Park Secondary School, Sudbury, Ontario, Canada

Second Place Award "Mathematics" \$750

MATH017 — *On the Application of Heat Diffusion across a Manifold for Dimensionality Reduction*

- John Tadeusz Piwinski, BASIS San Antonio Shavano Campus, San Antonio, TX, United States of America

MATH026 — *Classifying Magic Squares and Their Associated Symmetries Using a Chord Diagram Approach*

- AnaMaria Perez, Albuquerque Academy, Albuquerque, NM, United States of America

First Place Award "Material Science" \$1,000

PHYS050 — *Glue Busters II: The Effects of Accelerated Cure Time on the Ultimate Shear Strength and Efficiency of CA and PVA Glue*

- Kaitlyn Lee Zuravel, Terry Sanford High School, Fayetteville, NC, United States of America

Honorable Mention "Material Science"

MATSO79 — *OceanBioplas: The Plasticity of Marine Exoskeleton-Inspired Materials and Their Degradability in the Environment (Soil and Seawater/Saltwater)*

- Jacqueline Prawira, Mountain House High School, Mountain House, CA, United States of America

First Place Award "Cyber Pioneer" of \$1000

ROBO059 — *Looking through Walls with Artificial Intelligence: An Innovative Solution for Real-Time Retrieval of the Human Figure behind Visual Obstruction*

- Kevin Meng, Plano West Senior High School, Plano, TX, United States of America

Honorable Mention "Cyber Pioneer"

SOFT035 — *Should I Trust What's in My Computer? Using Current Draw Analysis to Identify Malicious Firmware in Solid State Drives*

- Ryan McDowell, Rockbridge Academy, Annapolis, MD, United States of America

Second Place Award "Cyber Pioneer" of \$1000

ROBO040 — *A Game of Jamming: A Multi-Agent Game Theoretic Learning Based Cognitive Anti-Jamming Communication System to Combat an AI Jammer*

- Milidu Jayaweera, La Cueva High School, Albuquerque, NM, United States of America

National Taiwan Science Education Center

Established in 1956, the National Taiwan Science Education Center (NTSEC) is the only national center for science education in the country. The Center's permanent exhibition area displays rich contents related to Life Sciences, Physics, Chemistry, Mathematics and the Earth Sciences, and the NTSEC also hosts the most up-to-date science exhibitions in collaboration with other international and domestic museums.

Taiwan International Science Fair Special Award is a trip to

participate in the Taiwan International Science Fair

BMED033 – An In-Depth Patch-Clamp Study of HCN2 Channel (Year II): Identification of Novel Biomarkers and Therapy for Ih Current Suppression in Autism Spectrum Disorders

- Perisa Satish Ashar, Maggie L. Walker Governor's School, Glen Allen, VA, United States of America

CELL013 – GATA6 and GATA4 CRISPR Cas-9 and shRNA Technology to Investigate Human Gastric Development and Disease Using Human Organoid Model Systems

- Afiya Fatima Quryshi, University School of Milwaukee, Mequon, WI, United States of America

Oracle Academy

As Oracle's flagship philanthropic educational program, Oracle Academy advances computing education globally to drive knowledge, innovation, skills development, and diversity in technology fields. In FY 2018, Oracle Academy worked with more than 15,000 educational institutions across 128 countries, supporting 6.3 million students worldwide. Oracle Academy offers educational institutions and educators free curriculum, resources, training, cloud-hosted technology and software, support, and certification resources. The program works with public and private partners to provide the tools educators need to engage, inspire and prepare students to become innovators and leaders of the future. Through Oracle Academy, students receive hands-on experience with the latest technologies, helping make them college and career ready in the era of big data, artificial intelligence, machine learning, cloud computing, Internet of Things, and beyond.

Award of \$5,000 for outstanding project in the systems software category.

EBED020 — *MADSA: Musical Accuracy Development Using Spectral Analysis*

- Cary Xiao, Alabama School of Mathematics and Science, Tuscaloosa, AL, United States of America

ROBO010 — *Thermocloud: A Smart Collaborative Thermostat*

- Harshal V. Bharatia, Vines High School, Plano, TX, United States of America

SOFT032 — *An AI-based System for Discovering Potential Adverse Drug Events Using Open Data*

- Brandon Xu Fan, Blacksburg High School, Blacksburg, VA, United States of America

SOFT040 — *Mad Mind Mazes: Video Game to Improve the Academic Performance of Kids Diagnosed with ADHD*

- Gianni Alejandro Plaza-Pizarro, The San Juan Math, Science and Technology Center, San Juan, Puerto Rico

SOFT044T — *The Fifth Sense: A Novel Aid Device for Visually Impaired People, Translating Computer Vision into Surround Sound for Obstacle Detection*

- Ian Benjamin Kaspi Langleben, Dawson College, Montreal, Quebec, Canada
- Liana Martins-Medina, Marianopolis College, Montreal, Quebec, Canada

SOFT045T — *Developing a 3D Modeling Application Based on a Bezier Surface Reconstruction Algorithm for the Rebuilding of Natural Disaster and War Damaged Areas*

- Allen Wu, Davies High School, Fargo, ND, United States of America

- Naomi Kenyatta, Horace Mann School, New York City, NY, United States of America
- Raymond Micheal Suo, duPont Manual High School, Louisville, KY, United States of America

SOFT054T – Creating a Technological Device that Enhances Autistic Children's Communication Skills

- Khadija Ahmed Elmagarmid, Qatar Academy Senior School, Doha, Ar Rayyan, Qatar
- Sama Ayoub, Qatar Academy Doha, Doha , Qatar

SOFT064T – Alcohol Sensor

- Rufaro Nicole Mutogo, Chisipite Senior School, Harare, Mashonaland East South , Zimbabwe
- Tinotenda Zimhunga, Chisipite Senior School, Harare, Zimbabwe

SOFT068 – EducationGo

- Saad Makhal Mankarious , Assuit Science, Technology, Engineering and Mathematics High School, Assuit, Egypt

Patent and Trademark Office Society

The PTOS is a membership-based organization for Patent and Trademark professionals and other interested individuals. From its inception in 1917, the Society has been dedicated to the improvement and appreciation of the United States Patent and Trademark Systems through promoting the systems' growth and well-being, as well as promoting the social and intellectual welfare of the Society members.

Top Award of \$1,000, and an American flag and a framed copy of the first patent granted in the USA

ANIM030 – Control of Varroa destructor Infestation with a Dual-Function, Thymol-Emitting Honey Bee Hive Entranceway

- Raina Jain, Greenwich High School, Riverside, CT, United States of America

Second Award of \$500

CELL034 – EnLIGHTened Therapeutics: Engineering Light-Activated Proteins for Optogenetic Applications

- Arundathi Sreejayan Nair, Laramie High School, Laramie, WY, United States of America

EGCH032 – A Novel Process to Fabricate Stable Bipolar Membranes for the Next Generation of Hydrogen Fuel Cells

- Nikhita Amrutha Bontha, Hanford High School, Richland, WA, United States of America

ENMCO40 – Phase 3: A High Performance Rowing Oar with Design Inspired by Biomimicry

- Lucy Annabelle Lake, Barker College, Sydney, NSW, Australia

MATSO45 – Lighting Up the Brain: Development of a Novel Molecular Probe for the Early, Minimally-invasive Diagnosis and Treatment of Alzheimer's Disease

- Shaan Baig, Dawson College, Brossard, Quebec, Canada

PLNT019 – C-Rice: Computational and Experimental Design Development of Transgenic Rice to Fulfill the Nutritional Demand of Carnosine in Human

- Michaela Samanta, Smak Penabur, Tangerang, Banten, Indonesia

ROBO003 – A Novel, Self-balanced Robot with Leading Technology in Crossing All Angles of Transmission Lines

- Bradley Jiping Xu, Shanghai American School - Pudong Campus, Shanghai, China

ROBO007 – Fast Braille: Multi-Function Printer to Assist the Writing of the Visually Impaired II

- Bruna Da Silva Cruz, Fundacao Escola Tecnica Liberato Salzano Vieira da Cunha, Canoas, Rio Grande do Sul, Brazil

SOFT041 – Weight Friction: A Simple Method to Overcome Catastrophic Forgetting and Enable Continual Learning in Neural Networks

- Gabrielle Kaili-May Liu, Ravenwood High School, Nashville, TN, United States of America

TMED031 – Bioactive Catheter to Prevent Systemic Infection Using Cashew Nut Shell Liquid (CNSL)

- Ekarinny Myrela Brito de Medeiros, Escola Estadual Professor Hermogenes Nogueira da Costa, Mossoro, Rio Grande do Norte, Brazil

Ricoh USA, Inc

Ricoh is empowering digital workplaces using innovative technologies and services enabling individuals to work smarter. For more than 80 years, Ricoh has been driving innovation and is a leading provider of document management solutions, IT services, commercial and industrial printing, digital cameras, and industrial systems. Ricoh has a long-standing environmental mission and commitment to sustainability, bringing corporate, social and environmental responsibilities into balance.

Ricoh Sustainable Development Award of \$10,000

ENEVo21 — *A Novel Method to Alleviate the Water Crisis in Uganda*

- Michael Chen, Ridgeview High School, Green Cove Springs, FL, United States of America

K. Soumyanath Memorial Award

This award is presented by the family of Krishnamurthy Soumyanath (1957 - 2010), for the best project in Computer Engineering. Dr K. Soumyanath was an Intel Fellow and held the title of Chief Architect, Integrated Platform Research at Intel Labs, USA. He led research and development in circuits and architectures for next-generation transceiver devices. The prize honors the memory of an energetic and adventurous individual who inspired and mentored many young people to excel in all aspects of life.

\$1,000 will be awarded to the winner's school.

First Award of \$3,000

EBEDo16T — *SkyHound: A Low-Cost 3D Printed Autonomous WiFi Tracking Search Drone to Locate Missing Victims of Natural Disasters*

- Neel Jain, West Linn High School, West Linn, OR, United States of America
- Pooja Jain, West Linn High School, West Linn, OR, United States of America

SPIE, the international society for optics and photonics

SPIE, the international society for optics and photonics, was founded in 1955 to advance light-based technologies. The Society serves more than 264,000 constituents from approximately 166 countries, the not-for-profit society advances emerging technologies through interdisciplinary information exchange, continuing education, publications, patent precedent, and career and professional growth.

First Award of \$2,500

PHYS069T — *Hand-Held Detector with Retro-Reflective Mosaic Screens to Visualize Optical Inhomogeneities*

- Dea Ilarionova, Cervantes Gymnasium AIA-GESS, Tbilisi, Georgia
- Marina Gudzhabidze, Cervantes Gymnasium AIA-GESS, Tbilisi, Georgia
- Shorena Gudzhabidze, Cervantes Gymnasium AIA-GESS, Tbilisi, Georgia

Second Award of \$1,500

PHYS030 — *Applications of Helium-4 Doubly Forbidden Singlet-Triplet Transition Lines in Astronomical Spectroscopy*

- Christine Ye, Eastlake High School, Sammamish, WA, United States of America

Third Award of \$1,000

ENBM007 — *A Novel Optical Diagnostic Method for Non-Invasive Detection of Blood Glucose Using Reverse Iontophoresis Modulation and Personalized Neural Networks*

- Rohan Ahluwalia, Westview High School, Portland, OR, United States of America

Sigma Xi, The Scientific Research Honor Society

Founded in 1886, Sigma Xi is the international honor society of research scientists and engineers, with a distinguished history of service to science and society. This multi-disciplinary society includes members who were elected based on their research achievements or potential, and historically, more than 200 members have won the Nobel Prize. The Society is pleased to offer awards for the best demonstration of interdisciplinary research.

First Life Science Award of \$2,000

ENBM037T — *Design of a Forearm Cumulative-Trauma-Disorder Risk Detector Using EMG Sensor Data Sent through an Arduino to a Mobile Application via Bluetooth*

- Dania Maraliz Villafuerte Gonzalez, Colegio Mater Salvatoris, Guaynabo, Puerto Rico
- Larissa Raquel Cortes-Morales, Colegio Mater Salvatoris, Trujillo Alto, Puerto Rico

First Physical Science Award of \$2,000

ENEVo82T — *A Novel Computational Tool to Inform Cost-Effective Nutrition Interventions in Sub-Saharan Africa*

- Garyk Jandl Brix, Winston Churchill High School, Potomac, MD, United States of America
- Lillian Kay Petersen, Los Alamos High School, Los Alamos, NM, United States of America

Second Physical Science Award of \$1,000

EAEVo22T — *Potential Identification and Application of the Rhizophora apiculata and Sonneratia alba as a Bio Antifouling Agent for Antifoulant Paints*

- Carolline Mathilda Nggebu, Denpasar 3rd State Senior High School, Denpasar, Bali, Indonesia
- Wiratathya Putramas I Made, Denpasar 3rd State Senior High School, Badung, Bali, Indonesia

Second Life Science Award of \$1,000

PLNT056T — *Environmental Friendly Seedling Nursery Balls from Cow*

Dung

- Sutthida Iamsaard, Phanomsarakham "Phanom Adun Witthaya" School, Phanom Sarakham, Chachoengsao, Thailand
- Thirakarn Wannakarn, Phanomsarakham "Phanom Adun Witthaya" School, Phanom Sarakham, Tha Than Sub-district, Chachoengsao, Thailand

Honorable Mention Life Science Award

MATSo19T — *Alternative Tessellation and Inner Cone Design for Helmets*

- Yunha Ham, Peachtree Ridge High School, Lawrenceville, GA, United States of America
- Yunseo Ham, Peachtree Ridge High School, Lawrenceville, GA, United States of America

Honorable Mention Physical Science Award

ANIM012T — *Aliens Invade Hong Kong: First Record of the New Guinea Flatworm (*Platydemus manokwari*) as an Invasive Species in Hong Kong, China*

- Elysia Ruo Yan Ye, Chinese International School, Hong Kong, China, Hong Kong Special Administrative Region
- Muhua Yang, St. Joseph's College, Hong Kong, China, Hong Kong Special Administrative Region

U.S. Agency for International Development

USAID is the world's premier international development agency and a catalytic actor driving development results. USAID's work advances U.S. national security and economic prosperity, demonstrates American generosity, and promotes a path to recipient self-reliance and resilience. The U.S. Global Development Lab serves as an innovation hub. We take smart

risks to test new ideas and partner within USAID and with other actors to harness the power of innovative tools and approaches that accelerate development impact.

USAID Science for Development Second Place Award of \$3,000.

EGPH025 – Improving the Harnessing of Solar Energy Using a Hybrid Photovoltaic Thermal System

- Hritik Mitha, Bryanston High School, Johannesburg, Gauteng, South Africa

ENEV082T – A Novel Computational Tool to Inform Cost-Effective Nutrition Interventions in Sub-Saharan Africa

- Garyk Jandl Brixi, Winston Churchill High School, Potomac, MD, United States of America
- Lillian Kay Petersen, Los Alamos High School, Los Alamos, NM, United States of America

PLNT058T – Coating Highland Rice Seeds with Local Spondias pinnata Gum Can Reduce Seedling Mortality Caused By Water Deficit During Rain Delay

- Jetsada Sittikhankaew, Damrongratsongkroh School, Wiangchai, Chiangrai, Thailand
- Namphung Panya, Damrongratsongkroh School, Muang, Chiang Rai, Thailand
- Phirachat Kochanil, Damrongratsongkroh School, Muang, Chiang Rai, Thailand

TMED010 – Deployment of a Scalable Single Shot Detector (SSD) Mobile Architecture for the Localization and Classification of Pneumonia Chest Radiographs

- Daniel Patrick Fleury, John Marshall High School, Rochester, MN, United States of America

USAID Science for Development Third Place Award of \$2,000.

EBED016T — *SkyHound: A Low-Cost 3D Printed Autonomous WiFi Tracking Search Drone to Locate Missing Victims of Natural Disasters*

- Neel Jain, West Linn High School, West Linn, OR, United States of America
- Pooja Jain, West Linn High School, West Linn, OR, United States of America

ENEV044 — *Using Raw Bamboo Waste to Sustainably Purify Water*

- Akash Rathod, Okemos High School, Okemos, MI, United States of America

ROBO074 — *Positively Identifying Species Using CNNs and Hypernetworks to Aid Wildlife Conservation Efforts*

- Aditya Radhakrishnan, Suguna PIP School, Coimbatore, Tamil Nadu, India

SOFT067 — *An Adaptive, Low-Cost Device for Automated & Offline Medical Analysis Utilizing Neural Networks with Reinforcement Learning Optimization*

- Neil Deshmukh, Moravian Academy, Bethlehem, PA, United States of America

USAID Science for Development First Place Award of \$5,000.

EBED005 — *Freeze Protected Vaccine Cold Box for Off-Grid Locations, Year Three*

- Susanna Ruth Dorminy, Sola Fide Home School, McDonough, GA, United States of America

ENEVo36 — *Optimized Homemade Water Purification System: The Solution to the Worldwide Potable Crisis*

- Jeancarlos Cortes Melendez, Jose Rojas Cortes, Orocovis, Puerto Rico

ENMCo58T — *A Continued Study of a More Realistic Solution to Refugee Housing Using the Isoperimetric Honeycomb Conjecture*

- Alicia Kuhlmann, Bingham High School, South Jordan, UT, United States of America
- Samantha B. Davis, Bingham High School, South Jordan, UT, United States of America

ENMCo71 — *AccessO2: An Innovative, Non-Electric, Life-Saving, Oxygen Concentrator*

- Sanjit Thangarasu, Poolesville High School, Clarksburg, MD, United States of America

Office of Naval Research on behalf of the United States Navy and Marine Corps

The Naval Science Awards Program (NSAP) is a U.S. Navy and Marine Corps program that encourages our nation's students to develop and retain an interest in science and engineering. NSAP recognizes the accomplishments of eligible students at regional and state science and engineering fairs and the Intel International Science and Engineering Fair (ISEF) in producing and presenting quality science and engineering projects.

The Chief of Naval Research Scholarship Award of \$10,000

ROBOo59 — *Looking through Walls with Artificial Intelligence: An*

Innovative Solution for Real-Time Retrieval of the Human Figure behind Visual Obstruction

- Kevin Meng, Plano West Senior High School, Plano, TX, United States of America

United Technologies Corporation

United Technologies Corporation is a diversified company that provides a broad range of high-technology products and services to the global aerospace and commercial building systems industries. We are pleased to offer eight awards of \$3,000 in UTC common stock for projects showing excellence in science and engineering.

Each winning project will receive \$3,000 in shares of UTC common stock.

EGCH022 — Fabrication of Light Responsive Super Capacitor for Energy Harvesting & Energy Storage Applications

- Woud Raed AlSadoun, KFUPM Schools, Dammam, Eastern Province, Saudi Arabia

ENMCo02 — Permanent Magnet Synchronous Motor with Innovative Stator-Rotor Structure to Extend Torque and Speed Range

- Haosong Zhong, Boren Sino-Canadian School, Jiangmen, Guangdong, China

ENMCo20 — Agriculture Soil Probe Rover

- Tate Schrock, Arickaree School, Flagler, CO, United States of America

MATH016 — Generating Set for Nonzero Determinant Links under Skein Relation

- Aayush Karan, University School of Milwaukee, Muskego, WI, United States of America

MATSo03 – The Flash Shade: Directional Darkening Technology

- Adrien Chen-Wei Jathe, Metropolitan School Frankfurt gGmbH, Frankfurt am Main, Hessen, Germany

MATSo59T – Novel Membrane for Wound Dressing Applications

- Fares Alaa Fathy, STEM School of Alexandria, Alexandria, Al- Agami, Egypt
- Ganna Allah Atef Khedr, STEM School of Alexandria, Alexandria, EL-Asafra, Egypt

PHYS021 – Search for Variations in the Strength and Frequency of Earth's Gravitational Field Using a Homemade Fiber Optic Gravitometer

- Catherine Annastina Taboada, BASIS San Antonio Shavano Campus, San Antonio, TX, United States of America

SOFT029 – General Distributed Backtracking Framework for Solving Combinatorial Constraint Satisfaction Problems

- David Aryeh Vulakh, Paul Laurence Dunbar High School, Lexington, KY, United States of America

ASU Rob and Melani Walton Sustainability Solutions Initiatives

ASU Walton Sustainability Solutions Initiatives are the result of a \$27.5 million investment in Arizona State University's Julie Ann Wrigley Global Institute of Sustainability by the Walton Family Foundation. Within the Walton Sustainability Solutions Initiatives, diverse teams of faculty, students, entrepreneurs, researchers, and innovators collaborate to deliver sustainability solutions, accelerate global impact, and inspire future leaders

through eight distinct initiatives.

Award of \$1,000

BEHA045 – A Card and Board Game to Reduce Gender-Based Implicit Biases using Perspective-Taking and Counter Stereotyping and Other Methods of Influence

- Prerna Magon, Police DAV Public School, PAP Campus, Jalandhar, India, Jalandhar, Punjab, India

EAEV004T – Synthesis of Organic Pinene Pyrethrum Attractant for D. frontalis

- Andrew William Schilling, Jasper County High School, Monticello, GA, United States of America
- Cameron Arnold Trent Snyder, Jasper County High School, Rutledge, GA, United States of America

MCRO024 – Food Preservation, Not Perversion: Development of a New Preservation Method for Alimentary Products

- Maitane Alonso Monasterio, Avellaneda Ikastetxea, Sodupe (Guenes), Bizkaia, Spain

SOFT015T – PanOculus: A Novel, Multifaceted Diagnostic Tool for Skin Cancer, Diabetic Retinopathy, and Otitis Media Powered by Deep Learning

- Abhinav Sinha, John Foster Dulles High School, Sugarland, TX, United States of America
- Jayanth Sairam Pratap, John Foster Dulles High School, Houston, TX, United States of America
- Naail Lakhani, John Foster Dulles High School, Sugar Land, TX, United States of America

SOFT021T — *Classroom 2.0*

- Jhorch Quispe Laura, Luis Alberto Sanchez, Chincheros, Apurimac, Peru
- Karen Vanesa Huaman Quintana, Luis Alberto Sanchez, Andahuaylas, Apurimac, Peru

American Committee for the Weizmann Institute of Science

The American Committee for the Weizmann Institute of Science, founded in 1944, develops philanthropic support for the Weizmann Institute of Science in Israel, one of the world's premier scientific research institutions. The Dr. Bessie F. Lawrence International Summer Science Institute at the Weizmann Institute provides students with a unique opportunity to participate in hands-on studies in professional academic laboratories at the forefront of scientific research.

Alternate for trip

BCHM032 — *Synthetic Virus-Like Particles: The Future of Targeted Drug Delivery*

- Joshua Hoyoung Yu, Urbana High School, Frederick, MD, United States of America

All-expense paid four week trip and scholarship to the Bessie Lawrence International Summer Science Institute

CELL038 — *Development of a CD4+ Neoantigen Vaccine in the Panc02 Tumor Model*

- Jocelyn Susan Mathew, Centennial High School, Ellicott City, MD, United States of America

Air Force Research Laboratory on behalf of the United States Air Force

The Air Force Research Laboratory is a global technical enterprise, boasting some of the best and brightest leaders in the world. We are Revolutionary, Relevant, and Responsive to the Warfighter. We defend America by unleashing the unconquerable power of scientific and technical innovation. Our mission is leading the discovery, development, and integration of affordable warfighting technologies for our air, space, and cyberspace force.

First Award of \$750 in each Intel ISEF Category

ANIM042 — The Effects of cisd Gene Family Disruption in Caenorhabditis elegans Fertility

- Zihan Zhao, Texas Academy of Mathematics and Science, Flower Mound, TX, United States of America

BCHM025 — Creating Potential Guidelines Based on the Effects of Silver Nanoparticles and Cadmium Quantum Dots on Saccharomyces cerevisiae

- Daniel Sungwhi Kim, Kickapoo High School, Springfield, MO, United States of America

BEHA038 — Chest Wall Muscle EMG Activity and Arm Force during Functional Tasks: Implications After Open Heart Surgery

- Ansel LaPier, Central Valley High School, Liberty Lake, WA, United States of America

BMED060T — Development of a Microscope for Fully Automated Real-Time Cancer Cell Tracking

- Nicole Lakshmi Segaran, Carmel High School, Carmel, IN, United States of America
- Yannik Singh, Carmel High School, Carmel, IN, United States of America

CBIO023 — A Novel Mathematical Model for the Early Detection of Dengue

Fever using SIR Infectious Disease Epidemiological Compartments, Ordinary Differential Equations, and Statistical Computing

- Tarun Kumar Martheswaran, The Waterford School, Draper, UT, United States of America

CELLO48 – Isolating Exosomes in Urine and Saliva to Detect Dust and Dander Allergens in IgE Sensitized Individuals Using a Capillary Tube Precipitation Test: A New Non-Intrusive Antigen/Antibody Reaction Allergy Test

- Audrey Jules Bakerson, Berrien County Mathematics and Science Center, Niles, MI, United States of America

CHEMO65 – Analysis of Manufacturing Process of D-Glucose-Based Thermoformed-Polymers

- Suvin Sundararajan, Westfield High School, Westfield, MA, United States of America

EAEVO41 – Algal Bioplastics: Developing a Sustainable Cycle of Compostable and Water-Soluble Plastics by Repurposing Waste Products of Algal Biofuel Production

- Melanie Elise Quan, Las Lomas High School, Alamo, CA, United States of America

EBEDO36 – Development of a Flexible Durometer Sensor for Improving Hardness Tactile Modality Using Piezoelectric Polymers

- Carrie Hsu, Herricks High School, Roslyn, NY, United States of America

EGCH003T – Optimizing and Fine-Tuning Electrode Pore Sizes Utilizing Varying Ratios of the Immiscible Polymer Blend PAN-PS for High Energy Density and Wide Temperature Range Supercapacitors

- Ashay Shah, Plano East Senior High School, Richardson, TX, United States of America
- Ashna Shah, Plano East Senior High School, Richardson, TX, United States of America

EGPH012T — Optimization of High-Efficiency Organic-Inorganic Lead Halide Perovskite Solar Cells via a Novel Polycaprolactone Additive Pathway

- Anisa Verma Prasad, Staples High School, Westport, CT, United States of America
- Sirina Verma Prasad, Staples High School, Westport, CT, United States of America

ENBM018 — A Novel Nanomaterial as a Multifunctional Contrast Agent for Targeted X-ray and Fluorescent Biomedical Imaging

- Arjun Jain, Catlin Gabel School, Portland, OR, United States of America

ENEV059 — Photocatalytic Oxidation Utilizing Doped Titanium Dioxide for Air Purification

- Adyant Shankar, Nashua High School South, Nashua, NH, United States of America

ENMC014 — Development of a Fully Reusable and Autonomously Landing Suborbital Launch Vehicle

- Ryan Steven Westcott, Oregon Episcopal School, Portland, OR, United States of America

MATH023 — Applications of Hyperdimensional Linear Algebra and Complex Analysis

- James Matthew Baker, Choctawhatchee High School, Fort Walton, FL,

United States of America

MATSo65 — *Novel Graphene Nanoplatelet and Ketjenblack Embedded Pigmentless Acrylic Emulsions for Next Generation Flexible Electronics*

- Daniel Zion Kang, John F. Kennedy High School , Tamuning, Tamuning, Guam

MCROo19 — *The Effects of Sugar Substitutes and Prebiotics on the Virulence of Gastrointestinal Bacteria*

- Elaina Rose Render, duPont Manual High School, Louisville, KY, United States of America

PHYSoo2T — *Optimization of Drone Flight Patterns for Use in Extraterrestrial Cave Mapping*

- Lauren Masley Amos, Vero Beach High School, Vero Beach, FL, United States of America
- Sydney Tran, Vero Beach High School, Vero Beach, FL, United States of America

PLNTo37 — *Combating Undernutrition in Developing Countries with a Compact Aeroponics System Utilizing Contaminated Water*

- Haley Colleen Jostes, Stillwater Area High School, Lake Elmo, MN, United States of America

ROBOo33 — *Frugal Flight: Indoor Stabilization of a Computationally Independent Drone without GPS*

- Nikhil Devanathan, Kennewick High School, Kennewick, WA, United States of America

SOFTo29 — *General Distributed Backtracking Framework for Solving Combinatorial Constraint Satisfaction Problems*

- David Aryeh Vulakh, Paul Laurence Dunbar High School, Lexington, KY, United States of America

TMEDo27 — *Sharks Take a Bite Out of Infection! An Antibacterial, Reusable Bandage for Post-Operative Patients*

- Hannah Herbst, Florida Atlantic University High School, Boca Raton, FL, United States of America

American Institute of Aeronautics & Astronautics

The American Institute of Aeronautics and Astronautics is committed to inspiring the next generation of aerospace professionals by recognizing exceptional students at all levels. We encourage students' progress through STEM-based educational programs, design competitions, scholarships, and awards such as the AIAA "Look Up!" Award. We will award a cash prize for the top three aerospace-related projects. We encourage students to Look Up! and see their future in aerospace.

First Award of \$2000.00

ROBOo13 — *Using a Computer Program Applied to an Electromagnetic Walking Apparatus to Simulate Earth's Gravity in Space*

- MaryAlice Diana Young, Bishop Kenny High School, Jacksonville, FL, United States of America

Second Award of \$1500.00

MCROo14 — *Implications for Biogas Energy Use via Methanogenesis in Mars Conditions*

- Alexandria Soren Montgomery, West Salem High School, Salem, OR, United States of America

Third Award of \$1000.00

ENMCo49T — *Development of Predictive Software for the Engineering & Optimization of Reliable Rocket Components*

- Chad Harrison Brown, Woods Cross High School, Bountiful, UT, United States of America
- Ryan Spencer Pearson, Woods Cross High School, Bountiful, UT, United States of America

Fourth Place \$500.00

ENMCo65 — *Design and Numerical Analysis of a Novel Co-Flow Jet System to Improve the Lift, Range, and Fuel Efficiency of a Commercial Airline Wing*

- Hans C Ehrnrooth, Pine Crest School, Ocean Ridge, FL, United States of America

Drug, Chemical & Associated Technologies Association (DCAT)

The Drug, Chemical & Associated Technologies Association (DCAT) is a not-for-profit, global business development association whose unique membership model integrates both innovator and generic drug manufacturers and suppliers of ingredients, development and manufacturing services, and related technologies. Through our participation in Intel ISEF, we are investing in the future of science by supporting young scholars who represent the geographic regions and areas of study that reflect the global membership of DCAT.

Award of \$3,000.

BCHMoo6 — *Targeted Drug Delivery for Drug Resistant Cancer*

- Ashton Body, Episcopal School of Jacksonville, Jacksonville, FL, United States of America

BCHM027T – An Innovative Method of Room Temperature Biospecimen Preservation via Tetramethyl Orthosilane (Sol-Gel) Encapsulation and Polyethylene Glycol Extraction

- Jack Boylan, duPont Manual High School, Louisville, KY, United States of America
- Kavya Sai Koneru, duPont Manual High School, Louisville, KY, United States of America

CHEM037T – Colors in the Dark

- Linda Grainca, Istituto Tecnico Industriale G. Omar, Novara, Italy
- Manuela Ficco, Istituto Tecnico Industriale G. Omar, Novara, Italy
- Margherita Tarocco, Istituto Tecnico Industriale G. Omar, Novara, Italy

TMED041 – Tampr-X: A Novel Technology to Combat Prescription Opioid Abuse

- Aditya Tummala, Brookings High School, Brookings, SD, United States of America

\$10,000 scholarship will be for a senior high school student planning to major in chemistry, chemical engineering, bioengineering or biochemistry.

BMED058 – Precision Care for Leukemia: Discovery of Novel Therapeutics for High-Risk ALL via Epigenetic and Computational Transcriptome Profiling

- Ruhi Sayana, The Harker School, Cupertino, CA, United States of America

Shanghai STEM Cloud Center

The Shanghai STEM Cloud Center is the very first STEM education center in

China that provide diverse programs for schools, teachers and students. Cooperated with professional societies, associations, research institutions in STEM field, the mission of our center is to encourage students to study Science, Technology, Engineering and Mathematics, and always be curious about the real world.

STEMCloud Award of \$1800 in Engineering Mechanics

CHEM029 — *Improving Affinity-Based Drug Delivery with Convenient Computational Models*

- Alison Wenqing Xin, Hathaway Brown School, Solon, OH, United States of America

STEMCloud Award of \$1800 in Systems Software

ENMC025 — *Bioinspired Submersible Dual Propulsion System: A Novel Approach to Ultra-Efficient Submarine Propulsion Utilizing Starting and Stopping Vortex Rings Mirroring Jellyfish Motion*

- Rachel M. SeEVERS, Paul Laurence Dunbar High School, Lexington, KY, United States of America

STEMCloud Award of \$1800 in Chemistry

SOFT045T — *Developing a 3D Modeling Application Based on a Bezier Surface Reconstruction Algorithm for the Rebuilding of Natural Disaster and War Damaged Areas*

- Allen Wu, Davies High School, Fargo, ND, United States of America
- Naomi Kenyatta, Horace Mann School, New York City, NY, United States of America
- Raymond Micheal Suo, duPont Manual High School, Louisville, KY, United States of America

National Center Junior Academy of Sciences of Ukraine

Junior Academy of Sciences of Ukraine is an educational system under the auspices of UNESCO that aims at providing the organization and coordination of students' research activities, creating conditions for their intellectual and creative development, spiritual advance, and vocational self-determination to engage children in discovery and creation. We would like to honor Intel ISEF Finalists Special Awards whose projects will be in alignment with United Nations Sustainable Development Goals.

UN Sustainable Development Goal Award \$2000.000

EBED045T — *Essameter: A Noble Device for the Visually Impaired and the Deaf Learners for Measuring Length*

- Esther Amimo Anyanzwa, Keriko Mixed Day Secondary School, Nakuru, Rift Valley, Kenya
- Salome Njeri, Keriko Day Mixed Secondary School, Nakuru, Rift Valley, Kenya

UN Sustainable Development Goal Award \$1500.00

MATSo77T — *Refushields*

- Aamena Almarzooqi, Al Mawaheb School, Abu Dhabi, Abu Dhabi, United Arab Emirates
- Dhabia Alhosani, Al Mawaheb School, Abu Dhabi, United Arab Emirates
- Reem Alhajeri, Al Mawaheb School, Abu Dhabi, United Arab Emirates

UN Sustainable Development Goal Award \$1000.00

TMED048 — *DOPA Reaction with Vacuum Filtration as a New Method for Diagnosing of Circulating Melanoma Cells and Metastasis*

- Olha Kharasakhal, Mariupol Technical Lyceum, Mariupol, Ukraine

UN Sustainable Development Goal Award \$ 500.00

EAEV062 — *Natural Air Filters*

- Dana Alkandari, Qurtoba High School, Kuwait, Kuwait

ROBO047 — *ExploreYourMind: Software for Harmonic Combination of Video and Music*

- Nazar Ponochevnyi, Specialized School #52 in Kyiv With In-depth Study of Information Technology, Vyshneve, Kyivs'ka Oblast, Ukraine

Arizona Public Service Company

For more than 130 years, APS has powered Arizona's growth, prosperity and innovation. Today, we provide 2.7 million people with safe, reliable and increasingly clean energy. Our 6,400 employees are dedicated to ensuring a bright energy future for Arizona. APS is excited to award three cash prizes for projects that provide scalable, real-time solutions to current energy challenges.

First Award \$4,000

EGPH005 — *It's Getting Hot in Here!*

- Gavin Alexander Baker, Fleming Island High School, Fleming Island , FL, United States of America

Second Award of \$2,000

EGCH017 — *A Novel Approach to Renewable Energy: Light Stimulated Active Cation Transport Membrane via Covalent Modification with a Photoacid*

- Matthew Lane Fosdick, Empire High School, Corona, AZ, United States of America

Third Award of \$1,000

EGCH011 — *Biochar Technology: A Carbon-Negative Energy System*

- Vivian Clarissah Chinoda, Queen Elizabeth Girls' High School, Harare, Zimbabwe

Innopolis University

Innopolis University is a Russian higher education institution focused on education and research in the field of IT and Robotics. Innopolis University employs 81 faculty members from 22 countries. In cooperation with representatives of the real sector of economy, the University staff adapts educational programs for their needs. All education programs taught in English.

Full tuition scholarships for the Bachelor program in Computer Science

EBED034T — *Undocumented Instructions in Microprocessors*

- Urban Meznar, Upper Secondary School of Electrical and Computer Engineering and Technical Gymnasium Ljubljana, Radomlje, Slovenia
- Vid Smole, Upper Secondary School of Electrical and Computer Engineering and Technical Gymnasium Ljubljana, Borovnica, Slovenia

MATH001 — *Evaluation of the Complexity of Fully Homomorphic Encryption Schemes in Implementations of Programs*

- Dimitar Atanasov Chakarov, Model High School of Mathematics "Akademik Kiril Popov", Plovdiv, Plovdiv, Bulgaria

ROBO047 — *ExploreYourMind: Software for Harmonic Combination of Video and Music*

- Nazar Ponochevnyi, Specialized School #52 in Kyiv With In-depth Study

of Information Technology, Vyshneve, Kyivs'ka Oblast, Ukraine

SOFT003 — *Digital Image Denoising Based on Sphere-Constrained Total Variation Optimization with an Additional Noise Component*

- Ivaylo Malinov Zhelev, High School of Mathematics and Nature Sciences "Vasil Levski", Smolyan, Smolyan, Bulgaria

SOFT006 — *Distributed Creation of Machine Learning Agents for Blockchain Analysis*

- Zvezdin Borisov Besarabov, National School of Mathematics and Natural Sciences, Sofia, Sofia-Town, Bulgaria

SOFT058 — *Colorizing Grayscale Photographs with a Neural Network*

- Jaroslav Urban, Stredni Prumyslova Skola Strojni a Elektrotechnicka a Vyssi Odborna Skola, Liberec, Czech Republic