

Intel International Science and Engineering Fair 2014



Finalist Directory

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West Virginia University
Wolfram Research, Inc.
World Economic Forum

Visit student.societyforscience.org/special-awards-organizations to learn more about each Special Award Organization.

Animal Sciences

- AS001** **Distribution and Patterns of Movement of the Weevil *Diaprepes abbreviatus* in Eucalyptus (*Corymbia torelliana*), a Fast-Growing Biofuel Crop**
 # # Evan MacKay, 17, Junior, Vero Beach High School, Vero Beach, Florida
- AS002** **The Use of Quantitative PCR to Determine the Impact of Zygosity (Hemizygotes vs. Homozygotes) on the Fitness and Impact in the Wild of Transgenic Fluorescent Zebrafish**
 Adrianna Danielle Pollak, 17, Senior, Cloquet Senior High School, Cloquet, Minnesota
- AS003** **Evaluation of Physiological Conditions that Influence Emerging Rate on Small Hive Beetles**
 Enoch Park, 17, Junior, Pulaski Academy, Little Rock, Arkansas
- AS004** **Autism in Fruit Flies II: Behavior of *Drosophila mGluR* Pathway Mutants**
 # Elise Nicole Paietta, 15, Sophomore, Carroll High School, Dayton, Ohio
- AS005** **Environmentally Induced Epigenetic Transgenerational Inheritance and Gender Dominance in Locomotory Behavior of *D. melanogaster***
 # # # Hannah Pagels, 17, Senior, Grove High School, Grove, Oklahoma
- AS006** **Hot Biology: Use of Thermal Imaging to Detect Nesting Behaviors of the Endangered Hawaiian Coot**
 # Sarah 'Alohilani Jenkins, 16, Junior, Molokai High School, Ho'olehua, Hawaii
- AS007** **Genetic Differentiation of Capelin (*Mallotus villosus*) in the Bering Strait and Southeast Alaska**
 Raven Ward, 14, Freshman, Juneau-Douglas High School, Juneau, Alaska
- AS008** **Improving *Apis mellifera* Hive Immunity through Environment Manipulation**
 Rebecca Layman, 18, Senior, Southmoore High School, Moore, Oklahoma
- AS009** **The Effects of *Allium sativum* on the Development and Meat Quality of *Gallus domesticus***
 # Chrysta Noelle Beck, 18, Senior, Pettisville High School, Pettisville, Ohio
- AS010** **The Effect of Exogenous Melatonin on the Diurnal Phototactic Behavior of *Daphnia magna***
 Mikayla Noel Carlton, 17, Junior, Central Virginia Governor's School/Brookville High School, Lynchburg, Virginia
- AS011** **Flagellum Causes Euglenoid Movements by Detecting Contact Stimuli in *Euglena***
 Ayaka Suda, 17, Junior, Saitama Prefectural Ohmiya Senior High School, Saitama, Japan
- AS012** **Leg Proposes, Antennae Disposes: Antennae Ultimately Determine the Turn Direction of the Pill Bug**
 Yasuhito Hayashi, 17, Junior, Toyama Prefectural Takaoka High School, Takaoka-city, Japan
- AS013** **Development of a Mathematical Model to Assess Territory Establishment by the Fiddler Crab, *Uca lactea*, Based on Tracking Walking Trajectories**
 Yuki Mochizuki, 18, Senior, Miyazaki Omiya High School, Miyazaki-City, Japan
- AS014** **The Effect of Weaning Age on Feed Consumption and Rate of Gain in Goat Kids**
 Lauren Elizabeth Haley, 16, Junior, Chillicothe High School, Chillicothe, Missouri
- AS015** **Effects of the Transgenic and Traditional Corn Plant Development on the Growth Rates and Demographic Parameters of an Evolved Diet Strain of *Spodoptera frugiperda* (*Lepidoptera: Noctuidae*)**
 # # Manuela Jojoa-Portilla, 17, Junior, Home School, Cleveland, Mississippi
- AS016** **Haplotype Variation in Banded Sunfish (*Enneacanthus obesus*) from the Peconic River, Long Island, New York**
 Allison Mary Murphy, 16, Junior, Sayville High School, West Sayville, New York
- AS017** **Deer's Preference: Trophy Rock or Bio Rock**
 Reese Nelson King, 16, Sophomore, Home School affiliated with Palmetto Independent Educators, Aiken, South Carolina
- AS018** **The Compositional and Hormonal Difference between Organic and Conventional Meat, Year II**
 Sarah Elise Wanjura, 17, Senior, Christ the King Cathedral School, Lubbock, Texas
- AS019** **Optimal Equine Balance: Application of Biophysics to Assess and Reduce Equine Injury, Phase II**
 # # Erika Nicole Mueller, 16, Junior, Clearfield High School, Clearfield, Utah
- AS020** **Effect of Turmeric on Memory Curves of Planarians: An Investigation into Chemical Memory**
 # Supraja Chittari, 17, Senior, George C. Marshall High School, Falls Church, Virginia
- AS021** **A Three Month Analysis of the Desert Bighorn Sheep (*Ovis canadensis nelsoni*) Translocation Project in the Santa Catalina Mountain Range**
 # Meagan Alanna Bethel, 16, Junior, Tucson Magnet High School, Tucson, Arizona
- AS022** **The *Ipomoea batatas* Leaf: Isolation and Identification of Its Mosquito Larvicidal Agent**
 # Margaret Donovan Doyle, 17, Junior, Yorktown High School, Arlington, Virginia
- AS023** **Developmental Effects of Correlated Color Temperature of Artificial Lights on Painted Lady Butterflies *Vanessa cardui***
 Simiao You, 19, Senior, Holyoke Catholic High School, Chicopee, Massachusetts
- AS024** **Toward Understanding the Neural Circuitry Regulating Cold Sensitivity in *C. elegans*, a Two-Year Study**
 # Michael Shao, 17, Junior, Detroit Country Day Upper School, Beverly Hills, Michigan
- AS025** **The Effect of *D. reticulatum* Mucus as a Deterrent to Other Slugs**
 Katie Gwaltney, 15, Freshman, Union Grove High School, McDonough, Georgia
- AS026** **An Experimental Study to Determine the Food Preferences of Coconut Crabs (*Birgus latro*) in Captivity**
 Liana Danielle Gurr, 16, Junior, Tafuna High School, Pago Pago, American Samoa
- AS027** **Silvernano Toxicity in *D. melanogaster***
 Karen Gu, 15, Sophomore, Collins Hill High School, Suwanee, Georgia
- AS028** **The Effect of Circadian Genes *dbt* and *dbdt* on the Lifespan of *Drosophila melanogaster***
 Andrea H. Dahl, 14, Freshman, Olathe North High School, Olathe, Kansas
- AS029** **The Role of *Homalanthus nutans* (G. Forst.) Guill., a Samoan Medicinal Plant, as an Insect Growth Regulator**
 Charu Joserose, 15, Sophomore, Tafuna High School, Pago Pago, American Samoa
- AS030** **The Efficacy of MSG as Positive Reinforcement in *D. melanogaster* Learning**
 Hannah Small, 18, Senior, Kettle Run High School, Warrenton, Virginia
- AS031** **Effects of Genetically Engineered Maize and Glyphosate on *Eisenia fetida* Growth and Reproduction**
 Brett Douglas Winters, 16, Junior, Dutch Fork High School, Irmo, South Carolina
- AS032** **The Behavioral and Physiological Effects of Nicotine on Crayfish**
 Samuel Hayden Wycoff, 17, Junior, Paul Laurence Dunbar High School, Lexington, Kentucky

- AS033 CowChips: A Comprehensive Bovine Health and Location Information Network**
Justin Nicholas Krell, 17, Junior, Plankinton High School, Plankinton, South Dakota
- AS034 The Effectiveness of Speckle Count to Determine Bottlenose Dolphins (*Tursiops cf. aduncus*) Age Range**
Maya Lynn Hall, 18, Senior, School Without Walls, Washington, District of Columbia
- AS035 The Effect of Ocean Acidification on Planarian Regeneration**
Kelsey Mourning White, 18, Senior, School Without Walls, Washington, District of Columbia
- AS036 Ichthyophonus vs. Proteins: Should We Be Eating These Fish?**
Alisa Rachael Aist, 17, Junior, Polaris K-12 School, Anchorage, Alaska
- AS037 The Effect of Environmental Stresses on the Gender Ratio of a Population**
Alexandra Nicole Pentel, 17, Senior, The Bolles School, Jacksonville, Florida
- AS038 Unintended Consequences of Mosquito Pesticides on the Marine Environment: Potential Effects on the Threatened Staghorn Coral, *Acropora cervicornis***
Chandler Ilsa Precht, 18, Senior, Westminster Christian School, Palmetto Bay, Florida
- AS039 The Effects of Four Plant Antioxidants on the Lifespan of *Caenorhabditis elegans***
Summer Arielle Stoff, 16, Junior, Benjamin N. Cardozo High School, Bayside, New York
- AS040 L-Leucine: A Novel Facilitator of Adult Stem Cell Differentiation in *Dugesia tigrina***
David Lu, 16, Sophomore, Mills E. Godwin High School, Richmond, Virginia
- AS041 The Science of Anxiety, Phase II: The Effects of Physiological and Psychological Stress Factors on Short-Term Memory Performance in *Pomacea diffusa***
Benjamin Michael Hummel, 17, Junior, Florence School, Florence, South Dakota
- AS042 The Effects of Acetaldehyde and Folic Acid on the Development of *Lytechinus variegatus* Zygotes**
Felicia Nainesh Patel, 16, Junior, Saginaw Arts and Sciences Academy, Saginaw, Michigan
- AS043 Supplementing Cattle: Is It Really Worth It? Feeding Heifers in a North Dakota Winter**
Seth Kenneth Obritsch, 18, Senior, Belfield Public School, Belfield, North Dakota
- AS044 The Observation of Growth Enhancers on the Development and Meat Quality of *Sus scrofa***
Brennen Eric Boll, 16, Junior, Hankinson Public School, Hankinson, North Dakota
- AS045 Genetic Variation of *Phormia regina* in the United States**
Dana Lyn Alhaffar, 17, Senior, Eman Schools, Fishers, Indiana
- AS046 Comparison of the Foraging Habits of Juvenile *Anolis sagrei* and *Anolis carolinensis* Males**
Caitlyn Ann Kelly, 17, Senior, Benjamin Franklin High School, New Orleans, Louisiana
- AS047 Quantitative Analysis of the Role of Mitochondria in *Drosophila melanogaster* Lifespan**
Caleb Smith, 16, Junior, Palos Verdes Peninsula, Rolling Hills Estates, California
- AS048 Effects of *Lygus*-specific *Bacillus thuringiensis* Insecticidal Proteins on *Lygus* & Its Predators**
Gen Fitzgerald, 17, Junior, Desert Vista High School, Phoenix, Arizona
- AS049 Strongyle Conundrum, Year Four**
Addison Hilyard, 18, Senior, Central High School, Brooksville, Florida
- AS050 Strengthening *Daphnia magna*'s Resistance to Poisoning Caused by Copper (II) Sulfate Pentahydrate using Non-Invasive Methodology**
Elise Isabella Wilson, 18, Senior, Sumner High School, Sumner, Washington
- AS051 PCB Effects on Zebrafish Development**
Elise Genee Harrison, 17, Senior, John Bowne High School, Flushing, New York
- AS052 Thoracic Temperatures of the Postman Butterfly *Heliconius melpomene* in Relation to Diurnal Ambient Temperature Changes on Coastal Guyana**
Carissa Arlene DeRanek, 16, Junior, North Broward Preparatory School, Coconut Creek, Florida
- AS053 Male Fragility in *Drosophila melanogaster* with Antennapedia Mutation**
Vikas Rammohan Maturi, 15, Sophomore, Carmel High School, Carmel, Indiana
- AS054 Breeding Season of the *Cephaloscyllium ventriosum* or Pacific Swell Shark in Captivity**
Cheyenne Newallis, 15, Sophomore, San Pedro High School Marine Science Magnet, San Pedro, California
- AS055 State of the Invasion**
Duncan Bruce Coles, 17, Junior, Good Hope Country Day School, Kingshill, United States Virgin Islands
- AS056 Cashew Tree (*Anacardium occidentale*): An Effective Treatment for Cattle Dermatitis**
Deeksha. P Hebbbar, 14, Freshman, Vivekananda English Medium School, Puttur, India
- AS057 A Study of the Effects of Transplantation of Tissue from Planarian Flatworms Conditioned with Light-Shock Therapy into Naive Planarian Flatworms**
Chloe Sherry, 17, Junior, John Adams High School, South Bend, Indiana
- AS058 Feed Alternatives for *Litopenaeus vannamei***
Abigail Marek, 15, Sophomore, Boone Grove High School, Valparaiso, Indiana
- AS301 What Effect Does Gender, Tone, and Sound Location Have on the Response Behavior of *Neogobius melanostomus* (Round Gobies) and the Possibility of Future Trapping of this Invasive Species?**
Crystal Rae Moynan, 16, Sophomore
Christine Elizabeth Neumann, 16, Sophomore
Cloquet Senior High School, Cloquet, Minnesota
- AS302 Juvenile Chum Salmon (*Oncorhynchus keta*) Migration Timing through Icy Strait from Different Southeast Alaska Hatcheries**
Gabrielle Duvernay, 16, Sophomore
Anouk Otsea, 16, Sophomore
Juneau-Douglas High School, Juneau, Alaska
- AS303 Body Temperature Regulation of Drone Beetles in Flight as Revealed by Remote Measurement of their Body Temperatures**
Kiryu Kazama, 15, Junior
Taishi Kuriya, 17, Senior
Yusuke Takami, 17, Senior
Kumamoto Prefectural Toryo High School, Kumamoto, Japan
- AS304 *Rubus ellipticus*: An Effective Natural Solution against *Giardia Intestinalis***
Daksh Dua, 16, Junior
Abhishek Verma, 15, Freshman
Maharaja Agarsain Public School, Delhi, India
- AS305 Investigating a Sleep Inducing Gene Found in *Drosophila melanogaster***
JoonHee Leo Lee, 16, Junior
Taylor Moor Sun, 16, Junior
Daniel Tang, 17, Junior
International School of Beijing, Beijing, China

- AS306 Three New Species of the Genus *Novophytoptus roivainen* 1947 (*Acariformes, Eriophyoidea*) from Russia, Serbia and USA**
Timofei Petrushenko, 15, Sophomore
Valentina Ruazantceva, 16, Sophomore
Academic Gymnasium of Saint-Petersburg State University,
Saint-Petersburg, Russian Federation
- AS307 The Effects of Non-Ionizing Radiation from Wireless Fidelity in the Circadian Rhythm of the Fruit Fly (*Drosophila melanogaster*)**
Albert Joel Colon-Gonzalez, 17, Junior
Pedro Juan Rodriguez-Fernandez, 16, Junior
University Gardens High School, San Juan, Puerto Rico
- AS308 Olfactometer and GC/MS Evidence for (E)-2-hexenal as a Semiochemical in the Defensive Secretions of the Kudzu Bug, *Megacopta cribraria***
Carly Onnink, 16, Sophomore
Abigail Anne Williams, 16, Sophomore
Brevard High School, Brevard, North Carolina
- AS309 Repellent Effects of Lamiaceae Plant Extracts on *Paederus fuscipes* Beetles and Inhibitory Effects of Lime Fruit Oil on *Paederus dermatitis***
Boonyakorn Assavanives, 17, Junior
Vachana Chongruijipinyo, 16, Sophomore
Chisanu Thumarat, 17, Junior
Bangkok Christian College, Bangkok, Thailand

Behavioral and Social Sciences

- BE001 The Effect of the Area of Visible Sclera on a Person's Perception of another Person's Trustworthiness**
Kevin Alexander Rodriguez, 15, Sophomore, Westminster Christian School, Palmetto Bay, Florida
- BE002 Hand Hygiene Gone Viral? A Study of Student Involvement in a Social Media Campaign as a Method of Bringing Hand Hygiene to the Masses**
Timothy James Fossum Renier, 16, Junior, Duluth East High School, Duluth, Minnesota
- BE003 Beef! How Should You Cook It and How Do Consumers Prefer It?**
Case Hilland Emerson, 16, Junior, Union County High School, Lake Butler, Florida
- BE004 The Effects of Texting on Driving Safety**
Conroy Cheers, 15, Sophomore, Caulfield Grammar School, Melbourne, Australia
- BE005 The Changing Face of Education: Development of a Pedagogic Computer Application and Its Effect on Student Cognition, Motivation, and Performance, Year Four**
Caitlyn Mary Ralph, 17, Senior, Lake Howell High School, Winter Park, Florida
- BE007 Benefits of the Education Style used in Asian and American Education Systems**
Hyejin Lee, 19, Senior, Trinity Lutheran High School Bend Oregon, Bend, Oregon
- BE009 Psychological Defense Mechanisms with Students of Intermediate Level**
Ali Mohammad Abbas, 15, Sophomore, Jaber Al-Mubarak Al-Sabah, Surra, Kuwait
- BE010 The Effects of Psychological Distraction on the Problem Solving Process in the Average Adolescents Mind**
Sarah Eva DiSalvo, 16, Junior, Coral Academy of Science Las Vegas, Nevada, Henderson, Nevada
- BE011 Host Preferences of Wild Northern and Southern *Ixodes scapularis***
Hannah Frankie Stewart, 17, Senior, Plainview-Old Bethpage John F. Kennedy High School, Plainview, New York
- BE012 A Comprehensive Study of Dollar Hegemony, Quantitative Easing, and the Foreign Exchange Market**
Justin Chase Lafazan, 17, Senior, Syosset High School, Syosset, New York
- BE013 The Paradox of Emotional Dimensionality: The Effect of the Dimensionality of Audio Stimuli on the Brain's Electrical Activity, a Neuroscience Study**
Michelle Marie Marquez, 14, Freshman, Math and Science High School at Clover Hill, Midlothian, Virginia
- BE014 Hawking for Deaf**
Lina Rasmi Albaidin, 15, Sophomore, Aljazeera School, Amman, Jordan
- BE015 Role of Somatostatin Interneurons in Alzheimer's Disease**
Divya Koyyalagunta, 18, Senior, Clear Lake High School, Houston, Texas
- BE016 Differences in Word Usage Patterns between "Well-Recovered" Aphasic Patients and Control Subjects on a Picture Description Task**
Daniela Ida Ganelin, 17, Senior, Montgomery Blair High School, Silver Spring, Maryland
- BE017 Testing Teaching Styles**
Jennifer Lee McDonnal, 18, Senior, York School, Monterey, California
- BE018 Alexithymia and Hemispheric Lateralization of Emotional Valence and Verbal Ability**
Helene Lovett, 17, Junior, Lusher Charter School, New Orleans, Louisiana
- BE019 Linking the Onset Type and Level of Severity of a Diagnosis of Autism Spectrum Disorder with Symptoms and Causations**
Courtney Alexandra Astore, 17, Junior, Cardinal Mooney Catholic High School, Sarasota, Florida
- BE020 Influence of Age in Response to Emoticon Stimuli Using Facial Electromyographic Technology**
Ellen Guyer, 18, Senior, Carter County High School, Ekalaka, Montana
- BE021 "ANATORAMA": The Wonderful Human Body**
Marisol Leon Cruz, 19, Senior, Colegio de Bachilleres del Estado de Sinaloa, Mazatlan, Mexico
- BE022 Investigation into Whether Teenagers Read Faster and Retain More Information When Tested Using Various Media**
Matthew Daniel Symon, 16, Junior, Herzlia High School, Cape Town, South Africa
- BE024 "Are You Sure?" A Multi-Factor Analysis: Are Eyewitness Testimonies Dooming the Innocent?**
Ansley Elizabeth Lynn, 16, Sophomore, Glenwood School, Smiths, Alabama
- BE025 An Analysis of Self-Perception in Relation to the Decision to Intervene in Bullying Situations within the Educational System**
Tessa Ray Carver, 18, Senior, Weber High School, Pleasant View, Utah
- BE026 Neighborhood Built Environment and Leisure-Time Physical Activity Participation among Adults in Utah**
Calvin Haowen Yu, 16, Junior, Hillcrest High School, Midvale, Utah
- BE027 The Effects of Imagined Stressful Trauma on Optimism and Self-Esteem in Adolescents**
Karissa Wang, 15, Sophomore, Northern Utah Academy for Math Engineering and Science, Layton, Utah
- BE028 The Effect of Innovative Colors Learning Method on Students with Learning Difficulties**
Fahed Gassem Ghazwani, 17, Senior, Alrawdha, Jazan, Saudi Arabia
- BE029 Light Speed: A Measure of Ocular Phototransduction Using Pulsed Light Emitting Diodes**
Ashley Maye Hamlin, 16, Sophomore, Hilton Head Island High School, Hilton Head Island, South Carolina
- BE030 Perception of Facial Expression of Emotion**
Danila Alferov, 16, Junior, A.B. Lucas Secondary School, London, Canada
- BE031 Using Google Trends to Enhance Predictive Models of Mortgage Delinquency to Mitigate Risk in the Loan Lending Process**
Soham Daga, 17, Senior, Stuyvesant High School, Manhattan, New York
- BE032 Pulsic: An Intelligent Music Player for Joggers**
Johanna Adojaan, 17, Sophomore, Hugo Treffneri Gymnasium, Tartu, Estonia
- BE033 Effect of Interruptive Facebook Use on Working Memory in the 21st Century Learning Environment**
Laela Rabab Zaidi, 18, Senior, Joplin High School, Joplin, Missouri
- BE034 Lucid Dreaming**
Claude Boueri, 16, Freshman, Antonine Sisters School/ Ghazir, Ghazir, Lebanon
- BE035 Linking Expression and Function of FoxP2 in Adult Songbirds Using Operant Preference Testing**
Petra Luna Grutzik, 18, Senior, Redondo Union High School, Redondo Beach, California

- BE036 Evaluating Problem Solving Approaches Using Child Safety Locks**
Amberley Meredith Powell, 16, Junior, Technology High School, Rohnert Park, California
- BE037 Hello My Name Is...Happy!**
Kelsey Kaye Guttormson, 16, Freshman, Tioga High School, Tioga, North Dakota
- BE038 Healthy Youth: Effect of Physical Activity and Sleep Patterns on Physical and Mental Well-Being in Adolescents**
Grace Hwang, 16, Junior, Hershey High School, Hershey, Pennsylvania
- BE039 Determining the Effectiveness of Various Subskills Training and Practice on Visual Perception**
Noorhan Zainab Amani, 14, Freshman, Mount Everest Academy, San Diego, California
- BE040 Self-induced Sleep Loss: A Novel Risk Factor for Nighttime Food Desire in Adolescents and the Association with Brain Dopamine Signaling and Obesity**
Zarin Ibnat Rahman, 17, Senior, Brookings High School, Brookings, South Dakota
- BE041 The Effect of Social Networking on the Mental State of Senior Citizens**
Haley Asofsky, 15, Sophomore, American Heritage School Boca/Delray, Delray Beach, Florida
- BE042 Identification of Markers Differentiating Anxiety from ADHD in a School-Aged Population**
Suganth Kannan, 14, Freshman, American Heritage School, Plantation, Florida
- BE043 Comparative Analysis of the Risks Towards Drunkorexia Suffering at Three Secondary Schools in Medellín, Colombia**
Luisa Fernanda Castano, 13, Freshman, Institucion Educativa Javiera Londono, Medellín, Colombia
- BE044 Cognitive Performance in Schizophrenia & Bipolar Disorder & their First-Degree Relatives**
Miribel Xuan Vy Tran, 16, Junior, Marina High School, Huntington Beach, California
- BE045 Musiclock**
Perttu Polonen, 19, Senior, Vaskivuoren Lukio, Vantaa, Finland
- BE046 Analyzing High School Students' Perceptions of Education System through Metaphors**
Irmak Su Tutuncu, 17, Senior, Cengiz Aytmatov Sosyal Bilimler Lisesi, Izmir, Turkey
- BE301 Is There a Correlation between Knowledge of Personality Types and How Well Different Personality Types Work Together over Time?**
Taylor Rose Leyrer, 16, Sophomore
Lauren Kidder Loeb, 15, Sophomore
Cloquet Senior High School, Cloquet, Minnesota
- BE302 Games of the Future: Brainwave-controlled Devices**
Octavian Coca, 17, Junior
Stefan Dascalu, 17, Junior
Colegiul National "Petru Rares" Suceava, Suceava, Romania
- BE303 Ritalin Me This? A Study of Correlation between Learning Styles of ADD/ADHD Students and Autistic Students**
Ashlee Fletcher, 17, Senior
Makenna Hukill, 17, Senior
Muskogee High School, Muskogee, Oklahoma
- BE304 Capacity Limits of Working Memory: The Impact of Multitasking on Cognitive Control and Emotion Recognition in the Adolescent Mind**
Sarayu Caulfield, 16, Junior
Alexandra Ulmer, 17, Junior
Oregon Episcopal School, Portland, Oregon
- BE305 Group Phyllos: Student Choir as an Instrument of Cultural Inclusion**
Lorena Sampaio Nascimento, 17, Sophomore
Mateus de Sousa Nogueira, 16, Sophomore
Escola Estadual de Educacao Profissional Julia Giffoni, Fortaleza, Brazil
- BE306 Why the Things We Love Are Hurting Us: An Analysis of the Amount of Screen Time on Dopamine**
Hannah Marie Coffey, 16, Junior
Brandon Michael Hill, 16, Junior
Hana Kim Ulman, 17, Junior
Hedgesville High School, Hedgesville, West Virginia
- BE307 Testing the Significance of Racial, Age, and Gender Descriptors in Relation to Personal Interaction**
Audra Burke, 17, Senior
Jason Lewis Mackay, 17, Senior
Edison High School, Yoder, Colorado
- BE308 The Accomplice Silence: The Role of Spectators in Bullying**
Andrea Aldaz, 18, Senior
Andrea De Leon, 18, Freshman
Mauro Pérez, 18, Senior
Escuela Tecnica Rafael Peraza, San Jose, Uruguay
- BE309 Psychosocial Variables Affecting Breast Cancer Patient Quality of Life**
Abigail E. Kamen, 17, Senior
Alyson Winter, 17, Senior
Ossining High School, Ossining, New York
- BE310 Prodenit**
Jesus Armando Jaramillo Lizarraga, 17, Junior
Aaron Macias Juarez, 17, Junior
Colegio de Bachilleras del Estado de Sinaloa # 65, El Apoderado, Rosario, Mexico
- BE311 Active Brain Regions during Sleep using Electroencephalography-Functional Magnetic Resonance Imaging**
Grace Yuewen Duan, 17, Junior
Sameeksha H. Malhotra, 17, Junior
Illinois Mathematics and Science Academy, Aurora, Illinois
- BE312 The Effect of Developing a Multilingual Cell Phone Application Based on Voice Search to Meet the Satisfaction of the Islamic Art Museum Visitors**
Thamer Al-Mass Al-Khatter, 15, Sophomore
Abdulla Mohammed Alrumaihi, 15, Sophomore
Nasser Khalid Alyafei, 15, Sophomore
Jassim Bin Hamad Independent Secondary School for Boys, Doha, Qatar
- BE313 Robot of Upbringing Genius Kids for the Future**
Adam Saif Alhinai, 14, Sophomore
Asaad Said Alhinai, 14, Sophomore
Alwaleed Mohammed Alnasseri, 16, Sophomore
Abu Aldarda Public School, Ibri, Oman
- BE314 The Effect of Academic Rigor on Sociometric Status and Subjective Well-Being**
Aundrea DeGravina, 17, Senior
Shea Van Slyke, 17, Senior
Hamilton High School, Chandler, Arizona
- BE315 The Effect of Technology on Teenagers**
Grace Elizabeth Brackman, 14, Freshman
Sydney Corinne Cason, 15, Freshman
Lakeshore High School, Stevensville, Michigan
- BE316 The Blind's Device**
Ahmad Thaer Abu Farha, 14, Freshman
Hasan Mohammed Nour Ramadan, 15, Freshman
International Pioneer Academy, Amman, Jordan
- BE317 Ants Advance**
Fatima Khaled Mahdi, 18, Senior
Zaineab Khaled Mahdi, 17, Senior
Fatima Al-Sarawy Secondary School for Girls, AL Salam, Kuwait

Biochemistry

- BI001 Organic Foods? Buy or Bypass: A Comparative Study Analyzing the Effects of Pesticides on Nutritional Content, Heavy Metal Toxicity and Pesticide-Induced Diseases**
Ria Chhabra, 16, Freshman, Plano Senior High School, Plano, Texas
- BI002 Does Oyster Mushroom Mycelium Colonize and Decompose Natural Growing Media More Quickly When Oil-based Pollutants Are Present?**
Aidan B. Arant, 19, Senior, Pensacola High School, Pensacola, Florida
- BI003 The Effect of Caffeine on the Development and Nervous System of *Drosophila melanogaster***
Kate Hogan, 18, Senior, Parkway Central High School, Chesterfield, Missouri
- BI004 Copper Chelation as a Possible Atherosclerosis Treatment: Finding the Optimal Therapy**
Mashad Arora, 16, Junior, Science Academy of South Texas, Mercedes, Texas
- BI005 L- Asparaginase Production from Kefir: An Alternative for the Treatment of Acute Lymphoblastic Leukemia**
Barbara Carolina Federhen, 19, Senior, Fundacao Escola Tecnica Liberato Salzano Vieira da Cunha, Novo Hamburgo, Brazil
- BI006 Computational Analysis of Beta-Lactam Stabilization in the N-Terminal Domain of Silk Fibroin**
Kevin Paul Fialkowski, 18, Senior, Arkansas School for Mathematics, Sciences and the Arts, Hot Springs, Arkansas
- BI007 An *in vitro* Study of the Effectiveness of Cinnamon Compounds on the Degradation of Amyloid- β and Tau Protein in Alzheimer's Disease**
Natalie Elizabeth Barton, 17, Junior, Bayside High School, Palm Bay, Florida
- BI008 The Toxicity of Kavalactones and Flavokavain A and B from Different Plant Areas of Kava on HepG2 Liver Cells**
Keanu Dean Pinner, 16, Sophomore, Hilo High School, Hilo, Hawaii
- BI009 The Investigation of the Antineoplastic Effects of Lentinus Edodes on Lung Cancer (PC9) Cell Line and Trachial-Bronchial Epithelial (AALE) Cells, Phase II**
Elijah D. English, 18, Senior, South Sumter High School, Bushnell, Florida
- BI010 PNA for Use in Small-Molecule Libraries Derived by Combinatorial Solid-Phase Synthesis: Reaction Optimization**
Richik Neogi, 17, Senior, Merlo Station School of Science and Technology, Beaverton, Oregon
- BI011 You Missed a Spot: Accuracy of Luminol Chemiluminescence to Detect Blood at a Crime Scene using Concealment Techniques and Measurements of False Positives**
Alexia Dean Benson, 15, Freshman, Grove High School, Grove, Oklahoma
- BI012 A Drug Discovery Project: Allosteric Inhibition of Indolethylamine N-Methyl Transferase**
Sevahn Kayaneh Vorperian, 17, Senior, West High School, Madison, Wisconsin
- BI013 Novel Inorganic Metallacarborane Inhibitors of HIV-1 Protease**
Robin Krystufek, 18, Junior, Gymnazium Na Vitezne Plani, Prague 4, Czech Republic
- BI014 Biofuels from Plant Cell Biomass: Characterization of a Novel Enzyme**
Noa Shulami, 17, Senior, Misgav High School, Misgav, Israel
- BI015 Using Nano Technology as an Anticancer Agent: Anticancer Effect of Catechin-coated Iron Oxide Nano Particles on Leukemic Monocytes**
Godabaddage Rakitha Dilshan Malewana, 18, Senior, Nalanda College, Colombo, Sri Lanka
- BI016 Interrogating SGK3 Function in Cancer**
Ken Aizawa, 17, Senior, Jericho Senior High School, Jericho, New York
- BI017 The Effects of Active Site Mutation in *Anopheles gambiae* Transglutaminase 3(AgTG3)**
Minh-Quan D. Pham, 18, Senior, Ocean Lakes High School, Virginia Beach, Virginia
- BI018 Diet-based Inhibition of Acetylcholinesterase as a Treatment for Myasthenia Gravis and Alzheimer's Disease**
Elishama Michel, 18, Senior, Loudoun County Academy of Science, Sterling, Virginia
- BI019 Effect of Hypoxia on Tumor Cell Proteins**
Andrea N. Peterson, 15, Freshman, Mayo High School, Rochester, Minnesota
- BI020 Cell Cycle Suppression in Breast Ductal Carcinoma by Anti-Cyclin E Antibody**
Sachindra Nath Sanam Venkata, 15, Sophomore, Michael E. DeBakey High School for Health Professions, Houston, Texas
- BI021 Will Combined BTK Inhibitors Decrease Growth of Multiple Myeloma Cancer Cells?**
Lauren Mirelle Strickland, 16, Junior, Benjamin N. Cardozo High School, Bayside, New York
- BI022 Using Chemical Biology to Target the Inhibitors of Apoptosis**
Kelsey Mackenzie Barter, 17, Senior, University High School, Tucson, Arizona
- BI023 The Effect of Climatic Change on the Bioluminescence of Dinoflagellates**
Cameron Nicholas Connolly, 17, Senior, North Point High School for Science, Technology, and Industry, Waldorf, Maryland
- BI024 The MAPT H1 Haplotype Is Associated with an Increased Clinical and Neuropathological Severity of Chronic Traumatic Encephalopathy**
Adam Z. Illowsky, 17, Senior, Ossining High School, Ossining, New York
- BI025 I Got C: A Study of Epigallocatechin Gallate on the Stability of Vitamin C and Quality Parameters in Deaerated and Sonicated Fresh Orange Juice using Titration**
Nirva Vassa, 15, Sophomore, Seminole High School, Sanford, Florida
- BI026 Evidence of Toll-like Receptor Nine-Mediated Amelioration of Amyloid Pathology in a TgSwDI Mouse Model of Alzheimer's Disease**
Charlotte Sophia Herber, 17, Senior, Fox Lane High School, Bedford, New York
- BI027 An Innovative Research about *Reynoutria japonica* (Houtt.): Distribution, Biochemical Analysis and Therapeutic Perspectives**
Stefan Milosavljevic, 20, Senior, Liceo Cantonale Lugano 1, Lugano, Switzerland
- BI028 Ethanol Production through Biological Pretreatment of *Miscanthus sinensis* using *Pleurotus ostreatus***
Srinath Vijay Seshadri, 14, Freshman, Village Academy, Delaware, Ohio
- BI029 Mechanism of Apoptotic Action of Colloidal Silver and Bromelain on PC12 Cells**
Marcelina Puc, 16, Junior, Lane Technical College Prep High School, Chicago, Illinois
- BI030 The Effects of Linking Multi Drugs with Silica Nanoparticles Coated with Silver Nanoparticles to Effectively Treat Tuberculosis**
Hassan Nezar Khadry, 17, Senior, Manarat AlRiyadh, Riyadh, Saudi Arabia
- BI031 The Effect of Surface Temperature on Chemiluminescence**
Kassie Jean Henry, 17, Senior, Southeastern High School, Augusta, Illinois

- BI032 Phthalates and Phthalate Alternatives: Effects on Proliferative and Estrogenic Target Genes**
Ranjani Sundar, 16, Junior, Illinois Mathematics and Science Academy, Aurora, Illinois
- BI033 Cross Kingdom Residue Comparison: A New Method for Identifying and Separating Taxonomic Groups**
Nicholas Christian Sass, 17, Junior, Canisius High School, Buffalo, New York
- BI034 Omega-3 Fatty Acids Benefit Microglial Responses to Myelin Pathology**
Songela Wenqian Chen, 17, Junior, North Allegheny Senior High School, Wexford, Pennsylvania
- BI035 Synthesizing pY Nanotubes: Toward a Phospholipid Bilayer Model**
Mitesh Dakshesh Bhalani, 17, Junior, Gwinnett School of Mathematics, Science, and Technology, Lawrenceville, Georgia
- BI036 Computational Prediction of Vaccine Potential Epitopes and 3D Structure of XAGE-1b for Non-small Cell Lung Cancer Immunotherapy**
Mohamed Tarek Mansour, 17, Junior, Salman EL Farisy High School, Cairo, Egypt
- BI037 Structural Snapshots of *K. lactis* Purine Nucleoside Phosphorylase Trapped with Transition State Analog Inhibitors**
Samuel Arturo Goldman, 16, Junior, Pelham Memorial High School, Pelham, New York
- BI038 The Effects of Lead on Beta-galactosidase Activity**
Blaine Alysse Dennis, 16, Junior, Mansfield High School, Mansfield, Missouri
- BI039 The Effect of Sodium Chloride on Catalase's Breakdown of Hydrogen Peroxide**
Olivia Jeanne Eustice, 15, Sophomore, Ocean Springs High School, Ocean Springs, Mississippi
- BI040 The Hunt for Wondrous Wolbachia**
Nikhil Mohan Arora, 15, Sophomore, St. Andrew's Episcopal School, Ridgeland, Mississippi
- BI041 Elucidating the Role of Reactive Oxidative Species (ROS) in TGF- β 1 Activation of TRPV1 in the Corneal Keratocyte**
Abrar Ali Nadroo, 16, Junior, Syosset High School, Syosset, New York
- BI042 Moving Towards the Cure for Alzheimer's Disease: The Effects of Histone Deacetylase Inhibitors on Neurofibrillary Tangle Formation and Microtubule Stability to Preserve Neuronal Integrity (A Novel *in vitro* Trial)**
Jay Chandar, 14, Freshman, Canterbury School, Fort Myers, Florida
- BI043 CARV-A-CURE: A Cell Viability Analysis of the Cancericidal Effects of Carvacrol on Pancreatic and Colorectal Carcinoma, Part Two**
Tushar Mittal, 17, Senior, Dutchtown High School, Hampton, Georgia
- BI044 Novel Design and Evaluation of Chitosan Nanoparticle Ocular Drug Delivery System**
Sriram Somasundaram, 16, Junior, The Harker School, San Jose, California
- BI045 A Comparison of the Mechanism and Effects of HIF-Targeting Oligonucleotides on Normal and Cancerous Breast Cells**
Katharine Elizabeth Adams, 16, Junior, duPont Manual High School, Louisville, Kentucky
- BI046 Development of a Therapeutic Drug for Alzheimer's Disease: A Chemical Approach to Cease Amyloidosis**
Yarim Lee, 16, Junior, Townsend Harris High School, Flushing, New York
- BI047 Titanium (IV) Oxide and Its Subsequent Effects on Cultured Cells**
Elizabeth Sarah Finlayson, 16, Junior, Lone Peak High School, Highland, Utah
- BI048 A Novel Treatment for Stroke, Traumatic Brain Injury, Alzheimer's, and other Neurodegenerative Disease: Sildenafil Promotes Axonal Outgrowth in the CSPG Inhibitory Environment through Modulation of miRNA Levels**
Guangning An, 17, Senior, International Academy, Troy, Michigan
- BI049 Study of Binding Modes of Synthetic Coumarin Derivates with DNA and Albumin**
Daniel Ondra, 18, Senior, Gymnazium Kosice, Kosice, Slovakia
- BI050 Effect of Trehalose and Poly (lactic-co-glycolic acid) (PLGA) Microparticles on the Release Kinetics of Hydrophobic Drugs in Polyurethane Scaffolds**
Michelle Lu, 18, Senior, School for Science and Math at Vanderbilt, Nashville, Tennessee
- BI051 Transactivation Assays for PPAR- γ and LXR- α**
Paul Carl Wassel, 17, Senior, Seminole Ridge Community High School, Loxahatchee, Florida
- BI052 Computational Analysis of the GABA(A) Receptor**
Aakash Jain, 17, Senior, Brophy College Preparatory, Phoenix, Arizona
- BI053 Alleviating Atrophy**
Christian Strock, 17, Junior, Satellite High School, Satellite Beach, Florida
- BI054 Understanding the Mechanism behind Nanoparticle Enhanced Oral Absorption of Chemotherapeutic Drugs**
Priyanka R. Narayan, 18, Senior, Wayzata High School, Plymouth, Minnesota
- BI055 Biofuel Enzymes**
Meghan Hill, 17, Junior, Monte Del Sol Charter School, Santa Fe, New Mexico
- BI301 Kefirada Milk 2.0: An Organic Alternative to Dairy Product as a Functional Food**
Katherine Astrid Araya Berrios, 15, Freshman
Javiera Francisca Salinas Contreras, 15, Freshman
Leonardo da Vinci, Coquimbo, Chile
- BI302 Identification of the Critical Amino Acids of Helicobacter Pylori Virulence Factor GroES Involved in Inflammatory Response Induction**
Yu-Chen Chen, 17, Junior
Pin-Hsin Chen, 16, Junior
Taipei First Girls High School, Taipei, Chinese Taipei
- BI303 SpuntINO'**
Alberto Agnoletti, 19, Senior
Alessio Mazzetto, 19, Senior
ISIS Arturo Malignani Udine, Udine, Italy
- BI304 The Biological Function of Telomerase in the Discontinuation of Cancer Immortality**
Anne Murray McCarthy, 17, Junior
Kristine Park, 17, Senior
Niles Township West High School, Skokie, Illinois
- BI305 The Utilization of Bioluminescence for the Diagnosis of Alzheimer's Disease and Related Tauopathies**
Sam Ilkka, 16, Junior
Andrew David Lekarczyk, 16, Junior
University of Detroit Jesuit High School, Detroit, Michigan
- BI306 Ligand-directed Macromolecular Urocanic Acid Conjugate for Treating Cancer: Design and Synthesis**
Darya Maximova, 17, Sophomore
Ekaterina Mozgunova, 17, Junior
Municipal Budget General Educational Institution "Lyceum No.22 "Nadezhda Sibiri", Novosibirsk, Russian Federation
- BI307 Characteristics of Sulfhydic Acid (H2S) Interactions with Lysozyme Amyloid Fibers**
Indra Gonzalez-Ojeda, 16, Senior
Javier Martinez-Rodriguez, 16, Senior
Centro Residencial de Oportunidades Educativos de Mayaguez, Mayaguez, Puerto Rico

- BI308 The Correlation between Docosahexaenoic Acid (DHA) and Cognitive Function in Healthy Teens**
Colin Norick, 15, Freshman
Colter Norick, 16, Junior
Columbia Falls High School, Columbia Falls, Montana
- BI309 A Test to Determine the Effect of Ethyl Alcohol on the Degradation of Cellular Hydrogen Peroxide by Enzyme Catalase**
Josee Laure Kapseu, 18, Senior
Karen Grace Wilkening, 18, Senior
Middleburg High School, Middleburg, Florida
- BI310 A Novel Analysis of Alzheimer's Disease: The Effects of α -Lipoic Acid, EGCG and Ibuprofen on Amyloid-beta and Tau in Neurodegenerative Transgenic *C. elegans* Model**
Kimberly Alexis Te, 15, Sophomore
Austen Gregory Te, 16, Junior
Jinyu Wu, 17, Junior
Manhasset High School, Manhasset, New York
- BI311 Low Cost Extraction and Pre-Purification of Bromelain Derived from Croata (*Neoglaziovia variegata*) by High Performace Liquid Chromatography: An Effective Antibacterial and Antifungal Alternative?**
Francisco Daniel Adriano, 16, Sophomore
Francisco Mairton Lima, 16, Sophomore
Escola Estadual de Educacao Proissional Julio Franca, Bela Cruz, Brazil
- BI312 Exploring Alzheimer's Prevention**
Julie Giannini, 17, Senior
Valerie Perea, 17, Senior
Saint Pius X High School, Albuquerque, New Mexico
- BI313 Cardiolipin-Targeted Peptides Block Alzheimer's Beta-Amyloid Oligomer Toxicity through a Two-Hit Approach: Fibril Formation and Inhibition of Newly Characterized Oxygenase Activity**
Margarita Ren, 18, Senior
Yinge Zhao, 16, Junior
Hunter College High School, New York, New York
The Dalton School, New York, New York
- BI314 Establishing the Parkinson's-Pesticide Connection through Computational Molecular Modeling**
Dana Abulez, 17, Junior
Rachana Kombathula, 16, Junior
Devyani Shekhawat, 16, Junior
Little Rock Central High School, Little Rock, Arkansas

Cellular and Molecular Biology

- CB001 The Effect of Orphan Receptor GPR83 on Neuronal Differentiation**
Maxwell D. Norleans, 15, Sophomore, Fort Myers High School, Fort Myers, Florida
- CB002 Investigation of the Genetic Transmission of the Atg1 Mutation and Its Effect on Embryogenesis in *Arabidopsis thaliana***
Ellen Wang, 17, Junior, Parkway North High School, Saint Louis, Missouri
- CB003 Evaluating the Effectiveness of Anthocyanin Treatment on the Reduction of CD4 Activity Associated with Cell Membrane Transformation of Viral DNA**
Emma Nelson, 17, Junior, Greybull High School, Greybull, Wyoming
- CB004 Overcoming Resistance**
Yasmine Sapphire Zubi, 18, Senior, Satellite High School, Satellite Beach, Florida
- CB005 Characterization of HeLa Cells Lacking Mitochondrial DNA**
Ji Hyun Byun, 17, Junior, Science Academy of South Texas, Mercedes, Texas
- CB006 Berberine Compounds as a Potential Methodology for Controlling Activity of Select Membrane Proteins**
Jarely Stephanie Castro, 18, Senior, Greybull High School, Greybull, Wyoming
- CB007 Identifying a Gene Responsible for Maturation of the Dendritic Cells in the Mammalian Immune System**
Anna Winnicki, 17, Senior, Punahou School, Honolulu, Hawaii
- CB008 Biochemical Analysis of Post Translation Modification to the Parkinson's Disease Protein Alpha-Synuclein**
Cherryse Abero Ulsa, 16, Sophomore, Wallace Rider Farrington High School, Honolulu, Hawaii
- CB009 Analysis of T-cell Proliferation in Lymph Nodes of Lymphopenic Hosts Using 2-Photon Microscopy**
Susie Min, 17, Senior, Hathaway Brown School, Shaker Heights, Ohio
- CB010 Universal, MHC-E Restricted Killer T Cell responses: Identification of a Novel Immune Response against HIV**
Reesab Pathak, 15, Junior, Camas High School, Camas, Washington
- CB011 Age and Glaucoma Induced Changes in Retinal Ganglion Cell Function**
Garrett Elijah McGrady, 16, Sophomore, duPont Manual High School, Louisville, Kentucky
- CB012 p38 in Muscle Differentiation**
Giuseppe Dall'Agnese, 19, Senior, Liceo Scientifico E. Vendramini, Pordenone, Italy
- CB013 Investigating MeCP2 Regulation of L1CAM Gene Expression in Neural Stem Cells Derived from a Patient with Rett Syndrome**
Ohyoon Kwon, 16, Sophomore, West Windsor-Plainsboro High School South, West Windsor Township, New Jersey
- CB014 Activation-induced Cytidine Deaminase and Its Role in Reliving the Promethean Dream**
Ritayan Chakraborty, 16, Junior, Syosset High School, Syosset, New York
- CB015 Alzheimer's Disease: The Effect of Neuregulin1/ErbB4 Back Signaling on γ -secretase Production**
Scott Massa, 16, Junior, Commack High School, Commack, New York
- CB016 Does BPA Cause Hearing Loss? Assessing the Potential Ototoxicity Induced by Bisphenol- A in *Danio rerio* (Zebrafish) Lateral Line**
Meghal Sheth, 16, Junior, Camas High School, Camas, Washington
- CB017 The Synthesis of Colicin M using Cell-Free Protein Synthesis**
Reyvin Michael Reyes, 17, Junior, Niles Township West High School, Skokie, Illinois
- CB018 Functions of BldD Repressor in Teicoplanin Producer *Actinoplanes teichomyceticus***
Kseniya-Oksana Zhukrovska, 17, Junior, Lviv Academic Gymnasium at the National University "Lviv Polytechnic", Lviv, Ukraine
- CB019 The Effect of a New LncRNA 2953 on Muscle Creation**
Caitlin Dutta, 16, Junior, Western Albemarle High School, Crozet, Virginia
- CB020 Engineering a Novel CDH1 Fluorescent Protein Reporter Construct to Evaluate Cancer Cell Differentiation**
Gregory John Konar, 18, Senior, Massachusetts Academy of Math and Science at WPI, Worcester, Massachusetts
- CB021 The Hidden Hazard of Infant Formula: Evaluating the Effect of Food Additive λ -Carrageenan on Blastemal Cell Growth and Development in a *Dugesia tigrina* Model**
Akshayaa Kethinni Chittibabu, 16, Junior, Massachusetts Academy of Math and Science at WPI, Worcester, Massachusetts
- CB022 Control of Induced Pluripotent Stem Cell Aging by Modulation of Mitochondrial DNA Deletions**
Joshua Abraham Meier, 18, Senior, Academy for the Advancement of Science and Technology, Hackensack, New Jersey
- CB023 Dysregulation of MicroRNA Expression in Diabetes**
Audrey Isomi Lang, 16, Junior, Edward M. Kennedy Academy for Health Careers, Boston, Massachusetts
- CB024 In Search of Genomic Dark Matter: A Novel Method for the Global Identification of Active Regulatory Elements**
Carlo Bocconcelli, 17, Senior, Falmouth Academy, Falmouth, Massachusetts
- CB025 Triclosan: The Snail's Achilles' Heel**
Tess Cushing, 17, Senior, Taunton High School, Taunton, Massachusetts
- CB026 Characterization of Gene Expression in p53 Activated Tumor-Initiating Cells**
Fan Liu, 15, Sophomore, Fontbonne Academy, Milton, Massachusetts
- CB028 Proteasome-Directed Camelid Nanobodies Promote the Degradation of α -Synuclein as a Potential Parkinson's Disease Therapeutic**
Ankit Singh Baghel, 17, Junior, The Albany Academies, Albany, New York
- CB029 Generating iPSCs from Human Adipocytes for Differentiation into Nociceptive Neurons**
Elizabeth Boyle Sobolik, 16, Junior, Sleepy Hollow High School, Sleepy Hollow, New York
- CB031 Effect of Shh Signaling on Neonatal Cardiomyocyte Proliferation**
Ryan Dahl, 17, Senior, Olathe North High School, Olathe, Kansas
- CB032 Transformation of XPV Cells by E6 and E7 Genes of HPV Sensitizes the Cells to UVB Light: Synthetic Lethality and Perspectives to the Treatment of Cervical Cancer**
Eduardo Padilha Antonio, 16, Junior, Centro Universitario Adventista de Sao Paulo - UNASP-SP, Sao Paulo, Brazil
- CB033 Preliminary Identification of Paramagnetic Extracellular Vesicles in Plasmodium Falciparum-Infected Erythrocytes**
Enrico Calvanese, 15, Junior, Instituto Panamericano, Panama, Panama
- CB034 Synthetic Biology Approach for Development of a Monosodium Glutamate Detector, Phase II**
Jodie Leigh Tinker, 17, Senior, Covenant Christian Academy, Huntsville, Alabama

- CB035 Hepatitis C Genotype 4 NS5A Protein: A New Study Determining Combination Therapy Drug Resistance in Saudi Patients**
Abdullah Ahmed Altorbag, 18, Senior, Complex Prince Sultan High School, Burydah, Saudi Arabia
- CB036 VEGF-3 Antibody Functionalized Gold Nanoshells for Near Infrared Photothermal Ablation of Lymphatic Endothelial Cells**
Morni A. Modi, 16, Junior, Caddo Parish Magnet High School, Shreveport, Louisiana
- CB037 Characterization of T Cell Receptor Clonotypes in an SIV Infected Pigtailed Macaque**
Darius Andrew Johnson, 18, Senior, Baltimore Polytechnic Institute, Baltimore, Maryland
- CB038 A Genome-Wide Analysis Tool to Identify Functional Regulatory Single Nucleotide Polymorphisms (rSNPs) Impacting Disease**
Natalie Ng, 18, Senior, Monta Vista High School, Cupertino, California
- CB039 Nano-Formulated Quercetin: A Novel Therapy for Neuroblastoma by the Re-expression of RIZ1**
Priyanga Selvakumar, 17, Senior, Marple Newtown High School, Newtown Square, Pennsylvania
- CB040 The Protein Expression of the Sp.185/333 Gene Family in the Immune System of Purple Sea Urchins**
Marcelle Pick Snead, 17, Senior, School Without Walls, Washington, District of Columbia
- CB041 Production of a Viral Enhancer Protein Using a Bacterial Platform**
Adamo Young, 17, Senior, Lisgar Collegiate Institute, Ottawa, Canada
- CB042 Inducing Cellular Adhesion via Membrane Targeting of Rap1 Pathway Effectors for Development of Bone Marrow Mobilizing Drug for Chemotherapy Patients**
Adit Chandra, 17, Junior, Carmel High School, Carmel, Indiana
- CB043 A Novel Approach for Metastatic Breast Cancer Therapy: Pharmacological Inhibition of EZH2 Histone Methyl Transferase Activity Suppresses Cancer Stem Cells and Induces Epithelial Phenotype**
Sara Sakowitz, 17, Senior, The Brearley School, New York, New York
- CB044 Zip1 M Region Phosphorylation Patterning: Implications for Effective Meiosis**
Anuhita Basavaraju, 17, Senior, Jericho Senior High School, Jericho, New York
- CB045 Lights, Nanocarrier, Crosslink! A Novel Nanocarrier for Drug Delivery in Cancer Treatment**
Nancy Wang, 16, Junior, Hershey High School, Hershey, Pennsylvania
- CB046 Differential Effects of Food Additives on Catalase and Its Close Interactors**
Shreya Menon, 16, Sophomore, Skyline High School, Ann Arbor, Michigan
- CB047 Effects of Resveratrol on 5-Fluorouracil Chemotherapeutic DNA Damage and Drug Resistance in Breast and Prostate Cancer Cells**
Michael Xiao, 16, Sophomore, Lone Peak High School, Highland, Utah
- CB048 An Alternative to the Use of Embryonic Stem Cells**
Danielle Stephenson-Threatt, 14, Sophomore, St. Johns School Guam, Upper Tumon, Guam
- CB049 Predicting Eye Color Genotype Based on Phenotype**
Madelyn Elizabeth Kloske, 15, Freshman, Pope John Paul II Catholic High School, Huntsville, Alabama
- CB050 Trail Avoidance, Spatial Pattern Recognition, and Tubule-crossing Efficiency in the True Slime Mold *Physarum polycephalum***
Hannah Leah McShea, 18, Senior, North Carolina School of Science and Mathematics, Durham, North Carolina
- CB051 Investigating the Culturing Environment of *Glioblastoma multiforme***
Heya Kaakeh, 16, Junior, West Lafayette Junior/Senior High School, West Lafayette, Indiana
- CB052 Targeting Brain Tumor Stem Cells through Natural Antioxidants**
Iman Mahoui, 16, Junior, Eman Schools, Fishers, Indiana
- CB053 Viscoelastic Properties of Rat Fibroblast Cells Using Atomic Force Microscopy (AFM)**
Arjun Ramani, 15, Freshman, West Lafayette Junior/Senior High School, West Lafayette, Indiana
- CB054 Effects of Glucose Concentration on Macrophage Growth and Macropinocytosis**
Katharine M. Young, 17, Junior, Brookings High School, Brookings, South Dakota
- CB055 A Novel Cell Cycle Analysis Protocol Utilizing High Content Screening in Adherent Cell Line HS-27**
Reid Akana, 17, Senior, Kamehameha Schools Kapalama, Honolulu, Hawaii
- CB056 Reprogramming Hair Follicle Stem Cells into Cardiomyocytes**
Manotri Chaubal, 17, Senior, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia
- CB058 Suppression of Malonyl-CoA: ACP Transacylase as a Treatment for Squamous Cell Carcinomas**
Lawrence Zhang, 18, Senior, Fairview High School, Boulder, Colorado
- CB059 Factomics: A Cloud-Enabled Application Incorporating Integrative Genomics and GWAS Facilitating Disease Causation Analysis**
Swetha Revanur, 15, Sophomore, Evergreen Valley High School, San Jose, California
- CB060 Innovative Non-invasive Test for Food Based, Non-IgE-mediated, Allergic Reactions**
Bailey Austin Bakerson, 15, Freshman, Berrien County Mathematics and Science Center, Berrien Springs, Michigan
- CB061 The Effects of S1P and FTY720 on OP-9 Bone Marrow Stromal Cell Morphology and S1P (subnumber 1)/S1P (subnumber 3) Expression**
Jovanay Carter, 16, Junior, Coretta Scott King Young Women's Leadership Academy High School, Atlanta, Georgia
- CB062 Effects of THP-1 Macrophage Conditioned Media on the Growth of Human Umbilical Vein Endothelial Cells**
Amadou Sadio Bah, 17, Junior, BEST Academy High School at Benjamin S Carson, Atlanta, Georgia
- CB301 Screening for Genetic Polymorphism in GRIN2B Gene in Patients Diagnosed with Bipolar Disorder**
Jeremy Jin Quan Goh, 17, Senior
Jun Yi Ong, 17, Senior
NUS High School of Mathematics and Science, Singapore, Singapore
- CB302 Utilizing Homologous Simplicial Complexes to Model Genomic Data**
Ying Liu, 18, Senior
Jessica Wang, 18, Senior
Liberal Arts and Science Academy High School, Austin, Texas
- CB303 Search for MICA Expression Controlling miRNA in A549 Lung Cancer Cells**
Ji Wook Kim, 18, Senior
Hyunwoong Kim, 17, Senior
Korea Science Academy of KAIST, Busan, South Korea
- CB304 Improvement of Techniques to *in vitro* Cultivate and Differentiate Stem Cells from Breast Milk**
Maite Campos Correa Mascarenha, 18, Senior
Maira Ferreira Lopes, 18, Senior
Luiza Maira Ribeiro da Silva, 18, Senior
Instituto Federal de Educacao, Ciencia e Tecnologia do Rio de Janeiro, Rio de Janeiro, Brazil

CB305 Enabling Neural Regeneration in a Model of Glial Scarring: Implications of Enhancing Retinoic Acid Signaling and Regulating NG2 Expression

Tejas Dharmaraj, 16, Senior

Manav Sevak, 17, Senior

Chandler High School, Chandler, Arizona

CB306 Loss of TSC2 Signals for Altered Macrophage Function within Lymphangiomyomatosis: A Role for VEGF-D?

Ruchi Asthana, 17, Senior

John Cannon Gow, 17, Senior

High Technology High School, Lincroft, New Jersey

Lawrence High School, Lawrenceville, New Jersey

CB307 The Influence of Y Matter Derived from Egg Yolk Oil on Liver Cancer (*Hepatocellular carcinoma*) Cells

Ahmet Resul Karababa, 17, Senior

Hazal Kayginer, 17, Senior

Sivas Fen Lisesi, SIVAS, Turkey

CB308 Placental Stem Cell Production using Milk and Whey Nutrients: Genetic Testing for Multipotency

Merve Akbulut, 16, Junior

Bircan Boga, 16, Junior

Adana Final High School, Adana, Turkey

CB309 Microbiological Investigations of Mushrooms: Health Hazards due to Improper Storage?

Elena Haring, 14, Senior

Carlotta Pribbenow, 14, Senior

Lise-Meitner-Schule, Berlin, Germany

Chemistry

- CH001 Enzyme Concentration**
Sara Jawad Mahmoud, 17, Junior, Franklin High School, El Paso, Texas
- CH002 Modification of the Oxygen Evolution Reaction Using Iridium (IV) Oxide Combined with Precious Metals through the Dip-Coating/Calcination Reaction, a Sixth Year Study**
Albert Scott Halbing, 17, Senior, Cocoa Beach Junior-Senior High School, Cocoa Beach, Florida
- CH003 The Optimal Reclamation Point of Phosphate from a Wastewater Treatment Plant**
Lewis Michael Nitschinsk, 17, Senior, Queensland Academies for Health Sciences, Southport, Australia
- CH004 New Approach to Synthesis of Glucose-Phosphates and Their Use to Increase the Efficiency of ATP**
Ayaz Abuzarov, 15, Freshman, "Young Talents" Lyceum, Baku, Azerbaijan
- CH005 A Novel Approach to Solar Desalination Using Nanoparticles**
Garrett Alejandro Camps, 16, Junior, Melbourne High School, Melbourne, Florida
- CH006 Measuring Antioxidants in Food and Beverages**
Daniel Bakos, 16, Sophomore, John Jay High School, San Antonio, Texas
- CH007 Synthesizing a STAT3 Dimerization Inhibitor Molecule via Retrosynthetic Analysis**
Maria Andrea Jurado, 18, Senior, Waipahu High School, Waipahu, Hawaii
- CH008 Rotation of Polarized Light by Chiral Monosaccharides**
Lucas Arthur Derbyshire, 15, Sophomore, Winona Senior High School, Winona, Minnesota
- CH009 Synthesis of Aspirin and the Importance of the Strength of the Acid Catalyst**
Ryann Nicole Fadden, 18, Senior, Century High School, Hillsboro, Oregon
- CH010 Stay Home or Go Global: Local versus Imported Fruit**
Liesl Krone, 15, Freshman, Granbury High School, Granbury, Texas
- CH011 A Study of Preparation of Fire-Retardant Exterior Wall Thermal Insulating Foam with a New Type of Raw Material**
Qiaochu Wang, 16, Sophomore, Zhengzhou No.1 High School, Zhengzhou, China
- CH012 Synthesis and Applications of Reusable Solid Acid Catalysts for Biofuels Production**
Yu-Hsuan Shen, 18, Senior, Taipei First Girls High School, Taipei, Chinese Taipei
- CH013 New Perspective Materials for Organic Photovoltaics**
Michael Batrla, 19, Junior, Gymnazium T. G. Masaryka, Zastavka, U Skoly 39, Zastávka, Czech Republic
- CH014 Improved Efficiency of Steam Generation Using Carbon Nanoparticles**
Carolyn Kay Jons, 15, Sophomore, Eden Prairie High School, Eden Prairie, Minnesota
- CH015 Flax Seed Biodiesel, Phase IV: Omega 3 Extraction**
Taylor John Schroeder, 18, Senior, Fairfield High School, Fairfield, Montana
- CH016 Novel Iron-Catalyzed Hetero Diels-Alder Reaction directed towards Natural Product Synthesis**
Andre Sanchez, 17, Senior, Manatee High School, Bradenton, Florida
- CH017 A Novel Metal Complex as Anti-Cancer Drug**
Arjun Rao Hurulihal, 16, Junior, Jawahar Navodaya Vidyalaya, Dharwad, Dharwad, India
- CH018 Stoichiometric Laser-Induced Breakdown Spectroscopy for Simple and Cost-Effective Laser Material Fabrication: A Case Study of Polycrystalline Yttrium Aluminum Garnet Ceramics**
Matthew Leong Chun, 17, Senior, Jericho Senior High School, Jericho, New York
- CH019 Optimal Chlorine/Ammonia Chloramine Equilibrium Ratios to Prevent Lead Leaching**
Matthew Duy Nguyen, 17, Junior, Fairfax High School, Fairfax, Virginia
- CH020 Building a Library of Difluoro- and Trifluoro- Artemisinins, Year Two**
Shreya Sundaresh Ramayya, 16, Junior, Palos Verdes Peninsula, Rolling Hills Estates, California
- CH021 The Effect of (ALPHA)-Cyclodextrin on the Solubility of Methane into Water for the Formation of Clathrate Hydrates**
Hayden Elise Fowler, 18, Senior, Alabama School of Fine Arts, Birmingham, Alabama
- CH022 Electronic Tongue: Tastes of Toxic Metal Ions in Water**
Seung Hye (Beatrice) Choi, 15, Sophomore, University High School, Fresno, California
- CH023 The Design and Synthesis of a Novel N-Co-Mo-MWCNT Fuel Cell Catalyst for ORR in Acidic Conditions**
Bryan Christopher Herbert, 18, Senior, Manhasset High School, Manhasset, New York
- CH024 Astrobiology: The Formation of Life-Supporting Amino Acids on Cosmic Dust Particles**
Alexander Morch, 19, Senior, Herlufsholm Kostskole og Gods, Naestved, Denmark
- CH025 Dendritic Polymers as a Modifier of Chromatographic and Electrophoretic Systems in the Determination of Vitamin and Amino Acids**
Alina Bogdanova, 17, Junior, Academic Gymnasium of Saint Petersburg State University, Petergof, Russian Federation
- CH026 Preparation of Surfactants Mixture from Cashew Nut Shell Liquid and Castor Oil to Combat the Dengue Mosquito Larvae, Phase Two**
Gabriel Tiago Galdino, 18, Senior, Nova Escola, Campo Grande, Brazil
- CH027 Carbonized Pineapple Peel (CPP) Waste as Low Cost Adsorbent for Acid and Reactive Dyes Removal**
Meor Zulhimi Syahir Ahmad Shohailee, 16, Junior, Tun Syed Sheh Shahabudin Science Secondary Boarding School, Bukit Mertajam, Malaysia
- CH028 Analysis of Performance and Effectiveness of Biodiesel Produced by Methanol**
Andre Hernandez - Espiet, 16, Junior, Escuela Secundaria Especializada en Ciencias, Matemáticas y Tecnología (CIMATEC), Caguas, Puerto Rico
- CH029 King's Electrolyte Drink vs. Pedialyte, Phase II**
Ryan Ball, 17, Junior, Weber High School, Pleasant View, Utah
- CH030 The Effectiveness of Guanidine Functionalized Polymers in Carbon Dioxide Capture and Utilization**
Sarah Hasan Al Abdullatif, 17, Senior, Dhahran Ahliyya Schools, Dammam, Saudi Arabia
- CH031 Considering the Green Economy of Recycling Amberlyst-15 Beads**
Rosemary Olamide Olatunbosun, 18, Senior, Harding Senior High School, Saint Paul, Minnesota
- CH032 Toward a Total Synthesis of Novel Anti-Cancer Drimentine C**
Claire Melinda Simpson, 18, Senior, Breck School, Golden Valley, Minnesota

- CH033 Luminescent Quenching by Transition Metal Ions on a Luminescent Surface**
Riley Philip McVey, 17, Junior, Big Sky High School, Missoula, Montana
- CH034 Antimalarials: Modeling the Next Generation Inhibitors**
Jimmy Thomas Olsen, 15, Sophomore, La Salle College High School, Wyndmoor, Pennsylvania
- CH035 Gold-Catalyzed Hydroamination of Methylene Cyclopropanes in Enantioselective Drug Synthesis**
Christopher Zhen, 18, Senior, North Carolina School of Science and Mathematics, Durham, North Carolina
- CH036 Evaporation Enhancement**
Zahraa Bader Alnakkas, 15, Sophomore, Bayan High School, Bayan, Kuwait
- CH037 Inked**
Tracy Abi Hanna, 16, Freshman, Antonine Sisters School/ Ghazir, Ghazir, Lebanon
- CH038 Synthesis of Magnetically Separable Catalysts and Nanosupports for Synthesizing Transportation Fuels**
Shannon Leslie Hendricks, 17, Junior, Marian High School, Mishawaka, Indiana
- CH039 Solar Cell Efficiency in Relation to Composition and Concentration of Glass Frits in Front Side Silver Pastes**
Walter Pan Li, 17, Junior, Canterbury School, Ft. Wayne, Indiana
- CH040 Factors that Influence Energies of Simple Hydrocarbons**
Tingyue Cui, 15, Sophomore, Terre Haute South Vigo High School, Terre Haute, Indiana
- CH041 Burning Calories**
Daija Gibson, 14, Freshman, St James High School, St James, Louisiana
- CH042 Novel Synthesis and Characterization of Antimony and Lithium Doped Tin Dioxide Nanocrystals Achieving Record Gas Sensor Performance**
Nikhil Murthy, 14, Freshman, Catlin Gabel School, Portland, Oregon
- CH043 Polarimetric Analysis of Solute Concentration on Optical Rotation of Assorted Chiral Molecules**
Jacqueline Li Chen, 16, Junior, Alexander W. Dreyfoos School of the Arts, West Palm Beach, Florida
- CH044 The Influence of Sample Preparation on Raman Spectrometry Spectrum with the Application of SERS Effect**
Marcin Witkowski, 19, Senior, Secondary School No. 6 in Radom named after Jan Kochanowski, Radom, Poland
- CH045 Fluorescence Sensor Based on Quenching of Curcumin for the Determination of Heavy Metal Ions**
Panitan Thakhiew, 17, Senior, Kaennakhon Wittayalai School, Khonkaen, Thailand
- CH046 Liquid Organic Hydrogen Carriers for Hydrogen Fuel Storage: Heterocyclic N and O Compound Dehydrogenation Utilizing the Iridium PCP Pincer Catalyst**
Jordan Lucas Fernandez, 18, Senior, Kapolei High School, Kapolei, Hawaii
- CH047 Explorations in Coal: What Is the Best Way to Utilize Coal's Energy?**
Christopher Siegle, 17, Senior, Council Grove High School, Council Grove, Kansas
- CH048 Glyco-Amino Acid Synthesis and the Effect of Glycosylation on Chemotaxis**
Jaimie Zhu, 17, Senior, Fairview High School, Boulder, Colorado
- CH049 Gas Phase Ion Chemistry and Ion Mobility of Pharmaceutical Substances in Counterfeit Formulations: Technology for Measurement and Confidence of Detection**
Jeongmin Lee, 16, Junior, Las Cruces High School, Las Cruces, New Mexico
- CH050 Reduction of Toxic Levels of Cadmium Uptake in Tomato Roots and Shoots**
Shane Flanagan, 17, Junior, Castle High School, Newburgh, Indiana
- CH051 Dendritic Crystallization of Salts**
Theresa Zeisner, 14, Sophomore, Okumenisches Gymnasium, Bremen, Germany
- CH052 The Synthesis of Thiophene Derived Conductive Copolymer and the Analysis of the Properties of Electrochromic Devices**
Busra Ban, 18, Senior, Cakabey Schools, Izmir, Turkey
- CH053 New Approach to the Block Synthesis of Alginate Fragments: The Molecular Geometry and Stereo Selectivity of the Mannuronoyl Donors**
Ekaterina Kutsenok, 17, Senior, Moscow Chemical Lyceum No. 1303, Moscow, Russian Federation
- CH054 Biomass to Biofuels: An Economic Study**
Rachel Marie Baker, 15, Sophomore, Camden Central High School, Camden, Tennessee
- CH055 Supramolecular Host-Guest Complexes as Fluorescent Markers in Tumor Diagnostics**
Gabriel Salg, 14, Senior, Hanns-Seidel-Gymnasium Hosbach, Hoesbach, Germany
- CH056 Graphene Oxide and Reduced Graphene Oxide Coated Nafion Membranes for Enhanced Performance in Hydrogen Fuel Cells**
Cameron Akker, 17, Senior, Redmond High School, Redmond, Washington
- CH301 Synthesis of Periodic Mesoporous Organosilicas (PMOs) for Radiotherapeutic and Chemotherapeutic Treatments**
Alicia Danielle DSouza, 16, Junior
Jessica Hong, 16, Junior
Plano East Senior High School, Plano, Texas
Plano Senior High School, Plano, Texas
- CH302 A Characterization of Ultrastable Silver Nanoparticles**
Aysha Kinjo Demeler, 18, Senior
Blanca Isabella Hernandez Uribe, 17, Junior
Health Careers High School, San Antonio, Texas
- CH303 On the Synthesis and Predictive Modeling of Thermostable Pigments Utilizing Silica Extracted from Rice Husk Biowastes**
Caroline Fang Gao, 16, Junior
Lily Xu, 16, Junior
Susan Xu, 16, Junior
Plano West Senior High School, Plano, Texas
Liberal Arts and Science Academy High School, Austin, Texas
Kingwood High School, Kingwood, Texas
- CH304 Crystal Formation on Collagenous Gelatins: Effects of Carboxylation and pH on Rates and Polymorphs of Calcium Carbonates**
Meredith Ellen Dove, 17, Junior
Keena K. Shang, 17, Junior
Blacksburg High School, Blacksburg, Virginia
- CH305 Mechanism of Chinese Silver Staining Diagnosis and Its Application as Rapid Test for Chronic Renal Failure**
Tai Hei Chan, 18, Senior
Er Hai Fang, 17, Senior
King's College, Hong Kong, China, Hong Kong Special Administrative Region
- CH306 Development of a Simplified Separation and Identification Method of Metallic Ions by Using High Voltage Ionic Migration**
Yuta Fujisawa, 17, Junior
Iori Kai, 17, Junior
Eika Kudo, 16, Sophomore
Oita Uenogaoka High School, Oita, Japan
- CH307 Greener, More Efficient Synthesis of a Medicinally Applicable 1,2,3-triazole Derivative**
Sofie Miihyun Hostrup Kim, 16, Junior
Jacob William Levy, 17, Junior
Breck School, Golden Valley, Minnesota
- CH308 Biofuel from Tree Fungus**
Priyal Parbat Varsani, 15, Freshman
Davyani Kunvarji Vasta, 15, Sophomore
Shree Cutchi Leva Patel Samaj School, Nairobi, Kenya

- CH309 A Unique Kit for Detection and Removal of Pesticides from Fruits and Vegetables**
Kopal Gupta, 16, Junior
Shreya Nandy, 16, Junior
Amity International School, Mayur Vihar, New Delhi, India
- CH310 Manufacture and Design of a Grating-Based Low Density Polyethylene and Urea Formaldehyde Obtained from Human Urine**
Tania Lizbeth Cortes García, 17, Senior
Montserrat Escarcega Ramirez, 18, Senior
Andres Lopez Carrasco, 17, Senior
Escuela Preparatoria Oficial No. 19, San Martián de las Piraimides, Mexico
- CH311 High Energy Density Anode Electrode for Sodium-Ion Batteries Variability from Lithium-Ion Batteries Energy Efficiencies**
Roshan Duggineni, 16, Sophomore
Rishi Jonnala, 16, Junior
duPont Manual High School, Louisville, Kentucky
- CH312 Recycling Sugary Remnants to Produce Ethanol**
Abdulaziz Fadala Al-Sulaiti, 16, Junior
Majid Abdulrasheed E.Ahmednooh, 16, Junior
Abdulaziz Abdulla Shams, 16, Junior
Qatar Technical, Doha, Qatar
- CH313 The Synthesis and Oil Absorption Properties of Hydrophobic Silica-Based Aerogels by Varying Methods of Functionalization**
Caroline Gellene, 17, Senior
Ashleigh Grace Wright, 17, Senior
The Governor's School, Manassas, Virginia
- CH314 From Factories Waste to Fertilizer: Producing Ammonium Sulfate from Gypsum and Fluorosilicic Acid**
Phuong Linh Tran Nguyen, 17, Senior
Dat Thanh Nguyen, 15, Sophomore
Tung Thanh Nguyen, 15, Sophomore
Xuan Hoa High School, Vinh Phuc, Viet Nam
- CH315 Multiple Chemical Generator**
Janvi Jiten Pabari, 13, Freshman
Nishta Amrishi Patel, 13, Freshman
Jalaram Academy, Kisumu, Kenya
- CH316 The Use of Bacteria from Soil of Sweihan Area to Clean up Wastewater**
Mohammed Ali Almazrouei, 16, Junior
Mohammed Mubarak Almehiri, 16, Junior
Khalifa Saleh Almheiri, 16, Junior
Sweihan School, Al Ain, United Arab Emirates
- CH317 Design of Novel Poly(oximinoalkyl) Amines and their Applications in Catalysis**
Daniil Patrikovich Agababayan, 16, Sophomore
Valentin Sergeevich Dorokhov, 17, Junior
Moscow Chemical Lyceum No. 1303, Moscow, Russian Federation

Computer Science

- CS001 Computational Simulation of T1 Contrast in BOLD-fMRI Scans to Improve Analysis Potential**
Aqib Javid Momin, 18, Senior, Rockdale Magnet School for Science and Technology, Conyers, Georgia
- CS002 How Do Different Factors Affect the Accuracy of Neural Networks in the Binary Decision Making of Cancer Detection?**
Lucas Ince, 17, Senior, Lakeville North High School, Lakeville, Minnesota
- CS003 The PART* Program: Improving Emergency Response Times (Police and Ambulances Regulating Traffic)**
Viney Kumar, 15, Sophomore, Knox Grammar School, Sydney, Australia
- CS004 Chemistry X10: Educational App with Problem Solver**
Pavel Batsylev, 17, Junior, School No.3, Starye Dorogi, Starye Dorogi, Belarus
- CS005 SNAP: A Novel Algorithm for Fast Global Sequence Alignment and Database Search**
Venkatesh S Sivaraman, 15, Sophomore, Caddo Parish Magnet High School, Shreveport, Louisiana
- CS006 Pi to Share: Utilizing the Raspberry Pi as a Home File Server**
Connor Joshua Cunningham, 15, Sophomore, Vici High School, Vici, Oklahoma
- CS007 Developing Automatic Music Transcription Software**
Michael John Menart, 17, Junior, Carroll High School, Dayton, Ohio
- CS008 Brownian Motion as a Source of Entropy for the Generation of Random Numbers**
Russell Ean Bryan, 18, Senior, Arkansas School for Mathematics, Sciences and the Arts, Hot Springs, Arkansas
- CS009 RNNScan: Eukaryotic Gene Finding via Hybrid Recurrent Neural Networks**
Anand Srinivasan, 17, Senior, Roswell High School, Roswell, Georgia
- CS010 FlyPy: Embedding a Compiled Language into an Interpreted One to Get Maximum Performance**
Dumitru Savva, 17, Junior, "Orizont" Lyceum, Chisinau, Republic of Moldova
- CS011 A Novel Method for Melanoma Skin Cancer Diagnosis at an Early Stage Using ANN and DNA Analysis**
Alaa Amri, 17, Junior, Pioneer High School of Gabes, Gabes, Tunisia
- CS012 Using Artificial Intelligence and Computer Vision in Creating an Operating System for Head-Mounted Displays**
Nebras Nabil Jemel, 17, Senior, Pioneer High School of Gabes, Gabes, Tunisia
- CS013 An Iterative Model for Developing Network-on-Chip (NoC) Architectures**
Anusha Pai, 16, Junior, Westview High School, Portland, Oregon
- CS014 Design and Engineering of a User-Centric Information System to Streamline Communication between Students and Their Teachers**
Milo McSherry Webster, 17, Senior, West Linn High School, West Linn, Oregon
- CS015 Detecting Heart Disease Faster**
Jiacheng Jason He, 16, Senior, Texas Academy of Mathematics and Science, Denton, Texas
- CS016 A New Optical Computing Method with Combination of Colored Lights Realizing Balanced Ternary Computation**
Yue Yao, 16, Junior, High School Affiliated to Shanghai Jiao Tong University, JiaDing Campus, Shanghai, China
- CS017 A Novel Implementation of Image Processing and Machine Learning for the Early Diagnosis of Melanoma**
Elizabeth Zhao, 17, Senior, Jesuit High School, Portland, Oregon
- CS018 Analyzing and Preventing Quick Response Code-based Malware and Phishing Attacks for Smartphones**
Alisha Saxena, 17, Senior, Interlake High School, Bellevue, Washington
- CS019 Panthera: A Study of Caching in Distributed Systems**
Dhairat Nitin Pandya, 16, Junior, Appleton North High School, Appleton, Wisconsin
- CS020 Detecting the Structure of Videos by Extracting Features from Time Series User Interaction Data**
Hiromu Yakura, 17, Junior, Nada Senior High School, Kobe, Japan
- CS021 Can the Mind and Body Be Trained Using Virtual Reality?**
Nicholas Charles McClure, 18, Senior, Ballard High School, Louisville, Kentucky
- CS022 "PACEBYTE": A Research Engine Based on Automated Summarization**
Abhishek Mitra, 16, Junior, National Public School - HSR, Bangalore, India
- CS023 Artificial Intelligence Sense for the Blind to Play Video Games using Their Tongue**
Liyanadura Nipun Kavishka Silva, 15, Junior, De Mazenod College, Kandana, Sri Lanka
- CS024 Winning Craps**
Jacob Ray Alford, 18, Senior, Grants High School, Grants, New Mexico
- CS025 Diagnosis of Abnormalities in 3-Dimensional Mammograms via an Artificial Neural Network**
Joshua Michael Zweig, 17, Senior, Commack High School, Commack, New York
- CS026 Automated American Sign Language Translation: Identifying the Handshape Component of American Sign Language Using a 3D-camera and Handtracking Middleware Library to Create a Basis for an Automated Sign Translator**
Hannah Margaret Devinney, 18, Senior, Loudoun County Academy of Science, Sterling, Virginia
- CS027 A User-friendly Computer Program Implementation of the RSA Public-key Encryption Algorithm in Python 3.3**
Yun Ha Seo, 17, Senior, Tinian Junior Senior High School, Tinian, Northern Mariana Islands
- CS028 Manipulated "Holograms": Fantastic Becomes Real**
Oleksandr Loyko, 17, Junior, Kyiv Gymnasium #48, Kyiv, Ukraine
- CS029 3D Education World: Learning, Motivation, Communication**
Victor Dorokhin, 17, Junior, Alushta Public School #2, Alushta, Ukraine
- CS030 A Novel Method for Determination of Camera Pose Estimation Based on Angle Constraints**
Hunter Park, 18, Senior, Wentzville Holt High School, Wentzville, Missouri
- CS031 Train the Artificial Brain II: Computer-Aided Diagnosis and Treatment Plan of Alzheimer's Disease using Neural Networks**
Roma Vivek Pradhan, 17, Senior, Friendswood High School, Friendswood, Texas
- CS032 iClick: The Development of a Vision-Based Virtual Mouse**
Selena Chun Feng, 15, Sophomore, Albemarle High School, Charlottesville, Virginia
- CS033 A Novel Computational Agent-Based Model for the Outbreak, Spread, and Containment of Tuberculosis**
Parth Chopra, 17, Senior, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia
- CS034 Secure Data Encryption Algorithm**
David Andrew Kravets, 14, Freshman, Chesapeake Science Point Public Charter School, Hanover, Maryland

- CS035 Design and Performance Analysis of Optimization Algorithms for Efficient Cryptographic Processing in Secure Internet Routing Protocol**
Vinay K. Sriram, 18, Senior, Poolesville High School, Poolesville, Maryland
- CS036 A Novel Filter for Tracking Trends in Noisy Real-Time Data**
Michael William Litt, 14, Freshman, Orange High School, Pepper Pike, Ohio
- CS037 Development of a Novel Machine Learning Algorithm to Monitor Vascular Tissue Transfers Using Speech Recognition Techniques**
Ariel Benjamin Kanevsky, 16, Junior, Ossining High School, Ossining, New York
- CS038 Come Code with Codester: A Novel Educational App that Teaches Computer Science**
Gili Rusak, 17, Junior, Shaker High School, Latham, New York
- CS039 Save Real Objects as Files**
Bimba Shrestha, 16, Junior, Maharishi School of the Age of Enlightenment, Fairfield, Iowa
- CS040 Optimizing Digital Content for Color-Blind Audiences Using Enhancement Algorithms**
Animesh Tripathi, 17, Senior, Sanskriti School, New Delhi, India
- CS041 A Novel Approach to Biometric Identification Using an Iris Scanner**
Sophia Demetriou, 18, Senior, Selly Park Secondary Convent, Rustenburg, South Africa
- CS042 Cost-Effective Interactive Augmented Reality Table**
Cher Yeoh, 16, Junior, Chengdu International School, Chengdu, China
- CS043 Plantation Improvement Simulator**
Juyeong Jeong, 17, Senior, Hwawon High School, Daegu, South Korea
- CS044 Android2Mouse**
Arseny Kirillovich Nerinovsky, 17, Freshman, Peterhof Gymnasium of Emperor Alexander II, Saint-Petersbourg, Russian Federation
- CS045 Using the Fractal Dimension to Diagnose Cancer**
Nataliya A. Koryavka, 16, Sophomore, Municipal Budget Educational Institution "Lyceum No 3", Sarov, Russian Federation
- CS046 What's Your Problem? Automatically Summarizing Scientific Research with Open Problems**
Cassidy Laidlaw, 17, Senior, Barrington High School, Barrington, Rhode Island
- CS047 Evolving Quantum Gomoku Engines**
Guochuan Zhang, 15, Sophomore, Lane Technical College Prep High School, Chicago, Illinois
- CS048 Game for Visually Impaired with 3D-Sound**
Joonsung Kim, 15, Sophomore, Korea Digital Media High School, Ansan-si, South Korea
- CS049 Real-time Poll System Using Cumulative Voting System**
Ji-Seok Ryu, 14, Freshman, Incheon Chung-ryang Middle School, Incheon, South Korea
- CS050 Parallel Sorting Algorithms in C Using Open Multi-Processing**
Nathaniel Zietlow, 16, Sophomore, Quest Charter Academy High School, Peoria, Illinois
- CS051 Comparison of Common Linear Pseudorandom Number Generators**
Sarah Molly Schwartz, 15, Sophomore, duPont Manual High School, Louisville, Kentucky
- CS052 Differential Evolution and Homes for Hubs**
Chi Lan Cao, 14, Freshman, Baton Rouge Magnet High School, Baton Rouge, Louisiana
- CS053 Indoor Navigation with Maximum Likelihood Classification of Wi-Fi Fingerprints**
Noah Christian Pritt, 17, Junior, Pritt Home School, Walkersville, Maryland
- CS054 An Enhanced Method for Fusing Multiple Exposure Images for High Dynamic Range Scenes**
Jihyeon (Janel) Lee, 16, Junior, Amador Valley High School, Pleasanton, California
- CS055 Modifying the One-Time Pad Cryptosystem for Practical Use**
Gavin Rees, 14, Freshman, Germantown Academy, Fort Washington, Pennsylvania
- CS056 Coordinate Descent in Two Dimensions for Protein Loop Closure**
Justin Yat-Fung Wong, 17, Junior, Germantown Academy, Fort Washington, Pennsylvania
- CS057 Fuzzy Logic Based Web Browser for the Motor Impaired**
Suvir Prakash Mirchandani, 14, Freshman, Fox Chapel Area Senior High School, Pittsburgh, Pennsylvania
- CS058 HyperCalc: A Free Multi-Platform Conversion and Calculation Application**
Logan Alexander Apple, 14, Freshman, Millbrook High School, Winchester, Virginia
- CS059 iSPI: Integrated System for Pest Identification**
Ben Friesen, 15, Sophomore, Grimsby Secondary School, Grimsby, Canada
- CS060 Tw-Lexa: A Novel Multifactor Social Media Analysis Algorithm**
Daniel Mogilny, 15, Freshman, Holy Trinity School, Richmond Hill, Canada
- CS061 MobileSoundDiscoveryApp: Mobile Audio Medical Devices and Quantitative-Qualitative Audio Analysis Applications and Designs Using an Autonomous Audio Knowledge Engine**
Ryan Chung, 17, Senior, Terre Haute South Vigo High School, Terre Haute, Indiana
- CS062 Predicting Cancer Drug Response Using Nuclear Norm Multi-Task Learning**
Ivan Paskov, 18, Senior, Edgemont High School, Scarsdale, New York
- CS063 SocialGrid: Utilising Power of Social Networks for Distributed Computing**
Aleksandr Goncharov, 17, Junior, Laboratory of Continuous Mathematical Education, Saint-Petersburg, Russian Federation
- CS064 Artificial Intelligence: Evolution and Genetic Algorithms**
Pavel Madaj, 18, Junior, Gymnazium V. B. Nedozerskeho, Prievidza, Slovakia
- CS065 Search Engine to Map FDA Approved Drugs to Diseases Based on Microarray Data Mined from GEO**
Axel Stephan Feldmann, 17, Junior, Hunter College High School, New York, New York
- CS066 Eye Detection and Tracking-Based Communication System for Tetraplegia Patients**
Abdullah Asem, 17, Senior, Dar Heraa Islamic Private School, Assiut, Egypt
- CS067 myEyeAssistant: Using Computer Vision to Create a Smart Camera Based Navigation System**
Chuanbo Pan, 16, Junior, North Oconee High School, Bogart, Georgia
- CS068 Optimizing Computing Power in Predicting an Individual's Response to Certain Toxins**
Grace Anne Ganzel, 18, Senior, Huron High School, Ann Arbor, Michigan
- CS069 Object Recognition for the Visually Impaired: Utilization of 3D Sensor Technology to Help the Blind "See"**
Arjun Kundan Dhawan, 14, Freshman, Castle High School, Newburgh, Indiana
- CS070 Algorithm for Machine Reading**
Axel Wilhelm Linnert Ericsson, 18, Senior, Viktor Rydbergs Gymnasium Odenplan, Stockholm, Sweden

- CS071 Potential for Learning and Memory in Evolutionary Robotics**
Gailin Pease, 17, Senior, Burlington High School, Burlington, Vermont
- CS072 Improving the Efficiency of Mobile Ad Hoc Network through Optimization of Inter-frame Space Values**
Yeongwoo Hwang, 17, Senior, Arkansas School for Mathematics, Sciences and the Arts, Hot Springs, Arkansas
- CS073 Semantic Multilayer SVM: Novel Artificial Intelligence Applied to Prostate Cancer Grading and Breast Cancer Diagnosis**
William C. Hang, 16, Junior, Scripps Ranch High School, San Diego, California
- CS074 Indium: Using Novel Machine Learning Algorithms to Develop a Nondisease-specific Personalized Medicine Engine**
Yousuf Mounir Soliman, 17, Senior, Canyon Crest Academy, San Diego, California
- CS075 High Dimensional Clustering Algorithms Applied to Face Recognition of Obscured Faces**
Kalyani Ramadurgam, 15, Freshman, Torrey Pines High School, San Diego, California
- CS076 A Novel Eye Blinking Based HCI with Statistical Prediction for Wearable Computing**
Jenny Lynn Wang, 16, Junior, North Carolina School of Science and Mathematics, Durham, North Carolina
- CS077 Three Dimensional Imaging in a Two Dimensional Domain without the Use of 3-D or Special Glasses: An Experiment to Determine if Increasing Switching Speeds and Vertical Displacement between Alternating Stereoscopic Images Will Further Enhance 3-D Depth Perception.**
Frank X. Baleno, 15, Freshman, Wilde Lake High School, Columbia, Maryland
- CS078 A Novel Approach to Genetic Interaction Research with an Integrated Repository of Gene Regulatory Networks**
Shrey Gupta, 17, Junior, BASIS Scottsdale, Scottsdale, Arizona
- CS079 A Lattice Boltzmann Method Based Computational Model for Optimizing Anode Morphologies to Design Efficient Li-ion Batteries**
Varun Krish Mohan, 17, Senior, The Harker School, San Jose, California
- CS080 Determining Optimal Police Patrol Times and Locations Using Local Search Techniques**
Vivek Naresh Miglani, 16, Junior, Marjory Stoneman Douglas High School, Parkland, Florida
- CS081 Procedural Generation of Earth-Like Planets**
Owen R. Kelly, 18, Senior, Spruce Creek High School, Port Orange, Florida
- CS082 Identifying Pollen Cells Using Computer Analysis: An Aid for Allergists, Immunologists, and Other Health Care Specialists**
Adam Clayton Staszewski, 17, Junior, John Adams High School, South Bend, Indiana
- CS083 Enabling Robots to Navigate Complex Environments through the Use of a Learning AI Algorithm**
Anthony Thomas Olive, 17, Junior, Palm Beach Central High School, Wellington, Florida
- CS084 Voice Integrated Development Environment for People Who Are Blind, Myopia Affected or Have RSI**
Diana Marusic, 16, Sophomore, Theoretical Lyceum "Ion Creanga", Chisinau, Republic of Moldova
- CS085 Conway's Labyrinth**
Jessica Lackas, 14, Senior, Max-Planck-Gymnasium, Saarlouis, Germany
- CS086 Talking Keyboard for the Blind**
Layan Amer, 14, Freshman, Abe-Salma Alkarmi, Tulkarm, Palestine
- CS301 Variable Neighborhood Search for the Partition Graph Coloring Problem**
Lorenz Leutgeb, 19, Senior
Moritz Wanzenbock, 19, Senior
Hohere Technische Lehranstalt Wien Ottakring, Vienna, Austria
- CS302 Design of an Optimum Switch Block for FPGA**
Yuan-Hung Kuan, 17, Junior
Hung-Kuan Yen, 17, Junior
Taipei Municipal Jianguo High School, Taipei, Chinese Taipei
- CS303 HeartBook & SmartHelper**
Yiu Ting Ho, 16, Junior
Oi Ching Poon, 16, Junior
Shun Tak Fraternal Association Yung Yau College, Hong Kong, China, Hong Kong Special Administrative Region
- CS304 A New Secure Distributed Storage System for Cloud: Mathematical Framework, Design and Applications**
Chih Wei Tan, 17, Senior
Pui Ching Middle School, Macau, Macau, China, Macao Special Administrative Region
- CS305 Trailblazer: Cooperative, Infrastructure-Independent Generation of Indoor Floor Maps using Handheld Android Mobile Devices**
Sanjay Kannan, 17, Senior
Elish Mahajan, 18, Senior
Andrew Zhou, 18, Senior
Raleigh Charter High School, Raleigh, North Carolina
- CS306 Eye of the Storm**
Jagath Jai Kumar, 15, Sophomore
Paul Amedee Maurais, 17, Senior
Hopedale Junior-Senior High School, Hopedale, Massachusetts
- CS307 Turn Your Standard Screen in to a Touch Screen**
Joseph Andre Centurion Torres, 14, Freshman
Bruno Ernesto Esquivel Trujillo, 15, Freshman
San Luis, Ilo, Peru
- CS308 Ally: A Novel Approach to Online Password Generation**
Kgothatso Molemi, 17, Senior
Thapelo Nthite, 17, Senior
Lebone II College, Phokeng, South Africa
- CS309 Automated Digital Comics Reading System Based on Image Processing**
Dahyun Kang, 16, Senior
Jaeyoon Kim, 18, Senior
Korea Science Academy of KAIST, Busan, South Korea
- CS310 Translator of Gestures: Human Interface Software**
Anna Dmitrievna Kustareva, 17, Junior
Maxim Alexeevich Sokolov, 17, Junior
Municipal Budget Educational Institution "Lyceum No.165", Nizhny Novgorod, Russian Federation
- CS311 Laser 3D Scanner**
Maksim Khivintsev, 16, Sophomore
Daniil Velovaty, 16, Sophomore
Municipal Budget Educational Establishment of Novosibirsk "Gymnasium No.1", Novosibirsk, Russian Federation
- CS312 Physics Interactive Materials Program**
Sarhad Soran Ahmed, 17, Junior
Raman Obaid Ahmed, 17, Junior
Mohammed Talib Hassan, 17, Junior
Private Salahaddin Ayyubi College, Sulaimania, Iraq
- CS313 Mammography Image Analysis to Ease Detection of Micro Calcification**
Prachatos Mitra, 18, Senior
Shailpik Roy, 18, Senior
South Point High School, Kolkata, India
- CS314 Voice Recognition Based Elections Voting System for Blind**
Nouran Mohamed Mohsen, 15, Sophomore
Enas Mohamed Safwat, 16, Sophomore
El-Gamaa Secondary School, Assiut, Egypt

- CS315 Rocket Application**
 # Gilbert Bustros, 17, Freshman
 # Hicham Nasr, 18, Freshman
 Antonine Sisters School, Roumieh, Lebanon
- CS316 A New General Method of Relational Heuristics Utilizing Agent-Based Collective Intelligence**
 Brian Charles Fitzgerald, 16, Junior
 # # # Conner Thomas Ruhl, 16, Senior
 The Governor French Academy, Belleville, Illinois
- CS317 The Mind: Graphics and Physics Hybrid Engine for Video Games**
 Juan David Quintero, 18, Junior
 David Restrepo, 17, Junior
 Liceo Francisco Restrepo Molina, Envigado, Colombia
- CS318 4+1**
 Francesca Banchiero, 17, Senior
 Alessandra Papa, 18, Freshman
 Margherita Pinna, 19, Senior
 ITIS "Michele Giua", Cagliari, Italy
- CS319 A Heart-Rate-Controlled Animated Exercise Trainer Using Neural-Network-Based Adaptive Control**
 Thitaree Tanprasert, 17, Junior
 Teerapaun Tanprasert, 14, Freshman
 Samsenwittayalai School, Bangkok, Thailand
- CS320 Programming an Adaptive Artificial Intelligence Utilizing Neural Networks and the Monte Carlo Tree Search Method**
 Rush Vincent Hoehne, 16, Junior
 Larry David Lane III, 17, Junior
 Trenton Dean Lawrence, 16, Junior
 Delavan High School CUSD 703, Delavan, Illinois
- CS321 Programming Independence Evolution**
 Nghi Lam Dinh, 17, Senior
 Minh Cuong Vu Pham, 15, Sophomore
 High School for Gifted Students, Hanoi University of Science,
 Vietnam National University, Hanoi, Viet Nam
- CS322 Are You Smarter than a Sentry Gun?: An Investigation of Motion Tracking**
 Sven Jandura, 17, Junior
 William R. Sidley-Parker, 16, Sophomore
 Jovan Y. Zhang, 16, Sophomore
 Los Alamos High School, Los Alamos, New Mexico
- CS323 Predicting Epileptic Seizures Using an Android™ Application**
 Maria Magdelene D'Azevedo, 18, Senior
 William Isaac MacGillivray Mason, 17, Senior
 Oak Ridge High School, Oak Ridge, Tennessee
- CS324 Environment for Probabilistic Amino Acid Analysis**
 Ilya Borovitinov, 17, Junior
 Michael Shtephan, 16, Junior
 Lyceum 1533 of Information Technologies, Moscow,
 Russian Federation

Earth & Planetary Sciences

- EA001 Lunar Tide Contribution to Thermosphere Weather**
Jesse Tan Zhang, 16, Junior, Fairview High School, Boulder, Colorado
- EA002 Comparison of Evaporation Rates from Mine Lakes to the Transpiration Rates from Previous Plant Life**
Timothy J. Lillo, 17, Junior, South Sumter High School, Bushnell, Florida
- EA003 The "Wisdom" of the Ancient Insects**
Tong Fu, 16, Sophomore, The High School Affiliated to Renmin University of China, Beijing, China
- EA004 Pleistocene Rancholabrean Large Mammalian Fauna from Aransas River, San Patricio County, Texas**
Lauren Monet Hall, 15, Sophomore, School of Science and Technology, Corpus Christi, Texas
- EA005 Increase in Tropical Cyclone Intensity and Ocean Subsurface Warming in the Western North Pacific Ocean**
Yu-Hsin Chen, 17, Senior, Taipei First Girls High School, Taipei, Chinese Taipei
- EA006 Tidal Rhythms Recorded in Precambrian Banded Iron Formations**
Chinami Motomatsu, 18, Senior, Chiba Prefectural Yakuendai Senior High School, Funabashi-City, Japan
- EA007 Data Sonification with the Seismic Signature of Ocean Surf**
Yongpeng Tang, 17, Senior, Smithtown High School East, St. James, New York
- EA008 Tsunami Mitigation as a Function of Alterations in Bottom Friction**
Naomi Benson, 17, Junior, Deerfield High School, Deerfield, Illinois
- EA009 Comparison between Pleistocene Horse (*Equus*, *Perissodactyla*) Populations from Sonora, Mexico and Rancho La Brea, Southern California and Testing Bergmann's Rule using Second Phalanges**
Zeeshan Jawaid, 14, Sophomore, Carpe Diem Collegiate High School, Yuma, Arizona
- EA010 An Optimized Analysis of Wind Flows in the Urban Environment and the Identification of Feasible Building Augmented Wind Turbine Sites**
Ben Ross, 17, Senior, Ossining High School, Ossining, New York
- EA011 Development of a Cost-Effective Flowable Fill Material for the Stabilization of Underground Cavities**
Chase Kicker, 17, Senior, Carlsbad High School, Carlsbad, New Mexico
- EA012 Using an Underwater Trench to Limit the Energy of a Tsunami**
Boyd Robert Kane, 16, Sophomore, Bishops (Diocesan College), Cape Town, South Africa
- EA013 Factors that Affect the Accuracy of 3-Dimensional Acoustic Locating for Sound Emitting Objects**
Maria Zakharova, 19, Senior, International School of Stavanger, Stavanger, Norway
- EA014 Early Warning System in Landslide Risk Areas**
Nalimary Gonzalez, 14, Freshman, Abelardo Diaz Alfaro, Toa Alta, Puerto Rico
- EA015 Geographic Belts for Hurricane Landfall Location Prediction**
William Wu, 17, Senior, Clear Lake High School, Houston, Texas
- EA301 The Oldest Coast Redwoods from the Middle Jurassic of North China and Its Environmental Significance**
Xiwei Ma, 15, Sophomore
Zhongtian Qiao, 16, Sophomore
The Experimental High School Attached to Beijing Normal University, Beijing, China
- EA302 Is Turbidite Deposited as Textbook Explains? Deposition of Turbidite Beds Analyzed by Diatom Fossils and Mud Contents**
Toshimi Hoshina, 17, Junior
Hinako Sakai, 17, Junior
Sae Sugahara, 17, Junior
Niigata Chuo High School, Niigata, Japan
- EA303 Secrets of San Lorenzo Valley's Atmosphere: Vertical Meteorological Measurements, Part Two**
Natalie Rose Gallagher, 16, Junior
Connor B. Lydon, 17, Junior
San Lorenzo Valley High School, Felton, California
- EA304 Hurricanes and Ocean Temperature**
Caroline Morris, 18, Senior
Mary Claire Morris, 17, Junior
Henry W. Grady High School, Atlanta, Georgia

Electrical and Mechanical Engineering

- EE001 The Helping Hand**
Michael Sabry Saber Farid, 14, Freshman, McMillen High School, Murphy, Texas
- EE002 Two Transistor Ternary Random Access Memory**
Simon Peter Tsaoussis, 16, Sophomore, Christopher Columbus High School, Miami, Florida
- EE003 Vertical Axis Wind Turbine Farm Configuration Efficiency Based on Schools of Fish in Nature**
Yenny Dieguez, 16, Sophomore, Miami Lakes Educational Center, Miami Lakes, Florida
- EE004 Applying Directional Antennas to the Field of Emergency Communications: A Comparative Performance Analysis**
Griffin Nicolas Macris, 14, Freshman, New Prague High School, New Prague, Minnesota
- EE005 Dual Function Solar Converter/Solar Shade System Using 3-D Spidron Architecture**
Zoe Rochelle Barbeau, 16, Sophomore, Home School Program under St. Lucie County School District, Port St. Lucie, Florida
- EE006 Passive Auto-Tracking Heliostat**
Brayton Miles, 17, Junior, Niceville High School, Niceville, Florida
- EE007 Analysis and Design of Powered Exoskeleton Technology Emulating Human Body Functions**
Nicholas A. Hopkins, 17, Senior, Fort Walton Beach High School, Fort Walton Beach, Florida
- EE008 Concentrated Solar: Raising It to the Next Level**
Andrew Kenneth Noonan, 17, Junior, International Baccalaureate School at Bartow High School, Bartow, Florida
- EE009 The Varied Use of Membranes and Mediators to Enhance the Ionic and Electronic Conductivity of a Capacitor**
Swati Narasimhan, 16, Junior, Miami Killian Senior High School, Miami, Florida
- EE010 Swirlesque: A New Form of Gesture Based Human Computer Interaction**
Jake Coppinger, 16, Junior, Gungahlin College, Canberra, Australia
- EE011 Aircraft Propeller Noise Reduction Using Owl Feather Inspired Notching**
David Alexander Ferrill, Jr., 16, Sophomore, John Jay High School, San Antonio, Texas
- EE012 H.E.R.E. Hyperthermia Endangerment Recognition Equipment: A Study on the Prevention of Vehicular Hyperthermia, Phase Two**
Kelly Maria Shelts, 18, Senior, Bartlesville High School, Bartlesville, Oklahoma
- EE013 Engineering A Novel Autonomous Wheelchair System for the Visually-Impaired and Quadriplegic Individuals**
Brandon Kinard, 16, Junior, Mililani High School, Mililani, Hawaii
- EE014 Optimization of Blade Angle of Attack of a Low Speed Giromill Vertical Axis Wind Turbine**
Kyle L. Dockendorf, 17, Junior, Caddo Parish Magnet High School, Shreveport, Louisiana
- EE015 Manipulating the Center of Gravity in order to Reduce Rollover Rates in Sports Utility Vehicles**
Vasili Angelo Courialis, 15, Sophomore, Wiregrass Ranch High School, Wesley Chapel, Florida
- EE016 Poker Robot**
Donat Sandor Hegyesi, 18, Senior, Toth Arpad High School, Debrecen, Hungary
- EE017 Implementation of an FPGA Based Real-time Assistance System for Blinds**
Ghaith Allah Chebil, 17, Junior, Monastir Pioneer Junior Secondary School, monastir, Tunisia
- EE018 Principles of Electrowetting on Liquid Prism Beam-Steering Module**
Christopher Y. Shen, 17, Junior, Texas Academy of Mathematics and Science, Denton, Texas
- EE019 Analyzing the Effectiveness of Applying the Mathematical Fibonacci to Modern Solar Sequence Panel Design**
Spencer Ladd Kendall, 17, Freshman, Harmony School of Nature, Dallas, Texas
- EE020 The Design of Plate Fan Based on Photo Sensor**
Diming Xu, 19, Senior, Nanjing Jinling High School, Nanjing, China
- EE021 Parking Space Search and Vehicle Guidance Technology in Parking Lots with Quadrotor Unmanned Aerial Vehicle**
Jiayan Chen, 17, Senior, Shanghai High School, Xuhui District, China
- EE022 Anti-Rain Storm Traffic Risk Detecting, Revealing & Wireless Messaging System**
Donglin Yang, 15, Sophomore, Beijing No.80 High School, Beijing, China
- EE023 The Optical Imaging Remote Sensor that Captures Objects' Changing Movement**
Junxi Zheng, 16, Sophomore, Taizhou No. 1 High School, Taizhou, China
- EE024 Design and Engineering of an Innovative Wind Turbine Generator**
Rou-An Lai, 14, Freshman, Keelung Municipal Jian De Junior High School, Keelung, Chinese Taipei
- EE025 Personal Physiological Sensor Network Device**
Marek Novak, 19, Senior, Gymnazium, Ceske Budejovice, Jirovcova 8, Ceske Budejovice, Czech Republic
- EE026 VoltX 2.0: A Rescue Robot that Can Locate and Extract Victims**
Jason Jerome Sylvestre, 17, Senior, Benilde-St. Margaret's, St. Louis Park, Minnesota
- EE027 Hit Me with Your Best Shot: An Arduino Controlled Training Platform for Child Martial Artists**
Mary Hood, 15, Sophomore, Sargent High School, Monte Vista, Colorado
- EE028 VOICE-O-NATOR: An Aid for the Speech Impaired**
Amrit Sahu, 14, Freshman, Dav Public School, Bhubaneswar, Odisha, India
- EE029 Versatile Field Construction Machine for Paddy Cultivation**
Wijesuriya Arachchilage Namal Udara Piyasiri, 18, Senior, Bellankadawala Maha Vidyalaya, Thambuththegama, Sri Lanka
- EE030 A System for the Prevention of Vehicular Heatstroke**
Robert Joseph Myrick, 17, Senior, Sewanhaka High School, Floral Park, New York
- EE031 Breaking Point**
Danika Louw, 14, Freshman, Holy Spirit Catholic High School, Tuscaloosa, Alabama
- EE032 What Type of Wing Design Creates the Greatest Lift? "Dimpled Airfoil"**
Nathan Roy Martus, 16, Sophomore, Oakleaf High School, Orange Park, Florida
- EE033 Using a Double Droplet System to Create a Fast-Focusing Liquid Lens**
John L. Dean, 16, Junior, Scotia Glenville High School, Scotia, New York
- EE034 Pneumatic Electromyographic Exoskeleton**
Conor James Maddy, 17, Junior, Langley High School, McLean, Virginia
- EE035 The Hound**
Darrin Andrew McFall, 15, Freshman, Buffalo Island Central High School, Monette, Arkansas
- EE036 Developing a Cost Effective Solar-Powered Surgical Sterilization System**
Maileen Kozak, 16, Junior, Westfield High School, Westfield, Massachusetts

- EE037 Enhancing Target Efficiency of Laser by the Integration of a Stabilization System**
Nadim A. Bari, 18, Senior, Cass Technical High School, Detroit, Michigan
- EE038 Electronic Anti-Counterfeit Protection using a Pseudorandom Binary Sequence**
Daniel Jin, 16, Junior, Rochester Adams High School, Rochester Hills, Michigan
- EE039 Teachable Robotic Arm**
Mark Edward Landergeran, 17, Junior, Newburyport High School, Newburyport, Massachusetts
- EE040 Mobile Inverted Pendulum Testing Platform**
Taylor Boardman, 17, Junior, Delta High School, Delta, Utah
- EE041 Ambient Energy**
Pedro Gabriel Rivera, 16, Sophomore, Holy Cross School, New Orleans, Louisiana
- EE042 A Multi-Architectural Approach to the Development of Embedded Hardware**
George David Morgan, 16, Junior, Clovis North Educational Center, Fresno, California
- EE043 Wired on Nitinol: A Truly Green Energy Source**
Matthew T. Miller, 15, Sophomore, Rio Grande Enrichment Studies, Albuquerque, New Mexico
- EE044 The Intelligent Energy Saving Power Strip**
Neil Fair, 17, Junior, Pretoria Boys High School, Pretoria, South Africa
- EE045 A Vibrating Device to Assist Visually Impaired Athletes**
Jason Benjamin, 18, Senior, South Peninsula High School, Cape Town, South Africa
- EE046 Fone2Find**
John Neill, 16, Sophomore, Down High School, Downpatrick, Northern Ireland
- EE047 A Low Cost Parallel Parking Guidance System Using Ultrasonics**
Madison Alexis Nasteff, 17, Junior, Liberty High School, Liberty, Missouri
- EE048 More than a Feeling: A 3D Haptic Vest for the Visually Impaired**
Sean Alexander Benson, 17, Junior, Satsuma High School, Satsuma, Alabama
- EE049 Mideumi Weather Capsule**
Young-Woon Song, 17, Senior, Daegu Science High School, Daegu, South Korea
- EE050 Ultrasonic Atomizer**
Anastasiia Korovianskaia, 17, Junior, Municipal Educational Institution "Gymnasium No.5", Yubileyniy, Russian Federation
- EE051 Wind Generated by Moving Vehicles on the Highway as a Source of Electricity**
Ruben Edgardo Rodriguez, 15, Sophomore, Bonifacio Sanchez Jimenez, Aibonito, Puerto Rico
- EE052 A Better Solar Heater in the Form of a Triangular Pyramid**
Bianca Paola Inostroza, 15, Sophomore, Colegio San Antonio Abad, Humacao, Puerto Rico
- EE053 Implementation and Evaluation of a New Routing Algorithm for Networks on Chip**
Lukas Gernot Schwab, 16, Junior, Lincoln High School, Portland, Oregon
- EE054 DrownGuard: Automatic Drown Alarm for Lifeguards**
Dominic Blythe, 17, Senior, Nottingham High School, Nottingham, United Kingdom
- EE055 How Does the Aspect Ratio of a Wing Affect the Lift Per Unit Area of the Wing?**
Stefano Croatto, 18, Senior, International School of Stavanger, Stavanger, Norway
- EE056 Demonstration and Characterization of Split Ring Resonators as Terahertz Waveguides**
Brandon Cui, 16, Junior, Hillcrest High School, Midvale, Utah
- EE057 IoT (Internet of Things) Connected Air Quality Monitor to Detect and Measure Particulate Matter Concentration**
Anjali Vasisht, 14, Freshman, Olympia High School, Olympia, Washington
- EE058 Micro-pin-fin: A Uniform Temperature Heat Sink**
Itamar Jacob Allali, 17, Senior, Adlai E. Stevenson High School, Lincolnshire, Illinois
- EE059 Lamp Black Carbon Films: Supercapacitors of the Future**
Riddhi Kumar, 17, Junior, Claudia Taylor Ladybird Johnson High School, San Antonio, Texas
- EE060 Manipulating Poly (vinylidene fluoride) Films with a Human Bipedal Motion**
Rebecca P Kincart, 15, Sophomore, Episcopal School of Jacksonville, Jacksonville, Florida
- EE061 Electromagnetic Tire Propulsion System**
Alexander William Beall, 17, Junior, Brunswick High School, Brunswick, Maryland
- EE062 Re-Design of the Automatic CPAP Hose and Mask Washer**
Andrew Gregory Przyjemski, 17, Junior, Governor Mifflin High School, Shillington, Pennsylvania
- EE063 Nanofluid CPU Cooling: Novel Block Design**
Duncan Bayard Stothers, 16, Junior, St. George's School, Vancouver, Canada
- EE064 The Hollow Flashlights: Head and Hand**
Ann Stasia Makosinski, 16, Junior, Saint Michaels University School, Victoria, Canada
- EE065 The Leidenpump: A Non-Mechanical Means of Fluid Delivery**
John Chapman Alexander Caddell, 16, Sophomore, Stevenson School, Pebble Beach, California
- EE066 Autocool**
Johnny Sawma Awad, 17, Freshman, Antonine Sisters School/Ghazir, Ghazir, Lebanon
- EE067 Creating a Microcontroller-Based, Non-Invasive, Multi-Modal, Photoplethysmographic Monitor**
Adam Benjamin Snowden, 15, Freshman, Ponte Vedra High School, Ponte Vedra, Florida
- EE068 Solar Engine Applications II**
Sean Michael Loken, 16, Sophomore, Wishek High School, Wishek, North Dakota
- EE069 Power Struggle**
Ryan James Joyce, 18, Senior, Tioga High School, Tioga, North Dakota
- EE070 Harnessing Earth's Power through Recycled Materials**
Kinsey Potter, 15, Sophomore, Jackson County High School, Gainesboro, Tennessee
- EE071 An Integrated Software Platform for Intelligent, Autonomous Control of Hyper-Redundant Modular Robotic Systems using Simultaneous Localization and Mapping**
Puneeth Naga Sai Krishna Meruva, 16, Junior, Homestead High School, Fort Wayne, Indiana
- EE072 The Powerful Water**
Cullen Michael Domangue, 16, Junior, Terrebonne High School, Houma, Louisiana
- EE073 Sustainable Energy for Sustainable Water: Solar Heat Driven Desalinating System for Providing Clean and Safe Water for Rural Areas**
Vladislav Sevostianov, 16, Junior, Las Cruces High School, Las Cruces, New Mexico
- EE074 Generalized Decision Functions for Synthesis of Multi-level Logic Circuits Realized by Memristor Imply Gates**
Anika Raghuvanshi, 16, Junior, Jesuit High School, Portland, Oregon
- EE075 Parabolic Solar Water Heater for the Navajo Nation**
Deshna Larrensen Joe, 16, Sophomore, Navajo Preparatory School, Farmington, New Mexico

- EE076 An Artificial Neural Network for Controlled Force Augmentation in an Electromyographic Exoskeleton Arm**
Joshua Kopel Hellerstein, 17, Junior, Suncoast Community High School, Riviera Beach, Florida
- EE077 Surveillance and Spy Robot**
Syed Talal Wasim, 16, Junior, Aga Khan Higher Secondary School, Karimabad, Karachi, Pakistan
- EE078 An Innovative Approach to Improve Spin Polarization in Co₂FeAl_{0.5}Si_{0.5} Thin Films for Spin Transport Electronics**
Sarah Nicole Galvin, 18, Senior, Corona del Sol High School, Tempe, Arizona
- EE079 Hunka Hunka Hybrid Luv, Phase II: Design and Construction of a Multipurpose Scalable Power Electronics Module for Electric or Hybrid Electric Vehicles**
Drew Prevost, 16, Sophomore, Covenant Christian Academy, Huntsville, Alabama
- EE080 Efficient Systems in Solar Panels for CubeSat**
Yesica Maria Gomez, 17, Junior, Institucion Educativa Ciro Mendía sede Asuncion, Medellín, Colombia
- EE081 Unlock Anywhere**
Ethan James Anderson, 15, Sophomore, Fort Wayne Area Home School, Fort Wayne, Indiana
- EE082 Development of a Teleoperation Robot**
Mina Fahmi Fahmi, 16, Junior, Great Mills High School, Great Mills, Maryland
- EE083 Using Water to Heat a Solar Hogan**
Kelly Charley, 15, Freshman, Navajo Preparatory School, Farmington, New Mexico
- EE084 Comparative Analysis of Piezoelectric Windstalk Designs**
Eleanor Celia Fadely, 17, Senior, West Salem High School, Salem, Oregon
- EE085 Shoe Charger for Cell Phones: Generating Sufficient Battery Power through Everyday Walking**
Queenie Luo, 16, Junior, High Technology High School, Lincroft, New Jersey
- EE086 Constructing an Alternative MIPS Football Helmet Model to Limit Rotational Acceleration from Angular Impact**
Dylan Rossbach, 17, Junior, Hellgate High School, Missoula, Montana
- EE087 Wind Turbines for Developing Worlds**
Donely Antwan Gunn, 18, Senior, The Mississippi School for Mathematics and Science, Columbus, Mississippi
- EE088 Thermal Energy Storage: The Efficiency of Latent Heat Energy Storage using Phase Change Materials**
Julia Mariko Hirano, 15, Sophomore, Waimea High School, Waimea, Hawaii
- EE089 Single-Walled Carbon Nanotubes/Silicon Based Solar Cells**
Nimit Rajesh Gandhi, 16, Junior, Little Rock Central High School, Little Rock, Arkansas
- EE090 To Design and Manufacture a Device to Maximize the Performance of Rowers**
Conor Richard Foy, 17, Junior, Colaiste Chiarain, Limerick, Ireland
- EE091 TapioTrack Satellite Tracker**
Daniel Saul, 17, Senior, Sutton Grammar School, Sutton, United Kingdom
- EE092 The Engineering and Programming of a Novel Robotic Exoskeletal Joint Enhancement Apparatus**
Matthew Campagna, 17, Junior, Lancaster Catholic High School, Lancaster, Pennsylvania
- EE093 Cube Satellites: Miniature Satellite Design and Operations for Pulsed Plasma System Applications**
Matthew Hileman, 16, Sophomore, The Classical Academy, College Pathways, Colorado Springs, Colorado
- EE301 Easily Adjustable Dock System**
Nicholas Ryan Anderson, 17, Senior
Ronald Lwamba Kitoy, 18, Senior
Ryan Kupietz, 17, Senior
Shakopee High School, Shakopee, Minnesota
- EE302 ECO Brise: Comfort and Energy Efficiency for Ambiences**
Allyson Franklin Marinheiro Borges, 17, Junior
Caio Celso Azevedo da Silveira, 18, Junior
Joata Kesley Oliveira, 17, Junior
IFRN Campus Natal Zona Norte, Natal, Brazil
- EE303 Solid State Fan**
Eliot Lim, 17, Senior
Zhong Liang Ou Yang, 18, Senior
Shiyang Yu, 17, Senior
NUS High School of Mathematics and Science, Singapore, Singapore
- EE304 The Design Development of an Innovative Multi-Modal Device to Improve Hand Hygiene Rates in Health Care Facilities**
Ezra D. Grothe, 17, Senior
Richard N. Sather III, 15, Sophomore
Lincoln High School, Thief River Falls, Minnesota
- EE305 CORPOS: Orthopedic Posture Corrector**
Lucas Henz Garcia, 18, Senior
Lucas Raupp Hans, 18, Freshman
Murilo Machado Pinto, 18, Senior
Fundacao Escola Tecnica Liberato Salzano Vieira da Cunha, Novo Hamburgo, Brazil
- EE306 SIMDEV: Visually Impaired Home Monitoring System**
Leonardo Gabriel da Paz, 18, Senior
Lucas Manique Leal, 19, Senior
Fundacao Escola Tecnica Liberato Salzano Vieira da Cunha, Novo Hamburgo, Brazil
- EE307 Automated Point Design and Fabricator for Orthopedic Kirschner Pins**
Maria-Luisa Ortiz Torres, 18, Senior
Maria-Fernanda Ramirez Monge, 18, Senior
Colegio Tecnico Don Bosco, San Jose, Costa Rica
- EE308 GO-SENGON: Sengon Wood for Wind Turbine Blades**
Anisa' Anisa', 17, Senior
Edwin Luthfi Saputra, 18, Senior
State High School 10 of Malang, Malang, Indonesia
- EE309 Electromagnetic Energy Harvester to Power LEDs Illumination**
Dwi Indah Anggraini, 16, Junior
Gigih Setyawan, 18, Senior
Sma Negeri 1 Salatiga, Salatiga, Indonesia
- EE310 Barrier-Free Acoustic Magnetic Socket Parts**
Hin Chon Lei, 16, Sophomore
Soi Lam Wong, 17, Junior
Escola Tong Sin Tong, Macau, China, Macao Special Administrative Region
- EE311 Printable Anti-Tampering and Security E-Tag**
Yansangni Luo, 17, Junior
Yujie Ren, 17, Freshman
Ruihan Yang, 18, Freshman
Chengdu No. 7 High School, Si Chuan Chengdu, China
- EE312 Intelligent Road Signage and Traffic Monitoring System**
Paulo Andres Diaz_Hernandez, 20, Senior
Jose David Porras_Solano, 17, Senior
Colegio Tecnico Profesional Santa Lucia, Cartago, Costa Rica
- EE313 Efficient Plant-Based Solar Array**
Kyeong Jin Han, 16, Junior
Myung Won Oh, 16, Junior
Kyoung Min Woo, 17, Junior
Gyeongnam Science High School, Jinju, South Korea
- EE314 Ambulance Emergency Radio Intercept System [AERIS]**
Muhammad Shahradszman Bin Jalaluddin, 17, Junior
Syed Syamil Bin Syed Osman Abadi, 16, Junior
MARA Junior Science College Tun Dr. Ismail, Pontian, Pontian, Malaysia
- EE315 TBox: Tracking Box**
Andre Santos Ferreira, 17, Junior
Ricardo Martins Coelho Nunes, 18, Senior
Goncalo Goncalves Duarte Pires, 16, Senior
Oliveira do Bairro High School, Oliveira do Bairro, Portugal

- EE316 Safe Cooker**
Maram M.M. Altaradeh, 16, Junior
Iman A.K. Khamayseh, 16, Junior
Taffouh Girls High School, Hebron, Palestine
- EE317 Digital Sandwich: Tasty Terabytes**
Nikita Chernyadev, 17, Junior
Dmitry Khodebko, 17, Junior
Alexander Shkitilev, 17, Junior
Lyceum No.82, Nizhny Novgorod, Russian Federation
- EE318 Renovated Cane to Aid Indoor Travel for the Visually Impaired**
Amber Elizabeth Gibson, 18, Senior
Isaac Daniel Searcy, 18, Senior
Billy Dalton Smith, 17, Senior
Hewitt Trussville High School, Trussville, Alabama
- EE319 Sobreviviente (Survivor)**
Jose Ernesto Saucedo Lopez, 18, Senior
Felipe de Jesus Saucedo Lopez, 14, Freshman
Universidad Autonoma de Guadalajara, Zapopan, Mexico
Escuela Secundaria Tecnica #5, Mazatlan, Mexico
- EE320 Ice Bot: A Deep Sea Diving Apparatus**
Mirae Leigh Parker, 18, Senior
Ema Linnea Parker, 15, Sophomore
West High School, Salt Lake City, Utah
Wasatch Academy, Mount Pleasant, Utah
- EE321 FitVos: A Cost-effective, Open Source UAV Designed for Easy Construction**
Drex Bradshaw Beckman, 16, Sophomore
Logan Eastman, 16, Sophomore
Northern Utah Academy for Math Engineering and Science, Layton, Utah
- EE322 Magnetic Mayhem**
Robert Marc Seitz, 17, Junior
John Nelson Wieland, 17, Junior
Central High School, Aberdeen, South Dakota
- EE323 Safety Car Control System**
Saad Ammar Sabouba, 16, Junior
Ayman Emad Tafesh, 16, Junior
International Pioneer Academy, Amman, Jordan
- EE324 Educational Module Development Multiple Knowledge**
Jaqueline Beciez Bedolla, 18, Senior
Juan Carlos Carlos García Hernandez, 17, Senior
Centro de Bachillerato Tecnológico Industrial y de Servicios No. 260, Puebla, Mexico
- EE325 Development of Environment-Friendly Car Model that Generates Electric Energy**
Yousef Mohammed Al-Jabir, 16, Junior
Mina Botros, 17, Freshman
Ibrahim Ismail Kenawy, 16, Junior
Tariq Bin Ziyad Independent Secondary School, Doha, Qatar
- EE326 G-14: A New Kind of Multi-rotors**
Abdelaziz Ahmad Elmasry, 16, Junior
Fares Essam Helmy, 16, Sophomore
Elnasrya Boys School, Alexandria, Egypt
- EE327 Traffic Control System for the Blind**
Edi Peremobowei, 14, Senior
Victory Samuel, 14, Senior
Teto Model College, Yenagoa, Nigeria
- EE328 Building a Better Battery: A Prototypical Analysis Utilizing Carbon-Based Ultra-Capacitor Technology**
Kenyon Conlin, 17, Senior
Taylor Murdock, 17, Senior
Wasatch High School, Heber City, Utah
- EE329 Compressed Air Energy Storage**
Erik Rapheal Santini, 18, Senior
Matthew Wrubel, 19, Senior
Yorktown High School, Yorktown Heights, New York
- EE330 Development of a Muscle Rigidity Measurement System for an Early Diagnosis of Parkinson's Disease**
Hyeongkeun Lee, 17, Senior
Sangjin Yun, 17, Senior
Korea Science Academy of KAIST, Busan, South Korea
- EE331 Ascender Cleaner**
Ruqaiya Ali Alajmi, 14, Freshman
Doaa Nasser Almaqbali, 15, Freshman
Shahad Aadil Alshezawi, 14, Freshman
Alturaf Basic School, Sohar, Oman
- EE332 The Laser Harp-Inator**
Paul Boulet, 18, Senior
Andrew David Carlson, 17, Senior
Saint Peter's Academy, New Market, Alabama
- EE333 Efficiency Development of Air Boat Model Movement Using Angular Velocity Measure**
Issariya Boonjang, 18, Senior
Chaleampon Photeam, 18, Senior
Princess Chulabhorn's College Lopburi, Lopburi, Thailand
- EE334 Electronic Braille Display for the Visually Impaired**
Du Nam Nguyen, 17, Senior
Dieu Lien Thi Tran, 17, Junior
Le Hong Phong High School for the Gifted, Hanoi, Minh, Viet Nam
- EE335 Self-cleaning Solar Panels**
Fatima Muhayer Al Ketbi, 16, Junior
Eman Abdulrahman Al Marzooqi, 16, Junior
Rahaf Taher Albreiki, 15, Junior
Applied Technology High School-Al Ain-Girls, Al Ain, United Arab Emirates
- EE336 The Portable Wood-Splitter: Faster Chopping, Safer Felling**
Joshua Rikker, 14, Senior
Patrick Ziesel, 14, Senior
Jugend Forscht, Waiblingen, Germany
- EE337 Target Designation with Infrared Laser and Tracking System**
Mustafa Erdogan, 20, Senior
Omer Ozbekler, 19, Senior
Deniz Harp Okulu Komutanligi, Istanbul, Turkey
- EE338 Power Failure Solution**
Dauda Temitope Ibrahim, 18, Junior
Olufemi Samuel Salami, 18, Junior
Government Technical College, Lagos, Nigeria
- EE339 The Nona Piece**
Glory Uko Ibanga, 15, Junior
Jeffrey Ini-Abasi Jude, 14, Junior
Air Force Comprehensive School, Uyo, Nigeria
- EE340 Design and Construction of an Electronic Pest Control Device**
Elect Chinyere Nicholas, 15, Junior
Imelda Osaji, 15, Junior
Maryam Babangida Girls Science College, Minna, Nigeria

ENGINEERING: Materials & Bioengineering

- EN001 Coquina and the Castillo de San Marcos: The Mystery Behind the Oldest Fort in the United States**
Sanika Subhash, 16, Sophomore, F.W. Buchholz High School, Gainesville, Florida
- EN002 What Is Vortex Shedding? "The Answer, My Friend, Is Blowing in the Wind"**
Kennen Dickens, 16, Junior, Cornerstone Christian School, San Angelo, Texas
- EN003 Trailer Safety**
Jacqueline Villalobos, 15, Freshman, Americas High School, El Paso, Texas
- EN004 Computational Analysis of the Dynamics in Single-Chain FV Fragments of the Anti-lymphotoxin- β Receptor Antibody upon Various Amino Acid Mutations**
Prithvi Potharaju, 16, Junior, Ardrey Kell High School, Charlotte, North Carolina
- EN005 An Analysis of the Effect of Trihydric Alcohol, Propane 1,2,3-triol (Glycerol), on the Strength and Pliability of Bio-engineered Fabric**
Taylor Jade Marks, 15, Sophomore, Catholic High School, New Iberia, Louisiana
- EN006 Co-Incubation of Algae for Biofuel**
Jessica Marie Moore, 14, Freshman, Union Grove High School, McDonough, Georgia
- EN007 Designing the M.A.R.S. Suit**
Sergio Alexander Parra, 18, Senior, Mill Creek High School, Hoschtou, Georgia
- EN008 Wings of *Neurothemis terminata* (Dragonfly): A Unique Hydrophobic Nanosculptured Surface Model**
Angelo Gabriel Abundo Urag, 14, Sophomore, Father Saturnino Urios University, Butuan, Philippines
- EN009 Characterisation and Engineering of Squid Sucker Ring Teeth Polymer Proteins**
Dousabel May Yi Tay, 17, Senior, NUS High School of Mathematics and Science, Singapore, Singapore
- EN010 Give a Hand: Designing and Developing a Neuroprosthetic Hand**
Vanessa Yun Han Tan, 17, Senior, Dunman High School, Singapore, Singapore
- EN011 The Fabrication and Characterization of Short and Long Term Memory Proton Induced Thin Film Synaptic Transistors**
Harsha Sudarsan Uppili, 17, Senior, Oregon Episcopal School, Portland, Oregon
- EN012 The VP (Ventriculoperitoneal) Shunt Circuit**
Jennifer Lauren Cramer, 18, Senior, West Linn High School, West Linn, Oregon
- EN013 Biofeedback Controller: Virtual Training for Myoelectric Transradial Prosthesis**
Matthew Lerdahl, 17, Senior, Coon Rapids High School, Coon Rapids, Minnesota
- EN014 Optimizing Natural Gas Separation and the Haber-Bosch Process with Thermally Rearranged Polymers: Effects of Morphology and Chemical Structure on Free Volume and Transport Properties of HAB-6FDA Structures**
Advait Anand, 16, Senior, Liberal Arts and Science Academy High School, Austin, Texas
- EN015 The Creation of Thermally Responsive POEGMA Films**
Dhikshitha Niranjana Balaji, 18, Senior, Hathaway Brown School, Shaker Heights, Ohio
- EN016 Orthopedic Vest**
Saba Mamukashvili, 17, Senior, Tbilisi #137 Public School, Tbilisi, Georgia
- EN017 Transformer Clepsydron: Deployable Support Framework with Varying Direction of Unfolding**
Temur Chichua, 16, Junior, Tbilisi #4 Public School, Tbilisi, Georgia
- EN018 Measurement of Adhesive Forces between Soil Particles and Identification of the Factors Affecting Those Forces**
Koichiro Miyake, 17, Junior, Kyoto Municipal Horikawa High School, Kyoto, Japan
- EN019 Dynamic Response of a Human Neck Replica to Axial-Compression Impact Loading**
Robert Bruce Kitaoka, 16, Sophomore, Mayo High School, Rochester, Minnesota
- EN020 Use of Shape Memory Polymers for Neonatal Endotracheal Tubes**
Apurva Subramanian, 17, Senior, Cherry Creek High School, Greenwood Village, Colorado
- EN021 The Effects of Barefoot and Shod Running on Risk of Injury in High School, Female, Recreational Runners**
Megan Boyer, 17, Senior, Manchester High School, Manchester, Connecticut
- EN022 The Synthesis and Characterization of EGCG-PLGA Conjugates and Mixtures: A Novel Biomaterial for Tissue Engineering**
Anubhuti Mathur, 16, Junior, Glastonbury High School, Glastonbury, Connecticut
- EN023 Multi-layered Phytopigments: Promising Alternative Materials for Solar Cell Development**
Debapratim Jana, 17, Junior, South Point High School, Kolkata, India
- EN024 Healthy Posture Monitor (HPM)**
Jamal Hazem Sa`d, 15, Sophomore, Jubilee Institute, Amman, Jordan
- EN025 Growing Spine Implant and Test Method**
Harry Paul, 17, Senior, Paul D. Schreiber High School, Port Washington, New York
- EN026 Second Generation Bioethanol: Opportunity to Decrease Production Cost**
Guilherme Molina Pinto, 17, Junior, Escola Americana de Campinas, Campinas, Brazil
- EN027 How Cool Is This?**
Gabriel Bryant Priest, 15, Sophomore, Nettleton High School, Jonesboro, Arkansas
- EN028 Developing a Low Cost Prosthetic Battery Charger**
Tanay Patri, 16, Sophomore, McCallie School, Chattanooga, Tennessee
- EN029 Ultrasound-responsive Nanoparticles for Neurotherapeutic Delivery**
Shelby Chi Yuan, 17, Junior, University High School, Tucson, Arizona
- EN030 Endothelial Differentiation of c-kit+ Cardiac Progenitor Cells in Extracellular Matrix-Fibrin Hybrid Hydrogel Scaffolds**
Erica Budina, 18, Senior, Medford High School, Medford, Massachusetts
- EN031 Novel Process for Observing Phase Transformations in and Strengthening Cast Iron via Controlled Cooling**
Austin Gan Li, 17, Senior, The Mississippi School for Mathematics and Science, Columbus, Mississippi
- EN032 Testing Rates/Voltages of Nanofibrous Mats for Dermal Tissue Engineering**
Iroshi Sachindini Seneviratna, 17, Senior, Union City High School, Union City, New Jersey
- EN033 Laser Speckle-Contrast Imaging: Bloodflow Mapping**
Vsevolod Evgenyevich Fomin, 17, Junior, Lyceum No.40, Nizhny Novgorod, Russian Federation
- EN034 Study of Properties of Aluminum Wires Treated with Nanoparticles of MoB2**
Michelle Dyane Marrero-Garcia, 15, Sophomore, Eugenio Maria de Hostos High School, Mayaguez, Puerto Rico
- EN035 Towards Practicality**
Katrina Haines, 17, Junior, Southeast Goshen County High School, Yoder, Wyoming

- EN036 Human Skin Equivalent for Transplants and Pharmacological Tests**
Angela Ferreira de Oliveira, 17, Sophomore, ETEC Professor Carmelino Correia Junior, Franca, Brazil
- EN037 Improving the Efficacy of the Pinhole Glasses**
Hanna Moalem, 16, Junior, Nazareth Baptist School, Nazareth, Israel
- EN038 Evaluating Feasibility of Using Microbial Fuel Cells as Power Supply for Implantable Medical Devices**
Isuru Ashan Somawardana, 15, Freshman, Keystone School, San Antonio, Texas
- EN039 Mud Energy: Single Chamber Sediment Microbial Fuel Cells**
Curtis Von Thygerson, 17, Junior, SUCCESS Academy Dixie, Saint George, Utah
- EN040 A Novel Optimization Technique Using Hydrophilic POSS-PEO Nanoparticles and PSU-PEO Block Co-polymers on Hydrophobic Polysulfone Membranes**
Ahmed Sami Kayat, 17, Senior, Dawerd Secondary School, Dwadmi, Saudi Arabia
- EN041 Optimization of ZnO Electron-Selective Buffer Layers in Flexible Organic Photovoltaic Devices**
Mohammed Fahmi Al Senani, 17, Senior, Riyadh School for Boys and Girls, Riyadh, Saudi Arabia
- EN042 Chlorophyll vs. Dye-Sensitized Solar Cells: Testing for the Lowest Resistance**
Kelly Marie Arnold, 16, Junior, Southeastern High School, Augusta, Illinois
- EN043 Analyzing the Hemodynamics of the Left Ventricle through MRI-Based Complex Fluid Dynamics Models**
Daniel O'Brien, 15, Sophomore, Bangor High School, Bangor, Maine
- EN044 Engineering Novel Biochips for the Rapid and Sensitive Detection of Biomarkers**
Jennifer Li, 17, Senior, Miramonte High School, Orinda, California
- EN045 A PEEK into the Future: Advanced Materials for Orthopedic Implants**
Ralph Ignacio Lawton, 15, Sophomore, PA Leadership Charter School, West Chester, Pennsylvania
- EN046 Calcium Alginate and Polyacrylamide Hydrogels as Antibiotic Drug Delivery Devices**
Katelyn Salotto, 15, Sophomore, Dallastown Area High School, Dallastown, Pennsylvania
- EN047 Engineered Chitosan Based Multi-reservoir Devices for Effective Localization to Treat a Multifaceted Set of Diseases**
Vibhav Satsheel Altekar, 18, Senior, Lynbrook High School, San Jose, California
- EN048 Novel Lateral Flow Test Design to Detect the Presence of Paralytic Shellfish Poisoning**
Taylor Jade Seitz, 16, Junior, Polaris K-12 School, Anchorage, Alaska
- EN049 In-Fiber Emulsification of Biodegradable Polymers for Drug Delivery**
Catherine J. Li, 17, Junior, Lake Highland Preparatory School, Orlando, Florida
- EN050 iAid: A Novel Multimodal, Cloud-Based Navigation System for the Visually Impaired**
Alexander Matthew Deans, 16, Junior, Académie Ste Cécile International School, Windsor, Canada
- EN051 Deposition of Carbon on Copper Wire: A New Process for the Fabrication of Carbon Microtubes**
Burhan Azeem, 17, Junior, Staten Island Technical High School, Staten Island, New York
- EN052 High-performance Solar Thermoelectric Energy Conversion System with Efficient Thermal Concentration**
Abdallah Mohamed Felfel, 17, Junior, El-Madina Al-Monawra Secondary School, Alexandria, Egypt
- EN053 Study of the Fluorescent Qualities of Yeasts in Different Liquid Environments**
Annette Miller, 19, Senior, Tallinn School No.21, Tallinn, Estonia
- EN054 A New Methodology for Laser Reduced Graphene as a Catalyst on the Counter Electrode of Dye Sensitized Solar Cells**
Meredith Anne Loy, 17, Junior, Oregon Episcopal School, Portland, Oregon
- EN055 Gold Nanoparticles: Efficient Synthesis of Catalytically Active Nanoparticles Using a One-Pot Method**
Justin Cheung, 17, Senior, Commack High School, Commack, New York
- EN056 Electrically Characterizing NbSe₂ through Soft Micro-Stencil Lithography and Atomic Force Microscopy**
Waqarul Islam, 17, Senior, Stuyvesant High School, Manhattan, New York
- EN057 Regulating Podocyte Redifferentiation Using Mechanical and Geometrical Constrains**
Mika Sarkin Jain, 16, Junior, Stuyvesant High School, Manhattan, New York
- EN058 Dependence of Silica Sol-Gel Thin Film Material Properties on Fabrication Methods**
Samantha Indunil Wathugala, 17, Senior, Palos Verdes Peninsula, Rolling Hills Estates, California
- EN059 A Microfluidic Device for Blood Separation and Cell Morphology Analysis using MicroVortex Technology**
Vick Cheung Liu, 16, Sophomore, Flintridge Preparatory School, La Cañada Flintridge, California
- EN060 Assessment of AZ31 for Biodegradable Stent Applications**
Mahati S. Vavilala, 17, Junior, Novi High School, Novi, Michigan
- EN061 Reduction of Circulating Tumor Cells by Induction of Apoptosis via a TRAIL-Functionalized, Nanostructured Shunt Device**
Olivia Helen Sheppard, 16, Junior, Manlius Pebble Hill School, Dewitt, New York
- EN062 A Novel Energy Harvesting System with a Piezo Element to Power a Visual Prosthesis**
Kumaran V.K. Ratnam, 15, Freshman, Dublin High School, Dublin, California
- EN063 A Genetic Engineering Strategy for the Production of Cancer-Therapeutic Compound Libraries**
Daniel Solomon Alber, 16, Junior, Penn High School, Mishawaka, Indiana
- EN064 Visualizing and Improving the Operation of an Inhaled Medication Chamber Tube**
Alexandra Jane Frank, 17, Senior, Marian High School, Mishawaka, Indiana
- EN065 Using Nanotechnology to Enhance Osteoblast Proliferation and Adhesion: Comparison of Different Implantable Biologically Inert Spinal Instrumentation Materials**
Hanya Marium Qureshi, 15, Junior, Pulaski Academy, Little Rock, Arkansas
- EN066 Magnetic Field Modulation for Assembly and Manipulation of Responsive Nanoscale Optical Systems**
Michael Janner, 18, Senior, Redlands East Valley High School, Redlands, California
- EN067 Development of Access to Unconscious Feelings in the Field of Neurobiological Physiology: By Means of Detection of REM Sleep**
Oleg Kochankov, 18, Freshman, Lyceum #15, Sarov, Russian Federation
- EN068 Strongly Coupling the Electrical and Mechanical Dynamics of the Heartbeat in a Diffuse Interface Model**
Kevin K. Lee, 17, Senior, University High School, Irvine, California

- EN301 Optimizing Solar Energy Using CuInS₂ and TiO₂ Nanoparticles**
Aaron Christopher Barron, 18, Senior
Crystal Brockington, 18, Senior
Rockdale Magnet School for Science and Technology,
Conyers, Georgia
- EN302 Anastomosis Robot Tool (ART)**
Dominik Kovács, 19, Senior
Thomas Gunther Steinlechner, 20, Senior
Yuki Trippel, 19, Senior
HTBLuVA Modling, Modling, Austria
- EN303 Green Biosynthesis and Characterization of Magnetic Iron Oxides (Fe₂O₃, Fe₃O₄) Nanoparticles Using Pomegranate (*Punica granatum*) Aqueous Extract**
Nargis Allahverdiyeva, 17, Freshman
Jamil Imranov, 16, Freshman
Technical-Humanitarian Lyceum No.16, Baku, Azerbaijan
- EN304 The Spider Is Changing the Game in the Building Industry**
Alexandru Mihai Glontaru, 17, Junior
Alexandru Stefan Iov, 17, Junior
Tudor Vianu National High School of Computer Science,
Bucharest, Romania
- EN305 Waste Power**
Robert Jesse Rose, 17, Junior
Austin Lane Young, 17, Junior
Leesville High School, Leesville, Louisiana
- EN306 Does your Dollar Go Farther in Golf?**
Peyton Allen Dunn, 15, Sophomore
Parker Malone, 15, Sophomore
James F. Byrnes High School, Duncan, South Carolina
- EN307 Microwave Sintering of SiC Ceramic Rollers for Roller Kiln**
Xiaoying Li, 16, Junior
Wenhao Liu, 16, Junior
Jingwei Zhang, 17, Senior
Henan Experimental High School, Zhengzhou, China
Zhengzhou Foreign Language School, Zhengzhou, China
- EN308 Modified Quantum Dots for Improved Biocompatibility in the Detection of Cancer**
Ryan H. Huston, 17, Senior
Spandan N. Shah, 17, Senior
Upper Arlington High School, Upper Arlington, Ohio
- EN309 Innovative Alternative Method for the Synthesis of Graphene**
Roberto Delgado-Webb, 17, Junior
Brandon Eduardo Montero-Montoya, 16, Junior
Colegio Vocacional Monsenor Sanabria, Desamparados,
Costa Rica
- EN310 Optimization of Ferrofluid Foams Properties for Radioactive Decontamination**
Adrien Chicot, 16, Senior
Emeline Gallo, 17, Senior
Johanna Jussey, 17, Senior
Notre Dame de Bury, Margency, France
- EN311 Intelligent Traffic Light**
Zaza Iremadze, 18, Senior
Nino Khimshiashvili, 17, Senior
Besarion Kvatsikheli, 18, Senior
Ltd. Gorda Batumi Multi-Profile Private School, Batumi, Georgia
Gorda Batumi Multi-Profile Private School, Batumi, Georgia
- EN312 Green Refrigerant Box**
Anjani Rahma Putri, 17, Senior
Muhtaza Aziziya Syafiq, 16, Junior
Sma Negeri 2 Sekayu, Musi Banyuasin, Indonesia
- EN313 Designing Whole-Cell Biosensors for the Detection of Heavy Metals**
Cindy Chen, 17, Junior
Mrugami Mahadik, 16, Sophomore
Niles Township West High School, Skokie, Illinois
- EN314 Fabrication and Characterization of Chitin Nanowires on Doped N/Mn Carbon Nanostructures for Thin Film Solar Cell Applications**
John Steven Desamparado Ablong, 15, Senior
Danise Bartolome Chan, 15, Senior
Michael Angelo Babatid De Chavez, 16, Senior
Victorino Mapa High School, Manila, Philippines
- EN315 Manipulation of Live MCS Incorporating Hydroxyapatite as a Regenerative Bioscaffold**
Angelica Andrade Bourland, 16, Junior
Charles Rice Bourland IV, 15, Freshman
Escola Americana de Campinas, Campinas, Brazil
- EN316 Enhancing the Efficiency of CO₂ Recycling by Using Visible Rays with Natural Dyes**
Nayoung Kim, 16, Junior
Hyeonji Kwon, 16, Junior
Junhyung Park, 16, Freshman
Daegu Il Science High School, Daegu, South Korea
- EN317 Making New Eco-Friendly Painting Powder Using Plants**
Eun Jo Kim, 16, Junior
Yumin Kim, 16, Junior
Ju-Eun Sim, 16, Junior
Gyeongnam Science High School, Jinju, South Korea
- EN318 Guns, Flames, and Steel 2.0: Creation of a Non-Newtonian Fluid-Based Body Armor**
Elizabeth Marie Prucka, 15, Freshman
Madison Diane Reed, 16, Junior
Park City High School, Park City, Utah
- EN319 Fabrication of Flexible Pressure Sensors Using MWCNTs Nanocomposites Material**
Osaid Ibrahim Ali, 17, Senior
Muhammad Alwaleed Aljaali, 16, Junior
Alansar High School, Madinah, Saudi Arabia
Ain Jaloud High School, Makkah, Saudi Arabia
- EN320 FISA: Film for Selective Absorption**
Gabriel Chiomento da Motta, 18, Senior
Raíssa Müller, 18, Senior
Fundacao Escola Tecnica Liberato Salzano Vieira da Cunha,
Novo Hamburgo, Brazil
- EN321 Derivatization of the Carbon Membranes and Analysis of Their Characteristics**
Nurila Kamar, 16, Sophomore
Asset Zhanabayev, 17, Junior
Republican Physics and Mathematics School Named after O.Zhautikov, Almaty, Kazakhstan
Ust-Kamenogorsk Physics Mathematics and Informatics School-Lyceum #25, Ust-Kamenogorsk, Kazakhstan
- EN322 Improving the Performance of TiO₂ Nanorod-Based Dye-Sensitized Solar Cells**
Zhenhua Dong, 15, Freshman
Zhenyu Dong, 15, Freshman
Benjamin Liu, 17, Junior
Central High School, Springfield, Missouri
- EN323 Portable Kidney**
Serage Amatory, 17, Freshman
Celia El Halabi, 16, Freshman
Canadian High School, Beirut, Lebanon
- EN324 Optimization of Lithium-Sulfur Battery Cathode: Role of Sulfur-Carbon Interaction**
Richard Nipun Gunasena, 15, Sophomore
Matthew Carmel Raj, 14, Freshman
Madan A Subheeswar, 15, Sophomore
duPont Manual High School, Louisville, Kentucky
- EN325 TPS (Thermoformed Plastic with Sand): Recycling Material as Coarse Aggregate in Concrete Mix**
Kelly Tatiana Arredondo, 17, Junior
Katherin Garces, 15, Junior
Sara Gonzalez, 17, Junior
Institucion Educativa Colegio Loyola Para La Ciencia y La Innovacion, Medellin, Colombia

- EN326 Metal Oxides@Polypyrrole Nanowire-based Pseudocapacitor**
Chi Kit Chang, 16, Sophomore
Ka Lung Tsang, 15, Sophomore
Chi Sum Wong, 17, Freshman
The Chinese Foundation Secondary School, Hong Kong, China,
Hong Kong Special Administrative Region
- EN327 Lipid Production by Oleaginous Fungi Grown on Rice Straw for Potential Biodiesel Resource**
Lan Yen Dang, 17, Senior
Tu Anh Dang, 17, Senior
Dat Tien Tran, 17, Senior
Hanoi Amsterdam High School for the Gifted, Hanoi, Viet Nam
- EN328 Improving the Efficiency of TiO₂ Thin Film-Based Solar Cells by Changing the P3HT: PCBM Ratio and their Characterization**
Hilmi Oguzhan Ayan, 16, Junior
Hasan Fatih Turkgenç, 16, Junior
Ozel Istanbul Fatih Anadolu Lisesi, Istanbul, Turkey

Energy & Transportation

- ET001 Biomethane Production from the Anaerobic Digestion of Different Organic Substrates**
Navin Buxani, 17, Junior, Houston County High School, Warner Robins, Georgia
- ET002 Dye Sensitized Solar Cells: New Structures and Components for Greater Efficiency**
Mokshin Suri, 17, Junior, Plano West Senior High School, Plano, Texas
- ET003 Optimal Navigational Escape Routes for Collision Avoidance Using Multiple Object Tracking**
Alexis Rose Hopkins, 15, Sophomore, Fort Walton Beach High School, Fort Walton Beach, Florida
- ET004 A Study of the Effects of Incomplete Spiroids on the Drag Coefficient of an Airfoil**
Robert Joseph Hermanoff, 15, Sophomore, University School of Milwaukee, Milwaukee, Wisconsin
- ET005 The Jerusalem Artichoke as a Perspective Renewable Fuel**
Lizaveta Salokhina, 16, Junior, Gymnasium No. 1 Zhodino, Zhodino, Belarus
- ET006 Rapid Aerodynamics Improvement Software Based on Innovative Drag Calculation and Polygonal Node Bifurcation**
Kwuang Tang, 16, Sophomore, Little Rock Central High School, Little Rock, Arkansas
- ET007 Optimizing Turbine Efficiency, Year Three**
Hunter David Stafford, 17, Senior, The Villages High School, The Villages, Florida
- ET008 Examining the Efficiency of Vertical Axis Wind Turbines Using Inexpensive Materials**
Courtney Ann Terrell, 17, Junior, Colquitt County High School, Moultrie, Georgia
- ET009 A Novel Single Compartment Concentration Cell Powered by Natural Evaporation for Green Energy Harvesting and Storage, Year Two**
Andrew Yang, 17, Senior, Health Careers High School, San Antonio, Texas
- ET010 The Effect of Washings and Shelf Life on Biodiesel Efficiency**
Katelyn Suzanne Girouard, 16, Junior, Ovey Comeaux High School, Lafayette, Louisiana
- ET011 Investigating the Potential of Graphene Coated Electrodes in Corrosion Prevention to Improve the Performance of Dye-Sensitized Solar Cells**
Charlyn Manuyag, 18, Senior, Waipahu High School, Waipahu, Hawaii
- ET012 Effectiveness of Downspout-Mounted Hydroelectric Systems**
Connor Wilkins Fritsch, 14, Freshman, Haas Hall Academy, Fayetteville, Arkansas
- ET013 How Does Flow Rate Affect Hydropower?**
Craig Worley, 16, Sophomore, Luella High School, Locust Grove, Georgia
- ET014 Nature Derived Carbon Microsheets as Efficient Electrocatalyst for Energy Storage**
Shannon Xinjing Lee, 17, Senior, National Junior College, Singapore, Singapore
- ET015 Year II: Domestic Wastewater Clarification and Power Generation- Increasing the Conductivity of Permeated Electrodes in a Single-Celled Microbial Fuel Cell**
Nurul MohdReza, 18, Senior, Union Colony Preparatory School, Greeley, Colorado
- ET016 From Waste to Electricity and Hydrogen Gas: A Novel Power Management Device for Microbial Fuel Cell-Microbial Electrolysis Cell Coupled Systems**
Ajay Krishnan, 17, Senior, Oregon Episcopal School, Portland, Oregon
- ET017 Using Piezoelectronics to Convert Energy from a Nontraditional Source: Vibration**
Travis Benjamin Lysaght, 16, Sophomore, Hicksville High School, Hicksville, Ohio
- ET018 Creating Electricity through the Use of Natural Drafts Produced by Hot Water**
Grace Dean Ray, 18, Senior, Gresham Union High School, Gresham, Oregon
- ET020 Möbius Strip Wind Turbine Ring**
Yagna Sai Deep Vudathu, 15, Sophomore, Spring Mills High School, Martinsburg, West Virginia
- ET021 Development of Highly Efficient and Stable Dye-sensitized Solar Cells Using Natural Hydrangea macrophylla Dyes**
Mie Yamanaka, 17, Junior, Miyagi Prefectural Sendai Daini Senior High School, Sendai-City, Japan
- ET022 Effects of Scaling a Microbial Fuel Cell**
Michael William Brady, 18, Senior, Cherry Creek High School, Greenwood Village, Colorado
- ET023 The Microbial Fuel Cell: Analysis, Developing and Performance Assessment**
Matteo Giardino, 18, Senior, ITIS Avogadro, Torino, Italy
- ET024 Mars Absolute Positioning System (MAPS): An Innovative Design to Advance the Exploration of Mars**
Matthew Russell, 17, Senior, Home School, Lexington, Kentucky
- ET025 Synthesis of Benzodifuran Derivatives for Solar Cells**
Valerie Youngmi Sarge, 16, Senior, Paul Laurence Dunbar High School, Lexington, Kentucky
- ET026 Next Generation Supercapacitor for Ultra-Fast Energy Harvesting**
Swetha Vanathy Shutthanandan, 16, Sophomore, Richland High School, Richland, Washington
- ET027 Comparing Shroud Design on the Electrical Power Output of a Small-Scale Horizontal-Axis Wind Turbine**
Kelly Nicole Devens, 15, Sophomore, Roanoke Valley Governor's School for Science and Technology, Roanoke, Virginia
- ET028 An Innovative Way to Help in the Functioning of Cars on the Roads in Snow and Ice**
Abdel Rahman Yaser Alrajabi, 15, Freshman, Modern Systems School, Amman, Jordan
- ET029 Isolation and Identification of Thermophilic Compost Bacteria and Screening of Their Cellulolytic Activity**
Michael Angelo Zafra, 16, Senior, Taguig Science High School, Taguig, Philippines
- ET030 Riding the Wave: Energy in Motion**
Matthew Caffet, 16, Junior, The Academy of Science and Technology at The Woodlands College Park High School, The Woodlands, Texas
- ET031 Rain Gain**
Samantha Olsen, 16, Junior, Manti High School, Manti, Utah
- ET032 The Effects of Bacteria Isolated from Waste Water on Sodium Lactate Microbial Fuel Cells**
Diego Aubert-Vasquez, 16, Junior, Tucson Magnet High School, Tucson, Arizona
- ET033 Algae....the Greener Fuel, Year Three**
Alexandra K. Gabrielski, 15, Freshman, Viera High School, Viera, Florida
- ET034 Phase II: Identification of Isolates of Algae with Biofuel Properties**
Mitchell Fosdick, 15, Freshman, Fowler High School, Fowler, Colorado
- ET035 Sustainable Energy and Water Purification through the Oxidation of Anaerobic Bacteria**
Benjamin Braunstadter, 17, Junior, Spring Creek High School, Spring Creek, Nevada

- ET036 Inflatable Airplane Design and Optimization for Low Reynolds Numbers**
Scott Alexander Bollt, 16, Sophomore, Potsdam High School, Potsdam, New York
- ET037 Utilizing Pine Cone Briquettes as an Alternative Energy Source**
Lungelo Don Clerence Sigudla, 16, Junior, Newcastle High School, Newcastle, South Africa
- ET038 Hidrociclismo**
Saul Pérez Arana, 16, Junior, Preparatoria de Tonalá, Universidad de Guadalajara, Tonalá, Mexico
- ET039 Green Algae as a Viable Substrate in a Microbial Fuel Cell**
Thesan Appalsamy, 16, Junior, Greenbury Secondary, Durban, South Africa
- ET040 Repurposed Residential Scale Wind Turbine with Blade Variance**
Jamielee Rose Buenemann, 17, Junior, Washington High School, Washington, Missouri
- ET041 Hydro-Power**
John Tyler Bass, 14, Freshman, Oxford High School, Oxford, Mississippi
- ET042 Bumping & Reversing Wave Energy Generating System (BRES): Energy Generating System with Often Wasted Wave by Applying Principle of Interference and Rip Current**
Chan Lee, 16, Junior, Kyunggi High School, Seoul, South Korea
- ET043 Optimization of Gasoline Performance Through Physical Changes Before the Combustion Process**
Patricia Romero, 15, Sophomore, Escuela Especializada en Ciencias y Matemáticas Brígida Álvarez Rodríguez, Vega Baja, Puerto Rico
- ET044 The Cooling of Solar Panels to Increase Power Output**
Christopher Rafael Botello, 15, Sophomore, John Jay High School, San Antonio, Texas
- ET045 Optimizing the Utilization of Wind Energy with an Alternative Engineering Design: A Horizontal Dual Motor Turbine, Phase II**
Caid Lunt, 17, Junior, Weber High School, Pleasant View, Utah
- ET046 MFCs Reloaded: A Novel Bio-Augmented Design to Enhance MFC Efficiency**
Dhuvarakesh Karthikeyan, 15, Sophomore, California High School, San Ramon, California
- ET047 Fun in the Sun! Increasing Grätzel Cell Efficiency Using Diatomaceous Earth**
Meagan Ann Fabel, 17, Senior, Walkerville Collegiate Institute, Windsor, Canada
- ET048 Grass to Gas: Phase III: Study of Calcium Hydroxide Pretreatment on Increasing Cellulosic Ethanol Yield and DDG Feed Value in Prairie Cordgrass and Switchgrass**
Eric Koehlmoos, 17, Junior, South O'Brien High School, Paullina, Iowa
- ET049 Go with the Flow: Examining the Potential of Continuous Flow Microbial Fuel Cells**
Patrick Myers, 18, Senior, Carlisle High School, Carlisle, Pennsylvania
- ET050 New Method for the Prediction of Carbon Nanostructures and the Application Towards Optimizing Electron Transfer Rates in Dye Sensitized Solar Cells**
Bailey Liao, 18, Senior, Half Hollow Hills High School West, Dix Hills, New York
- ET051 Developing an Organic Voltaic Cell**
Kaden Springer, 17, Senior, American Fork High School, American Fork, Utah
- ET052 Fuel of the Future**
Colby Michael Short, 15, Freshman, H.L. Bourgeois High School, Gray, Louisiana
- ET053 Using Intelligent Autonomous Holonomic Landing Gear in Crosswind Landings to Advance Aviation Safety**
Walter Emerson Czerwinski Burkard, 17, Junior, Manlius Pebble Hill School, Dewitt, New York
- ET054 The Power Output of Hydroelectric Generator Prototypes**
Emma Louise Fiore, 15, Sophomore, Joseph Case High School, Swansea, Massachusetts
- ET055 Employing *in situ* Generated Peracetic Acid and Fungal Biosynthesis to Produce Biofuels**
Jonah Zachariah Butler, 16, Junior, Sibley East High School, Arlington, Minnesota
- ET056 Infrared Alignment and Photon Densification Apparatus for Energy Optimization**
Andrew J. O'Neill, 18, Senior, Suncoast Community High School, Riviera Beach, Florida
- ET057 Wave-Powered Desalinator**
Mykhailo Lytovchenko, 16, Sophomore, Dnipropetrovsk Chemical Ecological Lyceum, Dnipropetrovsk, Ukraine
- ET058 The Effect of the Type of Chemical Solvent on the Amount of Crude Algal Oil Extracted for Biofuel Production**
Kaitlyn Noel Loop, 16, Junior, Arizona College Prep - Erie, Chandler, Arizona
- ET059 Biodiesel Production by Transesterification Using Environmentally Benign Reusable Heterogeneous Catalyst**
Dyuti Shreya Nandy, 14, Freshman, Newport High School, Bellevue, Washington
- ET060 Energy Harvesting via Pyroelectric Effect**
Rupa Palanki, 15, Freshman, WP Davidson High School, Mobile, Alabama
- ET061 The Viability of Tree Leaves for Cellulosic Ethanol: Testing Glucose Levels in Select *Quercus* & *Acer saccharum* Species**
Ryan Thomas Caudill, 16, Sophomore, Grove High School, Grove, Oklahoma
- ET062 Cones, Chutes, and Coils: Novel Proposals to Ebb Wingtip Vortices**
Loren J. Newton, 16, Senior, La Sierra High School, Riverside, California
- ET063 Efficient Energy Harvesting Using Bio-Nanowires**
Edward Park, 15, Sophomore, Las Cruces High School, Las Cruces, New Mexico
- ET064 Renewable Sources of Energy: A Study of Low-Cost By-Products, Cattle Manure and Nitrogen for Methane Gas Conversion Production**
Mike Espy, 16, Junior, Little Snake River Valley, Baggs, Wyoming
- ET065 Rain Power**
Michael Jose Lopez Chiesa, 18, Senior, Saint Mary's Ryken High School, Leonardtown, Maryland
- ET066 Quantification of the Effect of Contamination in Lithium-Air Batteries**
Emilia Wodzka, 19, Sophomore, Herlufsholm Kostskole og Gods, Næstved, Denmark
- ET067 Submersible Energy Apparatus: Linearly Extending Generator (SEA-LEG)**
Alexander Heron Thanos, 18, Freshman, European School Munich, Munich, Germany
- ET301 Optimization of the Aerobic Cultivation of *Euglena* to Be Used in Environmentally Feasible Production of Alternative Fuel**
Abigail Cadena, 15, Sophomore
Juan Guevara, 16, Sophomore
Joseph W. Nixon, Laredo, Texas
- ET302 The Effects of Various Adaptations to PEGASUS-I, an Unmanned Drone Carrier**
Michael Peter Hirsch, 18, Senior
Nathan Lax, 18, Senior
Saint Mary's High School, Sleepy Eye, Minnesota
- ET303 Designing, Prototyping, and Testing Agricultural Drones**
Eric Gene Chang, 16, Junior
Jordan Taylor Kuhn, 17, Senior
Christiansburg High School, Christiansburg, Virginia

- ET304 Width-variable Francis Turbine**
Bernhard Ebner, 19, Senior
Maximilian Palir, 19, Senior
Herbert Rippl, 19, Freshman
HTBLuVA Salzburg, Salzburg, Austria
- ET305 Cryogenic Energy Storage**
Lala Jabir Jumshudlu, 16, Junior
Jamil Muradov, 16, Junior
Medina Mursagulova, 16, Junior
Baku European Lyceum, Baku, Azerbaijan
- ET306 Comparison of Organized and Randomized Multilayer Films**
Jessica Kim, 17, Junior
Andrew Moshova, 16, Junior
Manhasset High School, Manhasset, New York
- ET307 Prolonging Battery Life through Application of the Seebeck Effect**
Davis Johnson, 17, Junior
Parker Logan Murray, 16, Junior
Woods Cross High School, Woods Cross, Utah
- ET308 Who Says Energy Is Scarce? It Is Everywhere**
Kpakpando Ruth Akaeze, 14, Junior
Opeyemi Jubril Bello, 17, Junior
Doregos Private Academy, Lagos, Nigeria
- ET309 Powering Hydrogen Fuel Cells using Chemical Water Splitting**
Vineeth Ashok Bajji, 16, Junior
Timothy Shiao Yong Quah, 17, Junior
West High School, Salt Lake City, Utah
- ET310 A Continuation Study on Petroleum Recovery Rates: Creating a Pickering Emulsion in Oil Reservoirs to Increase the Accuracy of 4D Seismic Surveys**
Razan Sami Alfouzan, 17, Senior
Rund Essam Tawfiq, 17, Senior
Saad National School, Alkhobar, Saudi Arabia
Dhran School, Dammam, Saudi Arabia
- ET311 Alternative Fuels for Future Engines: Investigating the Potential of FACE A, FACE C, and Farnasane as Novel Alternative Gasolines and Biofuels**
Salam Hasan Alabdullatif, 17, Senior
Mohammed Abdulfattah Aldajani, 17, Senior
Dhahran Ahliyya Schools, Dhahran, Saudi Arabia
- ET312 Heating Houses Using a Friction-Based Heating System that Employs Renewable Energy Sources**
Shady Hesham El Shazly, 16, Junior
Ahmet Alpaslan Kilic, 17, Senior
Turkish Salahaldin International School, Cairo, Egypt
Salahaldin International school, Cairo, Egypt
- ET313 Working of Wind Turbine with Low Air Pressure**
Sana Batool, 15, Freshman
Shazia Bibi, 15, Freshman
Iqra Irshad, 14, Freshman
Punjab Daanish Girls School, Hasilpur, Pakistan
- ET314 Wave Efficiency Converter Efficiency Enhancer: Adaptations to the Pelamis Device**
Casey Suzanne Calhoun, 15, Sophomore
Xingyu Yang, 15, Sophomore
BASIS Scottsdale, Scottsdale, Arizona
- ET315 Energy Production from *Chlorella vulgaris* Microalgae**
Elkin Sleider Agudelo, 15, Sophomore
Geydi Alexandra Bayona, 16, Sophomore
Nuestra Senora Del Pilar, Bucaramanga, Colombia
- ET316 Eyes on Road**
Ayesha Abdulrazak Al Ali, 17, Senior
Mira Humaid Alansari, 17, Senior
Dubai National School, Dubai, United Arab Emirates
- ET317 DatEnergy: Exploitation of Palm Waste**
Rawan Habreesh Al Katheeri, 16, Junior
Reem Zaid Al Menhali, 16, Junior
Shamma Al Mujaini, 16, Junior
Applied Technology High School-Abu Dhabi-Girls, Abu Dhabi, United Arab Emirates
- ET318 Multi-Purpose Exercise Machine**
Mohamed Hassan Al Dhanhani, 14, Sophomore
Mohamed Saeed Al Zarooni, 15, Sophomore
Abdallah Rayyan, 16, Junior
The Glenelg School of Abu Dhabi, Abu Dhabi, United Arab Emirates

Environmental Management

- EM001 Reclaiming the Desert**
Ethan Trotter, 18, Senior, Andrews High School, Andrews, Texas
- EM002 Solar Hot Air Generator Construction and Applicability**
Daniel Cosovanu, 18, Junior, Tomsa Voda Technological High School, Solca, Romania
- EM003 Riparian Area Multiple Indicator Monitoring**
Sarah Elizabeth Stalcup, 17, Senior, Delta High School, Delta, Colorado
- EM004 Isolating Hydrocarbon Metabolizing Bacteria from Oil Contaminated Soil and Seawater**
Tess Marie Cramer, 17, Senior, Mililani High School, Mililani, Hawaii
- EM005 Effect of Wind Turbine Blade Length on Noise, Electricity Production, and Temperature Change**
William Ellison, 16, Sophomore, Latta High School, Ada, Oklahoma
- EM006 Bio-Waste Materials as Eco-Friendly Mordant in Fabric Dye Process**
Faye Sow-Fei Jong, 15, Sophomore, Sekolah Menengah Kebangsaan Batu Lintang, Kuching, Malaysia
- EM007 Why Did Water Strider Mysteriously Disappear from Rural Ponds?**
Xidian Zhang, 18, Senior, No.1 Senior Middle School Puyang, Puyang City, China
- EM008 Recovery of Valuable Ni from Electroplate Nickel Slag by Bioleaching**
Qi Xin, 17, Senior, The High School Affiliated to Renmin University of China, Beijing, China
- EM009 Waste Drinks to Biofuel: Using Glucose and Fructose in Fermentation and Anaerobic Digestion for the Production of Ethanol and Methane**
Vishal Reddy Nallanagulagari, 16, Junior, Upper Arlington High School, Upper Arlington, Ohio
- EM010 Efficient Watering**
Connor A. Coughenour, 16, Sophomore, Natrona County High School, Casper, Wyoming
- EM011 Responsible (at Home) Recycling of Disposable Diapers**
Salvador Alvarado, 17, Junior, Escola Americana de Campinas, Campinas, Brazil
- EM012 DNP-based Formaldehyde Nano- Detector and Absorption Plate**
Grace Yan Chuen Tang, 15, Sophomore, The Chinese Foundation Secondary School, Hong Kong, China, Hong Kong Special Administrative Region
- EM013 Biodegradable Breathable Band-Aids**
Kan Wing Yi, 15, Sophomore, Maryknoll Fathers' School, Hong Kong, China, Hong Kong Special Administrative Region
- EM014 A Potential Management Strategy for the Endangered Southwestern Willow Flycatcher: Effects of Early Season Wildfire on Foraging and Nesting Habitat**
Tayler Ann Rocha, 18, Senior, Monte Vista High School, Monte Vista, Colorado
- EM015 Biological Control of the Invasive Eurasian Watermilfoil Using Aquatic Weevils**
Janine Alysa Kerr, 16, Junior, Danbury High School, Danbury, Connecticut
- EM016 Evaluating Petroleum-Contaminated Soil Remediation Methods**
Jacob Thomas Alborano, 17, Senior, North Toole County High School, Sunburst, Montana
- EM017 Developing a Sustainable Water Filtration System for Use in Low Income Countries**
Bluyé DeMessie, 17, Junior, William Mason High School, Mason, Ohio
- EM018 Sustainable Future for Endangered Species? Predicting the Impacts of the Wilmar Policy on Bornean Orangutan Populations**
Emma R. Freedman, 14, Freshman, Stanford University Online High School, Corralitos, California
- EM019 Cadmium Ion Removal from an Aqueous Solution by Dried Water Hyacinth Biomass-Kinetic Studies: Effect Of pH, Time, Hyacinth Dosage, and Cadmium Concentration on Adsorption**
Rohan Mathew, 17, Junior, Mills E. Godwin High School, Richmond, Virginia
- EM020 Experimental Analysis of the Benefits and Drawbacks of Rooftop Agriculture**
Genevieve Cherie Sertic, 17, Senior, Kalamazoo Area Math and Science Center, Kalamazoo, Michigan
- EM021 The Sustainable Cube**
Wilfred Aldo Mason, 15, Freshman, Laurier Senior High school, Laval, Canada
- EM022 Extraction of Bio-Ethanol from Rice Straw and Utilization of Rice Straw Residues for Animal Feeding**
Jung Hyun Chae, 16, Junior, Seocho High School, Seoul, South Korea
- EM023 Can the Application of Vegetable Oil to a Soil Surface Reduce Soil Evaporative Losses and Conserve Water to Avoid Aridity?**
Sopuruchi Stephania Uwakweh, 15, Sophomore, Escuela Bilingue Sergio de Arellano - Hostos, Añasco, Puerto Rico
- EM024 De-Inking Process: Fungal vs. Bacterial**
Sergio Andres Collado, 15, Sophomore, Southwestern Educational Society, Mayaguez, Puerto Rico
- EM025 The Use of Algalization by Inoculating Nostoc Commune Algae as an Important Resource for the Sustainable Management, Agricultural Systems and Environment Conservation**
Andrea Marie Albaladejo, 15, Sophomore, Brigida Alvarez Rodriguez, Vega Baja, Puerto Rico
- EM026 The Effects of Iron Seeding on Phytoplankton and Zooplankton Populations, and on Water Chemistry**
Jackson Stanton Richard, 15, Sophomore, Hilton Head Preparatory School, Hilton Head Island, South Carolina
- EM027 Don't Cry Over Spilled Oil!**
Nivatha Balendra, 18, Senior, Marianopolis College, Westmount, Canada
- EM028 Improving Seawater Membrane Distillation: The Development of Carbon Nanotube-coated Nickel Hollow Fiber Membranes**
Farah Essam Almulla, 17, Junior, Dhahran Ahliyya Schools, Dammam, Saudi Arabia
- EM029 Red Sea Ecosystem: A Novel Study to Determine Phytoplankton Diversity during Mesocosm Blooms**
Haifa Hammad AL-Belaid, 17, Senior, Al-Tarbia Alislamia Schools, Riyadh, Saudi Arabia
- EM030 Removal of Algal Material Using Coagulation-Flocculation-Decantation**
Najla Salih Aljabr, 17, Senior, Prince Mohammed Bin Fahad Complex, Dammam, Saudi Arabia
- EM031 Dispersing Oil Slicks: Impact of Droplets on a Floating Oil Layer**
Lambert Aryee, 17, Senior, Baltimore Polytechnic Institute, Baltimore, Maryland
- EM032 Hydraulic Fracturing Fluid Remediation in Water: Further Exploration of Mycoremediation Capabilities of Fungi**
Rachel Louise Rossi, 18, Senior, Durango High School, Durango, Colorado

- EM033 Waste No More: A Study of the Net Energy Gain of Cellulosic Ethanol from Recycled Matter**
Abby Walling, 16, Junior, West High School, Iowa City, Iowa
- EM034 Organic Waste Recycling by Using High Heat in Green Houses**
Baraah O.A Eyeyat, 16, Junior, Deer Abu Daeef Girls Secondary School, Jenin, Palestine
- EM035 Express-Diagnosis of Microbial Communities of Soil Polluted with Oil Products**
Valeriia Vostroknutova, 17, Junior, Municipal Autonomous Educational Institution Gymnasium, Tchaikovsky, Russian Federation
- EM036 The Influence of Rural Gravel Roads on Nest Mound Structure and Foraging Distances of *Pogonomyrmex occidentalis***
Stewart M. Cook, 16, Sophomore, Carter County High School, Ekalaka, Montana
- EM037 Emission Reduction Using an Activated Carbon Supplement**
Tyler Gordon Toepke-Floyd, 18, Senior, Wishek High School, Wishek, North Dakota
- EM038 The Efficiency of Ferromagnetic Nanoparticles and Chlorella Algae in the Remediation of Oil Spills**
Sahil Veeramoney, 14, Freshman, Oregon Episcopal School, Portland, Oregon
- EM039 Examining Productivity and Parameters for Growth of Chlorella Vulgaris in Effluent from Small-Scale Wastewater Systems for Potential Biofuel Production**
Nathan Wamsley, 15, Sophomore, Home School, Pacific, Missouri
- EM040 Removal of some Metal Ions from Aqueous Solution and Water using Dry Palm Leaflets and It's Dehydrated Carbon**
Abdul Aziz Ali Alhashemi, 15, Sophomore, Habib bin Zaid, SUR, Oman
- EM041 What Is the Effect of Canopy Cover on *Salvinia molesta* and *Salvinia minima*?**
Paris Ronique Evans, 17, Senior, Patrick F. Taylor Science & Technology Academy, Avondale, Louisiana
- EM042 Bioremediation: Using Strains of *Pseudomonas* on Oil Spills**
Nevil Desai, 15, Sophomore, South Burlington High School, South Burlington, Vermont
- EM043 Enhancing Nutrient Values of *Gryllodes sigillatus* for Future Food Sustainability**
Chase Evan Herman, 18, Senior, Nixa High School, Nixa, Missouri
- EM044 The Removal of Copper (II) Sulfate Water using *Saccharomyces cerevisiae* through Bioremediation**
Julia Shae Hager, 18, Senior, Pulaski County High School, Dublin, Virginia
- EM045 Safe and Sound Housing: Safe and Environmentally Sound Lime/Fly Ash Papercrete as a Substitute for Adobe in Seismically-Active Regions in Developing Nations**
Miriam Terese Demasi, 15, Freshman, Wheeling Park High School, Wheeling, West Virginia
- EM046 Passive Manipulation of Thermal Radiation: Dual Purpose Condensers to Provide Potable Water**
Calvin James Rieder, 17, Junior, Saint Thomas Aquinas Catholic Secondary School, Oakville, Canada
- EM047 Optimization of CO₂ Calcination Using a Nickel Catalyst and Varying Concentrations of Calcium**
Rebecca Elshahans, 17, Junior, Sarasota High School, Sarasota, Florida
- EM048 Species Diversification of *Farfantepenaeus duorarum* in South Florida Aquatic Ecosystems: The Significance of Genetic Variation within Geographically Diverse Pink Shrimp Populations**
Nicole Odzer, 15, Sophomore, Pine Crest School, Fort Lauderdale, Florida
- EM049 The Optimization of Compost Tea Formulations: A Plan for Future Sustainability of the Biosphere**
Tapasya Trivedi, 15, Junior, Academy of Tucson High School, Tucson, Arizona
- EM050 The Effect of Particle Size of Planting Machine Lubricants on Pesticide Abrasion from Corn Seeds**
Sarah Elizabeth Cooper, 17, Junior, Lafayette Jefferson High School, Lafayette, Indiana
- EM051 Removal of Pollutants from Wastewater Effluent using Activated Rice Husks**
Joshua Lin, 16, Junior, Houston High School, Germantown, Tennessee
- EM052 Removing Carbon Dioxide from our Atmosphere: Using Porous Crystalline Materials for CO₂ Capture**
Naveena Aishwarya Bontha, 14, Freshman, Hanford High School, Richland, Washington
- EM053 Save Our Oceans!: Oil Eating Bacteria!, Part Four**
Michael Patrick Randall, 17, Junior, Mayfield High School, Las Cruces, New Mexico
- EM054 The Heavy Metal Movement: Measuring the Phytoextraction and Bioaccumulation of Heavy Metals by *Panicum virgatum* and *Schizachyrium scoparium* when Grown in Soil Collected at the Tar Creek Superfund Site**
McKalee S Steen, 16, Sophomore, Grove High School, Grove, Oklahoma
- EM055 Novel Hydrophobic/Hydrophilic Macro-Patterns for Enhancing Water Vapor Condensation**
Shixuan Justin Li, 16, Sophomore, Rutherford High School, Panama City, Florida
- EM056 The Rate of Decomposition of Compostable Packaging Products**
Tessa Angele Ricker, 15, Freshman, Bradford High School, Starke, Florida
- EM057 The Concentration Combination**
Rishi Basdeo, 15, Freshman, East Ridge High School, Clermont, Florida
- EM301 "Prawn Shop": Can Quarries Sustain Freshwater Prawns?**
Peter Ashley, 15, Sophomore
Kyle Alexander Coady, 15, Sophomore
South Sumter High School, Bushnell, Florida
- EM302 Evaluation of Performance and Suggestions for Improvement in Obtaining *Prosopis alba* Griseb Flour in a Region of Semi-Arid Argentine Chaco**
Mirian Gomez, 17, Senior
Cristian Efraín Medina, 16, Senior
Escuela Agrotecnica Provincial No. 10, El Quebracho, Argentina
- EM303 Singing in the Shower...Recovering Water**
Alicia Francisca Barrios- Cordova, 17, Sophomore
Fabian Ignacio Lopez Caceres, 17, Sophomore
San Agustin de Atacama, Copiapo, Chile
- EM304 Electrostatic Sanitizer**
Man Kin Lai, 18, Senior
Ho Yin Tam, 18, Senior
Hon Sing Wai, 17, Senior
Ho Dao College, Hong Kong, China, Hong Kong Special Administrative Region
- EM305 Immediate Response System for Oil Spills**
Avi Dubovsky, 18, Senior
Tamer Hamoud, 17, Senior
Roey Shmuel Shafran, 17, Senior
Ort "Psagot", Karmiel, Israel
- EM306 Stretch the Road**
Adam Jamal Belaid, 15, Freshman
Mohammad Akram Salameh, 15, Sophomore
International Academy - Amman, Amman, Jordan

- EM307 A Model Approach to Harvesting Energy from a Marine Environment: The Engineering of Sediment Microbial Fuel Cells with a Modified Catalyst and Diffusion Layer**
Emma Jing Dong, 16, Junior
Grace Karen Lee, 16, Junior
Caitlin Noelle McCormick, 17, Junior
Manhasset High School, Manhasset, New York
- EM308 Bioremediation of Diesel Oil Contamination Using *Bacillus* Found in Palm Oil Sludge**
Nicole Orcullo Cejas, 16, Senior
Magenta May Viernes Orozco, 16, Senior
Lea Monteron Sibay, 16, Senior
Agusan del Sur National High School, San Francisco, Philippines
- EM309 Smart Compost: A Proposal of Biotechnological Application**
Camila Muniz, 18, Senior
Juan Parentelli, 18, Senior
Enzo Quintana Batto, 18, Senior
Liceo 2 Carmelo, Carmelo, Uruguay
- EM310 Effect of Antifreeze on a Keystone Species**
Sally Albright, 15, Sophomore
Allison Marie Raines, 15, Sophomore
South River High School, East Edgewater, Maryland
- EM311 Help Me! I Can't Take It Anymore: Together We Will Succeed**
Jhosley Yeltzin Culqui Vasquez, 13, Freshman
Fernando Enrique Tello Vargas, 13, Freshman
San Juan de la Libertad, Chachapoyas, Peru
- EM312 CYBM Biodiesel**
Elmer Benito Dominguez, 16, Freshman
Hee Young Jang, 17, Freshman
Young Ju Seo, 17, Sophomore
Zhongshi Korean International School, WeiHai, China
- EM313 Active Filter**
Nika Alavidze, 17, Junior
Daviti Chkheidze, 16, Junior
Kutaisi Andria Razmadze Physics and Mathematics #41 Public School, Kutaisi, Georgia
- EM314 Design of 'Worm-drum' Using Pectin and Activated Carbon Filter**
Surim Kim, 17, Senior
Serin Lee, 17, Senior
Yerin Na, 17, Senior
Korea Science Academy of KAIST, Busan, South Korea
- EM315 Green Technology**
Atheer F.M Dwikat, 16, Junior
Wafaa A.M Hamayel, 17, Junior
Beita Secondary School, Nablus, Palestine
- EM316 Environmental Gazebo**
Tania Diaz, 17, Senior
Krystal Enid Valle, 17, Senior
Brigida Alvarez Rodriguez, Vega Baja, Puerto Rico
- EM317 Isolation, Characterization and Identification of Microorganisms with Hydrocarbon Degradation Activity for Bioremediation in Polluted Soils**
Jose Javier Colon Rodriguez, 17, Senior
Angelo Louis Vazquez Barreto, 17, Senior
Superior Vocacional Benjamin Harrison, Cayey, Puerto Rico
- EM318 Recycling Sytrofoam® to Make Waterproofing Resin, Phase II**
Jaqueline Alves Pereira da Silva, 18, Senior
Gisele Cavalcante dos Reis, 18, Senior
Lucas Gustavo Pelinson, 18, Senior
Etec de Ribeirao Pires, Ribeirao Pires, Brazil
- EM319 A Greener Shade of Grey: The Effects of Fly Ash in Concrete, a Second Year Study**
Marygrace Summers Duggar, 17, Junior
Olivia Jane Guidry, 16, Junior
Saint Joseph's Academy, Baton Rouge, Louisiana
- EM320 Fruit Waste Based Ammonia-Biosorptive Permeable Barriers**
Fernando Cruz, 18, Senior
Aksal Pankaj Vashi, 16, Junior
Collins Hill High School, Suwanee, Georgia
- EM321 Engineering a Novel *Cimex Lectularius* Trapping Mechanism Utilizing Electrospun Recycled Polymers**
Michal Leibowitz, 17, Senior
Jacob Mitchell Plaut, 17, Senior
Daniel Rudin, 17, Junior
Samuel H. Wang Yeshiva University High School for Girls, Holliswood, New York
Rambam Mesivta High School for Boys, Lawrence, New York
Half Hollow Hills High School West, Dix Hills, New York
- EM322 Cleaning Streets by Using Solar Energy**
Saleh Abdulsalam Saleh Al-Safri, 16, Junior
Salman Hussain S A Al-Shamari, 16, Junior
Talal Rodayman H A Al-Shamari, 15, Sophomore
Shahanyah, Doha, Qatar
- EM323 Marine Platforms: Scientific Ways of Protection from Oil Sea Pollution (Sealant Oil Device)**
Gaffar Kamaledin Abbas, 16, Junior
Abdullah Hassan Alsafer, 17, Junior
Hamad Khalid Al-Thani, 17, Junior
Jameel Kateem Al Shemary, Doha, Qatar
- EM324 Cheap and Efficient Conversion of Plastic Garbage into Combustable Oil**
Haris Bin Ashraf, 16, Junior
Muhammad Babar Shah, 16, Junior
Muhammad Tahir, 17, Junior
Defence Authority Sheikh Khalifa Bin Zayed College, Karachi, Pakistan
- EM325 Environmental Stove**
Qusai Taysir Hussein, 16, Junior
Musbah Abdel hay Maraqa, 16, Junior
Alra'ed Al Arabi School, Amman, Jordan
- EM326 Zero-Waste Management for Spent Bleaching Earth: A Study of Its Reuse and Regeneration**
Papitchaya Rongdejpratheep, 17, Junior
Marisa Techasontichai, 17, Junior
Mahidol Wittayanusorn School, Nakhon Pathom, Thailand
- EM327 Development of Composite Fiber for Oil Removal in Waste Water**
Jakkrapop Nopparat, 18, Junior
Yanudchara Nuanpan, 16, Junior
Khattiyaporn Tiprongpon, 17, Junior
Princess Chulabhorn's College Nakhon Si Thammarat, Nakhon si thammarat, Thailand
- EM328 Vacuum Evaporator for Water Purification**
Mona El Sayed Abd El Gayed, 16, Junior
Sara Ezat El Hanbaly, 16, Junior
Hoda Mamdouh Shoman, 16, Junior
Maadi STEM School for Girls, Cairo, Egypt
- EM329 The Desert Vapor Tube: A 1 km Tube Which Desalinates Ocean Water by Using Solar Power**
Wouter Johanan Martijn Boot, 15, Sophomore
Robert Cornelis Adriaan de Bruijne, 16, Sophomore
Calvijn College, Goes, Netherlands
- EM330 How the Tallasa' Kamase-Mase and Customary Law Saved the Tana-Toa Forest and Water Resources**
Nur Amaliah, 17, Senior
Inayatul Azisah, 17, Senior
State High School 1 of Bulukumba, Bulukumba, Indonesia

Environmental Sciences

- EV001 Nanofiber Cellulose Zero Valent Iron Filtration: Potential for Reduction of Water-Borne Particulate and Microbial Contaminants**
Ceirra Danielle Carlson, 18, Senior, Greybull High School, Greybull, Wyoming
- EV002 Can Woody Fiber from the Invasive Exotic Tree Brazilian Pepper (*Schnius terebinthifolios*) Be Utilized as a Filtration Medium to Remove Phosphate from Waste Waters?**
Johnathan Forrest Fox, 16, Sophomore, Okeechobee High School, Okeechobee, Florida
- EV003 Effect of Temperature on Radon Decay Rate**
Bianca Montano, 17, Junior, El Dorado High School, El Paso, Texas
- EV004 Insect-repelling Plants & New Organic Pesticide**
Heeyong Huh, 17, Sophomore, Newman Smith High School, Carrollton, Texas
- EV005 Zero Valent Iron Nanoparticle Enhanced Polyethersulfone Membranes for Water Filtration: Isolating Casting Parameters for Global Applications**
Hope Alexis Weinstein, 17, Senior, Fairview High School, Boulder, Colorado
- EV006 An Investigation of the Consequences of Aquatic Single-Walled Carbon Nanotube Exposure Concerning *Daphnia magna* at Varying Concentrations**
Jonathan James McCutchen, 14, Freshman, Keystone School, San Antonio, Texas
- EV007 Investigation of Endocrine Disruptors: The Presence and Effects of Neonicotinoid and Sulfoximine Pesticides**
Nickolas Aubrey Hines, 18, Senior, Christ the King Cathedral School, Lubbock, Texas
- EV008 Storm Water Solutions, II**
Peyton Michelle Aulds, 15, Sophomore, Ridgway Christian School, Pine Bluff, Arkansas
- EV009 Preventing the Global Reproductive Failure of Aquatic Life through the Catalytic Treatment of Endocrine Disrupting Compounds in Municipal Waste Water**
Zachary A. Loeb, 17, Senior, Viera High School, Viera, Florida
- EV010 The Effects of Applying Wastewater Biosolids on Bio Energy Polyculture Test Plots and Various Varieties of Switchgrass, a Two Part Study**
Brian A. Prchal, 16, Junior, New Prague High School, New Prague, Minnesota
- EV011 Reversing the Effects of Lead on Cellular Models Using EDTA Chelation Therapy**
Beau Taylor Bingham, 14, Freshman, Cascia Hall Preparatory School, Tulsa, Oklahoma
- EV012 The Important Discovery of a Greenhouse Gas "Bio-Catcher": Carbon Fixation in *Trentepohlia***
Yiyang Lu, 17, Junior, No. 1 Middle School Affiliated to Huazhong Normal University, Wuhan, China
- EV013 Absorption and Mechanism of Peperomia (*Peperomia tetraphylla*) to Automobile Exhaust**
Luqing Qi, 17, Junior, Beijing 101 Middle School, Beijing, China
- EV015 The Effects of Ethinyl Estradiol on *Danio rerio* Embryonic Development**
Maria Cyr Lorenson, 17, Senior, Perham High School, Perham, Minnesota
- EV016 A Mycoremediation Study to Alleviate Eutrophication in Agricultural Watersheds**
Dalinh Tran, 17, Senior, Southmoore High School, Moore, Oklahoma
- EV017 Removal of Dissolved Heavy Metal Pollutant Using Tropical Peat Soils of Indonesia**
Alfy Fathnur Aziza, 17, Senior, Al Hikmah Surabaya Senior High School, Surabaya, Indonesia
- EV018 Determination of Factors that Impact Clearance of Suspended Particulate Matter (Dust) in Air**
Alanna M. Bram, 16, Junior, John Marshall High School, Rochester, Minnesota
- EV019 To Choose or Not to Choose?: Investigating the Trophic Effects of Thiamethoxam on *Euplectrus comstockii* when Parasitizing *Trichoplusia ni*, Year Two**
Ashley Suzanne Wyrick, 16, Sophomore, Tuscumbia High School, Tuscumbia, Missouri
- EV020 The Effects of Hydraulic Fracturing on Ground Water and Tap Water in the Bakken Formation**
Gabriella TJ Blatt, 15, Freshman, Box Elder High School, Box Elder, Montana
- EV021 Investigating the Efficacy of Bioluminescent Mushroom *Panellus stipticus* as a Biosensor to Detect the Toxicity of Water Contaminants**
Bridget Ann Oei, 18, Senior, East Catholic High School, Manchester, Connecticut
- EV022 The Effect of Lemnaceae on Overall Water Quality Part II: The Loss of Nitrate Nitrogen through Decomposition**
Brooke Pieke, 18, Senior, Newman Grove Public Schools, Newman Grove, Nebraska
- EV023 Investigating the Use of Plant Xylem from Angiosperm Wood Species as Organic Water Filters**
Varsha Venkatesh, 18, Senior, Jericho Senior High School, Jericho, New York
- EV024 Investigating the Sublethal Effects of Polycyclic Aromatic Hydrocarbons (PAHs) on Salmon Using Zebrafish as a Model Organism**
Meera Radha Srinivasan, 16, Junior, Interlake High School, Bellevue, Washington
- EV025 Effects of the Environmental Pollutant Acrylic Aldehyde on Renal Fibrosis**
Sanjana J. Rane, 16, Sophomore, duPont Manual High School, Louisville, Kentucky
- EV026 Diabetics Are More Susceptible to Air Pollution: Effects of Urban Particulate Matter with High Glucose on Human Monocytes**
Yue Zhang, 16, Sophomore, duPont Manual High School, Louisville, Kentucky
- EV027 Acid Rain... Bad for Coral Reef**
Adrienne Sara Green, 15, Sophomore, Nettleton High School, Jonesboro, Arkansas
- EV028 Novel Renewable Filter for Heavy Metal Removal: A Practical Application of Functionalized Multi-Walled Carbon Nanotubes**
Perry Alagappan, 17, Junior, Clear Lake High School, Houston, Texas
- EV029 Sustainable Water Purification System with UV Irradiation**
Hans Christian Pande, 17, Junior, Woods Cross High School, Woods Cross, Utah
- EV030 The Impact of Estradiol on *Artemia franciscana***
Robert Paul Baskin, 17, Senior, Bountiful High School, Bountiful, Utah
- EV031 Has Methicillin-Resistant *Staphylococcus aureus* (MRSA) Escaped Public Health Facilities and Is the General Population at Risk?**
Kincade Leo Stevenson, 14, Freshman, Davis High School, Kaysville, Utah
- EV032 Exploring the Effect of Herbicides on Aquatic Ecosystems: The Denitrification Efficacy of *Lemna minor* under Varying Atrazine Concentrations**
Abigail Ella Johnson, 17, Junior, Shenandoah Valley Governor's School, Fishersville, Virginia

- EV033 The Environmental Dependent Passive Flux Meter: A Numerical Model Assisted Design**
Stephen Yao, 17, Senior, University High School, Tucson, Arizona
- EV034 Improving Bioindicators: A New Weight-Length Model for Fish to Provide More Accurate Ecosystem Condition Assessment**
Ya'el Carmel Courtney, 17, Senior, Mount Carmel School, Aurora, Ohio
- EV036 Monitoring Ocean Microscopic Organic Material: Assessing Large-Scale Ecological Disruption on Annual Chl-a, POC, and PIC Fluctuation Equilibrium**
Jinsong (Tony) Yan, 17, Senior, Cleveland High School, Portland, Oregon
- EV037 Percolation vs. Homogenization: The Effects of Phosphate Amendment on Lead Contaminated Soil, Phase II**
Annika Daniels, 15, Sophomore, Ogden High School, Ogden, Utah
- EV038 Investigation of Different Degradation Treatments on Pesticide Contaminated Water with Toxicity Bioassay on *Daphnia magna***
Bovey Rao, 17, Junior, Hillcrest High School, Midvale, Utah
- EV039 The Distribution of *Enterococci* in Shoreline Sediment of Lake Carroll**
Margaret K. Parrish, 15, Sophomore, Chamberlain High School, Tampa, Florida
- EV040 Assessment of Thirdhand Exposure to Nicotine from Electronic Cigarettes**
Lily Wei Lee, 18, Senior, Stuyvesant High School, Manhattan, New York
- EV041 Micro and Macro Invertebrates: What's Crawling in the Water?**
Tyhendreon Wilson, 15, Sophomore, Noxubee County High School, Macon, Mississippi
- EV042 The Natural Decontamination of Industrial and Agricultural Water**
Gage Connor Metzen, 18, Senior, Hankinson Public School, Hankinson, North Dakota
- EV043 What Material Best Enhances Soil Microbial Carbon Use Efficiency to Reduce Soil CO₂ Emissions?**
Jarek Vincent Kwiecinski, 14, Freshman, Albuquerque Institute for Mathematics & Science at UNM, Albuquerque, New Mexico
- EV044 Protective Effects of Turmeric on Ultraviolet-Radiation Exposed Fruit Flies (*Drosophila melanogaster*)**
Raveena Aggarwal, 16, Sophomore, St. Andrew's Episcopal School, Ridgeland, Mississippi
- EV045 White River Quality and Pollution Study Using Benthic Macroinvertebrate Bioindicators**
Muhammed Amir Sankari, 14, Freshman, Eman Schools, Fishers, Indiana
- EV046 Sun In. . .Water Out!: Light Absorbing Nanoparticles Dramatically Enhance Vaporization in Solar Desalination**
Reeves Balderson, 14, Freshman, Moorestown High School, Moorestown, New Jersey
- EV047 The Effect of Phosphorus Levels on the Growth of Duckweed**
John Joseph Bell, 15, Freshman, Little Rock Central High School, Little Rock, Arkansas
- EV048 Which Grass Could Help Reduce Global Warming?**
Connor James Henze, 16, Sophomore, Elk Point Jefferson High School, Elk Point, South Dakota
- EV049 Possible Human Impact on Degradation of Surface Water Quality: Novel Bacterial Analysis with Ongoing Chemical and Macroinvertebrate Analyses of Weeks' Bayou Subwatershed**
Jane Elizabeth Moore, 17, Senior, Ocean Springs High School, Ocean Springs, Mississippi
- EV050 Comparative Analysis of Carbon Dioxide Sequestration and Calcium Carbonate Precipitation in Two Species of Cyanobacteria: *Tolypothrix distorta* and *Fischerella muscicola***
Asmaa Mahoui, 14, Freshman, Eman Schools, Fishers, Indiana
- EV051 *Escherichia coli* Disinfection: Comparing the Effects of Ultraviolet Light and Sodium Hypochlorite**
Akash Sivakumar, 16, Senior, South Pacific Academy, Pago Pago, American Samoa
- EV052 Investigating Relationships between Air Quality and Environmental Persistence of Fecal Indicator Bacteria at Recreational Beaches: A Molecular MST Approach**
Kristina Marie Thoren, 17, Senior, American Heritage School, Plantation, Florida
- EV053 H₂O_h No: Pharmaceuticals Contaminate Groundwater! Sulfamethazine Adsorption Isotherms and Kinetics with Hypercrosslinked Polymer MN250 in Acid and Alkaline Environments**
Maria Elena Grimmer, 15, Sophomore, Oxbridge Academy of the Palm Beaches, West Palm Beach, Florida
- EV054 The Selenoproteome Influences Vulnerability to Environmental Methylmercury: The Potential Perspectives in Relation to Human Diseases**
Davarshi Nikhil Patel, 17, Senior, Red River High School, Grand Forks, North Dakota
- EV055 Copper Paint: The Biocide to Marine Life Forms**
Holly Darlene Merrill, 16, Sophomore, Earl Wooster High School, Reno, Nevada
- EV056 Cymbo Quito as an Alternative to Reduce Mosquito Population**
Nur Zayani Zamri, 16, Freshman, SMK Seri Kenangan, SEGAMAT, Malaysia
- EV057 Prevention of Ozone (O₃) by Environmental Protection Filter (EPF)**
Sidra Riaz, 16, Junior, C.M.A Paradise School, Karachi, Pakistan
- EV301 Fracking Contamination**
Roger Christian Garcia, 15, Sophomore
JoLynn Faith Riojas, 16, Sophomore
Taft High School, Taft, Texas
- EV302 Co-Eerting Surplus: To Collect to Separate Pollution Plant Materials of Rice Plantae with Fresh Water Perch Fish (*Perca fluviatilis*) of Trichderma Terrarium**
Mohammed Nasih Mohammed, 17, Junior
Diyari Mawlud Murad, 17, Junior
Ishik Boys College, Erbil, Iraq
- EV303 Sun River Conservation**
Sabia Reiche, 15, Freshman
Serenity Wolfe, 14, Freshman
Simms High School, Simms, Montana
- EV304 Bacterial Colonies Growth in Presence of: Al, Ni, Pb, Cd, and Zn**
Jose Martinez, 15, Freshman
Rocio Taire Vazquez Beltran, 14, Freshman
Colegio Marista, Guaynabo, Puerto Rico
- EV305 Efficiency of Three Macrophytes in the Remediation of Miguelete Stream Waters**
Melissa Belén Cristóbal, 15, Freshman
Claudio Fabian Lacuesta, 16, Freshman
Liceo No. 17, Montevideo, Uruguay
- EV306 Bioremediation of the Enbridge Oil Spill through Autochthonous Biostimulation**
Alexandra Marie Peirce, 17, Senior
Katherine Wu, 17, Senior
Kalamazoo Area Math and Science Center, Kalamazoo, Michigan
- EV307 Super Spider Sieve**
Farah Hanin Mustapha, 17, Senior
Ain Adibah binti Roslaile, 17, Senior
Kolej Tunku Kurshiah, Seremban, Malaysia

- EV308 Rainwater Harvesting**
 Karla Judith Estrada Hernandez, 17, Senior
 Abigail Montserrat Morales Guerrero, 18, Senior
 Margarita Trinidad Rebollo Castaneda, 17, Senior
 Escuela Preparatoria Oficial No.102, Tlalmanalco, Mexico
- EV309 Effects of Solid Waste on the Colonization of Organisms Associated to Coastal Mangrove Forests**
 Jakeline Ku Cen, 16, Sophomore
 Javier Agustin Ku Cen, 18, Junior
 Colegio Parroquial San Jose de Almirante, Almirante, Panama
- EV310 Identification of Bioindicator Organisms in the Parana Coast through Correlation between Biotic and Abiotic Factors, Year III**
 Flavia Carolina Faggiao, 17, Senior
 Nayara Martins Orsi, 17, Senior
 Colegio Interativa de Londrina, Londrina, Brazil
- EV311 New Discovery of Eco Plyfibre via Pineapple Leaf and Recyclable Plastic for Future Sustainability**
 Nurul Najiha Binti Mohd Roslan, 17, Junior
 Nur Hanis Suriani Binti Mohd Zaini, 16, Junior
 Mara Junior Science College Terendak, Malacca, Malaysia
- EV312 Water Integrated Desalination System using Graphene Sheets and Silver Nano Particles**
 Demiana Ayad Abdelmalak, 16, Junior
 Mayar Mossad Allam, 16, Junior
 #
 Marwa Abd El-Raouf Ibrahim, 16, Junior
 Maadi STEM School for Girls, Cairo, Egypt
- EV313 Use of Lichens as Indicators of Air Quality in Jeju Island, Korea**
 Minseong Go, 16, Junior
 Jeongin Kang, 16, Junior
 Hyeon Woo Song, 16, Junior
 Namnyeong High School, Jeju-si, South Korea
- EV314 Investigating the Fermentation and Distillation of Ethanol from an Invasive Species**
 Irene Kekaulani Kuikahi, 17, Senior
 Jasmin Corpuz Valera, 17, Senior
 Waipahu High School, Waipahu, Hawaii
- EV315 Dispose Waste Lubricant in Soil and Fresh Water by Strains of Microorganisms Isolated in Nature**
 Hong Minh Huynh Duong, 17, Junior
 Anh Mai Nhu, 16, Junior
 Uyen To Tran, 16, Junior
 Tran Dai Nghia High School for the Gifted, Ho Chi Minh, Viet Nam
- EV316 Grains of Gold**
 Hayat Abdulredha Abu Alhassan, 16, Senior
 Shamma Faisal Al Bastaki, 17, Senior
 Al Ittihad Private School-Jumeira, Dubai, United Arab Emirates
- EV317 The Esquilmo Whey of Natural Cheese an Alternative to Prevent Fires at Home**
 Jesus Benitez Serrano, 17, Junior
 Clara Gomez Quintana, 18, Senior
 Colegio de Estudios Cientificos y tecnologicos del Estado de Mexico Plantel Aculco, Aculco, Mexico
- EV318 MENTH-RID-RAT**
 Imran Bin Miwan, 17, Freshman
 Nur Arifah Binti Mohamad Jamil, 16, Freshman
 SMK Seri Kenangan, Segamat, Malaysia
- EV319 Prevention of Acid Rain Effects with Sacrificial Metals and Development of a Detection System**
 Jorge Cordero Bermudez, 17, Senior
 Miguel Gomez Cid, 17, Senior
 Queila Bouza Peteiro, 17, Senior
 Aulas Tecnopole, Ourense, Spain

Mathematical Sciences

- MA001 A Novel Mathematical Simulation to Study the Dynamics of CD4 Cells, CD8 Cells, and HIV Viral Load**
Nirali Kunjan Thakor, 16, Sophomore, Shepton High School, Plano, Texas
- MA002 The Secret Formula**
Brandon Owen Locknar, 15, Freshman, Chaffin Junior High School, Fort Smith, Arkansas
- MA003 Continued Fractions and Euclidean Algorithm in Unique Factorization Domains**
Nikita Kondratyionok, 16, Sophomore, Minsk Gymnasium No.41, Minsk, Belarus
- MA004 An Application of Calculus Principles to Icicle Volume**
Jacob Floyd Nichols, 18, Senior, Brush High School, Brush, Colorado
- MA005 Olympics Year Two: Battle of the Genders**
Brandon Michael Williams, 16, Junior, Belleview High School, Belleview, Florida
- MA006 Mathematically Modeling Genetic Amplification**
Pranav Ishaan Warman, 15, Sophomore, Academy at the Lakes, Land O' Lakes, Florida
- MA007 Continued Fractions of Quadratic Numbers**
Aranka Hruskova, 19, Senior, Gymnazium Christiana Dopplera, Prague, Czech Republic
- MA008 Hybridized Characteristic 3 Galois Field Arithmetic for Elliptic Curve Cryptography, Phase III**
Vinay Sridhar Iyengar, 18, Senior, Oregon Episcopal School, Portland, Oregon
- MA009 Characterization of the Line Complexity of Cellular Automata Generated by Polynomial Transition Rules**
Bertrand Andrew Stone, 16, Senior, Nicolet High School, Glendale, Wisconsin
- MA010 A New Method to Determine the Properties of Solutions to One-Variable Cubic Equations with Integral Coefficients**
BoLi Fang, 18, Senior, Chengdu YuLin High School, Chengdu, China
- MA011 Optimal Therapy Design for Pancreatic Cancer Using a Boolean Network-Based Simulation**
Chaarushena Deb, 17, Senior, Liberal Arts and Science Academy High School, Austin, Texas
- MA012 A Rational Story of Pi: From Asymmetrical Cut to Weighted Average**
Kuan-Yu Wang, 13, Freshman, San Min Junior High School, Kaohsiung, Chinese Taipei
- MA013 Weighted Catalan Numbers and Their Divisibility Properties**
Sarah Lee Shader, 17, Senior, Laramie High School, Laramie, Wyoming
- MA014 The Math of Cancer: The Effects of Statistical Analysis on P-Value**
Haylee Jo Johnson, 16, Sophomore, Southwest Livingston County R-I High School, Ludlow, Missouri
- MA015 Hidden Secrets in Cevian Triangles**
Shahar Silberstein, 16, Junior, Makif Alef, Be'er Sheva, Israel
- MA016 A New Statistical Measure of Effect Size: Rate-Adjusted Standardized Mean Difference (RASMD)**
Katherine Marie Webb, 17, Senior, Tabb High School, Yorktown, Virginia
- MA017 Developing a Unique Model to Predict the Efficacy of a Revolutionary Cancer Therapy**
Rachel Burns, 18, Senior, Loudoun County Academy of Science, Sterling, Virginia
- MA018 Patterns in Random Numbers**
Prajwal Shivanand, 15, Freshman, Vagdevi Vilas School, Bangalore, India
- MA019 Patterns in Exponents**
Isak Romero, 15, Sophomore, Academia del Perpetuo Socorro, San Juan, Puerto Rico
- MA020 Facility Location Problems and Non-Leibniz Analysis on Complex Plane**
Oleksandr Tytov, 16, Junior, School-Lyceum #3 named after A. S. Makarenko, Simferopol, Ukraine
- MA021 On the Unique Roles of Neurocomputational States in Neocortical Circuits**
Archib Bhandarkar, 18, Senior, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia
- MA022 Base 1.5: Analysis of Properties and Relation to the Collatz Conjecture**
Jesse Martin Michel, 17, Junior, Massachusetts Academy of Math and Science at WPI, Worcester, Massachusetts
- MA023 The Speeds of Families of Intersection Graphs**
Jessica Shi, 17, Senior, Montgomery Blair High School, Silver Spring, Maryland
- MA024 Odd Dunkl Operators and nilHecke Algebras**
Ritesh Narayan Ragavender, 17, Senior, South Brunswick High School, Monmouth Junction, New Jersey
- MA025 Identification of the Impact of Obesity Treatments on Gene Expression using a Novel Statistical Test**
Shreya Mathur, 17, Senior, Oxford High School, Oxford, Mississippi
- MA026 An Application of Polynomials to Generate Pythagorean Triples**
Faviola Marrero-Soto, 15, Sophomore, Ramon Power y Giralt, Las Piedras, Puerto Rico
- MA027 Approaching Factorial Numbers by Refining Stirling's Formula**
Carlos Javier Lopez-Sierra, 16, Junior, University Gardens High School, San Juan, Puerto Rico
- MA028 Applying Game Theory, Statistics and Linear Algebra to Real Life Situations**
Ray Alexander Rosario, 15, Sophomore, University Gardens High School, San Juan, Puerto Rico
- MA029 Development and Comparative Analysis of Machine Learning Algorithms for Breast Cancer Detection**
Clemen Deng, 16, Sophomore, Lincoln High School, Portland, Oregon
- MA030 Distance, Kinematic & Isometry in Geometry**
Yad Luqman Hakim, 17, Junior, Private Salahaddin Ayyubi College, Sulaimania, Iraq
- MA031 Matrix Generalizations of the Euler Function**
Danila Baigushev, 16, Sophomore, Lyceum "Vtoraiia Shkola", Moscow, Russian Federation
- MA032 A Monte Carlo Protein Folding Simulation using Energy Optimization with Novel Applications to Alzheimer's Disease Research**
Niranjana Balachandar, 17, Junior, Texas Academy of Mathematics and Science, Denton, Texas
- MA033 Me, Mean, or Median: Which Is More Accurate at Determining Solutions to Questions that Can Only Be Quantified Empirically?**
Megan Harris, 15, Freshman, Weber High School, Pleasant View, Utah
- MA034 On the Lower Central Series of PI-algebras**
Rumun Rumunov Dangovski, 18, Senior, Sofia High School of Mathematics, Sofia, Bulgaria
- MA035 Covering Squares of Side Length $n+\epsilon$ with Unit Squares**
Rayna Dimchova Gadzheva, 18, Junior, Mathematical High School 'Konstantin Velichkov', Pazardzhik, Bulgaria
- MA036 On the Hamiltonicity of Cubic, Polyhedral, Bipartite Graphs**
Paul Clarke, 17, Junior, St. Paul's College Raheny, Dublin, Ireland
- MA037 Winning the War against Hackers: A Hybrid Asymmetric Cryptographic Algorithm for Safe and Secure Data**
Sasank Venkata Vishnubhatla, 15, Sophomore, duPont Manual High School, Louisville, Kentucky

- MA038 An Investigation of the p53 Ubiquitin-Proteasome System Using a Novel Non-Steady-State Enzyme Kinetic Model**
Prem Murali Talwai, 16, Junior, Mira Loma High School, Sacramento, California
- MA039 Mysteries of the Euclidean Algorithm Revealed with Applications**
David Chang Luo, 16, Sophomore, Baton Rouge Magnet High School, Baton Rouge, Louisiana
- MA040 The Impact of Demand Elasticity on the Downs-Thomson and Braess Paradoxes**
Rishi Suvir Mirchandani, 17, Junior, Fox Chapel Area Senior High School, Pittsburgh, Pennsylvania
- MA041 On the Number of Linear Extensions of Graphs**
Annie Hu, 16, Senior, Lexington High School, Lexington, South Carolina
- MA042 A New Method of Discovering Mathematical Proofs**
Matthew Adam Weidner, 18, Senior, Brandywine Heights Area High School, Tipton, Pennsylvania
- MA043 Characterizing the n-Division Points of Genus-0 Curves through Straightedge and Compass Constructions**
Nitya Mani, 16, Junior, The Harker School, San Jose, California
- MA044 Modeling Plant Growth with Mathematical Functions**
Shantanu Jakhete, 13, Freshman, South Fork High School, Stuart, Florida
- MA045 Alternative Proof of 100 Inequalities: Method of Separating Tangents**
Adilsultan Lepes, 17, Junior, Republican Physics and Mathematics School named after O.Zhautikov, Almaty, Kazakhstan
- MA046 Explaining the Map and the Matrix of the Discrete Lambert Exponentiation**
Krishan Shashi Kumar, 17, Senior, Terre Haute South Vigo High School, Terre Haute, Indiana
- MA047 Applying Bayes' Theorem to DNA Sequence for Identification of Pathogenic Bacteria**
Min Jean Cho, 16, Sophomore, Torrey Pines High School, San Diego, California
- MA048 Calculations on Randomness Effects on the Business Cycle of Corporations through Markov Chains**
Christian Holm, 18, Senior, Procvitas Privata Gymnasium Helsingborg, Helsingborg, Sweden
- MA049 Determining the Effectiveness of an Optimization Matching in Kidney Paired Donation Using Graph Theory**
Srimayi Tenali, 15, Sophomore, West Shore Junior-Senior High School, Melbourne, Florida
- MA050 Functional Equations: Rational Functions and Their Matrix Isomorphism**
Joshua Alan Rhodes, 17, Junior, Saginaw Arts and Sciences Academy, Saginaw, Michigan
- MA051 Completing Polynomials of n-th Order, Super Conic Sections and New Geometric Shapes**
Ala'a Abdel Hadi Abu Mahfouz, 17, Junior, Princess Basmah School, Amman, Jordan
- MA052 On the Theory of Lures with Dynamical Action on Compact Topological Manifolds and Ordinary Hyperreal Fractal Strings**
Jared Anthony Tramontano, 15, Sophomore, Centennial High School, Corona, California
- MA053 Do You Get What You Pay For?**
Margaret Elizabeth Mahaffey, 16, Sophomore, Dekalb County High School, Smithville, Tennessee
- MA054 Dynamic Mathematics on Smartphones and Tablets**
Lennart Julian Kleinwort, 14, Freshman, Friedrich-Koenig-Gymnasium, Wurzburg, Germany
- MA055 Planning for the Future: Is IB the Answer?**
Noel P. Vineyard, 18, Senior, Earl Wooster High School, Reno, Nevada
- MA056 Cohomology of Finite Groups without Homological Algebra**
Nikolai Mostovskii, 16, Junior, The Laboratory for Continuous Mathematical Education, St.Petersburg, Russian Federation
- MA057 Creating Permutations for Actions on Young Tableaux**
Jennifer Jude Zhifan Jones, 16, Junior, Frontier Academy, Greeley, Colorado
- MA301 Quadratic Tool**
Ahmad Aulia Justisiananto, 17, Senior
Galih Pradipto Wisnujati, 18, Senior
Sma Negeri 1 Yogyakarta, Yogyakarta, Indonesia
- MA302 A Regional Analysis of Twitter as an Effective Means to Monitor the Spread of the 2012-2013 Influenza Epidemic**
Luke Matthew Farrell, 16, Junior
Sarah Alyse Jacobs, 17, Junior
Hauppauge High School, Hauppauge, New York
- MA303 Discovery of Significant Tissue Specific DNA Methylation Patterns and Motif Analysis in NPAS3 Gene in Schizophrenia-Diseased Individuals**
Natasha Patel, 18, Senior
Soniya Qadir, 18, Senior
Lake Highland Preparatory School, Orlando, Florida
- MA304 Comparative Study on the Efficiency of the Stochastic and Wall Follower Methods of Solving Mazes in Three Dimensions**
Axel Gabriel Diaz Morales, 18, Senior
Gian Carlo Rivera Crespo, 17, Senior
Brigida Alvarez Rodriguez Mathematics and Science High School, Vega Baja, Puerto Rico
- MA305 Auto-generation of High-Efficiency Transportation Networks**
Ian Yiran Huang, 15, Sophomore
William Zong Ye Yang, 16, Sophomore
International School of Beijing, Beijing, China
- MA306 N-gon with the Maximum Area for Equal Length of Perimeter**
Sathaporn Insan, 17, Junior
Ronnakrit Panphom, 17, Junior
Pitipong Suwanmaneechot, 17, Junior
Nakhon Sawan School, Nakhonsawan, Thailand
- MA307 Deriving Some Trigonometric Identities and Inequalities in Triangles Using Vieta's Theorem**
Inal Ergun, 16, Junior
Yunus Tuncbilek, 17, Senior
MEF High School, Istanbul, Turkey
Ataturk High School of Science, Istanbul, Turkey
- MA308 Bracelet Problem with Identical Beads**
Hamdi Gökten Ozmenekse, 18, Senior
Ata Aydin Uslu, 18, Senior
Edirne Suleyman Demirel Fen Lisesi, Edirne, Turkey

Medicine and Health Sciences

- ME001 The Effect of Hypoxia on Human Osteosarcoma Cells' Motility and Expression of HIF-1 and HIF-2**
Morgan Sofia Lucey, 17, Junior, Episcopal School of Jacksonville, Jacksonville, Florida
- ME002 Acne Treatments**
Angelle Leger, 16, Junior, Alfred M. Barbe High School, Lake Charles, Louisiana
- ME003 The Use of MnSOD in Combined Modality Therapy to Sensitize Lung Cancer Cells to Ionizing Radiation and Chemotherapy**
Ahneesh Jayant Mohanty, 17, Junior, Plano Senior High School, Plano, Texas
- ME004 Mela NO MORE: Creating Novel and Potent siRNA-based Biotherapies for the Treatment of Melanoma**
Robert M. Bacchus, 17, Senior, Lincoln Park Academy, Fort Pierce, Florida
- ME005 Nicotine and Genistein as Novel Therapeutic Agents for Alzheimer's Disease**
Meenakshi Bose, 16, Junior, Eastside High School, Gainesville, Florida
- ME006 Characterizing Axillary Lymph Nodes**
Jack Collison, 16, Sophomore, University School of Milwaukee, Milwaukee, Wisconsin
- ME007 Combinations of Immune Checkpoint Blockade Inhibitors and Lymphodepletion as Immunotherapy for Myeloma**
Dominique Helen Tlomak, 17, Senior, University School of Milwaukee, Milwaukee, Wisconsin
- ME008 Correlation between Histology of Collagen Fiber and Muscle Strength in Athletes with Joint Hypermobility**
Tatiana Ciocler Trahtenberg, 16, Junior, Escola Antonietta e Leon Feffer, São Paulo, Brazil
- ME009 Seeking a Cure II: Targeting ER β in a Novel Cost-Effective Treatment for Ovarian Epithelial Cancer**
Jocelyn Elizabeth Hernandez, 17, Junior, STEM Academy at Robert E. Lee High School, San Antonio, Texas
- ME010 Natural Remedy for Pancreatic Cancer**
Trisha Mulamreddy, 16, Junior, Keystone School, San Antonio, Texas
- ME011 MUC1 as a Biomarker for TGF- β 1 Inhibition: Investigating the Role of MUC1 in the Switch of TGF- β 1 Function from a Tumor Suppressor to a Tumor Promoter in Pancreatic Ductal Adenocarcinoma**
Emily Lorin Ashkin, 16, Junior, Providence Day School, Charlotte, North Carolina
- ME012 Interfering with Glioblastoma Multiforme (GBM) Metabolism to Complement the Therapeutic Effects of Temozolomide**
Darin Garrett, 18, Senior, Harker Heights High School, Harker Heights, Texas
- ME013 Light It Up**
Savannah Elizabeth Floyd, 14, Freshman, Ruston High School, Ruston, Louisiana
- ME014 Fat Content of Beef**
Kayla Hooker, 16, Junior, Kailua High School, Kailua, Hawaii
- ME015 Investigating the Effect of Polyhydroxylated Small-Gap Fullerene as an Antioxidant for Amyloid β -Induced Free Radicals in NT2 Cells**
Alexander Torres, 18, Senior, Seminole High School, Sanford, Florida
- ME016 The Effects of Miraculin on Blood Glucose Levels as Compared to Sucrose, Saccharin, and Aspartame**
Hope Louise Didier, 16, Sophomore, McIntosh High School, Peachtree City, Georgia
- ME017 TETEBENE: Effects of the Experimental Therapeutic Model Isolated Peptide Toxic-prodrug in the Treatment of Subjects with Breast Cancer and with/without Diabetes**
Demetrio Agustin Rodriguez Fajardo, 18, Junior, Centro de Enseñanza Tecnica Industrial Plantel Colomos, Guadalajara, Mexico
- ME018 Evaluation of Ventricular Mass for Hypertrophic Cardiomyopathy using 4D Echocardiography**
Hannah Tam, 16, Junior, Winston Churchill High School, Eugene, Oregon
- ME019 Schwann Cell Differentiation from Stem Cells of Neurofibromatosis Patients and Normal Controls**
Amrita Mohanty, 17, Junior, Woodbury High School, Woodbury, Minnesota
- ME020 Development of a Novel Blood-Based Diagnostic for Canine Lymphosarcoma**
Golda R. Shaw, 17, Junior, George M Steinbrenner High School, Lutz, Florida
- ME021 Vitellogenin 6: A Novel Neuroprotective Gene Target for Epilepsy Treatment**
Duy Q. Phan, 17, Senior, Upper Arlington High School, Upper Arlington, Ohio
- ME022 Hydrogen Sulfide Ameliorates Hearing Loss during Ischemic Stroke**
Chitra Dileep Kumar, 16, Junior, Ballard High School, Louisville, Kentucky
- ME023 The Impact of Deuterium Oxide on the Cell Cycle of RBL Cell during Interphase via Tubulin-mediated Antimitotic Action**
Roshni S. Kalkur, 17, Junior, Air Academy High School, United States Air Force Academy, Colorado
- ME024 α -synuclein rs356219 Polymorphisms in Patients with Gaucher Disease and Parkinson's Disease**
Daniel Ben Zion Ioscovich, 17, Senior, Israel Arts and Science Academy, Jerusalem, Israel
- ME025 Pharmaceutical Solution for Blood Clotting Using Honey, Honey Wax, Etamsylate, and Adrenaline Injection**
Laith Imad Al-Abdallat, 16, Junior, Jubilee School, Amman, Jordan
- ME026 How Fast Is Fast?**
Alec Jay Ziebarth, 15, Freshman, Wilcox-Hildreth Public School, Wilcox, Nebraska
- ME027 Quizartinib (AC220) Reverses ABCB1- and ABCG2-Mediated Multidrug Resistance**
Kanav Gupta, 16, Junior, Jericho Senior High School, Jericho, New York
- ME028 Too Much of a Good Thing? A Novel Role of Osteopontin as an Anti-Obesity Cytokine and Its Implication in Obesity-Related Disease**
Lelina T. Chang, 17, Senior, William A. Shine Great Neck South High School, Great Neck, New York
- ME029 Killed by Sweetness**
Karishma Sunil Patel, 14, Freshman, Grants High School, Grants, New Mexico
- ME030 A Natural Way to Improve Chemotherapy: Investigating the Effect of Biochanin A on the Efficacy of Thapsigargin in a *C. elegans* Cancer Model**
Audrey Lyn Francis, 17, Senior, Loudoun County Academy of Science, Sterling, Virginia
- ME031 Inhibiting the Growth of the *Aedes aegypti* Larvae on Used Car Tires Utilizing Baby Oil Capsules: Dengue Fever Primary Prevention**
Francisco Antonio Alvarado, 15, Freshman, Colegio San Ignacio de Loyola, San Juan, Puerto Rico

- ME032 The Accuracy of Blood Pressure to Determine Lying due to Stress Levels**
Samantha Rose Walter, 15, Sophomore, Taconic High School, Pittsfield, Massachusetts
- ME033 A Novel Egg Timer Test on the Horizon: Changing Womens' Lives**
Tanya Kumar, 14, Freshman, Clear Brook High School, Friendswood, Texas
- ME034 Novel Single-Cell Screening: Optimized Droplet-Based Microfluidics for High-Throughput Screening of Adherent Cells**
Jason Shao Cui, 18, Senior, Langley High School, McLean, Virginia
- ME035 Curcumin vs. Cancer: The Effects of Curcumin on MCF-7 Breast Cancer Cells**
Katrina Marie Mamaty, 16, Junior, Calvary Chapel Academy, Rockland, Massachusetts
- ME036 Stiletto Stress: The Effect of Increased Plantar Flexion on the Degree of Pronation and Supination in the Ankle**
Amy Elizabeth Santos, 16, Sophomore, Taunton High School, Taunton, Massachusetts
- ME037 Characteristics of Deleterious Mutations in Tumor Suppressor Genes**
Nathan Han, 15, Freshman, Boston Latin School, Boston, Massachusetts
- ME038 Early Cancer Diagnosis and Treatment through the Detection of Circulating Tumor Cells Using Drop-based Microfluidics**
Neil Davey, 18, Senior, Montgomery Blair High School, Silver Spring, Maryland
- ME039 Cancerous Tumor Identification from MRI Image Analysis**
Madhurima Das, 17, Senior, Plymouth High School, Canton, Michigan
- ME040 A Novel In-Clinic Patient- and Cancer- Tailored Targeted Drug Delivery System**
Jay Harshad Mehta, 18, Senior, Port Huron Northern High School, Port Huron, Michigan
- ME041 The Effect of Veterinary Vaccines on Lake County and Ohio's Public Health**
Heather L. Walker, 17, Senior, Mentor High School, Mentor, Ohio
- ME042 Alteration in Androgen Receptor Expression by the 3' Untranslated Region**
Dhweeja Dasarathy, 14, Freshman, Hawken School, Gates Mills, Ohio
- ME043 Development of an Electroencephalography (EEG) Device for Evaluation of Mild Traumatic Brain Injury, Year Two**
Braeden Christopher Benedict, 17, Junior, Palos Verdes Peninsula, Rolling Hills Estates, California
- ME044 Is There Gliosis in the Autistic Brain?, Year Two**
Isabel Maria Torres, 16, Sophomore, The Villages High School, The Villages, Florida
- ME045 Does Aspartame or Insulin Affect the Regeneration of Planarian Worms?**
Darienne Lovern Frericks, 15, Sophomore, Northwestern High School, Mellette, South Dakota
- ME046 Induced Pluripotent Stem Cell-Derived Cardiomyocytes as a Model for Ischemia Reperfusion Injury**
Karina Noel Schmidt, 17, Junior, Divine Savior Holy Angels High School, Milwaukee, Wisconsin
- ME047 Investigation of CD8 T Cell Dynamics in Pathogenic and Non-pathogenic SIV Infection**
Angelin Ponraj, 17, Senior, Gwinnett School of Mathematics, Science, and Technology, Lawrenceville, Georgia
- ME048 Sugar Rush Sugar Crash: Analyzing the Effect of Sugar on Physical and Mental Performance Using ANOVA**
Chris Mathews, 14, Freshman, Home School, Las Vegas, Nevada
- ME049 Evaluation of Balance Skills in Male Subjects Aged 6-7 Years**
Romy Talia Bloch, 16, Junior, Herzlia High School, Cape Town, South Africa
- ME050 Automated ECG Feature Extraction with Mathematical Morphology**
Jonah Ng, 15, Sophomore, Las Cruces High School, Las Cruces, New Mexico
- ME051 No Bull about It: Antioxidants Prevent DNA Damage**
Arjana Begzati, 17, Junior, Fleming High School, Fleming, Colorado
- ME052 Athletic Kicks vs. Strain of the Patellar Tendon**
Mackenzie T. Grubb, 16, Junior, Braden River High School, Bradenton, Florida
- ME053 The Role of TNF-alpha in the Progression of Diabetic Nephropathy**
Alyssa P. Pennington, 18, Senior, Murrah High School, Jackson, Mississippi
- ME054 The Extract of the *Moringa oleifera* Tree Leaves as an Inhibitor of Colorectal Cancer Cells**
Carlos Francisco Rivera, 17, Junior, Jose Rojas Cortes, Orocovis, Puerto Rico
- ME055 Dengue or Leptospirosis?**
Miguel Geraldo Rodriguez, 16, Junior, Specialized School in Science and Mathematics Genaro Cautino Vazquez, Guayama, Puerto Rico
- ME056 Comparative Study of Aqueous and Ethanolic Extracts of *Annona muricata* L. Leaves in the Inhibition of the Inflammatory Breast Cancer Cells SUM-149 (Second Phase)**
Shannie Annjulisha Castilloveitia, 17, Senior, Specialized Science and Math Secondary School Thomas Armstrong Toro, Ponce, Puerto Rico
- ME057 Genetic and Immunological Responses to Infection with Periodontal Pathogens in the Development of Atherosclerotic Vascular Disease in ApoE -/- Mice**
Niyanthesh Reddy, , Junior, Vanguard High School, Ocala, Florida
- ME058 Aqueous Extracts of *Cinnamomum spp.*, *Syzygium romaticum* and Cinnamaldehyde and Their Effects on the Growth of MDA-MB-231**
Emma Fine, 16, Sophomore, DaVinci Academy of the Science and the Arts, Ogden, Utah
- ME059 Colorectal Cancer: Vitamin D Receptor Deficiency Upregulates Expression of Claudin 5**
Weipeng Zhang, 17, Senior, Whitney Young Magnet High School, Chicago, Illinois
- ME060 Treating GBM BTSCs through Growth Factor Stimulation and Drug-Polymer Conjugate Therapy**
Sujay Nagaraj, 17, Senior, Western Canada High School, Calgary, Canada
- ME061 Evolution of Developing an Alternative Treatment for *Candida albicans* using Natural Plant Extracts**
Surabhi Gopal Mundada, 14, Freshman, Olympia High School, Olympia, Washington
- ME062 AKT and pAKT Expression in Different Insulin Sensitive Tissues from C57BL/6J Mice**
Nanda Krishnan Siva, 17, Senior, Parkersburg High School, Parkersburg, West Virginia
- ME063 Myoblast Encapsulation for Novelty Muscular Dystrophy Gene Therapy**
Marquise Walker, 17, Senior, Lindblom Math and Science Academy, Chicago, Illinois
- ME064 Computer Enhanced Analysis of Images from Immunohistochemistry**
Lyubomir Lyubchov Yanchev, 19, Senior, Private Language School Erich Kaestner, Sofia, Bulgaria
- ME065 INGAP Circles around Diabetes**
Alexandra Cohen, 16, Junior, St. George's School of Montreal, Montreal, Canada
- ME066 The CYP2C19 Polymorphisms in Saudi Population: Clinical Response to Clopidogrel in Coronary Artery Disease**
Abdulkareem Hmoud Alharbi, 17, Senior, Manarat Riyadh Schools, Riyadh, Saudi Arabia

- ME067 Fighting for the Orange Ribbon: Acute Myeloid Leukemia Type-3 Differentiation Triggered by Cisplatin**
Jumanah Marwan Alsawaf, 16, Senior, Dar AlFiker School, Jeddah, Saudi Arabia
- ME068 Determining the Effect of Red Sea Sponge: Associated Bacteria against HIV-1 Integrase and HeLa Cancer Cell Line**
Hajar Adel Alreefi, 17, Senior, AlTarbyah Alislamiyah, Riyadh, Saudi Arabia
- ME069 The Effect of Qigong-Chinese Breathing Exercise of the Forced Vital Capacity of Participants with Different Breathing Habits**
Emma Marie Johnson, 18, Senior, Central High School, Aberdeen, South Dakota
- ME070 A Novel Device for the Diagnosis of Chronic Transplant Rejection**
Demetri Maxim, 16, Sophomore, Gould Academy, Bethel, Maine
- ME071 Man and Medical Machine: For Better or Worse**
Sophia Brown, 15, Sophomore, Anoka High School, Anoka, Minnesota
- ME072 Effect of Bacterial Quorum Sensing Molecule N-3-oxo-Dodecanoyl-L-Homoserine Lactone on Human Pancreatic Carcinoma Cells**
Ashwath Kumar, 18, Senior, David H. Hickman High School, Columbia, Missouri
- ME073 Investigating the Opposing Roles of Oncoprotein gC1qR and Tumor Suppressive cC1qR as Mechanisms for Inhibiting Cancer Pathogenesis**
Emily M. Pang, 17, Senior, Dougherty Valley High School, San Ramon, California
- ME074 Progressing Targeted Cancer Therapy and Diagnosis: Analyzing the Role of MiRNA Target Interactions and Expression Signatures for Glioblastoma Progression**
Vaishnavi Shrivastava, 16, Junior, Mission San Jose High School, Fremont, California
- ME075 A Novel Study on Behavioral and Reproductive Consequences of Embryonic Exposure to BPA and BPS in the *C. elegans* Model**
Bansri Manesh Patel, 17, Senior, Sussex Technical High School, Georgetown, Delaware
- ME076 Do Brainwaves Have an Effect on Cognitive Abilities?**
Alexander Feistritzer, 16, Sophomore, Central York High School, York, Pennsylvania
- ME077 A Wearable Ultrasonic Device for the Early Detection of Tumor Recurrence**
Milan Satch Gambhir, 15, Sophomore, Bellarmine College Preparatory, San Jose, California
- ME078 Treat Chronic Lymphedema: The Effects of Apigenin, Diosmetin, and Chicoric Acid on TNF-Alpha and COX-2 Levels of Stimulated RAW 264.7 Macrophages**
Catharine Antonina Bowman, 15, Sophomore, St. Mary Catholic Secondary School, Hamilton, Canada
- ME079 Isothermal Nucleic Acid Amplification System for Point-of-Care HIV Diagnosis**
Nicole Sabina Ticea, 15, Sophomore, York House School, Vancouver, Canada
- ME080 Personalized Medicine: A Novel Quantum Dot Bioconjugate Targeted Cancer Therapy**
Amit Scheer, 15, Sophomore, Colonel By Secondary School, Ottawa, Canada
- ME081 Analyzing the Effect of Curcumin on a Cervical Cancer Line**
Vasu Malhotra, 15, Sophomore, F.W. Springstead High School, Spring Hill, Florida
- ME083 Epithelial Mesenchymal Transition Enhances Perineural Invasion in Pancreatic Adenocarcinoma**
Erica Lin, 16, Junior, Hunter College High School, New York, New York
- ME084 An Exploratory Investigation of microRNA Regulation of ACSL4 in Androgen Deprivation Therapy Resistant Prostate Cancer**
Xinxin Du, 18, Senior, Scarsdale High School, Scarsdale, New York
- ME085 Development of a Multi-Sensory System to Better Relay Pharmacotherapy Information**
Matthew Mark O'Connell, 16, Junior, Commack High School, Commack, New York
- ME086 Are Sialic Acid Levels Altered in Human GM3 Synthase Deficiency?: Comparison to Ganglioside GM3 Levels in Amish Infantile-Onset Epilepsy Syndrome**
Jenny Taylor Eurich, 18, Senior, Elizabethtown Area High School, Elizabethtown, Pennsylvania
- ME087 What's in Your Smoothie?**
Anna Lauren Carr, 15, Freshman, Starkville Christian School, Starkville, Mississippi
- ME088 The International Medical Unit (UMI)**
Radwan El Othman, 18, Freshman, Rawdat El fayha School, Tripoli, Lebanon
- ME089 Molecular Characterization and Screening of Metabolic Diseases Ornithine Transcarbomylase Deficiency (OTC) and Citrullinemia (CIT) among Puerto Ricans**
Andrea Monique Rivera - Corona, 17, Senior, Escuela Secundaria Especializada en Ciencias, Matemáticas y Tecnología (CIMATEC), Caguas, Puerto Rico
- ME090 Analyzing Novel Functions of Arb1 Ribosome Biogenesis Gene in *Saccharomyces cerevisiae*: A Suppression Analysis**
Priya Kiran Khanolkar, 16, Junior, Keokuk High School, Keokuk, Iowa
- ME091 Adolescent Loss of Lis1 Results in Defective Hippocampal Morphology and Distinct Behavioral Deficits Resembling a Schizophrenic-Like Phenotype**
Leighton Braunstein, 17, Senior, The Dalton School, New York, New York
- ME092 Loss of TDP43 in Motor Neurons Leads to Deficits in Axonal RNAs in an Animal Model of ALS**
Karan Desai, 17, Senior, Edgemont High School, Scarsdale, New York
- ME093 The Forgotten Cancer: A Three-Pronged Approach: (1)MRI Analysis of Disease Localization, (2)Optimization of ZFN Therapy,(3) *In vitro* Implementation of ZFR Treatment**
Viputheshwar Sitaraman, 16, Senior, Hamilton High School, Chandler, Arizona
- ME094 The SMART System: Stroke Management with Augmented Reality Technology**
Ethan Thomas Butson, 18, Junior, The Illawarra Grammar School, Mangerton, Australia
- ME095 The Diagnostic Potential of Brain Derived Neurotrophic Factor in Mild to Moderate Depression**
Arjuna Sathyadeep Maharaj, 17, Senior, Ancaster High School, Ancaster, Canada
- ME096 Lipoproteins as a Vehicle for Targeted and Selective Delivery of Hydrophobic Drugs to Cancer Cells**
Kristina Ulicna, 18, Senior, Gymnazium Krompachy, Krompachy, Slovakia
- ME097 What Effect Do Goji Berries Have on the Viability of Alzheimer's Sick *Drosophila melanogaster*?**
Alexandra Svensson, 18, Senior, Katedralskolan in Linkoping, Linkoping, Sweden
- ME098 Alzheimer's Disease Distribution in the Northwest in Relation to Microclimates, a Second Year Epidemiological Study**
Talia Alysse Lichtenberg, 16, Sophomore, West Linn High School, West Linn, Oregon
- ME099 The Effect of Nerve Growth Factor on the Cardiac Regeneration of Zebrafish**
Nayla Labban, 17, Junior, Mills E. Godwin High School, Richmond, Virginia

- ME100** **Cytochrome C Oxidase Activity and Chemoresistance**
Tahireh Markert, 17, Senior, Indian Springs School, Indian Springs, Alabama
- ME101** **Towards a Combination Antiviral Therapy for Flu: An Interdisciplinary Drug Discovery Effort**
Eric S. Chen, 17, Senior, Canyon Crest Academy, San Diego, California
- ME102** **The Antimicrobial Efficacy of Nitric Oxide based on Release Rate from Mesoporous Silica Nanoparticles on *A. actinomycetemcomitans* and *S. mutans***
Shraddha Rathod, 18, Senior, North Carolina School of Science and Mathematics, Durham, North Carolina
- ME103** **Atherosclerosis-Inducing Cytotoxin 7-Ketocholesterol Is Mitigated by Exposure to 70-Kilodalton Heat Shock Protein in THP-1 Human Monocyte Cells**
Anne Yichen Feng, 17, Senior, North Carolina School of Science and Mathematics, Durham, North Carolina
- ME104** **A New Pathway for Alzheimer's Drugs: Modification of BACE1 to Decrease the Release of Beta Amyloid in the Brain**
Rahul Lall, 14, Freshman, Auburn Junior High School, Auburn, Alabama
- ME106** **Multicomponent Drug Delivery Systems Based on PLCL Nanofibers and Modified Gold Nanoparticles in Cancer Treatment**
Joanna Michalina Jurek, 17, Junior, I Liceum Ogólnokształcące im. Bolesława Chrobrego w Piotrkowie Trybunalskim, Piotrków Trybunalski, Poland
- ME107** **Comparative Study of the Effects of *Kalanchoe pinnata* Leaves Extracts, Obtained through Different Methods, in the Growth of *Pseudomonas aeruginosa*, *Streptococcus salivarius* and *Staphylococcus aureus* Bacteria**
Emily Lisandra Colon, 18, Senior, Specialized Science and Math Secondary School Thomas Armstrong Toro, Ponce, Puerto Rico
- ME108** **Determining the Active Compound in *Achyranthes aspera* Leaf Extract and Its Effects on the Cell Cycle and Growth of Pancreatic Cancer Cells**
Nanruoyi Zhou, 18, Senior, American Heritage School, Plantation, Florida
- ME109** **Quantitative Analysis of Macro-Cellular Biomarkers in Early Stage Ductal Carcinoma *in situ* (DCIS) Immunohistochemical Cytopathology Images Using Machine Learning**
Tanisha M. Joshi, 15, Freshman, Evergreen Valley High School, San Jose, California
- ME110** **The Effects of Theobromine, Theophylline, Paraxanthine, and Glucose on the Adenosine Circadian Cycle**
Wyatt Luke Limke, 18, Senior, Lewis and Clark Berthold High School, Berthold, North Dakota
- ME111** **Protecting DNA Structure and Function: Effectiveness of Common UV Radiation Barriers**
Kara E. Conley, 15, Freshman, Nicolet High School, Glendale, Wisconsin
- ME112** **The Role of a Novel Integrin Enhancing Protein Therapy to Protect Skeletal Muscle from Damage and Its Relationship to Fiber Type in a Mouse Model of Duchenne Muscular Dystrophy**
Annemarie R. Vogedes, 14, Freshman, Earl Wooster High School, Reno, Nevada
- ME113** **Evaluation of Herbal Product for Cure of Hemorrhoids**
Syeda Minahil, 18, Senior, Forward Girls Degree College, Peshawar, Peshawar, Pakistan
- ME114** **Aspirin and Salicylic Acid in the Combination with Inhibition of PI3K Promote Cell Death in Malignant Melanoma**
Emilia Petrikova, 19, Senior, The Secondary School of Jozef Gregor Tajovský, Banská Bystrica, Slovakia
- ME115** **The Effects of Lithium Chloride, Potassium Chloride and Valproic Acid Treatment on the Development of *Drosophila Oregon-R* and Midline Mutant Eyes**
Kelly Odom, 17, Junior, Forrest County Agricultural High School, Brooklyn, Mississippi
- ME116** **Hepatocyte Differentiation of hESC Cultured Under Xeno-Free and Feeder-Free Conditions**
Dhruba Biswas, 17, Senior, Mira Loma High School, Sacramento, California
- ME117** **Searching for the Fountain of Youth: Exploring the Relationship between the Natural Phenol Resveratrol and Diet to Examine Longevity in *Drosophila melanogaster***
Rachel Michelle England, 18, Senior, Demopolis High School, Demopolis, Alabama
- ME301** **The Effect of Extracted Phycocyanin from *Spirulina platensis* on Irradiated *Saccharomyces cerevisiae* Cells**
Luke Patrick Evans, 17, Senior
John Daniel Evans, 17, Senior
Viera High School, Viera, Florida
- ME302** **Enhancing Pancreatic Islet Function in an Obese Mouse Model**
Lawrence Conley Jacobs, 17, Junior
Chelse-Amoy Alicia Steele, 17, Senior
Rockdale Magnet School for Science and Technology, Conyers, Georgia
- ME303** **Cardiotoxicity of Cinnabar in Zebrafish Embryos**
Siu Yung Chan, 20, Senior
Man Wai Un, 17, Senior
Keang Peng Secondary School, Macao, China, Macao Special Administrative Region
- ME304** **Next-Generation Cancer Therapeutics: Enhancing Anti-Tumor Specificity of Antibody Drug Conjugates by N297Q Deglycosylation**
Shi Yuan (Elly) Meng, 17, Junior
Shi Chan (Amy) Meng, 17, Junior
Wilbert Tucker Woodson High School, Fairfax, Virginia
- ME305** **The Physiological Effects of Noise Pollution on the Cardiovascular System of *D. melanogaster***
Akanksh Chaudhary, 17, Senior
Marcelo Ferrari, 17, Senior
Bancroft School, Worcester, Massachusetts
- ME306** **Nanoparticle-Mediated Gene Delivery via Balloon Angioplasty to Suppress Intimal Hyperplasia**
Jenna Rose DiRito, 17, Senior
Serena Margaret Tharakan, 17, Senior
Academy for Medical Science Technology, Hackensack, New Jersey
- ME307** **A Novel Hybrid Non-invasive Clinical-Signal Processing Technique as Biomarker of Atrial Fibrillation**
Karthik Balaji Chakravarthy, 17, Junior
Rohit Vallabh Chakravarthy, 14, Freshman
Beavercreek High School, Beavercreek, Ohio
- ME308** **Evaluation of Delirium in the Intensive Care Unit Utilizing Confusion Assessment Methods**
Anika Batta, 17, Senior
Mackenzie Treu Brown, 15, Sophomore
Lake Highland Preparatory School, Orlando, Florida
- ME309** **Dnmt3l: A New Genetic Factor in Obesity**
Abigail Harvey, 18, Senior
Andrew Richard Reilley, 17, Junior
Roger Wolcott Van Peski, 18, Senior
The Maine School of Science and Mathematics, Limestone, Maine
- ME310** **Supertasting Ability, Satiety, and Childhood Obesity in the Hispanic Population**
Japmeet Kaur Sandhu, 16, Junior
Ashima Thusu, 15, Sophomore
Clovis North Educational Center, Fresno, California

- ME311 Beauty or Beast: A Study of Microbial Growth on Artificial Nails in the Healthcare Field**
Ashleigh Dawn Fraser, 17, Senior
Leah Dawn Guskjolen, 17, Senior
Willcox High School, Willcox, Arizona
- ME312 The Effect of Nitric Oxide on Cellular Adhesion in Head and Neck and Breast Cancer Cells**
Ashok Arjunakani, 17, Senior
Philip Nebres, 18, Senior
Illinois Mathematics and Science Academy, Aurora, Illinois
- ME313 Elucidating the Mechanism of the Ketogenic Diet as an Effective Adjuvant Therapy for Malignant Glioma: A Multiphase Study to Characterize Alterations in Tumor-Associated Inflammatory and Growth Factor Signaling**
Rajet Vatsa, 17, Senior
Claire Jayne Woodrow, 17, Senior
Brophy College Preparatory, Phoenix, Arizona
Xavier College Preparatory, Phoenix, Arizona
- ME314 Development of Pollen Allergens Specific IgE Detection in Allergic Patient through the ELISA Technique**
Chana Chaovanitkul, 16, Junior
Kwansiri Krairaweengarmwijitr, 17, Junior
Sasipach Wattanaprakarnchai, 17, Junior
Mahidol Wittayanusorn School, Nakhon Pathom, Thailand
- ME315 Rational Discovery and Optimization of Synergistic Chemotherapy Combinations: A Novel Framework Integrating Gene Perturbation Analysis and Machine Learning Algorithms**
Andrew Cheng Jin, 16, Junior
Steven Michael Wang, 16, Junior
The Harker School, San Jose, California
- ME316 Walnut: Sustainable Solution to Halitosis**
Ibukunoluwa Ruth Oladeinde, 15, Junior
Eveshorhema Sophia Samuel-Alli, 14, Junior
Doregos Private Academy, Lagos, Nigeria

Microbiology

- MI001 ESCAPE from ESKAPE: Effect of Natural Substances on Penetration of Biofilms Formed by the ESKAPE Bacteria**
Divya Ravinder, 15, Sophomore, International Baccalaureate School at Bartow High School, Bartow, Florida
- MI002 Development of a Novel Antimicrobial Polymer for Biomedical Applications**
Joshua Cyril Abreo, 16, Junior, James Clemens High School, Madison, Alabama
- MI003 Mitochondria: Different Adaptation to Grow Conditions with Possible Implications to Infectivity**
Barbara Cohen, 17, Senior, Escola Antonieta e Leon Feffer, Sao Paulo, Brazil
- MI004 Analysis of the ATP Hydrolysis Rate of Hepatitis C Viral Helicase in the Presence of PNR-379**
Darius Ford, 18, Senior, Parkview Arts and Science Magnet High School, Little Rock, Arkansas
- MI005 The Conjugative Plasmid RK2 as a Delivery System for Artificial AntheriaH Genes: A Novel Synthetic Biology Alternative to Traditional Antibiotics**
Logan Collins, 17, Junior, Fairview High School, Boulder, Colorado
- MI006 Analyzing the Complex Carbohydrate Structures on the Plasma Membrane of the Cultured Mosquito Cells Using Fluorescently Labeled Lectins**
Carly Crump, 17, Junior, Episcopal School of Jacksonville, Jacksonville, Florida
- MI007 Inhibitory Effects of Allicin on *Escherichia coli* DH5 α Growth**
Jessica Hsieh Li, 18, Senior, South Fork High School, Stuart, Florida
- MI008 The Effect of Hyaluronic Acid and Glucose Concentration on Hyaluronidase Activity of Wound Pathogens *Staphylococcus aureus* and *Streptococcus agalactiae* Isolated from Chronic Wounds**
Vaclav Kotyza, 18, Junior, Private Grammar School, Letohrad, Czech Republic
- MI009 Improved Multiplexed Automated Genome Engineering through Directed Evolution**
Mark Kit Lim, 17, Senior, Raffles Institution, Singapore, Singapore
- MI010 The Inception of Infection II: The Antimicrobial and Synergistic Efficiency of Antibiotic Ethambutol and Isoniazid and Bacteriophage D29 in Treating a Model Organism for Tuberculosis**
Lucy Cai, 17, Junior, Texas Academy of Mathematics and Science, Denton, Texas
- MI011 Interactions of Bactericidal Essential Oils**
Paige Elizabeth Montfort, 15, Freshman, Notre Dame Academy, Park Hills, Kentucky
- MI012 Investigate the Cause and Control of Black Mold on Bamboo Chopsticks**
Chengxun Ni, 14, Freshman, Nankai Xiangyu Middle School, Tianjin, China
- MI013 A Novel Response to Antibiotic Resistance: Application of Microparticles and AC Currents**
Pia Sen, 17, Junior, Liberal Arts and Science Academy High School, Austin, Texas
- MI014 The Comparison of Bacterial Compositions on Seven Kinds of Fermented Tofu by High-throughput Sequencing**
Linyi Jin, 16, Junior, Shanghai Qibao High School, Shanghai, China
- MI015 Evaluating Resistance to Triclosan™ in Selected Bacteria and Aquatic Samples Isolated from Pre and Post Water Treatment Effluent**
J. Gage Holleman, 17, Freshman, Cascia Hall Preparatory School, Tulsa, Oklahoma
- MI016 Development of Bright and Constant Lighting Using Luminescent Bacteria**
Kotaro Mizoguchi, 18, Senior, Meikei High School, Tsukuba, Japan
- MI017 The Itch to Twitch: The Effects of DNA, DNase, and Degraded DNA on Twitching Motility in *Acinetobacter baylyi***
Rebecca Bloomfield, 14, Freshman, William J. Palmer High School, Colorado Springs, Colorado
- MI018 Keratin Waste: An Effective Management**
Vasudev Malyan, 15, Sophomore, Lions Public Schools, Delhi, India
- MI019 Antibiotic Resistance Dissemination Increased by High Frequency of Conjugating Bacteria in *Escherichia coli* Populations**
Jennifer Barbara Wu, 17, Senior, North Carolina School of Science and Mathematics, Durham, North Carolina
- MI020 Host-specific Binding of ClfB in Staphylococcal Nasal Carriage**
Amy T. Xu, 17, Senior, Jericho Senior High School, Jericho, New York
- MI021 Novel Engineered Oral Vaccine against HIV/AIDS**
Jonathan Zou, 15, Sophomore, Boston Latin School, Boston, Massachusetts
- MI022 Development of *in vitro* Multispecies Biofilms with Hydroxyapatite and Artificial Saliva**
Terry Gwen Ni, 15, Sophomore, Boston Latin School, Boston, Massachusetts
- MI023 The Soursop: A Natural Antibiotic**
Jorge David García, 14, Freshman, Academia San Jorge, San Juan, Puerto Rico
- MI024 Elucidation of the Deterministic Properties of the Optimal Probiotic Microorganisms**
Arseniy Gordeychyk, 15, Sophomore, Kiev Public School #80, Kiev, Ukraine
- MI025 Resveratrol Biosynthesis in Genetically Engineered Microorganisms**
Steven Ban, 17, Senior, Logan High School, Logan, Utah
- MI026 The Effect of Honeybee Byproducts on Bacteria**
Katherine Irene Polk, 16, Junior, North Point High School for Science, Technology, and Industry, Waldorf, Maryland
- MI027 Synergistic Antimicrobial Activity of Manuka Honey and Silver Nitrate**
Emma Louisa Goodman, 16, Junior, Greenwich High School, Greenwich, Connecticut
- MI028 Identification of Motifs Necessary for Interaction between AB Toxins and PDI**
Shilpa P. Reddy, 17, Senior, Lake Highland Preparatory School, Orlando, Florida
- MI029 *Staphylococcus aureus***
Cecilia Louise Dean, 18, Senior, Tishomingo County High School, luka, Mississippi
- MI030 Determining Antimicrobial and Synergistic Properties of Silver Coated Carbon Nanotubes and Antimicrobial Peptides against *Streptococcus pyogenes***
Ruchir Rastogi, 16, Junior, Loveless Academic Magnet Program High School, Montgomery, Alabama
- MI031 Purification and Characterization of Outer Membrane Vesicles from Enterotoxigenic *Escherichia coli***
Abigail Lauren Dowd, 17, Senior, Louisiana School for Math, Science, and the Arts, Natchitoches, Louisiana
- MI032 The Effect of Eustress on Sirtuin 2 Levels in *Saccharomyces cerevisiae* as a Potential Solution to Aging, Cancer, and Epidemic**
Hannah Kurka Margolis, 16, Sophomore, Elko High School, Elko, Nevada

- MI033** **Elucidating the Interactions between the Envelope Glycoprotein gp41 of HIV-1, gC1qR and C1q: Relevance to HIV-1 Pathogenesis**
Stephanie Ying, 17, Senior, Manhasset High School, Manhasset, New York
- MI034** **Utilizing UV-rays to Eradicate Micro-Organisms on Healthcare Workers Cellular Phones to Prevent Cross-Infection**
Toni-Ann Black, 15, Sophomore, Roedean School SA, Johannesburg, South Africa
- MI035** **Effect of the Application of Carbon Dioxide in the Microbiology of Fresh Raw Milk**
Gabriela Maria Trinidad-Perez, 16, Junior, University Gardens High School, San Juan, Puerto Rico
- MI036** **Colonial and Motile Advantages of *Pseudomonas aeruginosa* in the Presence of Flow**
Kevin Romero, 17, Senior, Union City High School, Union City, New Jersey
- MI037** **Effects of Nanoparticles on Mycobacteriophage Infection**
Robert Jude Lester, 16, Junior, Butte High School, Butte, Montana
- MI038** **Inhibition of Host-Cell Endosomal Acidification by H1N1 Influenza**
Alex White, 17, Junior, Uplift North Hills Preparatory, Irving, Texas
- MI039** **What's on the Menu: Identification of the Hydrocarbon Transport Systems as a First Step in Marine Oil-Degradation by *Alcanivorax borkumensis***
Swapnav Deka, 16, Junior, Plano East Senior High School, Plano, Texas
- MI040** **The Effect of Benzoquinone on the Growth of *Staphylococcus epidermidis***
Jacob McKinney Smith, 16, Junior, Cascade High School, Wartrace, Tennessee
- MI041** **Is Methicillin-Resistant *Staphylococcus aureus* (MRSA) Present Influent Wastewater?**
Emma Marie Duffin, 14, Freshman, Roy High School, Roy, Utah
- MI042** **Microevolution of *Bacillus subtilis* in Response to Isopropanol Alcohol Stress**
Jackson Peterson, 17, Junior, Sturgis Brown High School, Sturgis, South Dakota
- MI043** **Let Food Be Your Medicine and Medicine Be Your Food**
Brianna Elizabeth Caspersen, 17, Senior, Hilton Head Preparatory High School, Hilton Head Island, South Carolina
- MI044** **The Effects of Cholecalciferol of the Survivability of Methicillin-Resistant *Staphylococcus aureus***
Micaela Jayne Bryant, 16, Junior, Central Lee High School, Donnellson, Iowa
- MI045** **Developing an Antibacterial Wipe with Copper Species to Prevent the Growth of *Escherichia coli***
Julia Carol Nahman, 18, Senior, Hilton Head Preparatory School, Hilton Head Island, South Carolina
- MI046** **The Effects of Various Inhibitors on the Dermatophyte, *Trichophyton rubrum***
Aniko Alicia Nowakowski, 16, Sophomore, St. Joseph's Academy, Baton Rouge, Louisiana
- MI047** ***Lactobacillus* vs. *Amoxicillin*: Beneficial Bacteria as a Treatment for Sinus Infections**
Abigail Millard, 16, Junior, Windsor High School, Windsor, Vermont
- MI048** **The Effectiveness of Antibiotics**
Austin A Van de Ven, 15, Freshman, Notre Dame Regional High School, Cape Girardeau, Missouri
- MI049** **Silver Nitrate's Effect on Natural vs. Induced Antibiotic Resistance in *Escherichia coli***
Breanna Kramer, 17, Senior, Central Lee High School, Donnellson, Iowa
- MI050** **Isolation of *Escherichia coli* O157 Proteins that Interact with the Bovine Recto-anal Junction Squamous Epithelial (RSE) Cells**
Aparna Sai Ajjarapu, 17, Senior, Ames High School, Ames, Iowa
- MI051** **Mycobacteriophage TM4 Tape-Measure Protein Blocks Entry into Stationary Phase of Tuberculosis**
Libby Ho, 17, Senior, Stuyvesant High School, Manhattan, New York
- MI052** **Constructing an HBV Reporter Virus**
Alexander F. Kaufman, 18, Senior, Horace Greeley High School, Chappaqua, New York
- MI053** **Effects of Pollutants and Changes in pH on the Bioluminescence of *Vibrio fischeri*: A Novel Bioassay for Water Pollution Detection**
Shayan Daniel Farmand, 14, Freshman, Methacton High School, Eagleville, Pennsylvania
- MI054** **Comparative Evaluation of Electrical Strategies for Eradication of *Staphylococcus epidermidis* Biofilms**
Michelle Elisabeth Marie Campeau, 16, Junior, Mayo High School, Rochester, Minnesota
- MI055** **A Comparative Study of the Antimicrobial & Synergistic Properties of Select Essential Oils and Clinical Disinfectants against Gram-positive & Gram-negative Clinical Isolates *in vitro*, Year III**
Bryant Jo Heckart, 18, Senior, Seneca High School, Seneca, Missouri
- MI056** **Fungus among Us**
Dale Patrick Spilman, 14, Freshman, Mandan High School, Mandan, North Dakota
- MI057** **Creation of a CTX-M-14/CTX-M-15 Gene Fusion to Determine if an Intrinsic Structural Feature of CTX-M-15 Causes Upregulation of Its Expression**
Archana Meera Varman, 16, Sophomore, Duchesne Academy of the Sacred Heart, Omaha, Nebraska
- MI058** **Using *Aliivibrio fischeri* to Detect Water Toxins**
Jon Samuel Rodgers, 15, Sophomore, Dexter Senior High School, Dexter, Missouri
- MI059** **Identification of Novel Broad-Spectrum Antimicrobial Compounds in *Curcuma amada***
Varsha Jayasankar, 17, Senior, Sir Winston Churchill Secondary School, St. Catharines, Canada
- MI060** **The Effect of ML 141 and Simvastatin on HUVEC/Fibronectin Binding**
Sarah Anika Komanapalli, 17, Junior, Indiana Academy for Science, Mathematics, and Humanities, Muncie, Indiana
- MI061** ***Mycoplasma bovis* in Dairy Cattle: Can It Be Isolated from More than One Site?**
Cady McGehee, 14, Freshman, Okeechobee High School, Okeechobee, Florida
- MI062** **Transcription Factors that Regulate Antimicrobial Resistance in *Candida glabrata***
Elan Eng Filler, 15, Sophomore, Palos Verdes High School, Palos Verdes High School, California
- MI063** **The Use of a Biological Assay to Quantify the Amount of Residual Pesticides after Various Washing Processes**
Andrew Owen Neely, 15, Sophomore, St. Andrew's Episcopal School, Ridgeland, Mississippi
- MI064** **Novel Treatment of Chronic Bacterial Infection: Investigation and Multi-Compound Inhibition of Acyl-homoserine Lactone-Based Quorum Sensing in *Pseudomonas aeruginosa* and Its Role in Biofilm Development *in vitro***
Nicholas Paul Miller, 17, Junior, West Linn High School, West Linn, Oregon
- MI065** **Developing Novel Protein Targets for *Bordetella pertussis* Antibiotics: Understanding Protein Interfaces and Domain-Domain Interactions**
William Huang Jin, 18, Sophomore, Gwinnett School of Mathematics, Science, and Technology, Lawrenceville, Georgia

- MI066 Approaching Anti-Viral Therapeutics via Sequence Analysis of Nucleoprotein and Glycoprotein Precursor Genes of Lassa Virus**
Matthew Dae-Young Park, 16, Junior, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia
- MI067 Kawakawa Extracts Demonstrate Anti-Inflammatory Activity**
Chris Ryan, 18, Sophomore, Howick College, Auckland, New Zealand
- MI068 Enzymes as Antivirals**
Rebecca Jeanne Jernigan, 16, Junior, Hamilton High School, Chandler, Arizona
- MI069 Moringa Power: Old or New?**
Aliyah Alexa Allick, 14, Sophomore, Good Hope Country Day School, Kingshill, United States Virgin Islands
- MI070 Effects of Selective Agonism of Angiotensin II AT1 and AT2 Receptors on Neural Differentiation and Proliferation in Human Neural Stem Cells**
Brigitte K. Blanco, 17, Junior, Pine Crest School, Fort Lauderdale, Florida
- MI071 DNA Repair Mechanisms in Yeast: Shu Complex Interactions with Rdh54**
Kyle T. Yoshida, 18, Senior, Kamehameha Schools Kapalama, Honolulu, Hawaii
- MI072 Development of microRNA Cancer Therapeutics: miR-17 and miR-19 Inhibition in Myc-driven Hepatocellular Carcinoma**
Tiffany Rose Perumpail, 17, Senior, High Technology High School, Lincroft, New Jersey
- MI073 "Fishing Out" Polyketide Synthesis Genes from a "Red Tide"-Forming Dinoflagellate**
Courtney Eileen Grinnell, 17, Senior, Petal High School, Petal, Mississippi
- MI074 The Antibacterial Agent Triclosan as a Growth Inhibitor of *Staphylococcus aureus* and *Staphylococcus epidermidis***
Irene Gayi Cheng, 17, Senior, Academic Magnet High School, North Charleston, South Carolina
- MI075 Is Working in Healthcare Unhealthy?**
Levi James Myler, 15, Sophomore, Piedra Vista High School, Farmington, New Mexico
- MI076 From the Antibiotic Resistance Acquisition by Bacteria to the Impact of the Resistant Tuberculosis on Society through a Computer Modelling (IBM)**
Sergi Macia Munoz, 16, Junior, INS Escola Industrial, Sabadell, Spain
- MI301 A Novel Approach Using Ultraviolet Radiation to Eliminate Bacteria Leading to Nosocomial Infections on Data Entry Peripherals in Hospitals**
Ahmed A. Ahad, 17, Junior
Varun P. Varshney, 16, Junior
Canterbury School, Fort Myers, Florida
- MI302 Project Runway: Creating an Antibacterial/Antifungal Fabric for Military Personnel and Athletes**
Avni Nandu, 15, Freshman
Stephanie Vu, 15, Freshman
Clark High School, Plano, Texas
- MI303 Medicinal Properties of *Ocimum basilicum* and *Azadirachta indica***
Calvin Walter Griffin, 16, Junior
Parker LeBlanc, 16, Junior
Ovey Comeaux High School, Lafayette, Louisiana
- MI304 The State of Parental Mitochondria Influences the Replicative Lifespan of Zygotes of *Saccharomyces cerevisiae***
Pei-Ming Chen, 16, Junior
Shao-Ting Chiu, 18, Senior
Taipei Municipal Jianguo High School, Taipei City, Chinese Taipei
- MI305 Discovery and Genomic Comparison of Bacteriophages BustinJunch and Kimya**
Justin Mark Bunch, 17, Junior
Erin Elizabeth Burba, 16, Junior
Carol Martin Gatton Academy of Mathematics and Science in Kentucky, Bowling Green, Kentucky
- MI306 Assessing Antimicrobial Properties of Selected Local Homeopathic Plants**
Samuel Allen Miller, 16, Junior
Andrew David Ryan, 17, Junior
North Toole County High School, Sunburst, Montana
- MI307 The Effect of Tattoo Ink Pigments on the Reverse Mutation Rate in *E. coli* Strain 49979**
Trisha Deshmukh, 15, Sophomore
Cara Golias, 16, Sophomore
Fairfax High School, Fairfax, Virginia
- MI308 Presymptomatic Detection of Disease**
Esteban Luis Abeyta, 17, Junior
Ashvini Vaidya, 16, Junior
Los Alamos High School, Los Alamos, New Mexico
- MI309 Elucidating the Metabolism and Toxicity of Host-Derived Toxin Methylglyoxal in *Mycobacterium Tuberculosis* and *Mycobacterium Smegmatis***
Zhun Che, 17, Senior
Luke E. Hellum, 16, Junior
Julia Burns Kavanagh, 17, Senior
Pelham Memorial High School, Pelham, New York
- MI310 Production of Bioplastic by a Bacterium Isolated from Waste Treatment Facility (from Lignocellulosic Glucose, Abundant Sucrose, Byproduct of Biodiesel & Spent Coffee Grounds Extract)**
Dong Il Je, 17, Senior
Gi Na Lee, 18, Senior
Korean Minjok Leadership Academy, Hoengseong-gun, South Korea
- MI311 Using Bacterial Division Rates to Estimate Genome Size**
Michael Edward Scott, 16, Junior
Jonathan Lee Sims, 17, Freshman
ChengDu International School, ChengDu, China
- MI312 *Ralstonia metallidurans* to Produce Gold Alongside Other Rare Metals**
Razi Ali Alalqam, 16, Junior
Abduljabbar Abdulraz Alhamood, 17, Junior
Dhahran Ahliyya School, Dhahran, Saudi Arabia
- MI313 Bacteriophage Lotion: A Way of Preventing the Spread of Bacterial Diseases**
Ana Rita Ferreira Monteiro, 18, Senior
Beatriz Cunha Quiaios, 18, Senior
Colegio Valsassina, Lisboa, Portugal
- MI314 Targeting Unique Spectral Absorptions through Multi-Treatment Laser Therapies for Corresponding Differential Mortality Rates between *Escherichia coli* and *Micrococcus luteus* Bacteria**
Shana R. Feltham, 17, Junior
Melanie A Martinsen, 16, Junior
West Linn High School, West Linn, Oregon
- MI315 Effect of Ginger on *Escherichia coli***
Eloise Jennes, 16, Junior
Vanessa Klapp, 17, Junior
Atert-Lyce Redange, Redange/Attert, Luxembourg
- MI316 An Efficient Method to Extract Antimicrobial Saponins from *Agave americana* and Their Application for Fruit Preservation**
Quang Minh Nguyen, 16, Junior
Anh Van Tran, 17, Junior
Minh Duc Vu, 16, Junior
High School for Gifted Students, Hanoi University of Science, Vietnam National University, Hanoi, Viet Nam

Physics and Astronomy

- PH001 Evaluating the Proportionality Constant between Recessional Velocity and Distance from Earth of 18 Selected Galaxies and the Relationship to Hubble's Constant**
Davy M. Pardonner, 17, Senior, Pensacola High School, Pensacola, Florida
- PH002 Brushless Maglev Engine: Design Improvements, Physical Model, Practical Application**
Raman Paliakou, 17, Junior, Gymnasium No. 1, Vitebsk, Belarus
- PH003 The Effect of Frequency on Wave Formation in Sugar-Water Mixtures of Various Specific Gravities**
Merritt Lynn Singley, 16, Sophomore, Brush High School, Brush, Colorado
- PH004 Exit Velocity of a Sphere Falling in Narrow Tubes**
Nicholas Alfredo Larsen, 18, Senior, Caddo Parish Magnet High School, Shreveport, Louisiana
- PH005 The Fast and the Freeziest**
John Paul Martinez, 15, Sophomore, Bartlesville Mid-High School, Bartlesville, Oklahoma
- PH006 The Search and Discovery of CoRoT 29: Photometry of Transiting Exoplanets Using the CoRoT and Faulkes Telescopes**
Christopher James Lindsay, 15, Freshman, Iolani School, Honolulu, Hawaii
- PH007 Rocks of the Rainbow: Asteroid Classification Using SDSS Filters**
Stephanie Hiromi Spear, 16, Junior, Henry J Kaiser High School, Honolulu, Hawaii
- PH008 A Novel Method for Quantitative Spectral Classification of R Coronae Borealis Stars**
Marianne Virginia Konikoff, 18, Senior, Saint Joseph's Academy, Baton Rouge, Louisiana
- PH009 Star Tracker: A Computational Framework to Locate Celestial Bodies**
Leonardo Vasconcelos Lopes, 19, Senior, Instituto Federal de Educacao, Ciencia e Tecnologia de Mato Grosso do Sul, Nova Andradina, Brazil
- PH010 Model of Soliton Waves**
Jan Mazac, 19, Senior, Mendelovo Gymnázium Opava, Prispevkova Organizace, Opava, Czech Republic
- PH011 Frequency Modulation Feedback Control for Near-Field Acoustic Characterization of Mesoscopic Fluid Films**
Pramith Sai Devulapalli, 17, Junior, Westview High School, Portland, Oregon
- PH012 Eddy Current Optimization of Thermal Deposited Silver Film for Nuclear Microprobe Applications**
Alexander Lu, 17, Junior, Texas Academy of Mathematics and Science, Denton, Texas
- PH013 Nova Delphini 2013: A Backyard Analysis of a Classical Nova**
Piper Michelle Reid, 17, Senior, Dripping Springs High School, Dripping Springs, Texas
- PH014 Research and Development of High-Efficient Non-Strobe Flash Electronic Ballast for Fluorescent Light**
Yanheng Xu, 16, Junior, Tongan No.1 Middle School, Xiamen, China
- PH015 "Curie Point" Demonstration Device: New Magnetic Generator**
Lingxuan Zeng, 16, Junior, Ganzhou No. 3 Middle School, Ganzhou, China
- PH016 Studies of Non-Linear Deformation by Electric Point Contact**
Shao-Ying Tseng, 14, Freshman, Kaohsiung Municipal CHIEN-CHIN Junior High School, Kaohsiung, Chinese Taipei
- PH017 Experimental Investigation of Segregation Mechanisms in Horizontally Shaken Granular Media**
Mikiko Takato, 17, Senior, Hilo High School, Hilo, Hawaii
- PH018 Light-Matter Coupling in Low-Q Optical Cavities: Application to Solar Energy**
Riya Jagetia, 18, Senior, Hathaway Brown School, Shaker Heights, Ohio
- PH019 Novel Automated Next-Generation Multijunction Quantum Dot Solar Panel Designs Using Monte Carlo-Based Modeling**
Valerie S. Ding, 17, Junior, Catlin Gabel School, Portland, Oregon
- PH020 Time and Radiation Domain in Star-Like Objects: Relating Intrinsic Colors of Quasars to Redshifts**
Lia Grace Strauss Eggleston, 13, Sophomore, Home School, Laramie, Wyoming
- PH021 Spectrometry Applied**
Miguel Angel Dominguez, 17, Junior, John B Alexander High School, Laredo, Texas
- PH022 A Novel Error Correction Scheme in Quantum Computing and Communication**
Kelvin Wang, 16, Junior, Academy for the Advancement of Science and Technology, Hackensack, New Jersey
- PH023 Velocity Gradients in Relation to Spatial Scales of Star-forming Dense Cores in the Perseus Molecular Cloud**
Luhong Li, 17, Senior, John L. Miller Great Neck North High School, Great Neck, New York
- PH024 Evolution of Novel Magnetism in Single-Crystal Honeycomb Iridates: An Approach towards Quantum Spin Liquids**
Vincent Shian Cao, 18, Senior, Paul Laurence Dunbar High School, Lexington, Kentucky
- PH025 Flow Rate vs. Magnetic Field**
Suveer S Desai, 17, Junior, New Hartford Senior High School, New Hartford, New York
- PH026 The Generation and Analysis of Waves with Varying Nonlinearity**
Thorsen Michael Wehr, 17, Junior, Odessa High School, Odessa, Washington
- PH027 The Effect of a Magnetic Field on the Solubility of Various Compounds**
Warner McGhee, 15, Sophomore, Roanoke Valley Governor's School for Science and Technology, Roanoke, Virginia
- PH028 The Development of a Novel, Low Cost, High Power, Tunable UV Supercontinuum Laser Source**
Joseph Patrick Lee, 17, Junior, Saint Peter's Academy, New Market, Alabama
- PH029 Trapped Field Superconducting Magnets**
Kavita Anjali Selva, 14, Freshman, Clear Lake High School, Houston, Texas
- PH030 The Optimization of Rocket Nozzle Performance**
Jamie Christine McCullough, 17, Senior, Friendswood High School, Friendswood, Texas
- PH031 Violating the Spin Barrier**
Kelsey Mackenna Barber, 14, Freshman, Bountiful High School, Bountiful, Utah
- PH032 Kinematic Determinants of Success in the Fencing Flick: Logistic and Linear Multiple Regression Analysis**
Anya Noelle Michaelsen, 16, Junior, Lake Braddock Secondary School, Burke, Virginia
- PH033 Investigating a Relationship between Coronal Mass Ejections and the Solar Sun Spot Cycle**
Justin Michael Boyce, 18, Senior, St Johns College, Johannesburg, South Africa
- PH034 Head in the Clouds: Is the Van der Waals Force Present in Cloud Structure?**
Jeremiah Thomas Pate, 15, Freshman, BASIS Oro Valley, Oro Valley, Arizona
- PH035 Increased Efficiency in Tip-Enhanced Raman Spectroscopy**
Anirudh Sridhar, 17, Senior, International Academy, Troy, Michigan

- PH036 An Application of Dean's Flow in Spiral Micro Channels for Particle Isolation**
Vipul Nandigala, 16, Junior, Walled Lake Western, Walled Lake, Michigan
- PH037 Utilizing Molecular Dynamics Simulations of Crystalline Poly(3-hexylthiophene) to Study Water Diffusion**
Alexander James Weber, 16, Junior, Saint Vincent - Saint Mary High School, Akron, Ohio
- PH038 The TAWA Method: Demonstration of the Alternative Method (Arithmetic Algorithm) to the Fundamental Formulas for the Solution of Problems and Definition of Concepts of Uniformly Accelerated Linear Motion (UALM)**
Omar Alonso Aguilar Collantes, 16, Junior, Lord Byron, Lima, Peru
- PH039 Quantum Locking: Applications towards Controlled Frictionless Spatial Motion**
Julienne Sauer, 14, Freshman, Dougherty Valley High School, San Ramon, California
- PH040 Varying International Space Station Re-entry Angle to Minimize Debris**
Nicholas Ross Poniatowski, 16, Sophomore, Hayfield Secondary School, Alexandria, Virginia
- PH041 Spectral Smartphone: Rapid Prototyping Mobile Platform Diffraction Spectrophotometry**
Allen Jiang, 16, Junior, duPont Manual High School, Louisville, Kentucky
- PH042 Research on Solidifying Liquid Drops**
Alexey Smirnov, 17, Junior, Advanced Educational Scientific Centre, A.N.Kolmogorov Boarding School, Moscow, Russian Federation
- PH043 Relation between the Flux of Galactic Cosmic Rays and the Occurrence of Tropical Cyclones in the Caribbean**
Andy Jonuel Lopez, 16, Junior, Petra Mercado Bougart, Humacao, Puerto Rico
- PH044 Fabricating an Artificial Nose using Mesoporous Photonic Crystals**
Achal James Fernando-Peirís, 16, Junior, Mount Vernon High School, Mount Vernon, Ohio
- PH045 3D Hydrodynamic Simulation of Classical Nova Explosions**
Coleman J. Kendrick, 15, Sophomore, Los Alamos High School, Los Alamos, New Mexico
- PH046 Partitioning Gamma-Ray Sources in Fermi Large Area Telescope Observations for Spatial and Spectral Analysis**
Isabelle Goldstein, 17, Senior, Ridgefield High School, Ridgefield, Connecticut
- PH047 Impact of Running Surfaces**
Tyler Michael Staten, 15, Freshman, Bonneville High School, Ogden, Utah
- PH048 Optimizing the Accuracy and Precision of Asteroid Orbital Determination: A Novel Approach**
Amara McCune, 17, Senior, Stoughton High School, Stoughton, Wisconsin
- PH049 Visualization of the Tidal Locking Phenomenon through Simulation**
Seha Choi, 16, Sophomore, Portsmouth Abbey School, Portsmouth, Rhode Island
- PH050 An Analysis of the Feasibility of a Superconducting Maglev Launch System Based on the Meissner Effect**
Chan Sam Lee, 17, Junior, Central Virginia Governor's School/Brookville High School, Lynchburg, Virginia
- PH051 Scientific and Technical Study on Dependent Factors for Wireless Power Transfer**
Manjit Ruprem, 14, Freshman, Floyd B. Buchanan High School, Clovis, California
- PH052 Achieving Net Gain Nuclear Fusion in Microcapsules by Coupling Sonoluminescence and Magnetic Compression**
Raghu Vamsi Dhara, 18, Senior, Mission San Jose High School, Fremont, California
- PH053 Piezoforce Imaging of Confined Oxide Nanowires**
Akash Levy, 17, Senior, Taylor Allderdice High School, Pittsburgh, Pennsylvania
- PH054 Discovering the Magnus Effect by Rolling Spheres through Resistant Fluids**
Gwendolyn Rose Gilbert-Snyder, 15, Sophomore, El Cerrito High School, El Cerrito, California
- PH055 Reducing the G-force and Traumatic Brain Injuries on Soccer Players through the Use of Headgear**
Lucas Patrick McMillan, 17, Junior, Hilton Head Preparatory School, Hilton Head Island, South Carolina
- PH056 Airfoils**
John Israel Hyle, 15, Sophomore, Starr's Mill High School, Fayetteville, Georgia
- PH057 Fringe E-Fields of Flat and Cylindrical Deflectors and a New Proposal for the Proton EDM Experiment**
Kevin Li Huang, 17, Senior, Jericho Senior High School, Jericho, New York
- PH058 The Quantum Hall Effect and Electron Interactions in Graphene Monolayers**
Justin Yang, 16, Junior, North Carolina School of Science and Mathematics, Durham, North Carolina
- PH059 The Relationship between Air Properties and the Deflection Experienced by an Electric Arc, Year Two**
Isfar Syed Munir, 17, Senior, Tracy Joint Union High School, Tracy, California
- PH060 PT-Symmetry Breaking in Periodic Potentials**
Charles Haohan Liang, 17, Senior, Carmel High School, Carmel, Indiana
- PH061 Keeping It Cool with Nanoparticle Technology**
Christopher Dean Karras, 16, Sophomore, Wilmington Christian Academy, Wilmington, North Carolina
- PH062 Refining Preliminary Orbital Determination for Near-Earth Asteroids: Comparison of Fundamental Methods with n-Body Correction**
Benjamin Thomas Lei, 18, Senior, Arlington High School, LaGrangeville, New York
- PH063 Finding the Minimal Length for a Conductive, Random Network of Wires**
Milind Jagota, 16, Sophomore, Liberty High School, Bethlehem, Pennsylvania
- PH064 The Slurpper: Gas Operated Super Suction & Spray Device (GOS³D)**
Dharsyanth Rao a/I Sivarao, 16, Junior, Mara Junior Science College Terendak, Melaka, Malaysia
- PH065 On Tycho Supernova Remnant Accelerating Cosmic-rays**
Michaela Brchnelova, 17, Junior, High School of Jura Hronca, Bratislava, Slovakia
- PH066 Fabrication of Platinum Catalyst Nanoparticle Arrays**
Branislav Viliam Hakala, 17, Junior, Evanjelicke Gymnazium Jana Amosa Komenskeho, Kosice, Slovakia
- PH067 Photodynamic Therapy Induced Microvascular Changes Assessed by Photoacoustic Microscopy**
Hakeem Mohamed Salem, 15, Sophomore, City Honors School at FMP, Buffalo, New York
- PH068 The Effect of Wing Shape and Angle of Attack on Lift Force**
Sheridan Steele Spicher, 14, Freshman, North Star High School, Rudyard, Montana
- PH069 The Effects of Wheel Bearing Greases on Rotational Motion**
Christian Peter Joseph Coury, 17, Junior, Suncoast Community High School, Riviera Beach, Florida
- PH070 IR against Piracy**
Hadaia Azad Ezzulddin, 14, Freshman, Nilufer Girls Secondary School, Erbil, Iraq
- PH071 Optimizing the Process of Single Photons Coupling into Single-Mode Fibers by Using a Genetic Algorithm and Spatial Light Modulation**
Jerzy Krzysztof Szuniewicz, 17, Junior, Adama Mickiewicza High School in Poznan, Poznan, Poland

- PH072 A Kinetic Monte Carlo Study of the Scalability and Variability of the Forming Voltage of Transition Metal Oxide ReRAMs**
Namrata Ramya Balasingam, 16, Junior, Archbishop Mitty High School, San Jose, California
- PH073 Detecting Reddening by Dust for Star Clusters in the Andromeda Galaxy**
Amy Jessica Cohn, 17, Senior, Park Tudor School, Indianapolis, Indiana
- PH074 Probing the Viability of Methicillin-resistant *Staphylococcus aureus* upon Irradiation with Blue Laser Light**
Grant Alfred Hussey, 17, Senior, Nicolet High School, Glendale, Wisconsin
- PH075 Predicting the Strength of Solar Flares using Sunspot Characteristics**
Kayla Lokelani Ishida, 16, Junior, Waimea High School, Waimea, Hawaii
- PH076 Time-Resolved Spin Lifetime Measurement of Surface States on the Topological Insulator Bi₂Se₃**
Connor Everett Tom, 16, Junior, John W. North High School, Riverside, California
- PH077 Measuring Water Waves**
Daniel Pfluger, 13, Senior, Gymnasium Johanneum Lueneburg, Lueneburg, Germany
- PH078 A Mathematical Analysis of the Wright Brother's Wind Tunnel Tests**
Christopher Glenn Romanoski, 17, Junior, Oak Ridge High School, Oak Ridge, Tennessee
- PH079 Negative Radio Components**
Oleg Novikov, 17, Junior, Advanced Educational Scientific Centre, A.N.Kolmogorov Boarding School, Moscow, Russian Federation
- PH080 Capturing Fingerprint Using a Simple Laser Marker and a Mobile Phone**
Dilem Coklu, 17, Senior, Milli Egitim Vakfı Private Ankara Science High School, Ankara, Turkey
- PH301 Muon Flux through Various Substances and Conditions**
Yonah Elorza, 18, Senior
Ana Sofia Olano, 17, Junior
Ronald W. Reagan/Doral Senior High School, Doral, Florida
- PH302 Observational Detection of Solar g-mode Oscillations Using Doppler Velocity Signals**
Min Sung Kim, 16, Junior
Matthew Thomas Sturm, 17, Junior
Maui High School, Kahului, Hawaii
- PH303 Optimizing Astronaut Squat Exercise on the International Space Station, Year Three**
Christopher Daniel Fregly, 16, Sophomore
Brandon Kim, 15, Sophomore
Eastside High School, Gainesville, Florida
- PH304 A Flying Mechanism of a Helicopter Like Toy, "Bamboo Dragonfly": Effect of Back Flow on a Lift Force in a Non-Stationary Condition**
Youdai Kametani, 17, Senior
Ryosuke Tamura, 18, Senior
Yamaguchi High School, Yamaguchi, Japan
- PH305 Holes Can Lift: A Continuing Study of the Separation Effects of Airfoil Slots**
Sarah Nicole Hancock, 16, Junior
Kate Rutherford, 17, Junior
Clear Horizons Early College High School, Houston, Texas
- PH306 Making Simple Korean Traditional Musical Instrument (Pyeon-gyeong) Using Ceramic**
Seonmi Lee, 17, Senior
Chaeun Song, 17, Senior
Jisoo Yu, 17, Senior
Incheon Sangok High School, Incheon, South Korea
- PH307 The Dark Matter inside of Early Type Galaxies**
Angel Alejandro Martinez Jimenez, 18, Senior
Omar Perez Alvarado, 17, Senior
Preparatoria del Tecnológico de Monterrey Campus Guadalajara, Zapopan, Mexico
- PH308 Weakening Fire Vortex Using Symmetry Breaking Method**
Da Weon Hwang, 17, Senior
Jeong Hyun Kim, 17, Senior
Min Ki Kim, 16, Senior
Daegu Science High School, Daegu-si, South Korea
- PH309 Green Synthesis of Palladium, Silver, Iron and Magnetite Zero Valent Nano Particles**
Farhang Razaq Hamad, 17, Freshman
Aryan Harbi Saido Harki, 16, Freshman
Bawar Mohammed Taha, 16, Sophomore
Sorani Ishik College, SORANI, Iraq
- PH310 Solar Sailing with Modulated Radial Thrust**
Sufyan Huma, 19, Senior
Mohammad Haider Hussain, 17, Senior
Christian Brothers School Synge Street, Dublin, Ireland
- PH311 Study of Two-dimensional Melting in a System of Small Magnets**
Michal Geci, 18, Senior
Martin Liscinsky, 18, Senior
Gymnazium Svateho Tomasa Akvinskeho, Kosice, Slovakia
- PH312 Nuclear Fusion Using a Pyroelectric Crystal Particle Accelerator**
Tucker John Sandbakken, 17, Junior
Jason Kim Syndergaard, 17, Junior
Maple Mountain High School, Spanish Fork, Utah
- PH313 Paper Pack's Curving Tracking Path Analysis and Its Application Suggestion**
Bihan Hwang, 17, Senior
Dong Geun Lee, 18, Senior
Junseok Son, 17, Senior
Garim High School, Incheon, South Korea
- PH314 Rising Water**
Leonard Bauersfeld, 14, Senior
Marcel Neidinger, 14, Senior
Hans Thoma Gymnasium, Lorrach, Germany
- PH315 Flexible Shape Changing (Morphing) Wing**
Judah Khary Brooks, 17, Senior
Moises Diaz, 17, Junior
From the Heart Christian School, Suitland, District of Columbia
- PH316 A Low-Cost and High-Temperature Vibrating Sample Magnetometer**
Mehmet Ege Karaesmen, 18, Senior
Ahmet Berk Selvi, 18, Senior
Takev Ozel Anadolu Lisesi, Auzmir, Turkey
- PH317 Ultrasonic Sound Tunnel**
Alibey Delimustafaoglu, 18, Senior
Ali Kaan Ergun, 18, Senior
Melikgazi Mustafa Eminoglu Anatolian High School, Kayseri, Turkey

Plant Sciences

- PS001 The Effects of Distance from a Stream on the Abundance of Ten Lichen Genera in Riparian Habitats**
Madeline Handley, 16, Sophomore, Juneau-Douglas High School, Juneau, Alaska
- PS002 Identification of Cold Tolerant Napiergrass Accessions Using Intergeneric Transferable Microsatellite Markers**
Namrata Buxani, 16, Junior, Houston County High School, Warner Robins, Georgia
- PS003 Use of Surfactant to Enhance Use-Efficiency of Nutrients by Foliar Application**
Stephanie Buraga Fisher, 17, Senior, Saint Lucie West Centennial High School, Port Saint Lucie, Florida
- PS004 The Effects of Rhizobia Inoculation on *Moringa oleifera* Growth, a Fourth Year Study**
Sarah Elizabeth Craig, 16, Sophomore, Niceville High School, Niceville, Florida
- PS005 Electromagnetic Seed Germination**
Victor Solis, 18, Senior, Americas High School, El Paso, Texas
- PS006 A Comparison of the Effects of Thermotherapy and Electrotherapy on Soybean Plants**
Auriel Samone Wright, 17, Junior, Northeast Magnet High School, Macon, Georgia
- PS007 Organic Homemade Fertilizer: An Analysis of Organically Made Compost and Nutrient Water Compared to Store Bought Fertilizer**
Stacy L Erickson, 17, Senior, New Prague High School, New Prague, Minnesota
- PS008 Do Air Root Pruning Pots Accelerate Success in a No-Till Garden?**
John Austin Ham, 16, Junior, DeRidder High School, DeRidder, Louisiana
- PS009 A Novel Discovery of Promoting Yeast Fermentation with Black Soybean Seed Coat**
Lanqingqing Lou, 18, Senior, No.2 High School of East China Normal University, Shanghai, China
- PS010 Algae's Photoinhibition Sheds Light on Why Land Plants Evolved To Be Green, Not Black**
Ruomeng Wan, 17, Senior, Experimental High School Attached to Beijing Normal University, Beijing, China
- PS011 Developing Transgenic Sugar Beet by Agrobacterium-mediated Gene Transfer**
Aditi Das, 17, Senior, Roseville Area High School, Roseville, Minnesota
- PS012 Globally Utilizing Perennial Intermediate Wheatgrass**
Heather Joy Stone, 18, Senior, Mounds View High School, Arden Hills, Minnesota
- PS013 Mechanistic Characterization of a Transcription Factor bZIP16 in Regulating Arabidopsis Flowering Pathways**
Yi-Hsuan Huang, 17, Junior, Taipei Municipal Jianguo High School, Taipei City, Chinese Taipei
- PS014 Sickly Spuds**
Nicolina Mao, 18, Senior, Harding Senior High School, Saint Paul, Minnesota
- PS015 Acquired Symbiosis of Nitrogen Fixing *Gluconacetobacter diazotrophicus* in Cereal Grains**
Monica Singh, 18, Senior, Central High School, Saint Joseph, Missouri
- PS016 A Study of *Pseudomonas putida* as a Viable Biofertilizer for Crops in Soils with High Salinity**
Tara Lynn Cook, 18, Senior, Sterling High School, Sterling, Colorado
- PS018 The Expression and Regulation of AqBANQUO Genes in *Aquilegia***
Clara Arina Sava-Segal, 17, Senior, John L. Miller Great Neck North High School, Great Neck, New York
- PS019 *Brassica juncea* (Mustard) Flowers to Attract Pollinators for Better *Malus domestica* (Apple) Yield**
Jaya Sagar, 15, Junior, Government Senior Secondary School-Manali, Manali, India
- PS020 The Effect of Nutrient Solution Concentration on Hydroponic Spinach Plants**
Boston Victoria Swan, 17, Senior, InTech Collegiate High School, North Logan, Utah
- PS021 The Variation of Carbon Dioxide Levels and the Subsequent Measurement of Dissolved Oxygen to Indicate Photorespiration in Crassulacean Acid Metabolism Plantlife: A Novel Method**
Aishah Isabelle Ahmed, 15, Sophomore, Port Huron Northern High School, Port Huron, Michigan
- PS022 Cellulose Binding Domains: Novel Implications in Agriculture and Biofuel Production**
Alon Millet, 16, Sophomore, Academy for the Advancement of Science and Technology, Hackensack, New Jersey
- PS023 Molecular Characterization of Wild Beet in the Imperial Valley's Commercial Sugar Beet Fields**
Kapil Sinha, 14, Sophomore, Salinas High School, Salinas, California
- PS024 Skim Milk vs. Tobacco Mosaic Virus**
Kaylie Nicole Wilson, 16, Sophomore, Central Lee High School, Donnellson, Iowa
- PS025 The Cactus as a Growing Medium for Tomatoes**
Keitlyn Marie Adorno, 16, Junior, Escuela Especializada en Ciencias y Matemáticas Brígida Álvarez Rodríguez, Vega Baja, Puerto Rico
- PS026 The Effect of Nitrogen-Rich Fertilizers on the Growth and Yield of Cotton Plants**
Lindsay M. Northcut, 18, Senior, Christ the King Cathedral School, Lubbock, Texas
- PS027 Evaluating the Effectiveness of Anthocyanins as Sunscreen, Phase Two**
Julie Anne Boyle, 18, Senior, Avon High School, Avon, South Dakota
- PS028 The Xylem Filter**
Shailey Shah, 14, Freshman, Chattanooga School for the Arts and Sciences, Chattanooga, Tennessee
- PS029 Estimation of Genome Size and Ploidy Level in *Salicornia* Species for Understanding the Extent of Genetic Variation**
Mariyah Tariq Bashawri, 17, Senior, AlBassam Schools, Dammam, Saudi Arabia
- PS030 Engineering Triterpene Methyltransferase in Tobacco**
Caroline Joan Bush, 16, Junior, Paul Laurence Dunbar High School, Lexington, Kentucky
- PS031 Amelioration of Hypoxic Coastal Shorelines Using the Physiological Adaptations of *Spartina* Grasses, Elucidated by Pick's Theorem**
Natalie Marie Bush, 15, Sophomore, Saint Joseph's Academy, Baton Rouge, Louisiana
- PS032 The Correlation between Oleoresin Production in Pine Species with the Number of Resin Canals They Produce, Year Five**
Holly Linn Tucker, 18, Senior, Union County High School, Lake Butler, Florida
- PS033 RNA-Guided Genome Editing in *Arabidopsis thaliana* Using CRISPR/CAS9**
Nadine Mahdi Almadani, 17, Junior, Dahran School, Dammam, Saudi Arabia
- PS034 The Insecticidal Properties of Noxious Weeds**
Carter Joseph Mauch, 16, Junior, Hankinson High School, Hankinson, North Dakota
- PS035 The Fungicidal Impact of Detrimental Weeds on Soybeans**
Grady Adam Mauch, 17, Junior, Hankinson Public School, Hankinson, North Dakota

- PS036 Utilizing the Isolated Components, Variation in Mammals, and Treatment Processes of Milk for Grain Yield Enhancement**
Jordan Ray Cadle, 18, Senior, Paoli Junior/Senior High School, Paoli, Indiana
- PS037 The Effects of Insecticides on *Leptinotarsa decemlineata* and *Solanum tuberosum***
Mya Jo Steinwehr, 14, Freshman, Hankinson Public School, Hankinson, North Dakota
- PS038 Unraveling the Mechanisms of Arsenic-Induced Stress in Rice (*Oryza sativa* L.) and Assessment of Potential Alleviation by Silicon Addition**
Rohith S. Venkataraman, 16, Junior, The Charter School of Wilmington, Wilmington, Delaware
- PS039 The Effect of Heat Stress on Constitutively Expressed Flowering Inhibitor Genes in *Arabidopsis thaliana* and the Onset of Early Bolting**
Jovan Baslious, 18, Senior, North Carolina School of Science and Mathematics, Durham, North Carolina
- PS040 Composting *Halyomorpha halys***
Sinmisola Tinubu, 17, Senior, Eleanor Roosevelt High School, Greenbelt, Maryland
- PS041 Genetic Diversity in Species of *Cyperus***
Ashley F. Kekona, 17, Senior, Kamehameha Schools Kapalama, Honolulu, Hawaii
- PS042 Examining Potential False Positives for Genetic Modification in Taro**
Anuheha DeLude, 17, Senior, Kamehameha Schools Kapalama, Honolulu, Hawaii
- PS043 An Eco-friendly RNA Interference-based Insect Control for Management of Citrus Greening Disease using a Model System**
Saumya R. Keremane, 16, Junior, Martin Luther King High School, Riverside, California
- PS044 Allergy among Students and Some Allergic Plants in Kutaisi (Imereti, Georgia)**
Natali Tchumburidze, 16, Junior, Georgian-American School "Progress", Kutaisi, Georgia
- PS045 Natural Healing: Regeneration of Epicuticular Waxes on Leaf Surfaces**
Johannes Reinhardt, 14, Senior, Hans Thoma Gymnasium, Lorrach, Germany
- PS046 Marine Algae as Fertilizers in the Bio-Orchard**
Luis Xavier Salgado, 14, Freshman, Marcelino Canino Canino, Dorado, Puerto Rico
- PS047 Red Raspberries vs. Gold Raspberries**
Mariah Joy Cox, 16, Sophomore, Zane Trace High School, Chillicothe, Ohio
- PS048 Cryopreservation and Germination of *Pisum sativum***
Brooklyn Shae Morris, 17, Junior, SUCCESS Academy Dixie, St. George, Utah
- PS301 Enhanced Third-Generation Biofuel Production from Genetically Modified Algae**
Wenjia (Dara) Li, 16, Sophomore
Anoop Vemulapalli, 16, Junior
Jasper High School, Plano, Texas
Plano West Senior High School, Plano, Texas
- PS302 Stress Signals: Evaluating Cellular Signals in Cotton, Soybeans, and Corn by Colorimetric Means as an Inexpensive Method of Crop Monitoring**
William Hurdle Welch, 18, Senior
Katherine Lynne Welch, 17, Senior
Alpena High School, Alpena, Michigan
- PS303 Application of the Biotechnological Plant Nim (*Azadirachta indica*) in the Combat of the Parasites of Plants and Animals**
Caroline Alcantara de Sousa Cirino, 16, Junior
Savio Henrique da Silva, 17, Junior
Dayana Stefane de Sousa Silva, 17, Sophomore
Manoel Antonio de Sousa, Azurita-Mateus Leme, Brazil
Escola Estadual Manoel Antonio de Sousa, Azurita-Mateus Leme, Brazil
- PS304 Silver Nanoparticles Synthesized Using Green Chemistry: A Study of Environmental Impacts on *Brassica oleracea* in a Hydroponic System**
Jacob Austin Mosley, 14, Freshman
Cassandra Shae Mosley, 17, Junior
Gabriela Sullivan, 15, Freshman
Vanguard High School, Ocala, Florida
- PS305 Healthy Grapevines without Heavy Metals**
Dimitrie Ginju, 15, Freshman
Anastasia Jeleznii, 16, Sophomore
"Mihai Marinciuc" Lyceum, Chisinau, Republic of Moldova
- PS306 Algaenius**
Kevin Martinez, 18, Senior
Ana Michelle Trevino, 18, Senior
James Pace High School, Brownsville, Texas
- PS307 Strategic Procedure to Improve the Acclimation of Cassava (*Manihot esculenta*) *in vitro* Plants through Variation of Source and Quantity of Carbon**
Laura Mariela Campos-Quesada, 17, Junior
Juan Manuel Segura-Castro, 18, Junior
Colegio Cientafico de Costa Rica, Sede San Carlos, San Carlos, Costa Rica
- PS308 How CAM Plants Open and Close Stomata**
Kota Izumi, 17, Junior
Ryohei Noda, 17, Junior
Saitama Prefectural Ohmiya Senior High School, Saitama, Japan
- PS309 The Arrangement of Florets in *Anthodia* Optimizes Production of Germinable Seed in the Sunflower**
Shoko Harano, 16, Sophomore
Arisa Shibata, 17, Junior
Nana Suzuki, 17, Junior
Hitachi First Senior High School, Hitachi-City, Japan
- PS310 Use of Bio Ferments in the Biological Control of *Moniliophthora roreri* in Cocoa (*Theobroma cacao*)**
Daylin Brian-Rodriguez, 16, Junior
Veronica Bustos-Guido, 17, Junior
Marcelo Guerra- Abrego, 19, Junior
Liceo Academico de Sixaola, Limon, Costa Rica
- PS311 The Effect of the Aqueous Extract of *Lepidium meyenii* walp Compared to Rivastigmine in the Memories of Rats that Have Scopolamine-Induced Amnesia in the Biotery of the Educational Institution "Jose Maria Arguedas"**
Aylinne Wendy Rivera Cangalaya, 17, Freshman
Sarely Jahel Usuriaga Leon, 17, Freshman
Jose Maria Arguedas, Yauli, Peru
- PS312 Anticarcinogenic Potential of Nutraceutical Supplement Soybean Based Quantified with High Rates of Genistein and Daidzein**
Rayane Dayara de Souza Melo, 18, Junior
Carla Fernanda Okabe, 17, Junior
Instituto Federal de Educacao, Ciencia e Tecnologia de Mato Grosso do Sul, Coxim, Brazil
- PS313 CUCARI-YA (Biological Insecticide Based Poisonous Plants)**
Lorena Felipe Trinidad, 17, Senior
Edgar Ignacio Morales Jimenez, 17, Senior
Maria Elena Ortiz Campos, 17, Junior
Colegio de Bachilleres del Estado de Puebla Plantel 6, Puebla, Mexico

- PS314 Organic Preventative Measures against the Germination of Musk Thistles**
 Amanda Mae Reiff, 17, Junior
 Devin William Tolsma, 17, Junior
 Avon High School, Avon, South Dakota
- PS315 Novel Iterative Methodologies in the Search for a Universally-Functional DNA Barcode for Plants**
 Julian Stefan Glowacz, 15, Sophomore
 Jaision Jain, 15, Sophomore
 Hunter College High School, New York, New York
- PS316 Investigating the Origin of Descent for the North American Variation of *Picea abies* using the Mitochondrial nad1 Gene Intron**
 Micah Cardwell Clegg, 16, Junior
 Samuel Ray Himes, 17, Junior
 Ethan Peterson, 17, Junior
 Pleasant Grove High School, Pleasant Grove, Utah
- PS317 The Vain Cayenne**
 Oriana Arrieta Mejia, 16, Junior
 Carlos Javier Tapia Avila, 16, Junior
 Institucion Educativa Buenavista, Buenavista - Sucre, Colombia
- PS318 Study of the Effect of the Major Components of *Bixa orellana* L. Seeds in Mosquito Control**
 Ester Mary Castro, 17, Junior
 Keren Mishell Galarza, 16, Junior
 Asuncion Rodriguez de Sala, Guayanilla, Puerto Rico
- PS319 Novel Strategy for Controlling Population of Pest Snails Using Plant Extracts**
 Wanta Kamlang, 16, Sophomore
 Pattarapong Limpawattana, 16, Sophomore
 Phanomsarakham "Phanom Adun Witthaya" School,
 Chachuengsao, Thailand
- PS320 The Hydro-Aeroponic Crops, an Alternative Technique in Agriculture**
 Juan Esteban Gaviria, 17, Junior
 Stefania Hernandez, 17, Junior
 Sara Sanchez, 16, Junior
 Institucion Educativa Santo Tomas de Aquino, Guarne, Colombia
- PS321 A Computational Model of Tree Growth to Maximize Carbon Sequestration**
 Eli J. Echt-Wilson, 17, Junior
 Albert Zuo, 17, Junior
 La Cueva High School, Albuquerque, New Mexico

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202.785.2255 telephone
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