

The Intel International Science and Engineering Fair 2010



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Finalist Directory

May 9-14, 2010

San Jose Convention Center

San Jose, California

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SOCIETY FOR SCIENCE & THE PUBLIC recognizes and thanks the sponsors of the Intel ISEF 2010 and recognizes with gratitude the San Jose Host Committee, its financial supporters, and volunteers for their dedication and hard work.

Special Awards are given by scientific, professional, industrial, educational, and governmental organizations in the form of scholarships, tuition grants, summer internships, scientific field trips, and equipment grants.

Special Award Organizations

Acoustical Society of America	IEEE Foundation
Agilent Technologies	IEEE Computer Society
Air Force Research Laboratory on behalf of the United States Air Force	IIT Institute of Psychology
American Association for Clinical Chemistry	International Council on Systems Engineering (INCOSE)
American Association of Pharmaceutical Scientists	King Abdulaziz and his Companions Foundation for Giftedness and Creativity
American Association of Physics Teachers and the American Physical Society	MIT Lincoln Laboratory
American Chemical Society	Mu Alpha Theta, National High School and Two-Year College Mathematics Honor Society
American Committee for the Weizmann Institute of Science	National Anti-Vivisection Society
American Dental Association	National Collegiate Inventors and Innovators Alliance/The Lemelson Foundation
American Geological Institute	National Institute on Drug Abuse, Friends of NIDA & National Institutes of Health
American Intellectual Property Law Association	National Oceanic and Atmospheric Administration (NOAA)
American Mathematical Society	National Taiwan Science Education Center
American Meteorological Society	North American Benthological Society
American Physiological Society	Office of Naval Research on behalf of the United States Navy and Marine Corps
American Psychological Association	Patent and Trademark Office Society
American Society for Horticultural Science	PowerPlus Engineering, Inc.
American Society for Microbiology	Psi Chi, The International Honor Society in Psychology
American Society of Pharmacognosy	Ricoh Americas Corporation
American Statistical Association	Sierra Nevada College
Association for Computing Machinery	Society for Applied Spectroscopy, Northern California Section
Association for Women Geoscientists	Society of Experimental Test Pilots
Astronomical Society of the Pacific and the American Astronomical Society	Society of Exploration Geophysicists
AVASC-Ashtavadhani Vidwan Ambati Subbaraya Chetty Foundation	SPIE-The International Society for Optical Engineering
CACO Pharmaceutical & BioScience Society	States United for Biomedical Research (SUBR)
China Association for Science and Technology (CAST)	Symantec Corporation / Science Buddies
Coalition for Plasma Science (CPS)	Synaptics, Inc.
Drexel University	United States Army
Endocrine Society	United States Coast Guard
European Organization for Nuclear Research (CERN)	United States Environmental Protection Agency
European Union Contest for Young Scientists	United Technologies Corporation
Florida Institute of Technology	University of the Sciences in Philadelphia
GE Energy	Vacuum Technology Division of the American Vacuum Society
Google	Wolfram Research, Inc.

Each # next to the finalist's name indicates previous ISEF participation
 An * identifies non-competing projects
 A T after the booth ID number indicates a Team Project

ANIMAL SCIENCES

- AS001** **Effects of Overexpression and Deletion of TBPH Genes on Motor Function of *Drosophila melanogaster***
 Joshua Miles Dreyzen, 18, Senior, Southridge High School, Beaverton, Oregon
- AS002** **Examining Dietary Preferences in *Manouria emys* Based on Olfactory and Visual Cues: A Behavioral Analysis of Food Selection, Year Six of the *M. emys* Investigations**
 # Richard Schinco Schaffer, 17, Junior, Stanton College Preparatory High School, Jacksonville, Florida
- AS003** **Testing Methods to Isolate and Grow Equine *Lawsonia intracellularis***
 # Samantha Kay Welu, 15, Sophomore, Marshall Senior High School, Marshall, Minnesota
- AS004** **The Effect of Plumage Coloration on Extra-Pair Paternity in the Indigo Bunting**
 Eugenia Pushkarskaya, 18, Senior, Paul Laurence Dunbar High School, Lexington, Kentucky
- AS005** **How Much Worm Is a Worm?**
 Monica Michelle Hernandez, 15, Freshman, Okeechobee Freshman Campus, Okeechobee, Florida
- AS006** **Using Toads: An Effective Method of Destroying Insects**
 Phuong Thi Xuan Doan, 17, Junior, Duc Trong High School, Duc Trong, Lam Dong, Vietnam
- AS007** **Study on Biological Control of *Panonychus citri* by Using Fungal Bio-Control Agents**
 Qijin Wu, 17, Senior, Fuzhou No. 1 Middle School, FUZHOU, FUJIAN, China
- AS008** **Are the Feeding Practices of *Apis mellifera* Significantly Affected by Deviation(s) from Foraging Schemata through Landmark Manipulation or Transposition?**
 Andrea Lynn Lazzari, 18, Senior, Melbourne High School, Melbourne, Florida
- AS009** **Nutritional Responses: The Effects of Dietary Carbohydrates, Lipids, and Proteins on the Memory and Neuromuscular Responses of *Procambarus clarkii***
 # Bretton Roy Medlin, 16, Sophomore, Grove High School, Grove, Oklahoma
- AS010** **Circadian Rhythms Interrupted: The Effects of Sleep Deprivation on the Reproduction Rate of *Drosophila melanogaster***
 Joshua A Mease, 16, Sophomore, Grove High School, Grove, Oklahoma
- AS011** **Birds of Quail Hollow Ranch: A Study of Avian Diversity**
 Alexander M. Rinkert, 17, Junior, San Lorenzo Valley High School, Felton, California
- AS012** **The Effects of Water Temperature and pH on the Metabolic Rate of Juvenile Blue King Crabs (*Paralithodes platypus*)**
 Lia Katherine Domke, 17, Junior, Juneau-Douglas High School, Juneau, Alaska
- AS013** **Why Spiderman Cannot Do without His Silk? Effects of Dragline Silk on Jumping Performance of Jumping Spider (*Hasarius adansoni*)**
 Yung-Kang Chen, 16, Junior, National Taichung First Senior High School, Taichung City, Taiwan, Chinese Taipei
- AS014** **The Effects of Elevated Temperature on Hypoxia Tolerance in Eastern Oysters, *Crassostrea virginica***
 Brianna Dane' Levonina Frink, 18, Senior, Harry P. Harding University High School, Charlotte, North Carolina
- AS015** **Relay Landscape Learning: A New Mode of Learning in Honeybees, *Apis mellifera***
 Neil Kondamuri, 17, Senior, Munster High School, Munster, Indiana
- AS016** **Effect of Resveratrol, a Phytoalexin, on Weight Gain, Leg Strength, and Wing Length of *Gallus gallus* Chicks**
 Wendell Shane Riels, 17, Junior, Seminary High School, Seminary, Mississippi
- AS017** **Iron Concentration of Quagga Mussel Glue and Its Effect on Shipwrecks**
 Amanda Grace Savagian, 17, Senior, Divine Savior Holy Angels High School, Milwaukee, Wisconsin
- AS018** **Effects of Alternate Feeding Times on Hamsters**
 Hagan Maree Capnerhurst, 14, Freshman, Batesburg-Leesville High School, Batesburg-Leesville, South Carolina
- AS019** **Does Size Matter? A Study of Dietary Supplements and Cellular Hydration**
 # Nathan Lyne Frantz, 16, Sophomore, Fleming High School, Fleming, Colorado
- AS020** **Lysine and Methionine Requirements of Chicks Fed Low Protein Corn-Soybean Meal Diets: A Three Year Study**
 # Rosemary Frances Chapple, 18, Senior, Waterloo High School, Waterloo, Illinois
- AS021** **Effects of Starvation on Wild Type and Adipose60 Mutant *Drosophila melanogaster***
 # Alyssa Chelsea Ehrlich, 17, Senior, South Side High School, Rockville Centre, New York
- AS022** **Comparison of Canine Lyme Disease between Virginia and Maryland**
 # Shahleen Zehra Ahmed, 17, Senior, Chantilly High School, Chantilly, Virginia
- AS023** **The Effects of Genotypic Pheromons on Inbreeding of *Drosophila melanogaster***
 Rio Anthony McMahon, 15, Sophomore, Spring Creek High School, Spring Creek, Nevada
- AS024** **Quantifying the Relative Abundance of Juvenile Atlantic Sturgeon in the Hudson River**
 Sean Patrick Maiorano, 18, Senior, Ossining High School, Ossining, New York
- AS025** **Can Hydrostatic Pressure on Eggs Cause Sterility in All Trout Species?**
 Tylynn Marie Barker, 15, Freshman, Weber High School, Pleasant View, Utah
- AS026** **The Identification of a Homolog of the Extra Cellular Matix Protein, hLAMP-1 in 24 Hour- 72 Hour Zebrafish Embryo**
 Ambria Nicole McDonald, 17, Senior, William B. Murrah High School, Jackson, Mississippi

- AS027 **My Spacel A Study of Gause's Law of Competitive Exclusion with Upper Ohio River Valley Crayfish**
Vincent Jacob O'Leary, 14, Freshman, Wheeling Central Catholic High School, Wheeling, West Virginia
- AS028 **Laboratory Environment Naturality as a Varying Factor in the Stress Levels and Scientific Viability of the Swiss Laboratory Mouse**
Casey J Acklin, 14, Freshman, The Davidson Academy of Nevada, Reno, Nevada
- AS029 **A Bug's Light: Insect Predilection to Light Color, Phase IV**
Daniel Seguro Samora, 15, Freshman, Alamogordo Senior High School, Alamogordo, New Mexico
- AS030 **The Effects of Different Genera of Algae on the Phosphorus Excretion and Oxygen Depletion of Quagga Mussels (*Dreissena bugensis*)**
Christopher Linabury Welker, 14, Freshman, Nicolet High School, Glendale, Wisconsin
- AS031 **An Evaluation of Invasive Tunicates in Pleasant Harbor, Washington**
Marley Elizabeth Iredale, 17, Senior, Sequim High School, Sequim, Washington
- AS032 **The Influence of Antiparasitics on Parasite Burden and Immune Response to Viral Vaccination**
Nathan Sven Wilen, 18, Senior, Belle Fourche High School, Belle Fourche, South Dakota
- AS033 **The Effects of Food Deprivation in Agonistic Contests between Male Juvenile House Crickets, *Acheta domesticus***
Robert Keith Pak, 17, Junior, Valley High School, West Des Moines, Iowa
- AS034 **A Multipronged Investigation of the Amphibian Pathogen *Batrachochytrium dendrobatidis***
Madeline Berit Sides, 17, Senior, Davis Senior High School, Davis, California
- AS035 **Ethology of Friendship among Adult Male Bonnet Macaques (*Macaca radiata*) at Arunachala Hill, India**
Athman Ramana Adishesan, 13, Freshman, Ramana Academy, San Jose, California
- AS036 **The Acquaintance and Study of Endangered Insects in the Tirana District Strictly for Protection Purposes**
Kristi Mitre, 17, Senior, Gjinnazi Ismail Qemali, Tirane, Albania
- AS037 **The Effect of Pesticides on the Chemotaxis of Planaria**
Christina yah-yun Lee, 14, Freshman, Sherando High School, Stephens City, Virginia
- AS038 **The Life of a Planaria**
Betlehem Dilnessa Ayalew, 15, Sophomore, Benjamin Banneker Academic High School, Washington, District of Columbia
- AS039 **Ocean Acidification and the Post Metamorphic Growth of *Lytechinus variegatus***
Charnelle Kanisha Bland, 18, Senior, Maritime and Science Technology Academy, Miami, Florida
- AS040 **The Effect of Genetic Mutation in *Drosophila melanogaster* in Food Odor Preference**
Katherine Marie Neal, 16, Sophomore, Beaufort Academy, Beaufort, South Carolina
- AS041 **Sources of Phytoplanktons Found in Alimentary Canal of *Rastrelliger neglectus* Babies at the Maerumpueng Bay, Prachuab Khiri Khan, Thailand**
Srisuda Rojsatien, 18, Junior, Princess Chulabhorn's College Phetchaburi, Cha-am, Phetchaburi, Thailand
- AS042 **The Nervous Function of *Aurelia aurita* (Moon Jellyfish) and Its Relation to Discrimination of Certain Shapes and Colors**
Adolfo Rodriguez-Velazquez, 17, Junior, Florencia Garcia High School, Las Piedras, Puerto Rico
- AS043 **Estimating Terrestrial Salamander Populations in Agriculture Areas Using Mark and Recapture Techniques**
Nathaniel Wade Hubbs, 15, Sophomore, Camden Central High School, Camden, Tennessee
- AS044 **Use of Regression Analyses to Build Ecological Models of Poison Dart Frogs in Their Native Habitats**
Gabriel Thailand Joachim, 16, Sophomore, Cibola High School, Albuquerque, New Mexico
- AS045 **Techniques for Mapping and Assessing Populations of the Threatened Elkhorn Coral, *Acropora palmata*, on Coral Reefs within the Florida Keys National Marine Sanctuary**
Lindsey Leona Precht, 17, Junior, Gulliver Preparatory School, Pinecrest, Florida
- AS046 **Creating RNAi Based Anthelmintics**
Elizabeth Lo-Ra Dick, 17, Senior, Seguin High School, Seguin, Texas
- AS047 **Color Feeders Birds Prefer**
Tanner Jon Meidinger, 15, Freshman, Ashley Public School, Ashley, North Dakota
- AS048 **An Investigation of Insecticidal Attributes Derived from Chitin**
Tanner John Coppin, 16, Sophomore, Hankinson High School, Hankinson, North Dakota
- AS049 **The Effect of Honey Hydrogen Peroxide (H₂O₂) and Antioxidants on Small Hive Beetle (*Aethina tumida*) Reproduction and Survival**
Lydia Louise McCormick, 17, Senior, Jefferson County International Baccalaureate, Birmingham, Alabama
- AS050 **Birds Species in Belen Rincon Neighborhood**
Alejandra Alvarez_Garcia, 18, Junior, Alcaldia de Medellin, Medellin, Antioquia, Colombia
- AS051 **The Answer Is in the Solution**
Emily Ann Schnoor, 18, Senior, Sargent High School, Monte Vista, Colorado
- AS301T **Analysis of *Caenorhabditis elegans*' Growth and Developmental Response to Ultraviolet Radiation**
MiKyle Ivy Crockett, 16, Junior
Kristen Nicole Huyghue, 15, Sophomore
Episcopal High School of Jacksonville, Jacksonville, Florida
- AS302T **Beetle Mania II: Effect of CO₂ Enrichment on the Growth of Tropical Soda Apple (*Solanum viarum*) and the Resulting Immature Survival and Adult Reproduction of *Gratiana boliviana* (Coleoptera: Chrysomelidae)**
Gerald Francis Condon, 18, Senior
Todd Joseph Condon, 16, Sophomore
Lincoln Park Academy, Fort Pierce, Florida
- AS303T **Determining the Optimal Scaffold for Three-Dimensional Bone Formation Using Bovine Adipose-Derived Adult Stem Cells**
Melissa Severn McDowell, 17, Senior
Michael Charles McDowell, 15, Freshman
Saint Joseph's Academy, Baton Rouge, Louisiana
Catholic High School, Baton Rouge, Louisiana
- AS304T **How Beach Sediment Composition and Tide Level Affect the Size and Age Distribution of Butter Clams (*Saxidomus giganteus*)**
Auriel Catherine Clark, 15, Sophomore
Lindsay Bristol Clark, 18, Senior
Juneau-Douglas High School, Juneau, Alaska
- AS305T **Silkworm Characteristics Improvement through Genetic Hybridization: Phagous and Resistance Optimization**
Si Rui Huang, 17, Sophomore
Yue Zhu, 17, Junior
Fei Chen, 18, Junior
Shanghai Nanyang High School, Shanghai, Shanghai, China
- AS306T **Plankton Population Census in the Eastern Shore of Puerto Rico—The Atlantic Ocean (Phase IV)**
Alejandro Manuel Taveira, 18, Senior
Ruben Oscar Bras, 18, Senior
Guillermo Francisco Mirandes, 17, Senior
Colegio Marista, Guaynabo, Puerto Rico

- AS307T Growth of Mealworms (*Tenebrio molitor*) When Fed Protein Supplements**
Alexis Whitney Olson, 16, Sophomore
Tayler Rae Doorn, 16, Sophomore
Mitchell High School, Mitchell, South Dakota
- AS308T An Investigative Study of Environmental Factors Affecting Migration of Juvenile American Eels in the Lower Hudson River Estuary**
Laura Louise Hellmich, 17, Senior
Dara Michelle Illofsky, 17, Senior
Ossining High School, Ossining, New York
- AS309T Diet Pills: Ruse or Real?**
Apas Aggarwal, 18, Senior
Divya Shenoy, 16, Senior
Saint Andrew's Episcopal School, Ridgeland, Mississippi
- AS310T Can Rose Bitterling Spawn in a Dummy Mussel? Wonder of Amino Acids that Induce Spawning and Ejaculation**
Fumiaki Taniguchi, 18, Senior
Takanori Hirata, 17, Junior
Arata Nishigaki, 17, Junior
Seifu High School, Osaka-shi, Osaka, Japan
- AS311T The Relationship between Colony Size, Worker Body Size and Productivity in *Temnothorax regatulus* Ants**
Damian Cory Alzua, 18, Senior
Chelsea Jewel Powers, 18, Senior
Tucson High Magnet School, Tucson, Arizona
- AS312T Identifying Trends of *Wolbachia pipientis* Infection in Various Species of Arthropods**
Jeannie Nguyen Tran, 17, Senior
Katerina Trinh, 17, Senior
Van Hoang Tran, 17, Senior
Oak Grove High School, San Jose, California
- AS313T Effect of *Adelges tsugae* on *Sasajiscymnus tsugae* Egg Production**
Rebekah Morgan, 15, Freshman
Yohana Dierolf, 15, Freshman
Erika Kate Williams, 15, Freshman
Brevard High School, Brevard, North Carolina
- AS314T The Effects of Creatine Monohydrate on Mice**
Bryan Marley Lent, 18, Senior
Brian Manuel Cambra, 17, Senior
Granada High School, Livermore, California
- AS315T Adscita Statices: Nightly Variations of Appearance in a Moth**
Markus Enekvist, 18, Freshman
Tor Ragnar Djarv, 18, Senior
Katedralskolan, Lund, Sweden
- AS316T Effect of the Isopropyl Alcohol on the Spin Pattern of the *Nephila clavipes* Spider**
Ralphdy Vergne, 14, Freshman
Fadi Tarek Abumoala, 14, Freshman
Blanca Malaret, Sabana Grande, Puerto Rico
- AS317T The Effect of the Moon on the Water Composition of Bees' Honey (*Apis indika*) in Bee Hives**
Adeesha Udayarekha Game Kankanamalage, 17, Junior
Lasitha Lakmal Thotage, 20, Senior
Vinushi Lakshani Hettithantrige Dona, 17, Junior
WP/Kalutara Gnanodaya College, Kalutara, Western, Sri Lanka
- AS318T Development of *Harmonia axyridis* (Coleoptera: Coccinellidae) Fed with Three Types of Prey (Diets)**
Laura Munoz_Baena, 17, Senior
Wendy Andrea Valencia_Montoya, 17, Senior
Institucion Educativa Centro Formativo de Antioquia, Medellin, Antioquia, Colombia

BEHAVIORAL AND SOCIAL SCIENCES

- BE001 Music Therapy**
Houa Xiong, 14, Freshman, John A. Johnson Senior High School, Saint Paul, Minnesota
- BE002 The Effects of Borderline Hypothyroidism on Quality of Life and Daytime Drowsiness**
Michael Andrew Fairchild Harding, 17, Senior, Lake Highland Preparatory School, Orlando, Florida
- BE003 Improving ADHD Treatment: A Comparison of Stimulant Medication Treatment for Children with ADHD, Computerized Cognitive Training of Attention and Working Memory, and the Combination of the Two**
Kevin Michael Knight, 17, Junior, Collegiate High School at Northwest Florida State College, Niceville, Florida
- BE004 Ability to Suppress the Expression of Fear in Human ApoE Mice**
Matthew Samuel Agam, 16, Junior, Beaverton High School, Beaverton, Oregon
- BE005 The Impact of a Set of Training Programs on the Serotonin Hormone in a Sample of (8-9) Year-Old Students with Learning Disabilities and Its Correlation to Their Achievement and Behavior (An Experimental Study)**
Mohammad Mesbah Al-Refai, 16, Junior, Modern Systems Schools, Amman, Jordan
- BE006 Harp Therapy's Effect on the Medulla Oblongata**
Katherine Jane Steffl, 16, Junior, St. Mary's High School, Sleepy Eye, Minnesota
- BE007 Who Am I? The Role Situational Factors Play When Understanding the Self-Concept**
Jean Louise Leighton, 16, Sophomore, Winona Senior High School, Winona, Minnesota
- BE008 A Comparative Study of Comprehension Differences in Struggling Readers Using Phrase and Character Spaced Models, Year Three**
Lindsey Brooke Saunders, 16, Junior, Union County High School, Lake Butler, Florida
- BE009 The Effect of the Amount of Time Students Text on Phones to the Number of Mechanical Errors in a Writing Assignment**
Sumer Ryan Doulk, 15, Sophomore, Nature Coast Technical High School, Brooksville, Florida
- BE010 Gemara and Gematria: A Case Study on the Effects of the Use of Sociocultural Contextualizing for the Learning of Mathematics**
Tamara Gedankien, 17, Senior, Escola Brasileira Israelita Chaim Nachman Bialik, Sao Paulo, SP, Brasil
- BE011 Student Connection**
Andressa Cardozo Rodrigues, 16, Junior, Colegio Presidente Emilio Garrastazu Medici, Bage, Rio Grande do Sul, Brasil
- BE012 The Relationship between Cognitive Demand and Stress**
Chase Tyler Huggins, 18, Senior, Saint Charles West High School, Saint Charles, Missouri
- BE013 Learning Styles and ADHD: The Utilization of VAK Methodology and DSM-IV Criteria to Enhance Educational Development and to Find a Correlation between Learning Styles and ADHD**
Travis Coleman Sigafos, 16, Sophomore, Champlin Park High School, Champlin, Minnesota
- BE014 It Ain't Over 'til the Knockout Mouse Sings**
Benjamin Rogers Bauchwitz, 16, Junior, Hershey High School, Hershey, Pennsylvania
- BE015 Perception of Environmental Issues**
Kelly Elizabeth Liles, 16, Sophomore, Oak Grove High School, Hattiesburg, Mississippi
- BE016 Nutrition Education in Brazilian Schools: A New Methodology**
Heitor Geraldo da Cruz Santos, 15, Freshman, Associacao Educacional e Cultural Arco-Iris, Recife, PE, Brasil
- BE017 You Are What You Eat**
Alexis Amy Caletka, 17, Junior, Holy Savior Menard Central High School, Alexandria, Louisiana
- BE018 Academic Dishonesty: Factors to a Student's Success**
Krupa H. Merchant, 15, Sophomore, Dutchtown High School, Hampton, Georgia
- BE019 The Effects "Chat" May Have in the Written Composition of Teenagers between the Ages of Fourteen and Sixteen Years**
Luis Alejandro Vazquez, 16, Junior, Colegio Maria Auxiliadora, Carolina, Puerto Rico
- BE020 Algebra: Not the Same Old Game - Educational Gaming for Knowledge Retention**
Neil Martin Redfield, 17, Senior, John Jay Science and Engineering Academy, San Antonio, Texas
- BE021 Risky Business: What Cognitive Factors Influence Risk Taking in the Academic Setting?**
Joseph Hunter Yagoda, 17, Senior, William A. Shine Great Neck South High School, Great Neck, New York
- BE022 The Effects of Issue-Based and Character-Based Attack Ads on Intent to Vote and Perceptions of Candidates**
Aaron Michael Levine, 17, Senior, Roslyn High School, Roslyn Heights, New York
- BE023 Understanding the Psychosocial Factors Related to Low Mammography Adherence amongst Low-Income, Urban African Americans**
Kevin Young Xu, 18, Senior, Roslyn High School, Roslyn Heights, New York
- BE024 The Effect of Congruent and Incongruent Facial Expressions on Remembering the Emotions of Others**
Willa Grace Kerkhoff, 15, Freshman, Mount Vernon High School, Mount Vernon, Ohio
- BE025 Obesity and Depression: Differential Responses to Environmental Stress**
Sarah Averi Albala, 17, Freshman, John Jay Senior High School, Cross River, New York
- BE026 Do People Read Faster and Comprehend Better When They Read on Paper or on the Computer Screen?**
Lucy Ann Kunzler, 14, Freshman, Orion Junior High School, Harrisville, Utah
- BE027 The Investigation of Latin Americanization in the United States: An Interracial Socialization Study of American and Brazilian Pre-Adolescents**
Camila Sorese Linneman, 18, Senior, Ossining High School, Ossining, New York
- BE028 The Relationship between Socioeconomic Status, Dietary Habits, and Health**
Christian Durango, 17, Senior, Times Squared Academy, Providence, Rhode Island
- BE029 Game Power: A Game Environment for Measuring ICT-enhanced Skills of Young Students**
Abdulaziz Khalid Alghunaim, 18, Senior, Asrary School, RIYADH, central, Saudi Arabia
- BE030 The Hearing Glasses**
Mahmoud Motaz Ghulman, 16, Sophomore, Dar Althikr Schools, Riyadh, Saudi Arabia
- BE031 Working Memory Span and Its Correlation to Gender, GPA, Sleep and Other Factors**
Kathryn Rose McClintic, 15, Sophomore, Cedarcrest High School, Duvall, Washington
- BE032 You Catch More Flies with Honey!**
James Michael Kobylanski, 17, Senior, Rome Catholic High School, Rome, New York
- BE033 The Youla Effect: Original Research on Human Facial Recognition by the Subconscious Mind**
Grant Perry Samms, 18, Senior, Olathe North High School, Olathe, Kansas
- BE034 Pharmaceutical Safety: Risk Perception and Drug Adherence**
Michael Joseph Vredenburg, 18, Senior, Carlsbad High School, Carlsbad, California

- BE035 The Predictability and Abstractness of Language: A Study in Understanding and Usage of the English Language through Probabilistic Modeling and Frequency**
Revanth Kosaraju, 16, Sophomore, The Harker School, San Jose, California
- BE036 Smart TV**
Hamza Farouk Mallah, 16, Sophomore, Iman High School, Saida, South, Lebanon
- BE037 The Anti-Rob Bag**
Walid Ahmad Chamma, 16, Sophomore, Rawdat Al- Fayhaa High School, Tripoly, North, Lebanon
- BE038 MUDIBANI**
Leslie Gonzalez Huerta, 17, Senior, Escuela Vocacional/Universidad de Guadalajara/Sistema de Edu, Guadalajara, Jalisco, Jalisco, Mexico
- BE039 Effects of an Educational Program about *Melaleuca quinquevernia* in the Attitude of Communities' Students Living Adjacent to Tortuguero Lagoon**
Elias K Pabon, 17, Senior, Lino Padron Rivera, Vega Baja, Puerto Rico
- BE040 The One Dollar Auction**
Alec Burton Howard, 17, Senior, Deer Valley High School, Antioch, California
- BE041 Holland Code Quiz and Personal Choices**
Bayan H. Abdallat, 15, Sophomore, Dove Science Academy, Oklahoma City, Oklahoma
- BE042 A Closer Look at Relationships between Youth's Recreational Activities and Their General Knowledge**
Aida Tarek Abdou, 14, Freshman, Alexandria Language School, Alexandria, Egypt
- BE043 Slow It Down to Speed It Up: Breaking through the Window of Autism**
Adelina Corina Cozma, 14, Freshman, Bayview Secondary School, Richmond Hill, Ontario, Canada
- BE044 Social Experience Modulates *Drosophila* Aggressive Behavior**
Andrew Wooyoung Kim, 17, Junior, Cedar Shoals High School, Athens, Georgia
- BE045 Voting Systems: An Outcome Analysis, Phase Two**
Vikash Evans Hypio, 16, Sophomore, Hotchkiss High School, Hotchkiss, Colorado
- BE046 Anxiety and Depression Level Patterns in Response to Hormonal Fluctuation across the Menstrual Cycle**
Carolina Jaramillo, 15, Sophomore, American Heritage School, Plantation, Florida
- BE047 Determining the Efficacy of Brain Synchronization Training on Subjects with Developmental Delays**
Danielle Nicole Scheer, 18, Senior, Pine Crest School, Fort Lauderdale, Florida
- BE301T Predictability: Understanding How and Why We Develop First Impressions and How Personal Characteristics Relate to Having Predictable Responses to Image and Sound**
Isaiah Martin Butler, 16, Junior
Megan Elizabeth Gilliland, 16, Junior
Boston Marie Portner, 17, Junior
Saint Mary's High School, Sleepy Eye, Minnesota
- BE302T Socio-Economic Factors and Test Scores in Wisconsin**
Jamie Lea Ginther, 17, Junior
Tyler Alan Tullius, 16, Junior
Cochrane-Fountain City High School, Fountain City, Wisconsin
- BE303T Construction and Validation of an Instrument to Measure Attitudes of Parents of Teenagers toward Reggaeton**
Coral Marina Reyes, 16, Sophomore
Isamar Mayol-Calderon, 17, Senior
Episcopal Cathedral School, San Juan, Puerto Rico
- BE304T The Study of the Placebo Effect in Relation to Probiotic Yogurt**
Lydia Catherine Harvengt, 16, Junior
Kaystin Lynn Weisenberger, 18, Senior
Wentzville Holt High School, Wentzville, Missouri
- BE305T Wake Up to Environment: Methodology Practice in Environmental Education through the Management of Solid Waste**
Aline Ribeiro Pinho, 16, Junior
Marina Maciel Marques, 17, Junior
Mayara Zayra Franco Araujo, 18, Junior
Colegio Estadual Liceu de Maracanau, Maracanau
- BE306T Mysteries of Autism**
Nupur Manoj Shambharkar, 15, Sophomore
Jessica Rae Rice, 16, Sophomore
Winston Churchill High School, San Antonio, Texas
- BE307T Analysis of the Effects of Sleep Deprivation on Learning Behavior and Cognitive Deficit in a *Drosophila* Model: A Potential Target for Neuroprotective Pharmacotherapy**
Shaunak Krishan Bakshi, 16, Junior
Peter Hans Massey, 17, Senior
Manhasset Senior High School, Manhasset, New York
- BE308T Gaining Insight into the Lives of Families that Have a Child with "Special Needs": A Nationwide Study of "Typically Developing" Siblings**
Morgan Bailey Blueglass, 17, Junior
Tyler Hayden Lipperman, 17, Senior
Elyse Mara Blueglass, 17, Junior
Somers High School, Lincolndale, New York
Yorktown High School, Yorktown Heights, New York
- BE309T Examining Top-Down Control in Cognition and Perception**
Charlotte Kleiman, 16, Junior
Alina Lesnovskaya, 16, Junior
Ossining High School, Ossining, New York
- BE310T The Effects of an Action Video Game on Reducing the Gender Gap in Geometry Scores**
Klaudia Kluzinski, 16, Junior
Angela Lee, 16, Junior
Forest Hills High School, Forest Hills, New York
- BE311T How Much Does Texting Affect the Human Reaction Time?**
Christopher Berneil Aslesen, 18, Senior
Jacob Raymond Tschetter, 18, Senior
Florence High School, Florence, South Dakota
- BE312T Blind Service**
Reem Ghazi Mrad, 15, Freshman
Farah Hussain Hajjar, 17, Junior
Siba Hussain Hajjar, 14, Freshman
Al Bayyader School, Beirut, Beirut, Lebanon
- BE313T Aprehendimex**
Sergio Miguel Rodriguez Hernandez, 18, Senior
Maria Guadalupe Patino Aguilar, 19, Senior
Colegio de Estudios Cientificos y Tecnologicos del Estado, San Juan de la Vega, Celaya, Guanajuato, Mexico
- BE314T Electronic Stick for the Blind**
Nour W.I. Alarda, 15, Freshman
Asil F.S Shaar, 14, Freshman
Askar Basic Girls School, Nablus, Nablus, Palestine
- BE315T An Experiment Investigating the Effect of Cognitive Scaffolding on Math Test Performance**
Sterling Ripley-Phipps, 17, Senior
Jameson J. Schwab, 17, Senior
Yosemite High School, Oakhurst, California
- BE316T A Functional MRI Study of Brain Activation during the Reading of Music**
Timothy A Ochsner, 17, Junior; Qiuzi Zhu, 16, Junior
Cara Marie Borelli, 16, Junior
Hilton Head Preparatory School, Hilton Head Island, South Carolina
- BE317T On Behalf Development: Economic Opportunities vs. Environment Deterioration**
Wafiakmal Miftah, 15, Junior
Afrizal Afrizal, 17, Junior
Lutfi Fachry Muhammad, 17, Junior
SMA Plus Negeri 17, Palembang, Sumatera Selatan, Indonesia

- BE318T Perspective Regarding the Use of Biotechnology in Puerto Rico's Agriculture**
Kiara Rivera, 16, Sophomore
Rafael Rodríguez, 17, Senior
Juana Colon, Comerio, Puerto Rico
- BE319T Historical Investigation about Archeological Remains Found at "Calera de las Huerfanas"**
Angelica Gonzalez Fernandez, 17, Senior
Andrea Martinez Genes, 17, Senior
Liceo Numero 2, Carmelo, Colonia, Uruguay
- BE320T Make Us Closer**
Maha Khalid Aldoughaim, 18, Junior
Mariya Saeed Alghamdi, 17, Junior
Rahaf Saleh Albathi, 17, Junior
Dar Al-Uloom Private School, Riyadh, central, Saudi Arabia
- BE321T Banjo Pickin' Music: Good for the Mind? The Effect of Bluegrass Music on 11th Grade Grammar Test Scores**
Meredith Claire Brick, 18, Senior
Bailey Marie Keith, 17, Junior
Chillicothe High School, Chillicothe, Missouri

BIOCHEMISTRY

- BI001** **Unique Loading Patterns of the Rho Family GTPase TCL**
Forrest Ryan Guilfoile, 18, Senior, Bemidji High School, Bemidji, Minnesota
- BI002** **Antifreeze Protein vs. Artificial Polymer**
Taylor Christian Velarde, 15, Sophomore, Cornerstone Christian School, San Angelo, Texas
- BI003** **Vacuolar Membrane Is Critical for Removing Intracellular ROS**
Muhammad Akef Abu-Rmaileh, 15, Sophomore, Little Rock Central High School, Little Rock, Arkansas
- BI004** **Weaving Health: The Weaving of Antimicrobial Substances from the Ootheca of the Spider, *Phoneutria nigriventer***
Leonardo de Oliveira Bodo, 15, Junior, Dante Alighieri, Sao Paulo, Brasil
- BI005** **The Effect of Amyloid Beta Exposure on Protein SUMOylation in Mouse Astrocytes**
Jessica Mingming Lee, 16, Junior, York High School, Yorktown, Virginia
- BI006** **Bioinformatic and Synthetic Approaches to Studying Advanced Glycation End-products in Eukaryotes**
Jason A. Gandelman, 17, Senior, Staples High School, Westport, Connecticut
- BI007** **Prion and Lipid Membrane Interactions: The Role of Dilauroylphosphatidylethanolamine in Fatal Prion Disease Propagation**
Marie Nielsen, 18, Senior, Pacific Collegiate School, Santa Cruz, California
- BI008** **Coarse-Grained Molecular Dynamics (MD) Simulation of Protein Aggregation: An Insight into Protein Aggregation Properties in Alzheimer's Disease**
Prachiti Hemant Dalvi, 17, Senior, International Baccalaureate School at Bartow High School, Bartow, Florida
- BI009** **Inulin vs. Cellulose in Ethanol Fermentation**
Apurv Suman, 16, Sophomore, Oak Hall School, Gainesville, Florida
- BI010** **Can Secreted Proteins from Whole-cell Mycobacteria Be Directly Detected Using MALDI-TOF Mass Spectrometry?**
Timothy Dillon Trippel, 16, Junior, Marian High School, Mishawaka, Indiana
- BI011** **Molecular Dynamics Simulations of Gramicidin A at Extreme Temperatures**
Ravi Uday Sheth, 16, Junior, Sycamore High School, Cincinnati, Ohio
- BI012** **Can Distillation Be Used as a Metabolic Quantifier?**
Amber Rose Gardner, 16, Sophomore, Home School, Dayton, Tennessee
- BI013** **Assessing the Risks Associated with P2Y1-Receptor Stimulation of Astrocytes as a Treatment for Stroke**
Carolina D. Lopez-Trevino, 16, Junior, John Jay Science & Engineering Academy, San Antonio, Texas
- BI014** **Effects of UV Irradiation on Embryonic Lethality in *C. elegans* jun-1 and xpf-1 Deletion Mutant Worms**
Carissa Janine Pekny, 15, Sophomore, West Lafayette Junior-Senior High School, West Lafayette, Indiana
- BI015** **Modification of Fibrinogen Clotting in the Absence of Thrombin: A Novel Surface Chemistry Approach with Biomedical Applications**
Pooja Rambhia, 17, Senior, Jericho High School, Jericho, New York
- BI016** **No More Sting Pain and Toothache Thanks to the Sodium Bicarbonate**
Elalim Zen Vukovic, 18, Junior, Liceo Scienifico Lorenzo Mossa, Olbia - OT, Sardinia, Italy
- BI017** **Ethanol Production Yield Improvement by Sterilization of the Sugar Cane Juice (Garapa) via Microwave**
Alejandro Mariano Scaffa, 17, Senior, Escola Americana de Campinas, Campinas, Sao Paulo, Brasil
- BI018** **Biochemical and Structural Characterization of the IcmR-IcmQ Complex, DotA, and DotF of *Legionella pneumophila***
Abhishek Chintapalli, 17, Senior, Homestead High School, Fort Wayne, Indiana
- BI019** **Brain Leucine Sensing Modulates the Rate of Hepatic Triglyceride Secretion *in vivo***
Florence Xavia Kuhl, 18, Senior, Ossining High School, Ossining, New York
- BI020** **Metal Ion Prevention of Insulin Fibril Formation**
Frances Loren Hubley, 17, Junior, Woods Cross High School, Woods Cross, Utah
- BI021** **Computational Analysis of Cyclin-Dependent Kinase Substrates in *Saccharomyces cerevisiae* Leads to a Novel Computational Identification Mechanism**
Manjinder Singh Kandola, 17, Senior, Queens High School for the Sciences at York College, Jamaica, New York
- BI022** **Protein Assay Alternatives**
Philippe Alexandre Chlenski, 15, Sophomore, Lincoln Park High School, Chicago, Illinois
- BI023** **Inhibition of Histone Deacetylases**
Neeli Mishra, 17, Senior, West Windsor-Plainsboro High School South, Princeton Junction, New Jersey
- BI024** **Der Teil und das Ganze : A Study on the Character of Abeta Fragment (9-28)**
Ji Hye Kim, 17, Junior, Chungnam Science High School, Gongju-si, South Korea
- BI025** **Is There a Genetic Similarity between Mutations that Cause Curly Hair in Dogs and in Humans?**
Sarah Elizabeth Thompson, 15, Freshman, Hempfield High School, Landisville, Pennsylvania
- BI026** **Finding the Structure of a Protein: Testing a New Paramagnetic Tag on the *E. coli* Protein GB1 by Solution NMR**
Manjari Randeria, 15, Sophomore, Upper Arlington High School, Columbus, Ohio
- BI027** **How Does the Ebola Matrix Protein, VP40, Form Virions at the Lipid Membrane?**
Michael David Hunckler, 16, Junior, Marian High School, Mishawaka, Indiana
- BI028** **Novel Inhibitors of Cytokines Signaling: Drug Candidates for the Treatment of Cancer and Inflammation**
Joanna Ray-Jia Yeh, 18, Senior, Urbana High School, Ijamsville, Maryland
- BI029** **Aldehyde Dehydrogenase 7a1 and Its Relationship to Pyridoxine Dependent Epilepsy**
Conor David Freeland, 17, Senior, Minerva High School, Minerva, Ohio
- BI030** **The Effect of Location of a DNA Base Mismatch on the Stability of a Hybridized DNA Duplex**
Charles Preston Blakemore, 17, Junior, Academy for Math, Engineering and Science, Salt Lake City, Utah
- BI031** **Thank You for Not Smoking**
Brooklynn Fayth Carney, 15, Sophomore, Cornerstone Christian School, San Angelo, Texas
- BI032** **Heat Stress Reveals Hexose Transport Rates in *Saccharomyces cerevisiae***
Stanley Palasek, 15, Freshman, Sonoran Science Academy, Tucson, Arizona
- BI033** **Characterization of Mice Fibroblast Cell Adhesion to Osteopontin**
Olive W. Tang, 17, Junior, Boston Latin School, Boston, Massachusetts
- BI034** **Prostate Carcinogenesis as Assessed by the Comet Assay and Immunohistochemistry**
Michelle Asha Khare, 17, Senior, Caddo Parish Magnet High School, Shreveport, Louisiana
- BI035** **A Comparative Analysis of the Proteins in Different Types of Beans and in Chicken**
Meghna P. Singh, 15, Sophomore, Classen School of Advanced Studies, Oklahoma City, Oklahoma

- BI036** **Role of Toxic N-Acetyl Aspartate on Oligodendroglial Cell Development in Canavan Disease**
Gazelle Meriam Zerafati, 16, Junior, The Baldwin School, Bryn Mawr, Pennsylvania
- BI037** **The Use of *Saccharomyces cerevisiae* in Deep Brain Stimulation**
Raja Selvakumar, 14, Freshman, Milton High School, Milton, Georgia
- BI038** **Targeting Mitochondrial Topoisomerase I (TOP1mt) to Trigger a Novel Pathway for Anti-Tumor Drugs**
Swetha Pasala, 17, Senior, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia
- BI039** **The Nutritional Loss in Foods due to Non-Enzymatic Browning**
Joshua Jayme Nubla, 17, Senior, East Syracuse-Minoa Central High School, East Syracuse, New York
- BI040** **Imaging the Apoptotic Effect of Tunicamycin in MDA-MB-231 Human Breast Cancer Cells Line**
Karla Patricia Ramos, 16, Junior, University Gardens High School, San Juan, Puerto Rico
- BI041** **Chemical Comparison of the *Cheiranthus cheiri* Plant with Commercial Pesticides**
Lester J Rosario, 17, Senior, Jose Rojas Cortes High School, Orocovis, Puerto Rico
- BI042** **The Effect of Heavy Metals on Porphyrin Ring Compounds, Part Two: Hg and Pb Uptake at the Base of the Food Chain Near Toxic Waste Disposal Sites**
Arina Ghosh, 16, Junior, Alabama School of Fine Arts, Birmingham, Alabama
- BI043** **The Effects of Increased Gravitational Forces on the Crystallization of the Amino Acid Glycine, Year Three**
Kirk John Henf, 18, Senior, Sebastian River High School, Sebastian, Florida
- BI301T** **Catalyzing Acetaldehyde Oxidation Using Curcumin**
Ashwin Kumar Malynur, 16, Junior
Daivik Jared Orth, 17, Junior
Beaverton High School, Beaverton, Oregon
- BI302T** **Effect of Environmental Factors on Tanshinone Content and Related Synthesis Gene Expression of *Salvia miltiorrhiza* Bunge**
Wenqi Lu, 17, Senior
Xinyan Yang, 17, Senior
Junjun Wu, 17, Junior
No. 7 High School of Chengdu City, Chengdu, Sichuan, China
- BI303T** **The Role of Perspiration Constituents in the Attraction of *Culex pipiens* to Humans**
Ruchi Jayesh Shah, 15, Sophomore
Garima Yadav, 15, Sophomore
Sachem High School North, Lake Ronkonkoma, New York
- BI304T** **A New Spin on Green Energy: Increasing Hydrogen Evolution in a Spirulina Derived Photobiological System**
Megan M Kurohara, 16, Junior
Hannah Rojas, 16, Junior
Hilo High School, Hilo, Hawaii
- BI305T** **Migraine Treatment with Cyber Bee Pheromone Mask**
Esen Duhan, 18, Senior
Emel Ezerce, 18, Senior
KTSO Computer Technical High School, Edirne, Edirne, Turkey
- BI306T** **The Effect of Monosodium Glutamate and Nicotine on Embryonic Chick Retinal Cells**
Lillian Jie Tong, 16, Junior
Elton Kit Zhou, 16, Junior
Little Rock Central High School, Little Rock, Arkansas
- BI307T** **Preparation of Quartz Crystal Microbalance (QCM) Based Nanosensors for Cocaine Determination: To Prepare Quartz Crystal Microbalance Sensors which Can Determine Addictive Chemical Substances from Blood**
Sevket Efe Gullerci, 15, Freshman
Ekrem Gundogdu, 15, Freshman
MEV Private Science College, Ankara/Turkey, Ankara, Turkey
- BI308T** **Effectiveness of *Plectranthus amboinicus* (Indian borage), *Salvia officinalis* (Sage) and *Ocimum basilicum* (Basil) Plant's Leaves Extracts to Eliminate the *Solepnosis invicta* (Red Fire Ant)**
Jamarys Torres-Diaz, 17, Senior
Jackeline Torres-Questell, 18, Senior
Elvira M. Colon Negron, Santa Isabel, Puerto Rico, Puerto Rico
- BI309T** **Natural Vanillin Extraction Using Cell Suspensions**
Jose Pablo Corrales-Villalobos, 17, Junior
Jorge Adolfo Piedra-Navarro, 17, Junior
Colegio Cientifico de Costa Rica, Sede San Carlos, Santa Clara de San Carlos, Alajuela, Costa Rica
- BI310T** **A New Approach to the Synthesis of (+)-Castanospermine**
Evgeniya O. Gorbacheva, 16, Junior
Vladislav I. Kurilin, 17, Junior
State Moscow Chemical Lyceum No. 1303, Moscow, Russia
- BI311T** **Measurement of Photoperception of *Brassica rapa***
Kathleen Sara Ralph, 16, Junior
Amber Jasmine Kazi, 18, Senior
West High School, Madison, Wisconsin

CELLULAR AND MOLECULAR BIOLOGY

- CB001 The Paradox of Immortality: Correlating Longevity with a Telomerase Gene Variant (SNP 2853672)**
Londyn Rayne Cullifer, 17, Senior, The Arkansas School of Mathematics, Sciences, and the Arts, Hot Springs, Arkansas
- CB002 Carboxy-terminal Modulator Protein in Adipocytes**
Elly Kathryn Bringaze, 17, Junior, Saint Joseph's Academy, Baton Rouge, Louisiana
- CB003 Feeding Studies and Immunofluorescent Analysis of Feeding Circuit in Lean Syndecan-3 Null Mice**
Diana Basali, 18, Senior, Hathaway Brown School, Shaker Heights, Ohio
- CB004 EGCG Mitigates Parkinson's Disease-associated mutant LRRK2-induced Neurotoxicity via Protein Translation Modulation**
Jingjie Cheng, 16, Sophomore, Raffles Girls' School (Secondary), Singapore, Singapore
- CB005 HPV Oncogene E6 Target Histone Acetyl Transferases in Cancer Cells**
Arun Brendan Dutta, 16, Junior, Western Albemarle High School, Crozet, Virginia
- CB006 A Novel Regulatory Mechanism in Cancer-linked Cell Signaling**
Hannah Taylor Stuart, 19, Senior, The King's School, Canterbury, Canterbury, Kent, United Kingdom
- CB007 The Role of Ctf18 in the Promotion of Chromosome Condensation in Cancer Cells**
Emma Elisabeth Sperry, 14, Freshman, Terre Haute South Vigo High School, Terre Haute, Indiana
- CB008 Ceramide-Enriched Domains in Mixed Lipid Bilayers: Unraveling the Mystery Behind Demyelination in Multiple Sclerosis (MS)**
Pranal Hemant Dalvi, 17, Senior, International Baccalaureate School at Bartow High School, Bartow, Florida
- CB009 Identification of a New Link in Gene Silencing: Acetylation of the Methyl Binding Protein MeCP2**
Stephanie Michelle Axelson, 18, Senior, Airline High School, Bossier City, Louisiana
- CB010 Gene Dosage and Expression in Human Lymphoblastoid Cell Lines**
Nolan Mint Kiyoshi Kamitaki, 17, Senior, Waiakea High School, Hilo, Hawaii
- CB011 Exosomes as Vectors: A Comparison of Nonviral Transfection Methods**
William Douglas Meadow, 16, Junior, Ponte Vedra High School, Ponte Vedra, Florida
- CB012 Differentiation of Mouse Embryonic Stem Cells into Neural Tissues**
Anastasiya Dykyy, 19, Senior, Trondheim Katedralskole, Trondheim, Sor-Trondelag, Norway
- CB013 Transdifferentiation: A Gateway to Diabetes Treatment**
Laurel Rose Bingman, 16, Junior, The Woodlands College Park High School, Academy of Science and Technology, The Woodlands, Texas
- CB014 Rapid Quantification of Salicylic Acid (via Biosensor) in npr1 Background Arabidopsis thaliana Ethyl Methanesulfonate Mutants**
Deepak Sathyanarayan, 17, Junior, Spruce Creek High School, Port Orange, Florida
- CB015 Pre-Initiation Complexes of SREBP-1a and -2: Mediator-Dependent Transcriptional Regulation of Fatty Acid and Cholesterol Metabolism**
Radhika Rawat, 17, Senior, Boulder High School, Boulder, Colorado
- CB016 Neurons and Glia Exhibit Different Adhesion Complexes in the Embryonic Chicken Retina: R-cognin-mediated Aggregation and Intercellular Communication**
Ryohei Ozaki, 17, Senior, Paul D. Schreiber High School, Port Washington, New York
- CB017 Computational Analysis of Protein Function of Alzheimer Proteins**
Sanjana Thota, 16, Junior, Ballard High School, Louisville, Kentucky
- CB018 Vulvar Cancer: Is Human Papilloma Virus the Etiological Factor?**
Liane Dupont, 17, Junior, Alssund High School, Sonderborg, Denmark
- CB019 The Development of siRNA Delivery Systems for Oncogene Suppression in Human Cancers**
Jason Michael Littman, 17, Senior, Plainview-Old Bethpage John F. Kennedy High School, Plainview, New York
- CB020 Cloning and Expression of MRP1-RNAi in Arabidopsis Plants**
Victoria Breanna Dawson, 17, Junior, Pine Bluff High School, Pine Bluff, Arkansas
- CB021 A Genetic Investigation of Autism: The Role of Type III Neuregulin-1/ErbB4 Signaling and Contactin4 Expression in Neurodevelopment**
Alexis Eleni Tchaconas, 17, Senior, Commack High School, Commack, New York
- CB022 Characterizing Novel Loci Important for Demyelinating Peripheral Neuropathy: A Study of the SOX10 Regulated Enhancer Regions at BCAS3 and DLG4**
Nithya P Vijayakumar, 16, Junior, Detroit Country Day School, Beverly Hills, Michigan
- CB023 Effects of Isoflavones on the Modulation of Immune Response in Fish Kidney Cells**
Jay H Parekh, 15, Freshman, Homestead High School, Fort Wayne, Indiana
- CB024 Identifying Novel Small Molecule Inhibitors of Androgen Receptor Activity for Treatment of Hormone-refractory Prostate Cancer**
Rachael Chi-Kue Lee, 17, Senior, Walt Whitman High School, Bethesda, Maryland
- CB025 Delayed Use of Calcineurin Inhibitors and High Dose Mycophenolate Mofetil as Initial Immunosuppressive Therapy for Liver Transplant Recipients with Pre-Transplant Renal Dysfunction**
Amishi Bajaj, 16, Senior, Illinois Mathematics and Science Academy, Aurora, Illinois
- CB026 The Role of the MiR-106b-25 Cluster in the Promotion of Gliomas**
Jovypeter Thevarkattu Paily, 17, Senior, Briarcliff High School, Briarcliff Manor, New York
- CB027 Osteogenesis Imperfecta in Dachshunds: Mutation in the Gene SERPINH1**
Courtney Marie Kloske, 14, Freshman, Catholic High School, Huntsville, Alabama
- CB028 Colocalization of Nlp in Mitosis & Oogenesis of Drosophila melanogaster**
Maza Rose Tchedou, 17, Senior, Carver School of Health Sciences and Research, Atlanta, Georgia
- CB029 The Effect of Biomimetic Polymers on the Endothelial Glycocalyx**
Sheraz Tariq, 18, Senior, Manhattan Center for Science and Math, New York, New York
- CB030 Evaluation of Antibacterial and Anticancer Properties of Capnella imbricata Extracts**
Katrina Yue Kay Koon, 17, Senior, Stuyvesant High School, New York, New York
- CB031 Acidification of Digestive Vacuoles Is Regulated by pH of the Ingested Food in Paramecium**
Hoko Nakada, 17, Junior, Urawa Daiichi Girls High School, Saitama-shi, Saitama, Japan
- CB032 Classification of Nicotinic-Acetylcholine Receptors in the Hippocampus through Ion Current Analysis**
Strom Truman Clark, 15, Sophomore, Karl G. Maeser Preparatory Academy, Lindon, Utah

- CB033 ***In vitro* Analysis of a Synthetic Protein: A Model for Enzyme Replacement Therapy**
Carolyn Sinow, 18, Senior, Palos Verdes Peninsula High School, Rolling Hills Estates, California
- CB034 **UVA1 Skin Irradiation Modulates the Migration of Dendritic Cells: A Novel Mechanism for the Potential Beneficial Effects of Phototherapy on Systemic Disease**
Alydaar Rangwala, 17, Junior, The Albany Academies, Albany, New York
- CB035 **Eliciting an Antiviral Immune Response to Inhibit HIV Infection**
Shemonti Rabeya Hasan, 18, Senior, Hamilton High School, Chandler, Arizona
- CB036 **The Role of CDNB in Understanding the Mechanisms of Action of JS-K, a Promising Anti-Leukemia Compound**
Stephen Alexander Lavanier, 17, Senior, Governor Thomas Johnson High School, Frederick, Maryland
- CB037 **Identification of Genes Involved in Resveratrol Action on *Saccharomyces cerevisiae* Growth**
John David Mueller, 16, Junior, Billings Central Catholic High School, Billings, Montana
- CB038 **The Natural Compound Celastrol, a Novel Inducer of the Stress Response Protein Heme Oxygenase-1, Confers Cytoprotection and Promotes Wound Repair in Cell Culture**
Alex Lee Han, 17, Senior, The Harker School, San Jose, California
- CB039 **Morphological and Functional Characterization of Lower Female Genital Tract Epithelial Cell Cultures in Different Growth Conditions**
Vivian Wingsee Leung, 17, Senior, Abbey Park High School, Oakville, Ontario, Canada
- CB040 **Kombucha Tea: The Effects of a Cure-All Tea on Breast Cancer Cells**
Dahyana Arias, 16, Sophomore, Musselman High School, Inwood, West Virginia
- CB041 **The Effects of Curcumin and Paclitaxel on Breast Cancer Cell Survival and the Nuclear Factor Kappa B Pathway**
Lola Yu, 18, Senior, Somerville High School, Somerville, Massachusetts
- CB042 **The Effect of Chemotherapeutic Vincristine on Transposon Mobilization-Induced Flanking Sequence Mutation Rates of *Drosophila melanogaster***
Smita Shukla, 17, Junior, Massachusetts Academy of Mathematics and Science at WPI, Worcester, Massachusetts
- CB043 **The Optimization of the Quality of RNA by Use of FastPrep® - 24**
Herman Li, 16, Junior, John D. O' Bryant School of Mathematics and Science, Roxbury, Massachusetts
- CB044 **Modeling and Applications of Suppressor tRNAs to the Boolean Satisfiability Problem**
Eric McLaran Sawyer, 18, Senior, Central High School, Saint Joseph, Missouri
- CB045 **Regulation of Zinc Transporters within the Prostate Epithelium has a Direct Correlation with the Development of Cancer in the Prostate**
Jacob Khan Sterling, 14, Sophomore, Academic Magnet High School, North Charleston, South Carolina
- CB046 **Multi-Modal Confocal Mosaicing Microscopy for Non-Melanoma Skin Cancer Detection**
Nathaniel Wei-Sen Chen, 16, Junior, Merlo Station High School, Beaverton, Oregon
- CB047 **The Effects of Mucin-4/Sialomucin Complex on the Expression of ErbB2, ErbB3 and ErbB4 in Breast Adenocarcinoma Cells**
Shanique Anthonet Martin, 17, Senior, Maritime and Science Technology Academy, Miami, Florida
- CB048 **Cancer Immunotherapy Research Vaccine: Mannose Glycoprotein Encapsulated PLGA Fluorescent Nanoparticles Biotinylated for Conjugation with CpG Oligodeoxyribonucleotide for Breast Cancer Research**
Riley C Ennis, 16, Junior, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia
- CB049 **Determining the Role of the PTEN/PI-3K Pathway in Regulating the Intracellular Expression and Localization of the Oncoprotein B-Catenin**
Zichao Kang, 17, Senior, Old Scona Academic High School, Edmonton, Alberta, Canada
- CB050 **Do NMDA Receptors Affect Early Brain Development?**
Claire Louise Edgcumbe, 18, Senior, Kitsilano Secondary, Vancouver, Canada
- CB051 **Functional Analysis of Telomerase Mutations in Dyskeratosis Congenita**
Katherine Taneille Johnson, 17, Senior, North Peace Secondary School, Fort St. John, British Columbia, Canada
- CB052 **Molecular Insights on DNA Uptake and Transit Pathways in *Saccharomyces cerevisiae***
Uliana Maria Kovaltchouk, 17, Senior, Sisler High School, Winnipeg, Manitoba, Canada
- CB053 **The Effect of the Magnetic Field of a Neodymium-Iron-Boron Magnet on the Reproduction Rate of Chinese Hamster Ovary Cells**
Kinga Janina Malkinska, 14, Freshman, Benjamin Franklin High School, New Orleans, Louisiana
- CB054 **Interactions between *Drosophila* Lamin Proteins and Df31**
Denis Coral Jaimes, 17, Senior, Cross Keys High School, Atlanta, Georgia
- CB055 **The Effect of Injecting Stem Cells into Cadaveric Decellularized Lungs**
Pooja Tushar Desai, 16, Junior, South Burlington High School, South Burlington, Vermont
- CB301T **RNAi as a Safe Method of Insect Population Control**
Joseph Corbett Ferguson, 17, Junior
Roshan Palli, 16, Junior
Paul Laurence Dunbar High School, Lexington, Kentucky
- CB302T **"Prime Steak"**
Stephen Michael Widner, 15, Freshman
Lauren Mckenzie Widner, 16, Sophomore
Alpena High School, Alpena, Arkansas
- CB303T **Influence of Lead on Guard Cells in Leaf Epidermis of *Allium cepa* L.**
Marian Babincak, 17, Junior
Juraj Goc, 17, Junior
Gymnazium a ZS sv. Mikulasa, Presov, Slovakia
- CB304T **Damaging *Escherichia coli* Containing a pGAL Plasmid with UV Light to Identify Beta Galactosidase**
Fiona Lynn Kearns, 17, Junior
Lauren Elizabeth Allison, 16, Junior
Palm Bay High School, Melbourne, Florida
- CB305T **Reactivation of the Epigenetically Silenced Tumor Suppressor Gene TFPI-2 by Curcumin Inhibits Invasiveness and Induces Cell Death in Liver Cancer Cells**
Anna Yu Duan, 17, Junior
Monali Gautam Haldankar, 16, Junior
duPont Manual High School, Louisville, Kentucky
- CB306T **High Glucose Levels Alter Morphine Signaling Systems: A Novel Pathway for Sugar Addiction**
Jan Gong, 17, Junior
Charles Cheng Yu, 16, Sophomore
Garden City High School, Garden City, New York
The Wheatley School, Old Westbury, New York
- CB307T **Characterization of BACE 1 Endocytosis**
Mehal Nilesh Shah, 17, Junior
Ruchi Aggarwal, 16, Junior
Illinois Mathematics and Science Academy, Aurora, Illinois

- CB308T Study the Radiosensitivity and Carrier's Frequency of Ataxia telangectasia like Disorder (ATLD)**
Fhad Abdulelah Almusharraf, 18, Senior
Abdulaziz Sultan Almugairin, 18, Senior
Ahmed Rashed Alhomaïd, 18, Senior
Riyadh Schools, Riyadh, Saudi Arabia
- CB309T Evaluating Novel Methods for Reversing the Denaturation Process in Catalase**
Ban He, 18, Senior
Jennifer Marie Spillers, 16, Sophomore
Miami High School, Miami, Oklahoma
- CB310T Polyol Cryoprotectants and Acclimatization to Freezing**
Thomas John Carroll, 16, Sophomore
Zachery Allen Gouveia, 15, Sophomore
Somerset High School, Somerset, Massachusetts
- CB311T Inducing Apoptosis in Embryonic Stem Cells by Adding Capsaicin as a Model for Capsaicin's Effect on Cancerous Cells**
Samantha Anne Brokenshire, 18, Senior
Devyn Marie Miller, 18, Senior
Vista Ridge High School, Cedar Park, Texas
- CB312T Analyzing the Separate Toxicity of Engineered Nanoparticles on L1210 Cells**
Lorne Dean Muir II, 16, Sophomore
Nathan John Weeks, 17, Sophomore
The Classical Academy, Colorado Springs, Colorado

CHEMISTRY

- CH001** **Physical and Chemical Analysis of Hydrogen Peroxide Used in an Autoclave for Sterilization: Year Six of an Ongoing Study**
Aubrey Ward Craig, II, 16, Junior, Collegiate High School at Northwest Florida State College, Niceville, Florida
- CH002** **Catalytic Decomposition and Oxidation of Propanol Utilizing Size-Selected Platinum Nanoparticles**
Elaine Zhou, 17, Junior, Lake Highland Preparatory School, Orlando, Florida
- CH003** **Investigating Insulating Compounds for the Optimization of Dye-Sensitized Solar Cells**
Alexander Patrick McCarthy, 18, Senior, Liberty High School, Hillsboro, Oregon
- CH004** **Synthesis of Silica Aerogels**
Meredith Grace Marks, 17, Junior, University School of Milwaukee, Milwaukee, Wisconsin
- CH005** **Astrobiology: Life in the Universe, Year IV**
Sandy Ren, 17, Junior, Midway High School, Waco, Texas
- CH006** **Application of Ultrasound in the Synthesis of Nanoparticles**
Barbora Pavlikova, 18, Freshman, Gymnasium Brno - Reckovice, Brno, South Moravian region, Czech Republic
- CH007** **Lights, Quantum Dots, Action!**
Amy Cindy Chyao, 15, Sophomore, Williams High School, Plano, Texas
- CH008** **Extraction of Zinc through Phytoremediation Using *Brassica juncea***
Haleigh Rae Hitzing, 15, Sophomore, Island Coast High School, Cape Coral, Florida
- CH009** **Lichens, Limestone, and Trees: Using X-ray Fluorescence Analysis to Quantify Elements**
Kristen Paige Kirkland, 18, Senior, Eastern High School, Pekin, Indiana
- CH010** **Preparation of Black Ink from Fruit Arils of Pomegranate (*Punica granatum*)**
Zain Shami, 17, Junior, Headstart School, Islamabad, ICT, Pakistan
- CH011** **Synthesis of Copper (II) Carboxylates from Used Cooking Oil**
Nurul Haiza Sapiee, 17, Junior, Taiping MARA Junior Science College, Taiping, Perak, Malaysia
- CH012** **Millimeter-Wave and Terahertz Radiation for Standoff Chemical Sensing and Threat Detection, Phase IV**
Michael Aaron Gord, 17, Junior, Dayton Christian High School, Miamisburg, Ohio
- CH013** **Chemical Analyses of Hazardous Substances and Polycyclic Aromatic Hydrocarbons in the Smoke of Incense Sticks Detected by Gas Chromatography - Mass Spectrometry**
Filip Kunc, 18, Senior, Gymnazium Ivana Kupca, Hlohovec, Slovakia
- CH014** **Optimization of the New Synthesis Method of Stobadine Precursors, Respectively Its Analogues**
Marek Buchman, 17, Junior, School for Extraordinary Gifted Children, Bratislava, Slovakia
- CH015** **How Do Gases Affect Fall Rate?**
Logan Payne Ressel, 14, Freshman, Saxony Lutheran High School, Jackson, Missouri
- CH016** **An Investigative Study on Pigmented Gallstones: Is Cu(II)-Induced Oxidation of Bilirubin Responsible for Their Formation?**
Shamik Mascharak, 16, Junior, Santa Cruz High School, Santa Cruz, California
- CH017** **Synthesis and Quantitative Analysis of the Effect of Concentration and pH on the Ion-Exchange Capacity of Metal Polyacrylates Using Copper**
Nicholas T. Wilson, 17, Junior, Dallastown Area High School, Dallatown, Pennsylvania
- CH018** **Exploring Mpemba Effect**
Daniel Michael Kassen, 18, Senior, Mayer Lutheran High School, Mayer, Minnesota
- CH019** **Synthesis of Ferromagnetic Nanoparticles with Polymer Surfactants**
Caitlyn Anne Hall, 17, Senior, Vail High School, Tucson, Arizona
- CH020** **Efforts toward the Synthesis of Enantiomerically Enriched Pyrazole Amino Acids**
Matthew Tsao Kiok, 18, Senior, Louisiana School for Math, Science, and the Arts, Natchitoches, Louisiana
- CH021** **Studies on Drug Microencapsulation**
Tony Huang, 15, Sophomore, F.J. Reitz High School, Evansville, Indiana
- CH022** **New Nanogold-based Derivative of a Drug against Alzheimer's disease**
Jan Machal, 18, Junior, Gymnazium, Brno-Reckovice, Brno, Czech Republic
- CH023** **A Novel Chemical Synthesis for $>1\text{-}m^2$ Graphene Sheets**
Paul Chandrica Masih Das, 17, Senior, Lawrence High School, Cedarhurst, New York
- CH024** **Separation of CO₂ Using SAPO-34 Membrane**
Junaid Akbar, 16, Sophomore, Ballard High School, Louisville, Kentucky
- CH025** **Investigating the Growth and Nucleation Process of C60 Fullerene Nanowhiskers via Formation Structures**
Nicholas Mark Worth Sharp, 18, Senior, Dominion High School, Sterling, Virginia
- CH026** **Investigation of Nano-Structured Super-Hydrophobic Coating on Structural Substrates**
Nivetita Ravi, 14, Freshman, Clarksburg High School, Clarksburg, Maryland
- CH027** **Specific Cellular Uptake of Targeted Liposomes in Cancer Cells**
Daniel Hyungseok Pak, 15, Junior, Illinois Mathematics and Science Academy, Aurora, Illinois
- CH028** **Development of a Low-Cost Electrochemistry System and a Novel Approach to Determine Fundamental Physical Properties of Oxygen, Phase II**
Sunil Kochikar Pai, 16, Junior, The Kinkaid School, Houston, Texas
- CH029** **Optimization of Adsorption of Fluorouracil onto Chemically Synthesized NanoZeolite Y**
Nikhil Arjun Dhuna, 18, Senior, Burlington Community High School, Burlington, Iowa
- CH030** **Synthesis of Zirconium and Hafnium Phthalocyanines for Gratzel-Type Solar Cell**
Kemakorn Ithisuphalap, 18, Senior, Manhattan International High School, New York, New York
- CH031** **Investigating and Characterizing Flow Rates in Capillary Tubes**
Ujwal Chadha, 15, Sophomore, Del Norte High School, Albuquerque, New Mexico
- CH032** **Hybrid Materials Based on Silicon Dioxide and Rhodamine 6G, Synthesis and Properties**
Yaroslav S. Fadeev, 16, Junior, School 11 of Vichuga, Vichuga, Ivanovskaya obl., Russia
- CH033** **Development of a User and Eco-friendly Procedure for the Oxidative Cleavage of Alkenes**
Prem P. Thottumkara, 17, Junior, Macomb High School, Macomb, Illinois
- CH034** **Extraction of Caffeine**
Luke Avetian-McMenamin, 17, Senior, Buena High School, Sierra Vista, Arizona
- CH035** **Medicinal Applications of Bis(trimethylsilyl) Acetylene in Copper(I)-Catalyzed Azide-alkyne "Click" Chemistry**
Daniel Alexander Mokhtari, 18, Senior, Breck School, Minneapolis, Minnesota

- CH036 Mimicking the Lotus Leaf: Employing Natural Processes of Micro- and Nano-texturing to Convert a Hydrophilic Surface into Hydrophobic Based on Cassie-Baxter Wetting**
Saumil Bandyopadhyay, 14, Freshman, Maggie L. Walker Governor's School for Government and International Studies, Richmond, Virginia
- CH037 Malleable Polymer-Imprinted Porous Silicon Photonic Crystal Composites**
Xiaoyu Cao, 16, Junior, Torrey Pines High School, San Diego, California
- CH038 The Effect of Curcumin on the Oxidation of N-acetyl-tyrosine in an *in vitro* Cu(II)/H₂O₂ Model of Alzheimer's Disease**
Chelsea Lynn Massaro, 16, Sophomore, Christian Home & Bible School, Mount Dora, Florida
- CH039 The Design of a Cooling System for Culture Media**
Grace Calva-Valencia, 17, Junior, Centro de Bachillerato Tecnológico Industrial y de Servicio, Panotla, Tlaxcala, Mexico
- CH040 Air Purifier, Adsorption of Greenhouse Effect: CO₂**
Edwina Williams Sombrerero Sanchez, 16, Senior, Conalep Plantel Puebla 1, Puebla, Puebla, Mexico
- CH041 Malathion: Chemoselective Hydrolysis via Enzymatic Means**
Katherine Zeita Michels, 17, Senior, Big Sky High School, Missoula, Montana
- CH042 Can You Wipe Away the Evidence?**
Jordan Lynn Eichler, 18, Senior, Taconic High School, Pittsfield, Massachusetts
- CH043 Computational Optimization of Carbon Dioxide Capture: Exploring Conformations of an Aryl Amidourea Cavitand for More Efficient Trapping of CO₂**
Rosalie Shinwei Doerksen, 14, Freshman, Oxford High School, Oxford, Mississippi
- CH044 Saponification within the Home**
Peyton Elizabeth Brown, 15, Sophomore, Harry P. Harding University High School, Charlotte, North Carolina
- CH045 Using a Conjunctive Reagent and Isolating Enantiomers through Classical Resolution**
Grant Alexander Wilson, 17, Senior, Hillside High School, Durham, North Carolina
- CH046 Investigating Photo-Induced Proton Transfer in Associated Solutions**
Kaj Andrew Hansen, 16, Junior, Carrollton High School, Carrollton, Georgia
- CH047 Extraction of Natural Carbonaceous Nanomaterials from Soil Sources: Exploration of Properties and Applications**
Aritra Chowdhury, 17, Junior, South Point High School, Kolkata, West Bengal, India
- CH048 Species Selective Acetylcholinesterase Inhibitors as Insecticides**
Samantha Sapumalee Nanayakkara, 16, Junior, Mississippi School for Mathematics and Science, Columbus, Mississippi
- CH049 Dibenzyl glycosyl Phosphate Synthesis on Ion Exchange Resin**
Dmitry Vladimirovich Vasilyev, 17, Junior, GOU Moscow Chemical Lyceum No.1303, Moscow, n/a, Russia
- CH050 The Effects of Heat on the Reduction Property of Antioxidants**
Aunika Lynn Swenson, 17, Junior, Dickinson High School, Dickinson, North Dakota
- CH051 Cellulosic Ethanol**
Jasmine LouAnn Kreft, 15, Freshman, Trinity Christian School, Williston, North Dakota
- CH053 Color Power**
Aliesha Danirae Lewis, 15, Freshman, Murphy High School, Mobile, Alabama
- CH054 The Effect of Heat Treatment on Calcium Lactate Crystallization on Cheddar Cheese**
Flora Kathleen Su, 17, Junior, South Burlington High School, South Burlington, Vermont
- CH301T Cost Effective and Industrial Pollution Prevention Dyeing of Wool and Polyamide Substrates with Extracts of Natural Sources**
Muhammad Sohail Mustafa, 17, Senior
Asjad Shaheen, 17, Senior
Amir Shahzad, 17, Senior
Defence Authority Degree College for Men, Karachi, Sindh, Pakistan
- CH302T Investigation of Rain-X* and Sunscreen Coating (Year Three): Protection against Radiation-Induced Oxidative Stress**
Derek Robert Lam, 15, Freshman
Brigitte Mary Lee, 15, Sophomore
Keystone School, San Antonio, Texas
- CH303T Synthesis and Analysis of the New Superconducting Material - FeSe Nanocrystals**
Chi-Chieh Lin, 18, Senior
Jacqueline Hung, 18, Senior
Taipei Municipal First Girls' Senior High School, Taipei City, Taiwan (R.O.C.), Chinese Taipei
- CH304T Small Scale Aluminothermic Titanium Reduction**
Dylan James Hinrichs, 18, Senior
Alexander H. Wise, 18, Senior
Aaron Christopher Waller, 18, Senior
West Linn High School, West Linn, Oregon
- CH305T Bisphenol-A Levels in Store Receipts**
Yan Ellen Yin, 15, Sophomore
Madeline Kate Hamlin, 15, Sophomore
Crescent Valley High School, Corvallis, Oregon
- CH306T Returnable Process of PET Bottles, the Study**
Vanessa Estefano Uriza, 15, Sophomore
Pamela Michelena De Marchi Gherini, 16, Sophomore
American School of Campinas, Campinas, Sao Paulo, Brasil
- CH307T A Combined Approach: Comparing Liquid Runway Deicer Performance Characteristics with Their Impact on Aircraft Corrosion, Catalytic Oxidation, the Environment, and the Economy**
Baillie Jo Bryant, 17, Senior
Lynnely Greye Parker, 18, Senior
Central Lee High School, Donnellson, Iowa
- CH308T Pore-Size Characterization of Monolithic Capillary Columns for High Performance Liquid Chromatography**
Kenneth Wayne Lee, 17, Senior
Garth Anthony Lee, 16, Junior
American Fork High School, American Fork, Utah
Pleasant Grove High School, Pleasant Grove, Utah
- CH309T Comparison of Redox Titration with a New Density-Based Device for the Analysis of Chrome Plating Bath Solutions**
Yae Eun Oh, 18, Senior
Jasmine Starr Podell, 17, Junior
Marian High School, Mishawaka, Indiana
- CH310T Application of Water-Soluble Polymer Acid Catalyst to Saccharification of Biomass**
Noriyoshi Oka, 18, Freshman
Shohei Ochiai, 18, Senior
Taiki Sunaba, 18, Senior
Okayama Ichinomiya High School, Okayama, Japan
- CH311T The Development of a Lycopene-based Sun Cream**
Nicole Ingrid Lynch, 19, Senior
Aoife Maire Erin White, 19, Senior
St. Mary's College, Londonderry/City, Ulster, Northern Ireland
- CH312T Research on the Usability of Low-cost Materials in Dye Sensitized Solar Cells**
Andreas Wagner, 19, Senior
Juergen Koechl, 19, Senior
HTL Braunau Am Inn, Braunau Am Inn, Upper Austria, Austria

- CH313T Effects of Temperature, pH, Sodium Fluoride and Artificial Sugars on Ethyl Alcohol Fermentation in *Saccharomyces cerevisiae***
Kevin Jay Green, 14, Freshman
Andrew Christian Lybbert, 15, Freshman
Lakeshore High School, Stevensville, Michigan
- CH314T Determining the Viability of Certain Organic Materials as Water Impermeable Barriers for a Green Food Tray**
Lauren Elizabeth Carter, 17, Junior
Aric Daniel Reviere, 17, Junior
Paul M. Dorman High School, Roebuck, South Carolina
- CH315T Temperature Variance in Forensic Luminol Reactions**
Stephanie Lynn Rosser, 17, Senior
Katelyn Shaye Ward, 18, Senior
Sebastian River High School, Sebastian, Florida
- CH316T Kaffot Universal Indicator**
David Udoessien Essien, 15, Junior
Thompson Aniedi Idara, 14, Junior
Wisdom Anthony Egbong, 15, Junior
Community Secondary School, Uyo, Akwa Ibom State, Nigeria

COMPUTER SCIENCE

- CS001** **Robust Video Tracking through Multiple Occlusions**
Thomas Frederick Wilkason, 17, Junior, Mount de Sales Academy, Macon, Georgia
- CS002** **Elliptic Curve Cryptography**
Alexander Sergeevich Gandzyura, 18, Senior, Ridgeview High School, Orange Park, Florida
- CS003** **Off-line Character Recognition Using Vector Trained Artificial Neural Networks**
Matthew Joseph Chang, 17, Junior, Chang Home School, Austin, Texas
- CS004** **Examining the Effects of Different Random Number Generators on Perlin Noise with Different Number Distributions**
Jacob Allen Dufault, 17, Junior, Canterbury School, Fort Myers, Florida
- CS005** **The Universal Translator: Real Time Voice to Voice Computer Assisted Language Translation**
Connor Austin Metz, 16, Junior, Dunbar High School, Fort Myers, Florida
- CS006** **Optimizing Deterministic Numerical Primality Testing Algorithms for Maximum Performance**
Joseph Christopher Woodson, 16, Sophomore, Home School, Tulsa, Oklahoma
- CS007** **A Novel Approach to Text Compression Using N-Grams**
Dylan Freedman, 16, Junior, Carmel High School, Carmel, California
- CS008** **The Effect of VPN Compression on Data Throughput**
Alexandra Lee Rey, 15, Freshman, Hernando High School, Brooksville, Florida
- CS009** **Bioinformatic Identification of Novel Protein Domains, Year Two**
Kamakshi Lajvanthi Duvvuru, 16, Junior, Little Rock Central High School, Little Rock, Arkansas
- CS010** **Matrix Based Discrete Logarithms Public Key System (MBDL) and Its Application in SecuriD**
Yang Gao, 18, Senior, Northeast Yucai School, Shenyang, Liaoning, China
- CS011** **X-Finder: The Electronic Guardian Angel**
Maximilian Lukas Reif, 14, Freshman, Justus-von-Liebig-Gymnasium Neusab, Neusab, Bavaria, Germany
- CS012** **Automated Characterization of Ultra-Light Metal Foam from μ CT Reconstructed Images**
Zheng Fu Edrei Chua, 18, Senior, National Junior College, Singapore, Singapore
- CS013** **Hardware and Software of a Smart House**
Dmitry A. Kabak, 16, Sophomore, Polytechnical Gymnasium #6, Minsk, Belarus
- CS014** **Optimizing the Deflation Strategy of a Divide and Conquer Eigensolver with a Genetic Algorithm**
Matthew R. Bauerle, 16, Sophomore, Bauerle Home School, Fenton, Michigan
- CS015** **ABReader: An Application to Analyze, Interpolate and Extrapolate Data from Auditory Brainstem Responses**
Ankush M. Gupta, 16, Sophomore, duPont Manual High School, Louisville, Kentucky
- CS016** **Sudoku...It's All about the Numbers**
Christy Nicole Munson, 17, Junior, Ridgway Christian School, Pine Bluff, Arkansas
- CS017** **Intelligent Robot**
Monika Svedirohova, 20, Senior, SPSE Pardubice, Pardubice, Czech Republic
- CS018** **Deterministic Lexical Categorization Using Genetic Algorithms**
Dru Harrington Knox, 18, Senior, Roanoke Valley Governor's School for Science and Technology, Roanoke, Virginia
- CS019** **A Parallel Computational Framework for Solving Quadratic Assignment Problems Exactly**
Michael Christopher Yurko, 16, Senior, Detroit Catholic Central High School, Novi, Michigan
- CS020** **Finding Efficient Shellsort Sequences Using Genetic Algorithms**
Kevin David Wang, 17, Senior, Wylie E. Groves High School, Beverly Hills, Michigan
- CS021** **BeatHoven: Identifying and Inventing Solutions to Obstacles Hindering Automatic Transcription of Polyphonic Music of a Single Instrument**
Vighnesh Leonardo Shiv, 16, Junior, Catlin Gabel School, Portland, Oregon
- CS022** **New Morphological Features for Automated Classification of Galaxy Images Obtained in Deep Space Surveys**
Andrei V. Nagornyi, 18, Senior, Stuyvesant High School, New York, New York
- CS023** **Probabilistic Computation of Pi Using Parallel Processing on the Graphics Processing Unit**
Alexandra Marie Porter, 14, Freshman, La Cueva High School, Albuquerque, New Mexico
- CS024** **Detection of Prostate Cancer Using Image Analysis**
Saad Syed Nasser, 18, Senior, Northside College Preparatory High School, Chicago, Illinois
- CS025** **Self-Organizing Behaviour in a Social Network Representation of Information**
Nelson Zhang, 16, Junior, Shanghai American School, Shanghai, China
- CS026** **The Analysis of the Lever Mechanism with Computer Application**
Rashan Askhatkuzy Kengesbayeva, 18, Junior, High-School # 176, Almaty, Kazakhstan
- CS027** **Transliteration from Kirill to the Latin, Arabic Alphabet and Back to Front Transliteration from Latin Alphabet to the Kirill Alphabet**
Almas Tilegenov, 18, Junior, Republican Specialized in Physics and Math, Almaty, Almaty, Kazakhstan
- CS028** **Silent as a Ninja: Network Security Made Easy**
Jordan Robert Conlin, 18, Senior, Wasatch High School, Heber City, Utah
- CS029** **90's to 09's: Reusing Computers in Smart Way**
Yazan Mohammed Alshehri, 17, Junior, AlBassam Schools, Dammam, Eastern Province, Saudi Arabia
- CS030** **Frobenius Problem Advantages over Encrypting Methods**
Hassan Mohammed Alsibyani, 17, Junior, Dar Alfikr Schools, Jeddah, Saudi Arabia
- CS031** **The Limits of Artificial Intelligence: Can a Computer Really Understand an English Essay?**
Nicholas Hansen, 15, Sophomore, Carbon High School, Price, Utah
- CS032** **Novel Computer Controlling Wireless Device for Handicapped People**
Ganindu Nanayakkara, 20, Senior, Ananda College, Colombo - 10, Western, Sri Lanka
- CS033** **Integration of Devices through the Virtualization in the Web**
Dongjun Lee, 19, Senior, Korea Digital Media High School, Ansan-si, Gyeonggi-do, South Korea
- CS034** **Accurate Prediction and Tracking of Lung Cancer**
Vedant S Kumar, 16, Junior, duPont Manual High School, Louisville, Kentucky
- CS035** **Does Practice Make Perfect? The Role of Training Neural Networks**
Brittany Michelle Wenger, 15, Freshman, The Out-Of-Door Academy, Sarasota, Florida
- CS036** **A Super-Encryption Standard for Large Data Using Elementary Chaotic Cellular Automata**
Akshay Nathan, 17, Junior, Lynbrook High School, San Jose, California

- CS037** **Local Layering of Images with a Natural User Interface**
Anna Kornfeld Simpson, 17, Senior, Patrick Henry High School, San Diego, California
- CS038** **CryptoDefender: A Smart Way to Protect Your Files**
Tin Lok Chung, 15, Freshman, Maryknoll Fathers' School, Hong Kong, Hong Kong, Region of China
- CS039** **IT-SPACE : A Planner for Allocating Objects in a Space Using Meta-heuristic Algorithm**
Jun Young Yun, 17, Junior, Whimoon High School, Seoul, Seoul, South Korea
- CS040** **Continual Adaptation of Acoustic Models for Domain-Specific Speech Recognition**
David C. Liu, 18, Senior, Lynbrook High School, San Jose, California
- CS041** **Modeling Electrical Demand Using Artificial Neural Networks for Sustainable Power Generation**
Andrew William Ellis, 17, Junior, Westfield High School, Westfield, Massachusetts
- CS042** **Head-Guided Wheelchair Control System**
John Blood Hinkel, III, 18, Senior, Hopkinton High School, Hopkinton, Massachusetts
- CS043** **Automatic Parallelization through Dynamic Analysis**
Kevin Michael Ellis, 18, Senior, Catlin Gabel, Portland, Oregon
- CS044** **Modeling Bullet Paths through a Hawker Hurricane's Wing**
Aaron Gabriel Feldman, 15, Sophomore, Charter School of Wilmington, Wilmington, Delaware
- CS045** **Grammar Agnostic Syntactical Validation of Natural Language**
Tucker Sterling Elliott, 17, Junior, Suncoast Community High School, Riviera Beach, Florida
- CS046** **Hardware-software RehabilitAtioN gamING solution for Cerebral PAIsy ChildrEn - TRAINING SPACE**
Bohdan Kachmar, 16, Junior, Lviv Physics and Mathematics Lyceum, Lviv, Ukraine
- CS047** **Aesalon: Visualizing Dynamically-Allocated Memory in Real-Time**
Kent Andrew Williams-King, 16, Senior, Argyll Centre, Calgary, Alberta, Canada
- CS048** **NeuroSLab Rapid Application Development for Artificial Intelligence**
Ionut Alexandru Budisteanu, 16, Freshman, National College "Mircea cel Batran", Ramnicu Valcea, Romania, Romania
- CS049** **Recognition of Sound Sample Sequences Using Waveform Analysis: Detecting Stutter Words in an Audio Stream**
Wisdom Liang Chen, 17, Senior, The Alabama School of Fine Arts, Birmingham, Alabama
- CS050** **XOR Encryption Revisited**
Carl Robert Kolbo, 15, Sophomore, Lakota High School, Lakota, North Dakota
- CS051** **1 Sun + 8 Bits = H₂O: Digitally Optimizing "Smart" Photovoltaics for a Water Distillation Application**
Nicholas Mycroft Christensen, 18, Senior, Wetumpka High School, Wetumpka, Alabama
- CS052** **Cooperation and Punishment: A Look at the General Phenomenon of Retribution through Evolved Strategies for a Modified Prisoner's Dilemma**
Eli Nathan Weinstein, 15, Sophomore, Flintridge Preparatory School, La Canada Flintridge, California
- CS053** **Effects of Saccadic Eye Movement on Continuous EEG**
Brittany Alexa Zelch, 16, Junior, Pine Crest School, Fort Lauderdale, Florida
- CS301T** **My Future, My Robot**
Gatlin Wayne Douglas, 18, Senior
Wesley Wilkerson White, 17, Senior
Viviana Salazar, 17, Senior
Odessa Senior High School, Odessa, Texas
- CS302T** **Making Chemistry Easier with GenII**
Werner van Zyl, 17, Junior
Gideon Christiaan Kruger, 17, Junior
Duineveld High School, Upington, Northern Cape, South Africa
- CS303T** **The Classification and Recognition of Emotions in Prerecorded Speech**
Akash Krishnan, 15, Sophomore
Matthew Fernandez, 16, Sophomore
Oregon Episcopal School, Portland, Oregon
- CS304T** **S.T.E.V.E. - Artificial Intelligence - and Tic Tac Toe**
Andrew Ryan Larsson, 16, Junior
Daniel Scott James, 15, Freshman
American Leadership Academy, Spanish Fork, Utah
- CS305T** **Optical Recognition Hand Signs**
Irma Nayely Jara Diaz de Leon, 16, Sophomore
Tania Janeth Rodriguez Diaz de Leon, 17, Sophomore
Centro de Bachillerato Tecnologico, industrial y de Servicio, Aguascalientes, Aguascalientes, Mexico
- CS306T** **Model-Driven Configuration of Automated Parking Facilities**
Omar Mohammad Ismail, 18, Senior
Jemale Donta Lockett, 18, Senior
Alabama School of Fine Arts, Birmingham, Alabama
- CS307T** **Synchronous Tangible Augmented Reality**
Darren Lim, 16, Junior
Hyun Ki Lee, 18, Senior
Lai Xue, 17, Junior
Chengdu International School, Chengdu, Sichuan, China
- CS308T** **Modeling of Self-reconfiguring Nanorobot Communities**
Alexander A. Bokov, 16, Junior
Dmitry V. Ulyanov, 16, Junior
GOU Lyceum of Information Technologies #1533, Moscow, Russia

EARTH AND PLANETARY SCIENCES

- EA002 The Coroneae Paradox: The Use of Magellan Radar Data to Determine the Overall Geologic History of Circular Lows on Venus, in Order to Determine the Process(es) of Coroneae Formation, Phase III**
Courtney Catherine Jackson, 17, Junior, Cloquet Senior High School, Cloquet, Minnesota
- EA003 Effects of UV Radiation, Year Two: Sunscreen Tolerance**
Caraline Nicole Vaughn, 16, Sophomore, Nettleton High School, Jonesboro, Arkansas
- EA004 Moor and More: Processes in Bogs**
Justin Ulf Muller, 17, Junior, Europaschule Gymnasium Westerstede, Westerstede, Niedersachsen, Germany
- EA005 Orbit Determination of Near-Earth Asteroids**
Tongji Li, 18, Senior, Hershey High School, Hershey, Pennsylvania
- EA006 Can GIS Help Conserve Fossils on the Jurassic Coast?**
Thomas William Hearing, 18, Senior, The Thomas Hardy School, Dorchester, Dorset, United Kingdom
- EA007 The Short-cycle Digital Seismometer**
Jianting Qiu, 19, Junior, Shenzhen Second Senior High School, Shenzhen, Guangdong, China
- EA008 The Research on Application of Common Digital Camera in Meterological Visibility Measurement**
Zi Mu Su, 17, Senior, No. 2 Secondary School Attached to East China Normal Univ., Shanghai, Shanghai, China
- EA009 Colorado River Salinity: Correlation to Geostrata and Mitigation with Carbon Fiber Capacitors**
Tanya Nicole Petach, 16, Junior, Fairview High School, Boulder, Colorado
- EA010 Monitoring Lake Superior Seiches at Bayfield, Wisconsin**
Genevieve K. Gephart, 18, Senior, Bayfield High School, Bayfield, Wisconsin
- EA011 The Study of Inclusions in Yogo Sapphires Extracted from the Vortex Mine Near Utica Montana**
Katelyn Elizabeth Gibbs, 17, Junior, Great Falls High School, Great Falls, Montana
- EA012 Isolation of Troglitic Bacteria in the Sunken Gardens, Lehman Caves**
Alexandra Elane Wheatley, 17, Junior, Northwest Career and Technical Academy, Las Vegas, Nevada
- EA013 Phinding Life: Understanding the Relationship between Phi and the Possibility of Life on Extrasolar Planets**
Samantha Emily Keith, 18, Senior, Weber High School, Pleasant View, Utah
- EA014 Geological History of Ferris Flats: Implications for a Re-advance of the Saginaw Ice lobe**
Brady Alexander Hasse, 16, Sophomore, Mecosta Osceola Math, Science & Technology Center, Big Rapids, Michigan
- EA015 Computational Simulations of Ring Systems around Rhea Using N-Body Integrated Programs**
Ian Alexander Sohl, 15, Sophomore, DaVinci Academy of Science and the Arts, Ogden, Utah
- EA016 Drowning Out Drought: The Effect of Collision and Coalescence on Secondary Ice Multiplication in Mixed-Phase Clouds**
Nicole Sophie Torosin, 17, Senior, Niles North High School, Skokie, Illinois
- EA017 Got Dielectrics? Simulating the Electrical Properties of Sea Ice**
Ryan Thomas Baker, 16, Sophomore, Hillcrest High School, Midvale, Utah
- EA018 The Shape of Change: Using Graphical and Statistical Analysis to Assess Current and Future Climate in Central Kansas**
Nicholas Kalon Van Swol, 17, Junior, Hiawatha High School/ Kansas Academy of Math and Science, Hays, Kansas
- EA019 Developing a Process for Seismo-Acoustic Imaging Applied to Humanitarian Demining**
Marian Joan Bechtel, 15, Freshman, Lancaster Catholic High School, Lancaster, Pennsylvania
- EA020 Identifying Diagnostic Characters in the Tooth Enamel Microstructure of Dromaeosaurid Dinosaurs**
Emma Justine Hoffman, 17, Senior, Rondout Valley High School, Accord, New York
- EA021 Sedimentary Varve Record of Climate Change and the Last Deglaciation of Central New York**
Hannah Rachel Valentino, 15, Sophomore, Valentino Home School, Mexico, New York
- EA022 The Development and Validation of a Novel, Eco-friendly Calcium *in situ* Precipitation System (ECIPS) for the Mitigation of Liquefaction-Prone Soil**
Evelyn Chang, 17, Junior, University High School, Irvine, CA
- EA023 The Effect of Increased CO₂ Emissions on Coastal Erosion Contributors in Alaska**
Kelsey Ann Meacham, 16, Sophomore, West Anchorage High School, Anchorage, Alaska
- EA024 The Effect of Catastrophic Forest Fires on the Hydrologic Properties of Mazama Ash Soils in Southern Oregon**
Rachel Jane Porter, 17, Junior, Tillamook High School, Tillamook, Oregon
- EA025 Quantifying Hydroperiod Fluctuations across an Everglades Wetland through Microscopic Analysis of Siliceous Microfossils**
Christopher Allen Sanchez, 17, Senior, Felix Varela Senior High School, Miami, Florida
- EA026 Climatological Predictions for the Northwest Passage: Unmasking the Signal**
Zachariah Quinn Moustafa, 16, Sophomore, Alexander W. Dreyfoos High School of the Arts, West Palm Beach, Florida
- EA027 Paleontological Study of Permian Gastropoda at Khoa Noi, Amphoe Takhli, Changwat Nakhonsawan, Central of Thailand**
Chatchalerm Ketwetsuriya, 17, Senior, Takhliprachason, Takhli, Nakhonsawan, Thailand
- EA028 Does Well Depth Affect Tetracycline Concentrations in Ground Water?**
Frederick Thomas Duemling, 15, Sophomore, Saint Clair High School, Saint Clair, Michigan
- EA029 Don't Let It Slide IV: Fire Factor!**
Majdolene Ziad Khweis, 17, Junior, Taos High School, Taos, New Mexico
- EA301T Change We Can Believe In: Evolution of Tidal Constituents in the Pacific Basin**
Hari Ramesh Caushik, 16, Junior
Andrei Secasiu, 16, Junior
Himanshu Satishchandra Pandey, 17, Senior
Westview High School, Portland, Oregon
- EA302T The Domino Effect of Global Warming: An Experimental Study of the Positive Feedback Mechanism (PFM) due to Global Warming on Methane Emissions and a Model to Quantify Its Worldwide Effect in the 21st Century from Anthropogenic and Natural Wetlands**
Naomi C Shah, 14, Freshman
Priyam C Shah, 17, Senior
Sunset High School, Portland, Oregon
- EA303T ESR Dating Early Men and Their Tools at Pradayrol, France and Ainikab I, Russia: "So Easy a Caveman Can Do It!"**
Israt Ahmed, 17, Junior
Xiao Y. Zhou, 16, Junior
Stephanie S Chen, 17, Junior
Francis Lewis High School, Fresh Meadows, New York
Stuyvesant High School, New York, New York

EA304T Effect of Solar Exposure on the Atomic Oxygen Erosion of Hubble Space Telescope Bi-Stem Thermal Shield Aluminized-Teflon FEP

Aobo Guo, 16, Junior; Claire Ashmead, 16, Sophomore
Hathaway Brown School, Shaker Heights, Ohio

EA305T A Study on the Features of Gudul Used for Korean Heating System (Ondol)

Subin Shin, 19, Senior; Hyun-A Choi, 19, Senior
Damyang Hing School, Damyang-gun,
Jeollanam-do, South Korea

ENGINEERING: ELECTRICAL AND MECHANICAL

- EE001** **How Salinity Effects Magnetohydrodynamic Propulsion**
Kohlton Thomas Bendowski, 14, Freshman, Crystal River High School, Crystal River, Florida
- EE002** **Creation of a 3D Environment with Binocular Vision**
Dylan Cooper Dalrymple, 15, Freshman, Pensacola High School, Pensacola, Florida
- EE003** **An Efficiency Study of a Head Controlled Computer Interface Using Embedded Circuitry**
Gavin Grant Ovsak, 15, Junior, Eden Prairie High School, Eden Prairie, Minnesota
- EE004** **The Energy Generator Speed Bump**
Ibrahim Abdulrahman Khalaf, 16, Junior, Al-Ra'ed Al-Arabi Schools, Amman, Jordan
- EE005** **Braille Keyboard**
Yaman Jamal Alali, 15, Junior, Jubilee High School, Amman, Jordan
- EE006** **Low Cost and Efficient High-Pressure Electrolyzer**
Kenneth Charles McGill, 15, Sophomore, Baldwin High School, Milledgeville, Georgia
- EE007** **VIAS: Creating a Visually Impaired Assistance System Prototype**
Shravan Shaastrri, 14, Freshman, Jasper High School, Plano, Texas
- EE008** **The Potential for Electroactive Polymers (EAPs) as Actuators in a Reflected Light Display Based on Cuttlefish Skin Behavior**
Jeremy Jackson Blalock, 18, Senior, York School, Monterey, California
- EE009** **Piezo-Power**
Adam Brian Schuster, 14, Freshman, F.W. Springstead High School, Spring Hill, Florida
- EE010** **The Development of Recyclable Gliding Sonde**
Yuqing Huang, 16, Junior, Beijing 101 Middle School, Beijing, Beijing, China
- EE011** **Prototype Solar-Powered Liquid Piston Engine, Phase II**
Kelly Maria Kleier, 17, Junior, Notre Dame Academy, Park Hills, Kentucky
- EE012** **Nanoparticle Optimization of Specific Impulse of a Novel Ionic Engine: A Link to nanoFET NEMS/MEMS Thrusters**
Alexis Emily Block, 16, Sophomore, Nicolet High School, Glendale, Wisconsin
- EE013** **"Compress Me Light": Harnessing the Mechanical Power of Springs**
Emely Louise Morales, 16, Junior, James Pace High School, Brownsville, Texas
- EE014** **The 3 Fan Type Wheel and the Magnetic Flydisk**
Ye Tian, 18, Senior, Nanjing Foreign Language School, Nanjing, Jiang Su, China
- EE015** **Stair Climbing Stability, Year Three**
Zachary Harrison Melnik, 16, Junior, Viera High School, Viera, Florida
- EE016** **Light Beam Communication: The Effect of Received Signal Power and Ambient Background Light on the Signal to Noise Ratio and Optimal Threshold of Free Space Optical Communication**
Bradley Joseph Natarian, 17, Junior, Old Mill Senior High School, Millersville, Maryland
- EE017** **Learning from the Past: Heat Transfer in Ancient Native American Buildings**
Nicholas C Rajen, 16, Junior, Eldorado High School, Albuquerque, New Mexico
- EE018** **Solar Stirling Capability & Comparison**
Cory Nicholson Owan, 15, Freshman, Home School, Tucson, Arizona
- EE019** **The Study of the Socket that Suits for the Use of Special or Ordinary People and Under Some Special Environments**
Yinkui Wang, 18, Senior, Liuzhou City Railway No.1 Middle School, Liuzhou, Guangxi, China
- EE020** **Closer to Where It Wasn't: Estimation and Tracking Using Adaptive Filtering**
John Tilla Parish IV, 17, Junior, Home School, Colorado Springs, Colorado
- EE021** **Low-Aberration Variable-Focus Liquid Lens**
Eric Chiwei Shiao, 15, Sophomore, Taipei Municipal Chien-Kuo Senior High School, Taipei, Taiwan (R.O.C), Chinese Taipei
- EE022** **Underground Imaging**
Alexander Kent Kendrick, 17, Junior, Los Alamos High School, Los Alamos, New Mexico
- EE023** **The Power of the Sun: Comparison between Photovoltaic Solar Cells and Stirling-Cycle Engines**
David Allyn Litherland, 17, Junior, Mid-Buchanan High School, Faucett, Missouri
- EE024** **Squeeze of a Screw**
Mark Philippe Schoeni, 17, Senior, Celebration High School, Celebration, Florida
- EE025** **Novel Heating Approach in Dynamic Spraying of Nano Particles**
Alice Wei Zhao, 16, Senior, Sheboygan North High School, Sheboygan, Wisconsin
- EE026** **The Design and Development of a Modified Piston-less Rotary Engine for Improved Thermal Efficiency**
Eric Lau, 15, Sophomore, Savannah Arts Academy, Savannah, Georgia
- EE027** **SLF Communications: The Miners' Life Line**
Sophie Marie Swingle, 18, Senior, McCurdy High School, Espanola, New Mexico
- EE028** **Lighting the Future: The Power Output of Titanium Dioxide Solar Cells Using Various Dyes**
Chaimaa Makoudi, 18, Senior, General Douglas MacArthur High School, Levittown, New York
- EE029** **A New Solar Energy Material Search Strategy**
Megan Katherine Mercer, 17, Junior, Ballard High School, Louisville, Kentucky
- EE030** **A New Approach to Encryption: Modification of Rossler's Chaotic Equations to Create an Encrypted Communication System with Signal Masking and Automatic Self Synchronizing Decryption**
Curtis Adrian Khol, 17, Senior, James Madison High School, Vienna, Virginia
- EE031** **High Efficiency Unity Power Factor Battery Charger**
Norman Luwei Jin, 15, Junior, Notre Dame Preparatory School, Pontiac, Michigan
- EE032** **Creating and Evaluating a Low Cost Interactive Whiteboard**
Gregory James Scanlon, 14, Freshman, Holy Name High School, Reading, Pennsylvania
- EE033** **Next Generation Propulsion: the ALFA markVI**
Jesse Kane Ellison, 18, Senior, Bayfield High School, Bayfield, Colorado
- EE034** **Green Engine: An Exploration of Small Engine Design**
Brantley Chance Henson, 17, Junior, Carlsbad High School, Carlsbad, New Mexico
- EE035** **A Maze Solving Robot**
John Frank Keller Jr, 18, Senior, The King's Academy, Mohrsville, Pennsylvania
- EE036** **Nature's Electricity**
Taylor Frances Kinyon, 16, Sophomore, Plankinton High School, Plankinton, South Dakota
- EE037** **Hovercraft, Phase III**
Christopher Allyn Taylor, 18, Senior, Northview High School, Brazil, Indiana

- EE038 Novel Development of Multiple Brushless Direct Current Synchronous Electric Motors: A Four Year Discourse**
Andrew Garrett Amis, 18, Senior, Clinton High School, Clinton, Mississippi
- EE039 Harvesting Human Energy: The Effect of Magnetic Field Flux on Induced EMF**
Elan Meir Ness-Cohn, 15, Sophomore, Niles North High School, Skokie, Illinois
- EE040 Satellite Solar Panel Launch Support & Release Mechanism**
Abdulmohsen Mohammed Albelushi, 18, Senior, Dahrahan Ahliyaa School, Dahrahan, Central, Saudi Arabia
- EE041 Knee Eye Device (KED)**
Bayan Mohammed Mashat, 15, Sophomore, Dar AlTarbiah AlHadiatha Schools, Jeddah, Saudi Arabia
- EE042 The Safe Drill**
Omar Ahmed AlHussain, 18, Senior, Aldeffi Schools, Aljubail Industrial City, Saudi Arabia
- EE043 Programmable Logic Controller Used to Program Alarms for Child Car Seats**
Virginia Lynne Martin, 17, Senior, Academics Etc., Lake Charles, Louisiana
- EE044 Motion Powered Recharger**
Vatsal Pandya, 14, Freshman, Dr. Ronald E. McNair Academic High School, Jersey City, New Jersey
- EE045 Demonstration of Terahertz Waveguides Using Structured Metal Films**
Albert Cui, 18, Senior, Hillcrest High School, Midvale, Utah
- EE046 Using Environmental Temperature Gradients to Produce Continuous Energy Outputs**
Ellenore Isobel Forrester, 15, Sophomore, Redeemer Baptist School, North Parramatta, New South Wales, Australia
- EE047 A Novel Navigational Aid for the Blind**
Rose Doris Perrone, 18, Senior, The Catlin Gabel School, Portland, Oregon
- EE048 Passive Solar Air Cooling/Heating Using Geological Insulation**
William Gregory Thornbury, 15, Sophomore, De La Salle High School, Concord, California
- EE049 VSR-2 Talos: FG, The Final Ultimatum**
Adam Bradley Halverson, 18, Senior, Garretson High School, Garretson, South Dakota
- EE050 Swarm Robotics**
Bryce Joseph Reitano, 15, Freshman, Dixie Middle School, St. George, Utah
- EE051 A Novel Fiber Optic Backlight System Utilizing Controlled Light Attenuation**
Scott Douglas Olson, 18, Senior, Highland High School, Gilbert, Arizona
- EE052 Distributed Learning for Dynamic Spectrum Sharing in Cognitive Radio Networks: A Decision Theoretic Approach**
Angela Yu-Yun Yeung, 18, Senior, Davis Senior High School, Davis, California
- EE053 Hybrid Polymer Solar Cells Based on Zinc Oxide Nanorods and the Water-Soluble Polymer PTEBS**
Andrew Douglas Sylvester, 17, Senior, Mills E. Godwin High School, Richmond, Virginia
- EE054 A Computer Controlled, Energy-Efficient Continuously Variable Transmission (CVT) System**
David Andrew Zarrin, 15, Freshman, Saratoga High School, Saratoga, California
- EE055 Don't Break the Surface Tension: Designing a Biomimetic Water Strider Robot**
Emily Louise Baas, 17, Junior, Saint Patrick Catholic High School, Biloxi, Mississippi
- EE056 Developing an Automated Sun Seeking Solar Panel System**
Dora Young Chen, 15, Freshman, Oxford High School, Oxford, Mississippi
- EE057 Synthesis of Ternary Semiconductor Nanocrystals (CuInSe₂ CuGaSe₂, Cu(InGa)Se₂) as New Generation Solar Cell**
Idil Ozdamar, 15, Freshman, Izmir Private Fatih Science High School, Izmir, Turkey
- EE058 Safe Motor Cycle Side Stand**
Ritigahawaththa Arachchillage Dimalka Maduranga Karunajeewa, 19, Senior, Ruwanwella Rajasinghe Central College, Ruwanwella, Sabaragamuwa, Sri Lanka
- EE059 Simulating Ocean Water for Video Laser Communication**
Mark Evan Ragland, 17, Senior, Saint Marys Ryken High School, Leonardtown, Maryland
- EE060 The Automated Mailbox**
Zach Kenneth Williford, 17, Senior, D. H. Conley High School, Greenville, North Carolina
- EE061 Can the Concept of Stereo Vision Be Applied in Robotics?**
Arjun Aggarwal, 15, Sophomore, Lexington High School, Lexington, South Carolina
- EE062 Engineering a Superior Horse-Tying Device**
Somer Harper Hand, 15, Sophomore, Academic Magnet High School, North Charleston, South Carolina
- EE063 Optimal Angle of Attack for Untwisted Wind Turbine Blades**
Lexie Kae Buchs, 17, Junior, DeKalb High School, Waterloo, Indiana
- EE064 Breaking Point: Testing the Structural Integrity of Concrete Using Alternate Methods of Reinforcement**
Alexander Matthew Zuelke, 18, Senior, Whiteford High School, Ottawa Lake, Michigan
- EE065 Helios: A Solar-Tracking Mechanism for Efficiency Max. of Photovoltaic Modules**
DMontae Gregory Jones, 18, Senior, Saginaw Arts & Sciences Academy, Saginaw, Michigan
- EE066 Engineering a Hydroelectric Turbine to Harness the Energy of Tidal Change**
Reid William D'Amico, 17, Junior, Hilton Head Preparatory School, Hilton Head Island, South Carolina
- EE067 Pedestrian We Are Here to Save You: Designing Analysis for Double Frontal Fluid Bag (DFFB)**
Romisaa Abd el halim Samhoud, 16, Sophomore, El Nasr Girls College, Alexandria, Egypt
- EE068 Speed Limitation System**
Ahmed Samir Rashed Nouh, 16, Sophomore, Mohamed Zahran Experimental Language School, Alexandria, Alexandria, Egypt
- EE069 2 for 1 Wheelchair: Improving Autonomy through the Development of Multi-Functional Mobility Aids**
Gary Stanley Kurek, 18, Senior, Bonnyville Centralized High School, Bonnyville, Alberta, Canada
- EE070 Robust Displacement Estimation Employing Inexpensive Webcam Based Optical Flow**
Christopher Stephan Nielsen, 16, Junior, Home School, Calgary, Alberta, Canada
- EE071 Maximization of Daylight with Thermal Mass Modification in an Eastern, Mid-Atlantic High School**
William T. Chauvin, 18, Senior, Valley Central High School, Montgomery, New York
- EE072 The Electronic Community Guard**
Olajumoke Tolulope Adebayo, 15, Junior, Doregos Private Academy, Lagos, Lagos, Nigeria
- EE073 Robotics and Artificial Intelligence**
Michael Anthony Booker, 18, Senior, Greenville Weston High School, Greenville, Mississippi
- EE074 Desalination of Sea Water: A Comparison of Processes**
Isaaca G. Hoglen, 15, Sophomore, Kauai High School, Lihue, Hawaii
- EE075 The Application of Hot-Wire Anemometry to the Mapping of Boundary Layer Flows**
Mark Thomas Parrish, 18, Senior, Chamberlain High School, Tampa, Florida

- EE076 The VEX Robotics Challenge for Engineering and Mechanical Design for Applied Robotics Technology**
Eon Dwayne Duzant, 17, Junior, W.E.B. DuBois High School, Baltimore, Maryland
- EE077 Solar Sail, Year Two**
Steven Munn Jeanes, 16, Sophomore, Bradenton Preparatory Academy, Bradenton, Florida
- EE078 CookerSmart**
James Sinclair Popper, 18, Senior, Marlborough College, Marlborough, Wiltshire, United Kingdom
- EE079 Jump out! Rescue Rope**
Sara Yaser Shawoosh, 17, Junior, The Model Children Garden School, Jeddah, Saudi Arabia
- EE301T Bring to Light: The Development of a Novel PFO Inverse Organic Light Emitting Diode**
Elisa Bisi Lin, 18, Senior
Ian Chan, 18, Senior
Plano West Senior High School, Plano, Texas
- EE302T Beat the Heat: A Reversible One Way Heat Panel**
Ryan C. Erickson, 16, Junior; Holly C. Erickson, 14, Freshman
Los Alamos High School, Los Alamos, New Mexico
- EE303T Research on a Mechanical Detecting Pipe-Rat with Steerable Double Driving Wheels**
XingYuan Xu, 18, Senior; XinYi Gong, 18, Senior
Tian Zhang, 18, Senior
Liaoning Province Shiyang High School, Shenyang, Liaoning, China
- EE304T Self Generating Electric Fan (SGE-Fan)**
Raja Muhammad Nur Saifullah Raja Omar, 17, Junior
Muhamad Farid Muhamad Khosim, 17, Junior
Amirul Mustaqim Roslee, 17, Freshman
Taiping MARA Junior Science College, Taiping, Perak, Malaysia
- EE305T Autonomous Robotic Rubik's Cube Solver**
Spencer August Berglund, 14, Freshman
David Alexandre Joseph Campeau, 15, Freshman
Mayo High School, Rochester, Minnesota
- EE306T New Principle: Vertical Filament Winding Machine for Composite Tubes**
Jan Mares, 19, Senior; Martin Ron, 19, Senior
Jan Patak, 20, Senior
Gymnazium, Susice, Fr. Prochazky 324, Susice, Czech Republic
- EE307T Light Your Jack**
Francisco Ivan Rivas, 15, Sophomore
Juan Ramon Ibanez, 16, Sophomore
Colegio La Piedad, Carolina, San Juan, Puerto Rico
- EE308T The Motorcycle Air Bags**
Gabriel Enrique Silva, 17, Junior
Derek Radames Morales-Acosta, 17, Junior
Colegio Nuestra Senora de la Piedad, Carolina, Puerto Rico
- EE309T Auto Collision Avoidance**
Albert Lynn Payne, 15, Sophomore
Christine Marie Stone, 18, Senior
Provo High School, Provo, Utah
- EE310T Aeolus Temperature Regulation System**
Nicholas Crispie, 15, Freshman
Kevin Rinaldo Crispie, 15, Freshman
Mountain View High School, Mountain View, California
- EE311T Saving Water through Weather Analysis: Using Precipitation Probabilities and Moisture Sensing in Lawn Irrigation**
Alexander Joseph Mullen, 18, Senior
Cathy Hsi Chen, 18, Senior
Oxford High School, Oxford, Mississippi
- EE312T Regenerative Braking**
Erick Yiqing Chen, 16, Junior
Delian Tihomirov Asparouhov, 16, Junior
West High School, Salt Lake City, Utah
- EE313T Automatization of Milling Machine Axis**
Juan Ignacio Gnero, 19, Senior
Juan Pablo Maspons, 19, Senior
Escuela Industrial Superior, Santa Fe, Santa Fe, Argentina
- EE314T Reusing Electronic Ballasts to Save Electrical Energy**
Alberto Erminio Gil, 18, Freshman
German Norberto Dominguez, 18, Freshman
"Ingeniero Santiago Barabino" Technical School #2, La Banda, Santiago Del Estero, Argentina
- EE315T Anti-bumping Safety Door**
Wing Ki Woo, 15, Sophomore
Yu Hei Bithia Wong, 16, Sophomore
King Lam Kwan, 16, Sophomore
Heep Yunn School, Hong Kong, Hong Kong, Region of China
- EE316T Ozone Washington Machine**
Neftali Vera, 17, Senior; Diana Luz Hernandez, 16, Senior
Claudia Lopez Montero, 17, Senior
Escuela Preparatoria Oficial Anexa a la Normal Numero 1 de N, Nezahualcoyotl, Mexico
- EE317T A New Gadget Solar Charger and Voltage Generator**
Christopher Santy Gonzalez-Santiago, 18, Senior
Stephanie De Jesus, 17, Senior
Dra. Maria Cadilla de Martinez, Arecibo, Puerto Rico
- EE318T Automated Paper-Recycling Machine**
Matthew Arbesfeld, 16, Sophomore
Benjamin Edelstein, 16, Sophomore
Lexington High School, Lexington, Massachusetts
- EE319T The Effect of Humidity on Solar Cells**
Deniz Ismail Karabakal, 14, Freshman
Rohan Paul, 14, Freshman
Huron High School, Ann Arbor, Michigan
- EE320T A Novel Design of Chair to Assist in Climbing Stairs**
Lakshmi Rajesh, 15, Sophomore
Vibha Suresh, 15, Sophomore
Vidya Vardhaka Sangha Sardar Patel High School, Bangalore, Kanataka, India
- EE321T Design of a Novel, Low-cost, Easy to Use, Auto-disposable Syringe**
Manosij Ghosh Dastidar, 17, Junior; Anarta Roy, 17, Junior
South Point High School, Kolkata, West Bengal, India
- EE322T Sensorial, Audiovisual and Tactile Stimulation System (S.E.S.A.T.)**
Elvis Andrey Zamora-Mora, 17, Junior
Raquel Emilia Ramirez-Moreno, 17, Junior
Karol Beatriz Quiros-Espinoza, 17, Junior
Colegio Tecnico Don Bosco, San Jose, Costa Rica
- EE323T iMohallil : Making Distant Control Easy**
Ibrahim Ardi, 18, Sophomore; Nadir Belhaj, 17, Sophomore
Imam Elghazali, Meknes, Morocco
- EE324T Processor Cooling Engine**
Krisztina Sugar, 18, Senior; David Szabolcs Simon, 18, Senior
Szent Margit Secondary School, Budapest, Hungary
- EE325T A New Approach to Accident Prevention Systems: Designing a Low-Cost Driver Assistance System to Prevent Traffic Collision**
Cristian Emilian Rosu, 18, Senior
Paul Stelian Sucala, 18, Senior
"Emanui Gojdu" National College, Oradea, Bihor, Romania
Silvania National College, Zalau, Bihor, Romania
- EE327T The Design and Construction of a Rugosity Substrate Profile Gauge and Comparison with the *in situ* Chain Method**
Lauren Michelle Farwell, 17, Senior
Kate Noel Donahue, 18, Senior
Bellarmine Preparatory School, Tacoma, Washington
- EE328T Friction Increasing Forearm Sleeve**
Mark Alexander Morgan, 18, Senior
David Richard Stephens, 18, Senior
Dutch Fork High School, Irmo, South Carolina

- EE329T Solar Thermal Water Heater**
Tambirya Denesia Barney, 18, Senior
Briana Denice Mouldin, 17, Senior
Kenneth Ray Jones, 17, Freshman
Simmons High School, Hollandale, Mississippi
- EE330T Wireless Unlimited**
Juan Natividad Cano, 17, Senior
Alan Efrain Garcia, 18, Senior
Americas High School, El Paso, Texas

ENGINEERING: MATERIALS AND BIOENGINEERING

- EN001 Prospective Thermoelectric Tellurides**
Patrik Cermak, 19, Senior, SPSE a VOS, Pardubice, Pardubice, Czech Republic
- EN002 Efficiency of Two Novel Biodegradable Polymers at Various Temperature Levels**
Nisha Pillai, 17, Junior, Temple High School, Temple, Texas
- EN003 Spatial Correlation of Graphene Etching Tracks Towards Nanoribbon Formation**
Arunita Kar, 16, Junior, Paul Laurence Dunbar High School, Lexington, Kentucky
- EN004 Protecting Levees from Wave Erosion: Rocks, Trees, Marsh**
Andre James Simoneaux, 16, Junior, South Terrebonne High School, Bourg, Louisiana
- EN005 Novel Thermogelling Dispersions of Polymer Nanoparticles for Controlled Drug Delivery**
Peter D. Hu, 18, Senior, Texas Academy of Mathematics and Science, Denton, Texas
- EN006 Regarding the Applications of Semiconducting Carbon-Based Single-Walled Nanotubes**
Yosyp Shvab, 16, Junior, T. C. Williams High School, Alexandria, Virginia
- EN007 Use of Gas-filled Lipid Microbubbles for Ultrasound-modulated Drug Release from *in situ* Forming PLGA Implants**
Rebecca L. Forcier, 17, Senior, Hathaway Brown School, Shaker Heights, Ohio
- EN008 Superhydrophobicity in Plants of Puerto Rico**
Maria Cristina Sepulveda, 15, Sophomore, Southwestern Educational Society, Mayaguez, Puerto Rico
- EN009 Designing a Force-Sensing Device to Aid in the Treatment of Idiopathic Toe Walking through Motivation**
Isabelle Cicely Gill, 14, Freshman, Nicolet High School, Glendale, Wisconsin
- EN010 The Effects of Pier Type on a Riverbed's Erosion**
Alyssa Marie Bennett, 16, Junior, John Jay Science and Engineering Academy, San Antonio, Texas
- EN011 Development of an Antimicrobial Acrylic Resin, Year Two**
Catherine Yang Fan, 18, Senior, Tom C. Clark High School, San Antonio, Texas
- EN012 An Investigation of Sol-gel Techniques to Fabricate Memristive Devices**
Heather Nicole Leask, 17, Senior, Norwich Free Academy, Norwich, Connecticut
- EN013 Diatom-CdS Nanostructures as a Method to Enhance the Efficiency of a Dye-Sensitized Solar Cell**
William Cummings Newberry, 18, Senior, Greenwich High School, Greenwich, Connecticut
- EN014 Controlled Release of Acetylsalicylic Acid from Acrylic Polymers**
Purnima Malik, 16, Junior, Central York High School, York, Pennsylvania
- EN015 Ecological Agents Effect on Synthetic Tanning of Tilapia Fish Skin**
Priscila Oliveira Andre, 18, Senior, ETEC Carmelino Correa Junior, Franca, SP, Brasil
- EN016 The Effect of Wood Hardness on the Speed of Fire by Friction**
Thomas Peter Foulkes, 17, Junior, Terre Haute North Vigo High School, Terre Haute, Indiana
- EN017 ENERGIZE: Optimization of a Process to Determine Algal Species Present in a Sample Prior to Fermentation through Single-Strand Conformational Polymorphism**
Charlotte Sophia Kirk, 17, Senior, Westville High School, Westville, Oklahoma
- EN018 What Type of Wood Glue Is the Strongest When It Comes to Holding Wood Together?**
Lewis Martin Nugent, 16, Sophomore, North Daviess Junior/Senior High School, Elnora, Indiana
- EN019 Viability of a Photoinduced Electron Spin Alignment Creating a Magnetic Event in a Polymer**
Michael Vincent Di Mascio, 18, Senior, Waynesville High School, Waynesville, Ohio
- EN020 Commercial Glazes: Their Affects on the Physical Properties of Ceramics**
Anthony Reed Smith, 17, Senior, Greybull High School, Greybull, Wyoming
- EN021 Generation of Electricity from Algae in Multi-Organism Hydrogen Fuel Cell Bioreactors**
Daniel Morgan Scott, 16, Sophomore, Benjamin Franklin High School, Portland, Oregon
- EN022 Effects of Different Types and Sizes of Recycled Plastics on the Strength of Concrete**
Ryan Elmer Headrick, 15, Sophomore, Seckman Senior High School, Imperial, Missouri
- EN023 Engineering Microfluidics-Based Technologies for Rapid Sorting of White Blood Cells**
Vinay Ashok Raj, 16, Sophomore, duPont Manual High School, Louisville, Kentucky
- EN024 Refinement of Solar Cell Morphology in Bulk Heterojunction Nanoparticle Polymer Composites**
Mubarrat Nuvid Bhuiyan, 17, Senior, Jericho Senior High School, Jericho, New York
- EN025 A Molecular Automaton with Built-in Visual Display for Filovirus Identification**
Julia Elizabeth Poje, 17, Senior, Valley Stream South High School, Valley Stream, New York
- EN026 Use Black to Keep Your Teeth White: The Effect of Various Light Types on the Ability to Detect Signs of Dental Caries**
Vina Phuong Nguyen, 16, Junior, Hayfield Secondary School, Alexandria, Virginia
- EN027 Can Recycled Plastics Be Used to Reduce Landfill Waste, Help Improve the Infrastructure of Buildings, Roads, Highways and Bridges and Reduce Greenhouse Gas?**
John Charles Boykin, 15, Sophomore, St. Peter Chanel High School, Bedford, Ohio
- EN028 Aligning Silicon Nanowires for Use in Nanoelectronic Device Fabrication**
Peter James Mintun, 18, Senior, Hawken School, Gates Mills, Ohio
- EN029 Analyzing the NCI-60 Cancer Cell Lines Using Data Obtained from Genome-Wide ChIP-X Experiments**
Jayanth Krishnan, 16, Junior, Mahopac High School, Mahopac, New York
- EN030 What Are the Effects of Recycled Materials on Concrete Strength?**
Elias Bradley Johnson, 14, Freshman, Orion Junior High School, Ogden, Utah
- EN031 The Effect of Recycling on the Tensile and Crush Strength of Paper**
Noah Jackson De La Hunt, 17, Junior, Central Virginia Governor's School, Lynchburg, Virginia
- EN032 Hydrogels for Rehabilitation of the Herniated Spine Disc**
Adi Friedman, 17, Senior, Leo Baeck, Haifa, Israel
- EN033 Characterization and Optimization of the Bonding Forces of a Novel Silicon Nano-wire Gecko Biomimetic Adhesive**
Zoe Elise Dubrow, 16, Junior, Carlmont High School, Belmont, California
- EN034 Effects of Oxygen Plasma on Biological Systems**
Bilge Zeren Aksu, 18, Senior, Ankara Science High School, Ankara, Turkey
- EN035 Comparison of Charcoal Produced from the Invasive *Pueraria montana var. lobata* (Kudzu), Red Oak, Hickory, and a Commercially Available Charcoal**
James Edward Whitfield LeCroy, 18, Senior, Jefferson County International Baccalaureate School, Birmingham, Alabama

- EN036 Biomechanically Assisting the STS Movement**
Spencer R Wilson, 17, Junior, Colquitt County High School, Moultrie, Georgia
- EN037 Development of a Low-cost EMG-based Human Interface Device and Associated Applications**
Jun Nishida, 18, Senior, Nara Women's University Secondary School, Nara, Nara, Japan
- EN038 The Effect of Helium Ion Irradiation on the Tunneling Behavior in Aluminum/Aluminum Oxide/Lead Junctions**
Rahul Mitra, 16, Junior, Corona Del Sol, Tempe, Arizona
- EN039 Environmentally Responsible Processing of Nylon 6: A Two Year Study**
Xavier Joyner, 17, Senior, Wake Early College of Health and Sciences, Raleigh, North Carolina
- EN040 Low-Cost Polarization Based GFP Viewer**
Harikrishna Rallapalli, 18, Senior, Amador Valley High School, Pleasanton, California
- EN041 A Ballistic Vest with Composite Trauma Plate Insert: A Prototype**
Connor James Rise, 17, Junior, Brownell-Talbot College Preparatory School, Omaha, Nebraska
- EN042 The Pain Free Socket 2.0: Eliminating Phantom Pain in Amputees Using Thermal Biofeedback Incorporated into Prosthetics**
Katherine Emily Bomkamp, 18, Senior, North Point High School for Science, Technology and Industry, Waldorf, Maryland
- EN043 The Efficiency of Bridge Truss Based on Force Resistance Compared to Cost Analysis**
Rachel Estelle Coleman, 17, Senior, Westview High School, Martin, Tennessee
- EN044 Innovative Use of Anaerobic Effective Microorganisms for Natural Rubber Latex Coagulation**
Suppachai Nindum, 17, Junior, Khunhanwittayasan School, Khunhan, Sisaket, Thailand
- EN045 Using Waste Televisions and CRT Tubes in Heavyweight Concrete for Radiation Shielding**
Muhammet Can Sayar, 15, Sophomore, Private Beylikduzu Fatih High School, Istanbul, marmara, Turkey
- EN046 SUPER-EGG : Simple and Innovative Technology for Traditional Preserved Food**
Mohammad Pandi Alam, 15, Sophomore, SMA Negeri 2 Jombang, Jombang, Jawa Timur, Indonesia
- EN047 Improved Portable Burn Treatment Unit: Testing Simulation**
Gabriel Francisco Justiniano, 18, Senior, Guamani Private School, Guayama, Puerto Rico
- EN048 Why Our Ancestors Preferred Drumsticks Made from Trifoliolate Orange (*Poncirus trifoliata Rafin*)**
Bonjun Ku, 16, Sophomore, Je Mul Po, Incheon, South Korea
- EN049 A Study on Eco-Friendly Utilization of *Typha orientalis* Fruits for Insulation and Wallpaper**
Kay Hyun Joo, 17, Senior, Changduk Girls High School, Seoul, South Korea
- EN050 Eco-concrete: A Good Use for the Rice Husk**
Werner Nicolai Wasen, 17, Senior, Liceo Dr. Anibal Acosta Estape, Rio Branco, Cerro Largo, Uruguay
- EN051 *In vitro* Study of Thermal Ablation Capabilities of Gold-Gold Sulfide Nanoparticles for Human Liver Cancer Therapy**
Suhas Ravindranath Bharadwaj, 16, Junior, duPont Manual High School, Louisville, Kentucky
- EN052 Reduce, Reuse, Insulate?**
John Alexander Roberts, 18, Senior, The Academy of Science and Technology, The Woodlands, Texas
- EN053 The Ideal Design**
Jonathan Matthew Ketterling, 15, Sophomore, Wishek Public High School, Wishek, North Dakota
- EN054 Body Armor Utilizing a Shear Thickening Fluid**
Jared Joseph Carter, 18, Senior, Sarasota High School, Sarasota, Florida
- EN055 Breakin' Bridges**
Naivasha M. Harris, 16, Sophomore, Murphy High School, Mobile, Alabama
- EN301T The Use of an Electroless Intermetallic Coating to Reduce Infrared Emissivity and Temperature Oscillation in Metal Alloy Saw Blades**
Gennifer Reid Rubin, 17, Junior
Audrey Christine Leasure, 17, Junior
Lake Highland Preparatory School, Orlando, Florida
- EN302T Insulation Nation**
Robert Joseph Brust, 13, Freshman
Luis Ignacio Salinas, 15, Freshman
Del Rio Freshman School, Del Rio, Texas
- EN303T Near Infrared Upconversion Phosphors for Biomedical Imaging**
Matthew Raigosa, 18, Senior
David Ortiz, 18, Senior
Weslaco East High School, Weslaco, Texas
- EN304T Impregnation of Zirconium Oxide and Silver Nanoparticles in a Dressing Aimed at Activating Skin Blood Flow and Antimicrobial Effect**
Gabriela Schaab da Silvia, 18, Senior
Kawoana Trautman Vianna, 17, Senior
Fundacao Escola Tecnica Liberato Salzano Vieira da Cunha, Novo Hamburgo, RS, Brasil
- EN305T Air Quality Promotion: The Use of the ZnO/U.V Photocatalytic System in the Analysis and Control of Microbial Pathogens Present in Contaminated Indoor Environments**
Paulo Ricardo Maciel Nascimento, 17, Senior
Gabriel Nascimento da Silva Santos, 17, Senior
Escola Santa Teresinha, Imperatriz, MA, Brasil
- EN306T The Optimization of a Microbial Fuel Cell**
Samuel Joseph Sohlden, 17, Senior
Damien Walsh, 18, Senior
Sycamore High School, Cincinnati, Ohio
- EN307T Decolorization and Free Fatty Acid Extraction of Waste Cooking Oil by Adsorption, Percolation, and Gas Stripping**
Lingga Adidharma, 15, Freshman
Widya Adidharma, 18, Senior
Laramie Junior High School, Laramie, Wyoming
Laramie Senior High School, Laramie, Wyoming
- EN308T Construction of a Contrast-Enhanced Brain-Mimicking Hydrogel and Simulation of the Mechanical Effects of Implantable Brain Electrodes**
Rohit Anish Ramani, 17, Senior
Neil Pathak, 17, Junior
Half Hollow Hills High School East, Dix Hills, New York
Herricks High School, New Hyde Park, New York
- EN309T Comparative Analysis: Sorbothane *versus* Non-Newtonian Fluids**
David Booth, 18, Senior
Tyler James Chumbley, 17, Senior
Saint Xavier High School, Louisville, Kentucky
- EN310T Orientation and Differentiation of Adult Dental Pulp Stem Cells on Electrospun Fiber Scaffolds**
Yesha Maniar, 18, Senior
Julie Chang, 17, Junior
Herricks High School, New Hyde Park, New York
- EN311T Building Enhanced Bioscaffolds: Improving the Stability and Wound-healing Properties of Biocompatible Scaffolds Using Hydrogels and Electrospun Fibers**
Salonee Shah, 17, Senior
Michelle Theresa Leonetti, 18, Freshman
Walter Tresper Clarke High School, Westbury, New York
Long Beach High School, Long Beach, New York

- EN312T Hydrogen Production by Urea Electrolysis**
Christopher Alan Pang, 17, Senior
Michael Jonathan Wu, 17, Junior
Edbert Kang Li, 16, Junior
Watchung Hills Regional High School, Warren, New Jersey
- EN313T Switchgrass: A Source of Biofuels and Fibers**
Mallory Ruth Busso, 16, Junior
Lauren Marie Raycraft, 16, Junior
Kalamazoo Area Mathematics and Science Center, Kalamazoo, Michigan
- EN314T REVO FOOT: Low Cost Orthopedic Prosthesis to Lower Limb Amputations, Produced from Recyclable Materials**
Eduardo Trierweiler Boff, 18, Senior
Lucas Strasburg Ferreira, 18, Junior
Fundacao Escola Tecnica Liberato Salzano Vieira da Cunha, Novo Hamburgo, Rio Grande do Sul, Brasil
- EN315T Optimization of Platinum Nanoparticles for Proton Exchange Membrane Fuel Cells Using Pulse Electrochemical Deposition**
Andrew James Touloukian Swoboda, 16, Junior
Ryan Dennis Lindeborg, 15, Sophomore
Thomas Jefferson High School for Science & Technology, Alexandria, Virginia
Dana Hills High School, Dana Point, California
- EN316T A Study on the Effectiveness of Masks Made from Korean Traditional Paper in Preventing Droplet Infection of Influenza A Virus**
Wonseok Oh, 14, Freshman
Jaein Lee, 14, Freshman
Home School, Goyang, Gyeonggi, South Korea
- EN317T The Testing of Zea Maize and Carica papaya L. for Genetically Modified Genes on a Real Time PCR System**
Jasmine Gajeton, 17, Senior
Jessica Chiang, 17, Junior
Deer Valley High School, Antioch, California
- EN318T The Secret Scents of the Cactus**
Marisol Del Valle Quinteros, 14, Freshman
Elda Guadalupe Seballos, 15, Sophomore
CBU Rural Estacion Chuna, Chuna, Cordoba, Argentina
- EN319T Applications of Faraday Shielding**
Barron Collins Roberts, 18, Senior
Chelsey Maxine Bartlett, 18, Senior
- ##**
Sirish Veligati, 17, Senior
Central High School, Saint Joseph, Missouri
- EN320T Developing a Non-Intrusive Method for Measuring Wall Insulation**
Rachel Marie Jenkins, 18, Senior
Mark Anthony Poczontek, 17, Senior
D.H. Conley High School, Greenville, North Carolina
- EN321T Making the Best Better: Optimizing the TiO₂ Semiconducting Layer for Applications in Dye-Sensitized Solar Cells**
Amy BC Tang, 16, Junior
Anjali Jaba Das, 18, Senior
Westview High School, Portland, Oregon
- EN322T Ultrascale Modeling of Supercapacitors for Electrical Energy Storage**
Linus Hauming Liang, 17, Senior
Jonathan Linden Bryan, 18, Senior
Oak Ridge High School, Oak Ridge, Tennessee
- EN323T Electrospun Polymer Nanofibers Containing Antibiotics**
Yarely Chiselle Davila-Vazquez, 17, Senior
Yelitzzah Michelle Fernandez-Rodriguez, 17, Senior
Escuela Especializada en Bellas Artes, Humacao, Puerto Rico
- EN324T Mini Magnetic Muck Managers**
Vivienne Hui Xian Tam, 17, Junior
Janelle Hui Min Tam, 14, Sophomore
Waterloo Collegiate Institute, Waterloo, Ontario, Canada
- EN325T Stealing from Nature**
Cameron David Stadtfeld, 18, Senior
Todd Michael Ollre, 17, Senior
Robert Matthew Graham, 18, Senior
William B. Travis High School, Richmond, Texas
- EN326T Low Cost, High Tech: Engineering a Gel Electrophoresis Apparatus**
Michelle Jacqueline Lowe, 17, Senior
Peter J. Nelson, 17, Junior
Brookwood High School, Snellville, Georgia

ENVIRONMENTAL MANAGEMENT

- EM001** **Researching a Relevant Remedy to Repair Riparian Residences: Exploring the Effectiveness of *Ceratophyllum demersum* and *Lemna valdiviana* in Absorbing Nitrates from Freshwater Sources**
Nicole Elizabeth Smith, 18, Senior, Saginaw Arts & Sciences Academy, Saginaw, Michigan
- EM002** **Creating a Solar Powered UV Water Filtration Device**
Bobby D. Lee, 17, Junior, Sunnydale High School, Charlotte, North Carolina
- EM003** **Got Iron? nZVI: An Improvement in Ocean Fertilization**
Jingxian Zhang, 16, Junior, Westview High School, Portland, Oregon
- EM004** **The Down-Low on DO: An Analysis of the Measure of Dissolved Oxygen in Mining Pit Quarries' Hypolimnion and Their Ability to Sustain Aquatic Ecosystems**
Hannah Renee Perkins, 18, Senior, South Sumter High School, Bushnell, Florida
- EM005** **Improving Mine Reclamation Outcomes with Soil Amendment Variations**
Travis Cole Sylvester, 16, Sophomore, Greybull High School, Greybull, Wyoming
- EM006** **The Feasibility of Reinforcing the Mississippi River Embankments with Borrow Harvested via Flocculation**
Alaina Brooke Leggette, 16, Junior, Saint Joseph's Academy, Baton Rouge, Louisiana
- EM007** **The Effects of Varying Depths of Water on the Germination Rate of *Carex hystericina* in Its Natural Habitat**
Tiffany Colleen Tischer, 17, Senior, Lincoln High School, Thief River Falls, Minnesota
- EM008** **The Algae-Mobile 2: Creating an Energy Sufficient Anti-Pollutant Device in the Exhaust of a Car**
Param Jaggi, 15, Junior, Plano East Senior High School, Plano, Texas
- EM009** **Heavy Metal Bioremediation: Relief for a Ravaged Land**
Paige Hunter Parrack, 16, Junior, Southmoore High School, Moore, Oklahoma
- EM010** **Carbon Bio Capture: Solving the CO₂ Dilemma**
Bryan Austin Johnson, 15, Sophomore, Southmoore High School, Oklahoma City, Oklahoma
- EM011** **Leaching Lead, Phase Two**
James Andrew Rose, 15, Sophomore, Alpena High School, Alpena, Arkansas
- EM012** **Living Roofs**
Frances Wisdom Atkins, 16, Junior, Carmel High School, Carmel, California
- EM013** **The Implications of Chrysanthemum Blossom Extract on an Invertebrate Food Chain, Phase Three**
Jack Alexander Fruth, 17, Junior, Northwestern High School, Kokomo, Indiana
- EM014** **Nitrate Reduction in Simulated Nitrate Wastewater by Biobarrier Filtration**
Monica Elizabeth McFadden, 15, Freshman, Notre Dame Academy, Park Hills, Kentucky
- EM015** **Possible Bioremediation of Lake St. Marys, Ohio via *Dreissena polymorpha***
Andrew Benedict Favorito, 16, Junior, Paulding High School, Paulding, Ohio
- EM016** **The Impact of Temperature and Food Availability on the Viability of the Early Developmental Stages of the Marine Copepod, *Acartia tonsa***
Young-Ah Lee, 18, Senior, New Horizons Governor's School for Science and Technology, Hampton, Virginia
- EM017** **Electrochemical Remediation of Acid Mine Drainage**
Luke Steven Andraka, 15, Freshman, North County High School, Glen Burnie, Maryland
- EM018** **Using Thermal Infra-Red Satellite Imagery to Measure Water Surface Temperatures in Large Rivers**
Vicki Lam, 18, Senior, Benson Polytechnic High School, Portland, Oregon
- EM019** **Engineering a Rain Garden to Control Road Run-off in Scanlon Creek and an Assessment of Rain Gardens as the Best Storm Water Management Practice, Phase IV**
Logan Joseph Pallin, 17, Senior, Cloquet Senior High School, Cloquet, Minnesota
- EM020** **Photobioreactor for Carbon Sequestration**
Victor Marelli Thut, 15, Freshman, Colegio Dante Alighieri, Sao Paulo, SP, Brasil
- EM021** **Analysis of Absorption/Adsorption of Heavy Metals in Aquatic Environments with the Use of *Pistia stratiotes***
Natalia Giuzio, 16, Freshman, Colegio Interativa, Londrina, PR, Brasil
- EM022** **Construction of a Continuous Flow SODIS System with PET Bottles Integrated to a Water and Waste-Water Treatment System**
Karoline Elis Lopes Martins, 18, Senior, Centro Federal de Educacao Tecnologica de Minas Gerais, Belo Horizonte, SP, Brasil
- EM023** **Rhodamine Dye Retention in Silica Isolated from Diatoms *Cyclotella meneghiniana* and *Thalassiosira sp.***
Kalia S. Bistolas, 17, Junior, Wilsonville High School, Wilsonville, Oregon
- EM024** **Design, Fabrication, and Evaluation of a Deployable *in situ* Nitrate Sensor for Real-Time Analysis of Sediments**
Avilash Kalpathy Cramer, 17, Senior, West Linn High School, West Linn, Oregon
- EM025** **Monitoring Ammonia Oxidizing Bacteria Using Quantitative Polymerase Chain Reactions**
Arezu Hajar Monawer, 18, Senior, Madison West High School, Madison, Wisconsin
- EM026** **Sustainable Use of West Indian Natural Ecosystems for Rubber Production**
Lorianny Rivera, 17, Senior, Colegio Maria Auxiliadora, Carolina, Puerto Rico
- EM027** **Buildings Constructions with Concrete and Recycled Materials**
Desiree Janice Nieves, 17, Junior, Colegio Marista, Guaynabo, Puerto Rico
- EM028** **A Cleaner Trip on Acid: Can Carbon Dioxide Be Removed from Internal Combustion Engine Exhaust at Its Source?**
Steven Louis Toub, 16, Sophomore, Spruce Creek High School, Port Orange, Florida
- EM029** **Toxicity of Surrogate Organoclay Surfactant to Straight-Chain Hydrocarbon-Degraders and Potential for Organoclay Biodegradation**
Laurie Ann Rumker, 17, Junior, Oregon Episcopal School, Portland, Oregon
- EM030** **Flood Levees: The Composition of Sandbags**
Rachel Marie Woodhouse, 16, Sophomore, Roseville College, Sydney, NSW, Australia
- EM031** **Pore Size Reduction of Electrospun Polyacrylonitrile (PAN) Scaffolds for High Performance Microfiltration**
Brandon Li, 17, Senior, Jericho Senior High School, Jericho, New York
- EM032** **The Impact of Soil Thermal Diffusivity Variance on Geothermal Heating**
Peter Nicholas Gardner, 18, Senior, Dearborn Center for Mathematics, Science, and Technology, Dearborn Heights, Michigan
- EM033** **The Effects of Pesticides on the Viability of Macro Invertebrates, Specifically *Artemia franciscana*, Phase III**
Alexa Anne Lunt, 17, Junior, Weber High School, Pleasant View, Utah

- EM034 **Rapid Intervention: A Practical Solution for the Butane Explosions**
Mohammed Khalid Shafi, 18, Senior, Alshafi Private Schools, Taif, Saudi Arabia
- EM035 **H₂O Splitting Using Photon in Chemistry**
Noor Tawfeek Alawadh, 17, Junior, Jabal Alnoor High School, Khobar, Saudi Arabia
- EM036 **Carbon Sequestration: Hydroxide Air Capture (The Artificial Tree)**
Tyler Austin Clark, 17, Junior, St. John High School/ Kansas Academy of Mathematics and Science, St. John/ Hays, Kansas
- EM037 **Erosion Control of Mountainside through Asexual Propagation Using *Rhus glabra Cis-montana***

Ellie Antonia Vawdrey, 18, Senior, Hillcrest High School, Midvale, Utah
- EM038 **Design and Development of a Portable Light Trap for Sampling Brachyuran Crab Larvae**
Heather Marie Eberhart, 18, Senior, Bellarmine Preparatory School, Tacoma, Washington
- EM039 **Foundry Sand: Waste or Beneficial, Year Three**

Kayleigh Sue Warner, 17, Junior, DeKalb High School, Waterloo, Indiana
- EM040 **The "Green" Way of Layered-Double Nickel Hydroxide: From Waste to Electric Energy**
Olexandr Tokarev, 16, Junior, Chemical Ecological Lyceum, Dnipropetrovsk, Ukraine
- EM041 **Erosion: Going, Going, Gone...**
Natalie Adelle Dyjak, 17, Junior, Home school, Benson, Arizona
- EM042 **The Effects of Nutrient Supplementation on *in situ* Bioremediation**
Adair Louise Borges, 17, Senior, Billings Senior High School, Billings, Montana
- EM043 **Formulating Trends of Nematode Distributions Based on the Modified Baermann Funnel Extractions and Using the Four Corners Nematode from Soil Samples Collected in San Juan County, New Mexico Providing a Guide for Environmental Management during Site Restoration Project**

Laura B. Lane, 16, Junior, Aztec High School, Aztec, New Mexico
- EM044 **Inedible Cellulosic Ethanol**
Hoi Ming Chu, 18, Senior, Carmel Pak U Secondary School, Hong Kong, Hong Kong, Region of China
- EM045 **Self-Reinforced Polymer Composite from Postconsumer Waste**

Chun Hei Lam, 18, Senior, Shun Tak Fraternal Association Yung Yau College, the New Territories, Hong Kong, Region of China
- EM046 **The Effect of Magnesium Acetate on the Capability of *Synechocystis* sp. Strain PCC 6803 Suspended in Calcium-alginate to Remove Lead (II) from Contaminated Aquatic Environments**
Christina Anne-Josiane de Fontnouvelle, 15, Sophomore, Wellesley High School, Wellesley, Massachusetts
- EM047 **Determining the Phytoremediation Potential of *Brassica rapa* with Arbuscular Mycorrhizae as a Plausible Agent for Increasing Heavy-metal Uptake Using a Water Culture Hydroponic System**
Vivien Macnguyen, 18, Senior, Oak Grove High School, San Jose, California
- EM048 **Interpreting the Nutrient Limitations, Seasonal Variations, and Salinity of Florida Bay in order to Analyze Shifts in Species and Biomass Productivity**
Jonathan Anthony Prendergast, 18, Senior, Felix Varela Senior High School, Miami, Florida
- EM049 **The Effects of Natural Peroxidase as a Lignin Decomposer in Modern Landfills**
Lexis Ann Sherman, 15, Sophomore, Mansfield High School, Mansfield, Missouri
- EM050 **Styrofoam's Achilles Heel: The Effect of Oliophilic Bacteria on Styrene**
Giovanni Righi, 16, Sophomore, Collins Hill High School, Suwanee, Georgia
- EM051 **The Effectiveness of Various Types of Drainage Systems and the Production of an Ideal System**
Brittney Whittingham Parker, 16, Junior, Hilton Head Preparatory School, Hilton Head Island, South Carolina
- EM052 **Developing an Attractant for Mass Trapping the Invasive Coconut Rhinoceros Beetle**
Anran Li, 16, Junior, St. John's School, Tumon Bay, Guam
- EM053 **Domestic Plastic Shredder**
Abdullah Saied Elmenoufy, 16, Sophomore, Dar el Tarbiah American School, Cairo, Egypt
- EM054 **Management and Conservation of Sighting Areas of the West Indian Manatee (*Trichechus manatus*) in the South-Central Coastal Area of Puerto Rico and Physical, Chemical and Biological Characterization of Its Natural Habitat, Phase IV**
Luis Enrique Valentin-Alvarado, 17, Senior, Elvira M. Colon Negron, Santa Isabel, Puerto Rico
- EM055 **Comparative Analysis of Acidification Effects on Structural Decalcification between Samples of Coral Exoskeletons *Montastraea cavernosa* and *Diploria clivosa***
Angelica I. Cruz-Lebron, 17, Senior, High School Luis Munoz Marin, Yabucoa, Puerto Rico
- EM056 **Novel Synthesis: Imidacloprid CYP450 Pesticide Synergist from Dill Lowers Surface Runoff Toxicity**

Emma Jean Graham, 16, Sophomore, Lisgar Collegiate Institute, Ottawa, Ontario, Canada
- EM057 **Got Gas?: Feasibility of a Methane Capture System**
Kimberly Nicole Gulevich, 17, Senior, North Peace Secondary School, Fort St. John, British Columbia, Canada
- EM058 **Grasping Water: Exploring a Novel Method of Inducing Precipitation**
Yiyue Zhao, 18, Senior, Sir Winston Churchill High School, Vancouver, British Columbia, Canada
- EM059 **The Effect of Biomass Type on Hydrothermally Carbonized Biochar as a Soil Supplement and Energy Source**
Afia Zarrin Khan, 15, Sophomore, Spring Valley High School, Columbia, South Carolina
- EM060 **The Preference in Predation of the Native Aquatic Bug, *Anisops nasutus*, on the Larvae of Four Mosquito Species Found in American Samoa**
Faaloloi Teo, 16, Junior, Tafuna High School, Pago Pago, American Samoa
- EM061 **Disposable Diapers Decomposed by *Trichoderma harzianum* into Fertilizer Using *Basella alba* as Test Plant**
Jennifer Arangcon Doromal, 16, Sophomore, La Filipina National High School, Tagum City, Davao del Norte, Philippines
- EM062 **Methods for the Reduction of Methane Released during the Cultivation of Rice**
John Hill Price, 17, Junior, Navasota High School, Navasota, Texas
- EM063 **Sustainability in a Home**
Royce Jay Brady, 18, Senior, Red Mesa High School, Teec Nos Pos, Arizona
- EM301T **Earth's Leftovers: Increasing Compost Kinetics by Using an Organic Accelerant**
Shelby Elise Koos, 16, Sophomore
Tiffany Michelle Swinney, 15, Sophomore
Alyson Elizabeth Sapirman, 15, Sophomore
Crooms Academy of Information Technology, Sanford, Florida
- EM302T **The Comparison of Compression Strength Endpoints on Concrete Composition**
Lorrisa Rose Craigmile, 17, Freshman
Leandra Marie Craigmile, 14, Freshman
Lincoln High School, Thief River Falls, Minnesota

- EM303T Enhanced Sprinkling System with Energy-Efficient Applications at Stevenson School**
Michael Lin, 16, Junior
Jimmy Lin, 15, Sophomore
Robert Louis Stevenson Upper School, Pebble Beach, California
- EM304T Decomposition of Organic Waste from Households and Schools under Their Fermentation Methods Combined with Farming *Perionyx excavatus***
Ha Thi Thu Dinh, 17, Junior
Vu Kim Thanh Tran, 17, Junior
Dateh High School, LamDong, Vietnam, Dateh,
- EM305T Postcards from the Bay: A Comparison of Three Phytoplankton Communities in Monterey Bay**
Joanna Katherine Claire Coker, 17, Senior
Kelly Anne Chesus, 17, Senior
San Lorenzo Valley High School, Felton, California
- EM306T New Treatment System for Runoff Water Using Natural Filters and Biomass Remnants**
Laura Genesis Roldan, 16, Sophomore
Odemaris Carrasquillo, 16, Sophomore
Colegio Maria Auxiliadora, Carolina, Puerto Rico
- EM307T Recycling of Styrofoam: Application in Retention of Water Heavy Metal Ions**
Amanda De La Rocque Rodrigues, 18, Senior
Carlos Henrique Leite da Silva, 18, Senior
Paolo Damas Pulcini, 18, Senior
ETEC Getulio Vargas, Sao Paulo, SP, Brasil
- EM308T Enhancing Biofilters: The Impact of Abscisic Acid on the Sequestration of Heavy Metals by *Euglena gracilis***
Jackie Bokor, 16, Junior
Hannah Michele Berkowitz, 16, Junior
Long Beach High School, Lido Beach, New York
- EM309T Mussels, a Natural Solution to Bug Spray Toxicity: Evaluation of *Geukensia demissa* as DEET Biofilters in Runoff Water**
Jane E. Smyth, 16, Sophomore
Arienne Papa, 16, Sophomore
Long Beach High School, Lido Beach, New York
- EM310T Determining the Best Geological Makeup of Sand for Man-Made Beaches**
Caitlyn Josette Smith, 17, Senior
Kaela Renee Stender, 17, Senior
Edward Clark High School, Las Vegas, Nevada
- EM311T Gray Matters: Using Grey Water from Air Conditioning Units to Reduce Bathroom Water Consumption**
Tahani Osamah Badeeb, 18, Senior
Abrar Saleh AlTurkistani, 18, Senior
Raneem Abdulelah Binismail, 18, Senior
AlFerdous Private Schools, Jeddah, Saudi Arabia
- EM312T Recycling Used Cooking Oil for the Production of Hydroxy Fatty Acids by Microbial Conversion**
Sunyoung Hwang, 17, Senior
Eric Young-Oh Jang, 17, Senior
One Park, 17, Senior
Korean Minjok Leadership Academy,
Gangwon, Gwangwon, South Korea
- EM313T Integrating Programmable Thermostats with the National Digital Forecast Database XML Web Service and Web Scheduler to Maximize Energy Efficiency**
Neil Nijhawan, 16, Sophomore
Kush Nijhawan, 16, Sophomore
duPont Manual High School, Louisville, Kentucky
- EM314T Biochar: A Viable Method for Soil Improvement, Water Conservation, and Carbon Sequestration**
Brian Lance Hie, 15, Sophomore
Vivek G Vishwanath, 15, Sophomore
Scripps Ranch High School, San Diego, California
- EM315T Removal of Cooking Fume and Odors in Cooking Exhaust**
Chi Kong Leung, 18, Senior
Pak Sum Lo, 18, Senior
Tin Chi Choi, 17, Senior
Ju Ching Chu Secondary School (Yuen Long),
Yuen Long, Hong Kong, Region of China
- EM316T The Bioremediation Of Atrazine Using *P. putida***
Christopher Scott Jarvis, 17, Junior
Daniel Patrick Lukason, 16, Junior
Hopkinton High School, Hopkinton, Massachusetts
- EM317T Waste Management for Cattle Feedlots: Engineering a System for the Eco-friendly Treatment of Feedlot Waste**
Jacqueline Rae Stergar-Elliott, 17, Junior
Ellen Marie Hyams, 17, Junior
Billings Central Catholic High School, Billings, Montana
- EM318T Identifying the Effects of Locally Grown Plants on Mealworm Weight and Mortality**
Michelle P Tagapuen, 18, Senior
Ilora Danne Nola Mendoza, 19, Senior
Rizzaly Aquino Agustin, 17, Senior
Waipahu High School, Waipahu, Hawaii
- EM319T What Is the Optimum Environment for Fungus Growth in Vinasse from Sugar Cane Molasses for a Potential Fish and Animal Feed Ingredient?**
Sarah Mieko Tamashiro, 16, Junior
Lindsay Sumiko Fujimoto, 16, Junior
Saint Andrew's Priory School, Honolulu, Hawaii
- EM320T How to Overcome the Next Worldwide Depletion in Conventional Gas Production?**
Omar Amin Ghorab, 17, Junior
Zeyad Ali Emam, 16, Junior
Mohammed Ayman Zerban, 15, Sophomore
House of English, Alexandria, Egypt
- EM321T Biological Treatment of Captured Carbon Dioxide**
Yousr Mostafa Al Shaarawy, 15, Sophomore
Sarah Mostafa Al Shaarawy, 15, Sophomore
Alexandria House of English, Alexandria, Egypt
- EM322T The Effect of Ecological Roofs in Reducing Water Runoff and Temperature as Compared to Regular in Concrete Roofs**
Amanda Kristel Hernandez-Lopez, 18, Senior
Yamira Rentas-Vazquez, 18, Senior
University Gardens High School, San Juan, Puerto Rico
- EM323T Study of the Wind Energy in the Francisco Oller High School**
Mercedes D. Almanzar, 16, Junior
Cindy Cordova, 16, Junior
Francisco Oller, Catano, Puerto Rico

ENERGY AND TRANSPORTATION

- ET001** **Is Solar Power Practical for Louisiana?**
Katie Ann Chiasson, 16, Junior, St. James High School, St. James, Louisiana
- ET002** **Generating Electricity from Cactus**
Razan Hamzeh Abdul-Nabi, 16, Junior, Pineer Center for Talented Students, Al korah, Jordan
- ET003** **The Application of an Electromagnetic Induction Coil Input Frequency Gradient to Conjoin the Lift and Propulsion Systems of an Electromagnetic Suspension Vehicle**
Christopher Joseph Davlantes, 17, Junior, Bishop Kenny High School, Jacksonville, Florida
- ET004** **Piezoelectric Nanogenerators: Optimizing Zinc Oxide Nanowire Quality through the Use of Gold/Copper Alloy Catalysts**
Morgan McKay Monroe, 17, Junior, Episcopal High School of Jacksonville, Jacksonville, Florida
- ET005** **Comparing the Efficiencies of Various Blends of Ethyl Alcohol in a Single Cylinder, Four Stroke Engine**
Adam Lee Broderius, 17, Junior, Glencoe Silver-Lake High School, Glencoe, Minnesota
- ET006** **Going Clean, Flying Green: Decreasing of Nitrogen Oxide Emissions from a Jet Engine**
Keegan Clive Moore, 17, Junior, Rand Park High School, Randburg, Gauteng, South Africa
- ET007** **Phase I of II: Designing and Fabricating a Wind Tunnel for Wind Turbine Efficiency Testing**
Christina Marie Serena, 17, Junior, John F. Kennedy High School, Babbitt, Minnesota
- ET008** **Coal from Cane**
Cole William Bergeron, 15, Freshman, Houma Junior High School, Houma, Louisiana
- ET009** **Levitation by Magnetization: A More Efficient Source of Wind Energy?**
Alexander Scott Madlom, 16, Sophomore, Park Christian School, Moorhead, Minnesota
- ET010** **Back to the "Greener" Future**
Nathanael Louis Mickelson, 16, Sophomore, Alma High School, Alma, Arkansas
- ET011** **Improving the Power Output of Photovoltaic Cells with Cooling Systems**
Karl Maxwell Wallace, 17, Senior, Jensen Beach High School, Jensen Beach, Florida
- ET012** **The Effect of a Wind Turbine's Rotor Design on Its Voltage Output**
Jacob Charles Pulawski, 15, Freshman, F.W. Springstead High School, Spring Hill, Florida
- ET013** **Decomposing Energy**
Max Aaron Keller, 17, Senior, Alden-Conger High School, Alden, Minnesota
- ET014** **Improving Cathode Kinetics and the Rate of Reaction in a Direct Methanol Fuel Cell**
Jeffrey Donald Martin, 17, Senior, John Adams High School, South Bend, Indiana
- ET015** **Improving Wind Turbines with Winglets**
Daniel J. Dorminy, 15, Freshman, Sola Fide Home School, McDonough, Georgia
- ET016** **Enhancing Algae Biofuels: The Effects of Nitrogen Limitation and Carbon Dioxide Infusion on the Oil Yields of *Nannochloropsis oculata***
Sara Ellen Volz, 14, Freshman, Cheyenne Mountain High School, Colorado Springs, Colorado
- ET017** **Optimizing Energy Extraction and Water Conservation of Geothermal Heating Systems: Part II**
John Raleigh Burt, 18, Senior, Sargent High School, Monte Vista, Colorado
- ET018** **Do the Enzymes Spezyme CP and Novozyme 188 Affect the Production of Free Sugars and Ethanol in the Ammonium-treated Leaf of *Sorghum officinarum* Compared to the Ammonium-treated Leaf of *Sorghum bicolor* Using Lignocellulosic Biomass Hydrolysis?**
Kai Addrianne Williams-Spraggins, 17, Senior, Lighthouse Christian High School, Abbeville, Louisiana
- ET019** **Catch More Sun: Affordable Energy**
Pranjal Bodh Gupta, 15, Sophomore, Auburn High School, Auburn, Alabama
- ET020** **GEET Fuel Processor Emissions and Efficiency**
Rocky L. Schaeper, 19, Senior, Sale Creek High School, Sale Creek, Tennessee
- ET021** **Advances in Oscillating Water Column Development**
Michael Reed Glawe, 18, Senior, Cathedral High School, New Ulm, Minnesota
- ET022** **Novel Method: Detecting High Energies in Sonoluminescence**
Lyric Elizabeth Gillett, 18, Junior, Cornerstone High Home School, Houston, Texas
- ET023** **The Effects of Spin on Rocket Flight**
Aaron Blake Shepperd, 15, Sophomore, Hart County High School, Munfordville, Kentucky
- ET024** **Reducing Wing Induced Drag through the Addition of Adaptive Tip Sails, Part II**
Joseph Anthony Gerner, 17, Senior, George Marshall High School, Falls Church, Virginia
- ET025** **Warning about Warming: A Global Problem with a Fuel Cell Solution—An Evaluative Analysis Assessing a Competitive Option amongst the Proton Exchange Membrane, Reversible, Direct Methanol, and Microbial Fuel Cells as a Mechanism of Eliminating Idling Emissions**
Pavane Gorrepati, 16, Sophomore, Rivermont Collegiate, Bettendorf, Iowa
- ET026** **Generation of Electricity from Ocean Wave Oscillation by Employing Quintuple Independent Magnet Shaft Assemblies**
Jessica Kelsey James, 17, Junior, Weber High School, Pleasantview, Utah
- ET027** **An Experimental Study to Harvest Hydrocarbons with Combustion Flue Gases from Fossil Fuel Power Plants**
Bryan Matthew Lu, 16, Sophomore, Southside High School, Greenville, South Carolina
- ET028** **So Easy a Student Can Do It: Engineering an Affordable Electric Vehicle**
Joel Jack Tinker, 16, Sophomore, Covenant Christian Academy, Huntsville, Alabama
- ET029** **A Simulation using C++ to Evaluate the Performance of the Columbia University Non-Neutral Torus Stellarator Based on a Pedersen Model for Optimization**
Soo Kyoung Kim, 18, Senior, Bronx High School of Science, Bronx, New York
- ET030** **An Investigation of Photovoltaic Enhancement Methods**
Lindsey Johnson, 14, Freshman, Orion Junior High School, Harrisville, Utah
- ET031** **Increased Energy Transfer from Small Wind Turbines**
James Lee Clark, 17, Senior, Mayfield High School, Las Cruces, New Mexico
- ET032** **Nuclear Power: The Next Generation Locomotive**
William A. Wright, 17, Junior, Belgrade High School, Belgrade, Montana
- ET033** **Twin Turbines**
Nicholas Edward Mueller, 17, Junior, Garretson School District 49-4, Garretson, South Dakota
- ET034** **The Power of the Wind**
Calan Kay Olsen, 17, Junior, Manti High School, Manti, Utah
- ET035** **"Green" Synthesis of Nanowires on FTO Substrates for Organic Dye-based Solar Cells: Analysis with New Rapid D-SCOPE 2.0**
Shyamal Buch, 14, Freshman, Vista del Lago High School, Folsom, California

- ET036 **It's Ship Shape**
Brandon B. Benninger, 15, Freshman, Boone Grove High School, Valparaiso, Indiana
- ET037 **Levoglucohol: Engineering Ethanogenic *E.coli* for Levoglucosan Utilization**
Avanthi Sai Ajarapu, 16, Junior, Ames High School, Ames, Iowa
- ET038 **Eco Energy**
Courtney Marie James, 14, Freshman, Muldrow High School, Muldrow, Oklahoma
- ET039 **The Effect of Winglet Shape on the Induced Drag of an Airplane**
Taylor Mason Hose, 15, Sophomore, Hedgesville High School, Hedgesville, West Virginia
- ET040 **Solving the Modern Energy Crisis: A Comprehensive Study of the Effectiveness of Biofuels as a Clean Renewable Energy Source**
Brady Mark Holst, 17, Junior, Southeastern High School, Augusta, Illinois
- ET041 **Maximizing Hybrid Rocket Motor Efficiency for Evaluating Recycled Fuels**
Megan Lynn Perkins, 15, Sophomore, duPont Manual High School, Louisville, Kentucky
- ET042 **Wingtip Vortices**
Zakary John Sipich, 18, Senior, Kouts Junior-Senior High School, Kouts, Indiana
- ET043 **Biomass Gasification**
John Stephen Barber, 16, Junior, Colquitt County High School, Moultrie, Georgia
- ET044 **A Design of a Tethered, Lighter-than-Air, Power-Generating Wind Turbine**
Kelsi Sumiko Watanabe, 15, Sophomore, Milliani High School, Milliani, Hawaii
- ET045 **Wave Energy Systems: The Future of Energy**
Lawrence Zachary Bright, 17, Junior, Suncoast Community High School, Riviera Beach, Florida
- ET046 **A Homemade Microbial Fuel Cell**
Brendan Eugene Betts, 15, Freshman, Easton Area High School, Easton, Pennsylvania
- ET047 **Production of Biodiesel from *Terminalia catappa L.*, Natural Almond of Puerto Rico: New Model Sustainable Energy**
Angelinet Rodriguez-Sotomayor, 15, Freshman, Abelardo Diaz Alfaro, Toa Alta, Puerto Rico
- ET048 **Producing Electricity from the Air Caused by Ocean Waves**
Hadi AbedelHadi Hotait, 16, Freshman, College Notre Dame des Soeur Antonine, Nabateyeh, South, Lebanon
- ET049 **Highways Go Green**
Mohammad Ghazi Issa, 17, Senior, Rafic Hariri High School, Saida, South, Lebanon
- ET050 **Bio-Inspired Photonic Fuel Cell**
Dheevash Arulmani, 14, Freshman, Gordon Graydon Memorial Secondary School, Mississauga, Ontario, Canada
- ET051 **Comparison of Alternative Processes for Producing Biofuels from Sweet Potatoes**
Ryan Christopher Davis, 17, Senior, Morristown Hamblen High School East, Morristown, Tennessee
- ET052 **Concentrated Solar Power System: Utilizing Fresnel Lens and Temperature Control**
Caleb George Gestes, 16, Sophomore, John Curtis Christian School, River Ridge, Louisiana
- ET053 **A New Look of Alternative Energy**
Christy Marie Farnsworth, 18, Senior, Paonia High School, Paonia, Colorado
- ET054 **Optimization of a Novel High Efficiency Photo-Thermovoltaic Concentrator Solar Cell: A Second Year Study**
Rounok Joardar, 16, Junior, Plano West Senior High, Plano, Texas
- ET055 **Synthesizing Hydrocarbon Derivatives as an Alternative Fuel Source Using Natural Coal (Anthracite) and Hydrogen in a Cobalt Molybdenum Hydrodesulphurization Process**
Justin Kenrick Ramsaran, 16, Junior, Palm Bay High School, Melbourne, Florida
- ET056 **Alarmed and Heated Fuel Tanks Suitable for Retro-fitting and Available for All Commercial Vehicles**
Simon David Brookes, 18, Senior, Balcarras School, Cheltenham, Gloucestershire, United Kingdom
- ET057 **Use of an Electric Shock Received from a Lightning by a Building's Lightning Rod**
Alejandra Aristizabal_Buitrago, 19, Senior, Gimnasio Los Pinares, Medellin, Antioquia, Colombia
- ET058 **Ethanol Production: Determining the Optimal Conditions for the Saccharification of Sugar Beet Pulp**
Anna Maria Joykutty, 16, Junior, American Heritage School, Plantation, Florida
- ET301T **A Current Event: An Ongoing Study of the Production of Clean Tidal Energy**
Kyle Scott Saleeby, 15, Freshman
Katherine Marie Stone, 16, Sophomore
Niceville Senior High School, Niceville, Fort Walton Beach High School, Fort Walton Beach, Florida
- ET302T **The Future of Energy: Organic Solar Cells**
Jyoti Lodha, 17, Junior
Aamna Dhillon, 17, Junior
Ruchi Sudhir Jahagirdar, 16, Junior
Seminole High School, Sanford, Florida
- ET303T **Alternate Source of Energy for a Lower Consumption of Petroleum Fuel in Vehicles**
Ramzi Azzam Shweihat, 16, Junior
Omar Raouf Farwagi, 16, Junior
Modern Montessori School, Amman, Khalda, Jordan
- ET304T **H₂O Derived Hydrogen Fuel Operating an Internal Combustion Engine**
Sonya Jooma, 18, Senior
Tuure Novian Pasto, 18, Senior
Michael Cameron Martin, 17, Senior
Fayette County High School, Fayetteville, Georgia
- ET305T **Cylindrical Organic Solar Cells with Carbon Nanotube Charge Collectors**
Raymond Lou, 16, Junior
Dante Zakhidov, 16, Junior
Navaneeth Goduwin Ravindranath, 16, Junior
Texas Academy of Mathematics and Science, Denton, Texas
- ET306T **Having Our Cake and Eating It Too: Novel Composite Membranes with Low Methanol Permeability and Good Proton Conductivity for Direct Methanol Fuel Cells**
Liang-Bo Shen, 17, Sophomore
Kan-Ran Tan, 17, Sophomore
Beijing No.4 High School, China, Beijing, China
- ET307T **Converting Ammonium Hydroxide into Hydrogen for Energy Usage by Electrolysis and Photoelectrochemical Reduction**
Manpreet Kaur Chopra, 16, Junior
Asif Rahman, 16, Junior
duPont Manual High School, Louisville, Kentucky
- ET308T **From Wastewater to Electricity: A Study of Mediator Style Microbial Fuel Cells**
Matthew Joseph Detmer, 15, Sophomore
Daniel Peter Jensen, 16, Sophomore
Piedra Vista High School, Farmington, New Mexico
- ET309T **Return to Serenity: Turning Noise into Renewable Energy**
Feng Ling, 17, Senior
Zhiyang Zeng, 18, Senior
Pengxiang Xu, 19, Senior
Bellaire High School, Bellaire, Texas

- ET310T The Effect of Solid Acid, Base, and Enzyme Catalysts on Transesterification and the Purity of the Fuel Formed**
Jonathan David Tam, 16, Freshman
James Charles Krach, 16, Junior
Manhasset High School, Manhasset, New York
- ET311T Hydrogen Horsepower**
Derek Roger Dumdie, 16, Sophomore
Jadyn Kirk Miller, 16, Sophomore
Selby Area High School, Selby, South Dakota
- ET312T "Hairodynamics": The Effects of Different Wind Velocities and Different Hair Lengths on the Drag Force of a Model Track Sprinter's Head**
Frank Walter Woo, 16, Junior
Tammy Yuwen Hsia, 18, Senior
Macomb Mathematics Science Technology Center, Warren, Michigan
- ET313T Water as an Alternative Fuel**
Aaron Wayne Murphy, 19, Senior
Joshua Allen Rupley, 17, Junior
Rio Grande Enrichment Studies, Albuquerque, New Mexico
- ET314T Heat Exchange System: Using Local Bay Water to Increase Heating and Cooling Efficiencies in a Residential Application**
Griffin Dell Shapiro, 17, Junior
Zakaria Idrissi Seghrouchni, 17, Junior
Long Beach High School, Lido Beach, New York
- ET315T Mediator-Less Microbial Fuel Cell**
Joseph David Tarnowski, 14, Freshman
Spencer McKinley McAfee-Gundrum, 14, Freshman
Nicolet High School, Glendale, Wisconsin
- ET316T Algae-based Bio Fuel: The Solution to Global Energy Demands**
Mark Dinuka Rupasinghe, 16, Junior
Rohit S. Talreja, 16, Junior
Folsom High School, Folsom, California
- ET317T Electrochromic Sun-Tracking Windshield**
Aaron V Schild, 18, Freshman
Rafael S Cosman, 16, Junior
The Bishop's School, La Jolla, California
La Jolla High School, La Jolla, California
- ET318T PEM Productivity: An Analysis of Efficiency-Affecting Aspects in Polymer Electrolyte Membrane Fuel Cells through Pressure Transducers in a Pressure Decay Model**
Angela Jean Smith, 16, Sophomore
Jackson Lee Frazier, 15, Sophomore
Louisville High School, Louisville, Ohio
- ET319T Will Waves One Day Power the World?**
Rachel Ann Campbell, 16, Sophomore
Tyler Austin Green, 16, Sophomore
Plymouth North High School, Plymouth, Massachusetts
- ET320T A Novel and Efficient Method of Hydrogen Production: Optimizing the Microbial Electrolysis Cell and Microbial Fuel Cell Coupled System**
Cheng Cheng, 17, Senior
Aakriti Jain, 17, Senior
Lynbrook High School, San Jose, California
- ET321T Solving the Current Dilemma: An Innovative Approach to Create Alternative Energy Using Oceanic Phenomena**
Diana Yuri Cabral, 17, Senior
Noelle Rani Owen, 18, Senior
St. Andrew's Priory School, Honolulu, Hawaii
- ET322T Does Height Affect the Volts?**
Ashley Jean Bonilla, 16, Sophomore
Alyssa Noriko Braun, 15, Sophomore
Meghan Sakae Fujimoto, 15, Sophomore
Kauai High School, Lihue, Hawaii

ENVIRONMENTAL SCIENCE

- EV001** **The Pyrolytic Synthesis of Biocchar and Biofuel from Biowaste: An Analysis of Its Potential to Amend Fuel Crisis and Food Security**
Andrea Aleah Pugh, 15, Sophomore, Saginaw High School/Saginaw Arts and Sciences Academy, Saginaw, Michigan
- EV002** **Stable Carbon and Oxygen Isotopic Signatures of Climate Change Found in Fossils from Inner Mongolia**
Linda Wang, 16, Junior, Lawton Chiles High School, Tallahassee, Florida
- EV003** **Effectiveness of Natural Aluminosilicates in the Removal of Heavy Metal Contaminants from Solution**
Joseph Sean Sylvester, 18, Senior, Greybull High School, Greybull, Wyoming
- EV004** **Biomimetic Insulation: Inspired by the Eastern Tent Caterpillar and White-tailed Deer**
Madeleine Layla Skaller, 16, Junior, Brewster High School, Brewster, New York
- EV005** **Lichens as Weathering Agents of Sandstone**
Danielle Taljaard, 17, Senior, Bethlehem Voortrekker High School, Bethlehem, Free State, South Africa
- EV006** **The Effects of Urbanization: What Are the Effects of Land Use on Benthic Macroinvertebrate Biodiversity and Water Quality in the Elm Creek Watershed?**
Karin Lynette Sather, 17, Junior, Champlin Park High School, Champlin, Minnesota
- EV007** **An Examination of Silver Nanoparticles: Antimicrobial Effects and Mitigation**
Wyatt Neal Palsler, 15, Freshman, Otis High School, Otis, Colorado
- EV008** **Usage of *Lolium sp.* and *Paspalum sp.* to Decrease Lead Content Against Air Pollution**
Sheeraz Munir Soomro, 15, Freshman, PakTurk International Schools and Colleges Khairpur Branch, Khairpur Mir's, Sindh, Pakistan
- EV009** **Acid Mine Drainage Remediation: A Novel Approach, Phase II**
John Tyler Barnes, 16, Sophomore, Northwestern High School, Kokomo, Indiana
- EV010** **Color Method and Application in Water Quality Data Analysis**
Linbo Shao, 18, Senior, Hangzhou Xuejun High School, Hangzhou, Zhejiang, China
- EV011** **The Impact of Organic Pollution from the Nitra River on the Diversity of Ciliates in the Chotina Tributary**
Silvia Hnatova, 16, Junior, Gymnazium Parovska 1, Nitra, Slovakia
- EV012** **Darter Communities: Their Status in Turbidity Impaired Waters of the Greater Blue Earth River Basin**
Lina Wang, 18, Senior, Loyola High School, Mankato, Minnesota
- EV013** **Chimney Filter from Activated Carbon and Cellulose Fiber**
Kevanie Anne Mones Damit-og, 16, Senior, Wicox-Hidreth Public School, Wilcox, Nebraska
- EV014** **The Mitigation of CO₂ by the Effects of Coccolithophorid Biofixation**
William Li, 16, Junior, South Fork High School, Stuart, Florida
- EV015** **A Study of Macroinvertebrates as Indicators of Water Quality in a Montana Stream**
Harold Blake Whitford Jr., 16, Sophomore, Box Elder High School, Box Elder, Montana
- EV016** **Determining the Effects of Greywater on the Efficiency of Nitrogen Removal in Septic Systems**
Mary Maxine Luber, 16, Junior, Camdenton R-3 High School, Camdenton, Missouri
- EV017** **The Evaluation of *Typha sp.* as an Effective Oil Absorbent**
Peranika Enzri, 17, Junior, Mara Junior Science College Balik Pulau, Pulau Pinang, Malaysia
- EV018** **The Effects of Ground Water in Aquifers and Surface Water on Drinking Water Quality in Schools**
Brianna Marie Schumann, 18, Senior, Ovey Comeaux High School, Lafayette, Louisiana
- EV019** **The Uptake of Endocrine Disrupting Chemicals**
Benjamin Waring Armstrong, 17, Senior, Monte Vista Senior High School, Monte Vista, Colorado
- EV020** **A Study of the Effectiveness of Pharmaceutical Filtration Methods from Water**
Shane Matthew Sellers, 17, Junior, Latta High School, Ada, Oklahoma
- EV021** **Phytoremediation of Heavy Metal Contamination: Utilizing Freshwater Aquatic Plants to Remove Lead, Cadmium, and Zinc**
Lacey Taylor Jobe, 16, Sophomore, Grove High School, Grove, Oklahoma
- EV022** **Is Chlorophyll a Surrogate Marker for Water Pollution in Lakes?**
Conrado Andres Asenjo-Molina, 15, Freshman, Academia del Perpetuo Socorro, San Juan, Puerto Rico
- EV023** **The New Filter! Honeycomb of *Apis mellifera***
Yailene Marie Bueno, 15, Sophomore, Nuestra Senora de La Piedad, Isla Verde, Puerto Rico, San Juan, Puerto Rico
- EV024** **Getting Carried Away IV: Investigating Environmental Consequences of Soil Treated with Polyacrylamide and Polyvinyl Alcohol**
Cameron Bradley Strong, 18, Senior, The Woodlands College Park High School, The Woodlands, Texas
- EV025** **The Comparison of Detritus, Large Woody Debris, and Biomass Production in Upper Green River Basin Kentucky**
Aimee Michelle Turner, 15, Freshman, Ballard High School, Louisville, Kentucky
- EV026** **The Effect of Evergreen Covering on the pH of Pond Water**
Danielle Elizabeth Krouper, 16, Sophomore, St. Clair High School, St. Clair, Missouri
- EV027** **Environmental Toxin 4-Nonylphenol and Autoimmune Diseases: Using DNA Microarray to Examine Genetic Markers of Cytokine Activity**
Celline Kim, 17, Senior, Manhasset High School, Manhasset, New York
- EV028** **Can Drugs be Found in Stream Systems?**
Alison Kristine Tune, 18, Senior, Springfield High School, Springfield, Ohio
- EV029** **Chemical and Environmental Degradation of Osetamivir Phosphate**
Ashley Marie Thelen, 18, Senior, Mitchell High School, Mitchell, South Dakota
- EV030** **Viral Contamination: A Field Evaluation on the Presence of Viruses in Treated Sewage from Wastewater Treatment Facilities**
Cassandra Wilson, 16, Junior, Weber High School, Ogden, Utah
- EV031** **How Does Urbanization Affect Aquatic Biota?**
Lucy Caroline Leonard, 15, Sophomore, Henry W Grady High School, Atlanta, Georgia
- EV032** **Evaluation of Hydraulic Conductivity from Grain Size Analysis and Slug Test in Araihasar, Bangladesh**
Ho Chit Siu, 17, Senior, Bronx High School of Science, Bronx, New York
- EV033** **Does T.F. Green Airport's De-icing Affect Water Quality?**
Nathan Edward Andrews, 16, Junior, Bishop Thomas F. Hendricken High School, Warwick, Rhode Island
- EV034** **Sources of Sedimentary Organic Matter in NY, Jamaica Bay Region**
Elaine Gomez, 18, Senior, Union City High School, Union City, New Jersey
- EV035** **An Innovative Method to Evaluate the Effects of the Aquatic Environment on the Chemotaxis of the Amphibian Pathogen *Batrachochytrium dendrobatidis***
Scott Paul Boisvert, 16, Junior, Basha High School, Chandler, Arizona

- EV036 Tile Line Trauma**
Brian Allan Buss, 18, Senior, Southeastern High School, Augusta, Illinois
- EV037 Environmental Effects of Carbon Nanotubes as Shown via the Indicator Organism *Triops longicaudatus***
Gabriel Scott Stephens, 17, Freshman, East Noble High School, Kendallville, Indiana
- EV038 Finding the Optimal Conditions for Algae Growth under the Presence of Carbon Dioxide**
Lauren Cushman Ransohoff, 16, Sophomore, Lexington High School, Lexington, Massachusetts
- EV039 The Effect of Turbidity on Light Scattering: A Study of Refracted Light through a Cloudy Medium**
Holly Elizabeth Peterson, 16, Sophomore, Sherando High School, Stephens City, Virginia
- EV040 The Genotoxicity of Environmental Contaminant on HepG2 Cells**
Deepa M. Manjanatha, 15, Sophomore, Little Rock Central High School, Little Rock, Arkansas
- EV041 *Pseudomonas*: Its Possible Use in Reduction of Ferric Ions in Water**
Jayu Pramudya, 17, Senior, Sekolah Menengah Atas Negeri 1 Surakarta, Surakarta, Central Java, Indonesia
- EV042 New Natural Fertilizer**
Martina Panfilo, 15, Sophomore, Santa Elena, Lagomar, Canelones, Uruguay
- EV043 Destroying More than Ice: The Effects of Road Deicers on *Lumbriculus variegatus***
Paul Joseph Stylingler, 16, Freshman, The Altamont School, Birmingham, Alabama
- EV044 Decreasing the Acidity of Ultisols through Sequestered Carbon Soil Amendments**
Megan Delilah Walsh, 15, Sophomore, Kauai High School, Lihue, Hawaii
- EV045 The Quantity and Quality of Spring Waters: For Emergency Home Land Security Crisis**
Tiffany Tu, 15, Freshman, Cookeville High School, Cookeville, Tennessee
- EV046 Soil Mediums which Absorb the Most Pollutants**
Jonathan L. Lin, 16, Sophomore, White Station High School, Memphis, Tennessee
- EV047 Engineering a Path to Cleaner Water: Phytoremediation of Coal Bed Methane Produced Water on an Industrial Scale**
Casey Brian Campbell, 14, Freshman, La Veta High School, La Veta, Colorado
- EV048 Get the Lead Out: The Removal of Lead from Water Using Common Seashells**
Madeline Maley Landon, 16, Sophomore, Friendswood High School, Friendswood, Texas
- EV049 Mold Identification and Analysis of *Zea mays***
Preston J. Gilderhus, 17, Junior, Maddock Public School, Maddock, North Dakota
- EV050 An Inquisition into the Hydro-Conditions of Tile Drainage Runoff**
Patrick Charles Gulan, 18, Senior, Hankinson High School, Hankinson, North Dakota
- EV051 Identifying Sources of *E.coli* Pollution in Lake Lavada**
Katherine Elizabeth Christopher, 16, Junior, Patrician Academy, Butler, Alabama
- EV052 The Role of Corticosterone in the Endocrine Chemistry of *Xenopus laevis* (African Clawed Frog)**
Anita Vasudev Saraf, 15, Sophomore, Alfred M. Barbe High School, Lake Charles, Louisiana
- EV301T Evaluating Pesticide and Herbicide Contamination of Big Horn River Sediments Using GC/MS**
Jessica Fay Hunt, 16, Sophomore
Kyra LaDon Cundall, 16, Sophomore
Greybull High School, Greybull, Wyoming
- EV302T CO₂ Here, CO₂ There, CO₂ Everywhere: A Test of Carbon Dioxide on Various Sources of Gases**
Neeraja Balachandar, 14, Freshman
Elise Nicole Howard, 15, Freshman
Shepton High School, Plano, Texas
- EV303T Global Climate Change: The Influence of Temperature Differentiation on Embryo Female-to-Male Phenotypic and Genotypic Sex Reversal in the Medaka Fish, Phase III**
Benedict Leo Scheuer, 17, Senior
Bethany Judith Rosemore, 16, Sophomore
Cloquet Senior High School, Cloquet, Minnesota
- EV304T The Needs of Seeds**
Ali Nadine Thomas, 14, Freshman
Morgan Elizabeth Petersen, 14, Freshman
Nettleton Junior High School, Jonesboro, Arkansas
- EV305T The Phytoremediation of Petroleum in *Typha latifolia***
Amber Jean Erickson, 17, Senior
Presley Devon Morua, 17, Junior
Alden-Conger Public High School, Alden, Minnesota
- EV306T Study of *Gobiocypris rarus*, Evaluating Environmental Hormone Effect: The Effect of 17BETA-estradiol and 4-nonyl-Phenol on *Gobiocypris rarus* Feminization**
YouRan Zhang, 17, Senior
Bingjie Hu, 18, Senior
Peng Wang, 18, Senior
Beijing No. 159 Middle School, Beijing, Beijing, China
Wuhan No.2 Middle School, Wuhan, Hubei, China
No.1 Middle School Attached to Central China Normal University, Wuhan, Hubei, China
- EV307T Utilizing the Isotopic Signature of Macroalgae to Identify Sources of Nitrogen in Streams and Rivers Flowing into Monterey Bay, California**
Lara Victoria Tromba, 17, Senior
Isabella Marie Tromba, 17, Senior
Pacific Collegiate School, Santa Cruz, California
- EV308T Natural Oil Boom**
Nor Adibah binti Mohd Hadzir, 17, Sophomore
Nuradiza binti Rani, 17, Sophomore
Rohaizah Binti Mohd Faijan, 17, Sophomore
Kolej Tunku Kurshiah, Seremban, Negeri Sembilan, Malaysia
- EV309T Quantitative Assessment of Water Quality and the Study of Rain Variation in the Coulee Baton Microwatershed**
Julie Rene Matte, 17, Senior
Paul Christopher Greagoff, 18, Senior
Ovey Comeaux High School, Lafayette, Louisiana
- EV310T The Effects of Various Organic Substances on Strains on Environmental Bacteria**
Priya Singh, 16, Junior
Heather Lynne Nielsen, 17, Junior
The Villages Charter High School, The Villages, Florida
- EV311T Health Effects of Metal Nanoparticles: The Role of Hypoxia Inducible Factor-1alpha in MMP-2 and MMP-9 Production by Human Monocytes Exposed to Nickel Nanoparticles**
Yixin Li, 17, Junior
Yihua Li, 17, Junior
Ballard High School, Louisville, Kentucky
- EV312T *Bermolli vintori* Sidewalk**
Yazeed Saqer Abdel Fattah, 16, Junior
Abdul Kareem Hassan Darwazeh, 16, Junior
Al Ra'ed Al Arabi School, Amman, Jordan
- EV313T Compact Florescent: A Bright Idea?**
Erick Valentin Chavez, 18, Freshman
Amanda Caitlyn Edington, 17, Senior
Deming High School, Deming, New Mexico

- EV314T** *Umbilicus rupestris*- A Small Step in Phytoextraction, but a Big Step in Evolution
Susana Brito Duarte Sousa, 18, Senior
Diana Raquel Quaresma Duarte, 18, Freshman
Tania Oliveira Brandao, 18, Senior
Escola Secundaria de Arouca, Arouca, Portugal
- EV315T** **Catching IR: Contributing in Solving Global Warming by Finding the Most Efficient Surface for Reducing Reflection of Infrared Light from the Sun in order to Reduce the CO₂ Absorption for the Radiation**
Ahmad Omar Bayonis, 18, Senior
Abdullah Mohammed Aldosari, 18, Senior
Abdullah Ibrahim Alkanhal, 17, Senior
Asrariy Schools, Riyadh, Saudi Arabia
- EV316T** **Effects of Cardenolides in Milkweed on Monarch Butterfly (*Danaus plexippus*) Development**
Kara Marie Lillehaug, 18, Senior
Kristina Louise Tester, 17, Senior
Breck School, Minneapolis, Minnesota
- EV317T** **Are Eco-Tergents Truly "Gents"?**
Ream Elbadri, 16, Junior
Sara Abu Obaid, 16, Junior
North Park Collegiate Vocational School, Brantford, Ontario, Canada
- EV318T** **Determining Sea Pollution by Analyzing Metallothioneins in *Mytilus galloprovincialis***
Eni Kodra, 16, Junior
Enxhi Vrapi, 17, Junior
Turgut Ozal College, Tirane, Albania
- EV319T** **Farm Feeding Practices: Exploring Solutions for Environmental Sustainability**
Pearl Sawhney, 15, Sophomore
Minna Ghofrany Mohammadi, 15, Sophomore
Maharishi School of the Age of Enlightenment, Fairfield, Iowa
- EV320T** **Caution: Water Undrinkable**
Tiffany Rose Armstrong, 19, Senior
Michele Pacheco, 17, Senior
Victoria Catherine Green, 18, Senior
East Boston High School, East Boston, Massachusetts
- EV321T** **The Effects of Milltown Dam Removal on Macro Invertebrate Populations in the Clark Fork River**
Bryce Charles Caye, 18, Senior
Luke Alan VonLanken, 17, Senior
Sentinel High School, Missoula, Montana
- EV322T** **Analyzing Water Samples by LIBS Method**
Matej Veis, 18, Senior
Juraj Hasik, 18, Senior
Spojena Skola Novohradska, Bratislava, Slovakia
- EV323T** **Alkaline Rainfall**
Sol Paskvan, 17, Freshman
Lucas Matias Gille, 17, Freshman
Colegio San Ignacio, Tandil, Buenos Aires, Argentina
- EV324T** **Study of the Effect of Organic Decomposer on the Incidence of Stable Flies (*Stomoxys calcitrans*) (L.) in Pineapple Stubble (*Ananas comosus*) (L.) Merr.**
Susana Beatriz Garita-Araya, 17, Junior
Alexia Quiros-Rojas, 18, Junior
Colegio Cientifico de Costa Rica-Sede San Carlos, Santa Clara de San Carlos, Alajuela, Costa Rica
- EV325T** **Heavy Metals in Mines**
Saud Dakhel Alharbi, 18, Senior
Rakan Thareeb Almutairi, 16, Sophomore
Humoud Saleh Almutairi, 16, Sophomore
Alhakm Bin Hesham Public School, Mahd Althahab, Saudi Arabia
- EV326T** **Biological, Physical and Chemical Indicators of Ungulate Grazing Pressure on Montane Streams with a Description of a Previously Unidentified Invasive Species in the Valles Caldera National Preserve**
Nathaniel Reichert Clements, 16, Sophomore
Jose P. Abeyta III, 15, Sophomore
Los Alamos High School, Los Alamos, New Mexico
- EV327T** **Global Information System and Global Positioning System in Reducing Endangerment of *Dermochelys coriacea* (Leatherback Turtles) Nesting Habitats in St. Croix, VI**
Stephanie Rhoden, 16, Freshman
Mendrell Symphorien, 19, Senior
Jaleel Benjamin, 16, Junior
St. Croix Educational Complex, Kingshill, St. Croix, Virgin Islands
- EV328T** **Use of Natural Flocculants in Mitigating Harmful Algal Blooms (Red Tides)**
Maria Clara Isabel De Los Reyes Sia, 15, Sophomore
Marc Abegonia Mapalo, 16, Junior
Jean Reni Briones De Guzman, 16, Sophomore
Philippine Science High School - Eastern Visayas Campus, Palo, Leyte, Leyte, Philippines
- EV329T** **Is Soil and Water Conservation Becoming a Major Global Concern?**
Nadia Banks Miller, 17, Junior
Nevada Banks Miller, 17, Junior
Sherman High School, Seth, West Virginia
- EV330T** **To Swim or Not to Swim...**
Valerie Ann Lopez, 16, Junior
Sophia Maria Jimenez, 17, Senior
Loving High School, Loving, New Mexico
- EV331T** **Correlation between Hydrogen Ion Concentration and Malignant Neoplasms**
Madison Lyric Burchfield, 17, Junior
Jessica Chu, 17, Junior
Leena Samir El-Sadek, 17, Junior
Mississippi School for Mathematics and Science, Columbus, Mississippi

MATHEMATICAL SCIENCES

- MA001 On the Lattice Representations and Linear Extensions of Series-Parallel and $(m+n)$ -free Posets**
Martin Ayalde Camacho, 14, Senior, Central High School, Saint Paul, Minnesota
- MA002 Contrasting the Waltz of Pi, Music of Pi and Music of the Golden Number Phi**
Danae Jean Pick, 15, Sophomore, Olivet Private School, Port Saint Lucie, Florida
- MA003 Grids and Greenery: Mathematical Models of Invasive Species**
Cathryn Margaret Manduca, 18, Senior, Century High School, Rochester, Minnesota
- MA004 Explaining Wind Farm Output Using Regression Analysis**
Kate Alexandra Geschwind, 15, Freshman, Mayo High School, Rochester, Minnesota
- MA005 Creating and Deducing Structure Using Domination Numbers in Permutation Graphs**
Maxim Ilya Wimberley, 17, Junior, Liberal Arts and Science Academy, Austin, Texas
- MA006 The Math of Getting Lucky**
Casey Ann Gibson, 14, Freshman, Nettleton Public Schools, Jonesboro, Arkansas
- MA007 Finding a Pattern in Diseases**
Mitchell Craig Brown, 17, Senior, Grants High School, Grants, New Mexico
- MA008 Problems of Distances and Their Applications to the Measurements in Practice**
Uy Van Ha Nguyen, 17, Senior, Le Quy Don High School for Gifted Students, Da Nang, Vietnam
- MA009 Extremal Properties of l.c.m. and g.c.d. for Sequences**
Volha U. Shumskaya, 17, Junior, Gymnazium #56, Minsk, Belarus
- MA010 Universal Law for the Distribution of Odd Periodic Cycles within Chaos in Nonlinear Dynamical Systems: A Fine Classification of Odd Cycles (Year III)**
Almas Abdulla, 16, Senior, West Shore Junior Senior High School, Melbourne, Florida
- MA011 Risk Mitigation Strategies for Quants: From Blackjack to the Stock Market**
Talia Kate Greene, 15, Sophomore, Cocoa Beach Junior/Senior High School, Cocoa Beach, Florida
- MA012 Markov Matrices Applied: Testing the Accuracy of the Markov Chain Using a Popular Board Game**
Wyatt Vann Dunham, 15, Freshman, Grove High School, Grove, Oklahoma
- MA013 Finding a Mathematical Relationship in Human Proportions**
Diana Judith Cardenas, 15, Freshman, The Good Hope School, Frederiksted, Virgin Islands
- MA014 Analysis of Single-Elimination Tournaments**
Chi-Hua Wang, 18, Senior, National Pingtung Senior High School, Pingtung, Chinese Taipei
- MA015 Maximizing the Lion's Share**
Hsin-Po Wang, 16, Junior, Taipei Municipal Jianguo High School, Taipei City, Taiwan (R.O.C.), Taipei City, Taiwan (R.O.C.), Chinese Taipei
- MA016 Computer Modeling Reveals a Novel Property Describing the Relationship between Triangles and Their Internal Hexagons**
Nathan Kondamuri, 15, Freshman, Munster High School, Munster, Indiana
- MA017 Simulation Study of Stable Metro Braking with Real Time Closed-loop System Based on Optimization Model**
Jia Hao Xu, 16, Sophomore, High School Attached to Fudan University, Shanghai, Shanghai, China
- MA018 Formula to Find the Borders of Square Number Which Are Named YANI's Numbers**
Yaniria Ayala-Lopez, 15, Sophomore, Ramon Power y Giralt, Las Piedras, Puerto Rico
- MA019 Novel Relationship between Square Shapes**
Angel Rafael Agrinsoni-Santiago, 16, Junior, Florencia Garcia High School, Las Piedras, Puerto Rico
- MA020 Analyzing the Fibonacci Sequence, Phase Two**
Hector Luis Maldonado-Perez, 16, Senior, Croem High School, Mayaguez, Puerto Rico, Puerto Rico
- MA021 The Membership Problem in $Z[x]$**
Axel Antonio Garcia-Burgos, 17, Senior, Croem High School, Mayaguez, Puerto Rico
- MA022 Egyptian Fractions in Light of Algorithms**
Sebastian Sueiras, 16, Junior, Colegio San Ignacio de Loyola, San Juan, Puerto Rico
- MA023 Super Kohler-Ricci Flow**
Joshua William Pfeffer, 17, Senior, North Shore Hebrew Academy High School, Great Neck, New York
- MA024 Delyne Categories and Representation Theory in Complex Rank**
Akhil Mathew, 18, Senior, Madison High School, Madison, New Jersey
- MA025 Benford's Law Failure in Different Bases of Recursive Functions**
Aaron Lawrence Zweig, 13, Freshman, Randolph High School, Randolph, New Jersey
- MA026 Decycling Densities of Tessellations**
Jacob Benjamin Hurwitz, 17, Senior, Montgomery Blair High School, Silver Spring, Maryland
- MA027 On the Construction of an Uncountable Class of Transcendental Numbers**
Yevgeniy Rudoy, 18, Senior, Stuyvesant High School, New York, New York
- MA028 An Analogue of the Collatz Problem and Its Connection to Cantor Sets**
Se-Ho Kim, 17, Junior, Marriotts Ridge High School, Marriottsville, Maryland
- MA029 Randomized Artificial Maps for Epidemiological Studies of Sporadic Amyotrophic Lateral Sclerosis (ALS)**
Jane Margaret Cox, 15, Sophomore, Timpview High School, Provo, Utah
- MA030 Involutions on Cohomology Algebras**
Andrey A. Gorshkov, 17, Junior, Center of Mathematical Education, Saint-Petersburg, Saint-Petersburg, Russia
- MA031 Barycentric Coordinates and their Applications**
Bayram Safa Cicek, 17, Junior, Ankara Fen Lisesi, Ankara, Turkey
- MA032 Regiomontanus' Angle Maximization Problem: Accounting for Distortion**
William Grant Murray, 19, Senior, Christ the King Cathedral High School, Lubbock, Texas
- MA033 Beta Adjusted Ratio Quantifying Volatility of Mutual Funds**
Matthew John Richardson, 16, Junior, Basha High School, Chandler, Arizona
- MA034 An Analysis of the Primitive Cycles Existence Conjecture**
Dhiraj Rawat Holden, 15, Junior, University High School, Fresno, California
- MA035 Crank 0 Partitions and the Parity of the Partition Function**
Kaavya Niveda Jayram, 11, Sophomore, Sravani Academy, Morgan Hill, California
- MA036 Batter Up**
Demi Shareece McCoy, 17, Senior, Dr. Henry A. Wise, Junior High School, Upper Marlboro, Maryland
- MA037 Amazing Property of Bisectors**
Roman Chalidze, 16, Junior, Georgian-American High School, Tbilisi, Georgia Republic
- MA038 Analysis of Evacuation from Closed Spaces**
Jan Hoffmann, 17, Junior, Gymnazium Alejova 1, Kosice, Slovakia
- MA039 The Calculation Methods for Sum of k to the m th Power**
Kazuki Hirakawa, 18, Senior, Jonan, Tokushima, Tokushima, Japan

- MA040 Prime Numbers and New Regularities**
Rina Ismailati, 17, Senior, Gjinnazi Ismail Qemali, Tirane, Albania
- MA041 Properties of Families of the Simson Lines of Inscribed Polygons**
Yevgeniy Gruver, 16, Junior, General Specialized Sanatorium Boarding School for Gifted Children, Donetsk, Ukraine
- MA042 The Square-Root-of-Time Rule and the US Stock Market: Utilizing the Jarque-Bera and Hurst Analyses to Assess the Validity of Time-Scaling in Volatility**
Shiqi Shan, 16, Junior, Caddo Parish Magnet High School, Shreveport, Louisiana
- MA043 On the Period Lengths of the Parallel Chip-Firing Game**
Tian-Yi Damien Jiang, 16, Senior, North Carolina School of Science and Mathematics, Durham, North Carolina
- MA044 Measuring the Distance between Two Objects by Using the Parallax Method**
Lucca Norton, 16, Senior, Bradenton Preparatory Academy, Bradenton, Florida
- MA045 Continued Fraction Convergents and Linear Fractional Transformations**
Evan Michael O'Dorney, 16, Junior, Venture School, San Ramon, California
- MA046 Orbifolds and Music**
Tulsi Manoj Patel, 17, Senior, Arkansas School for Mathematics, Sciences, and the Arts, Hot Springs, Arkansas
- MA047 On the Lower Central Series Quotients of a Graded Associative Algebra**
Anirudha Balasubramanian, 17, Senior, Saint Albans School, Washington DC, District of Columbia
- MA048 New Triangular Inequalities in the Form of $s-a$, $s-b$, and $s-c$**
Kang-Ying Liu, 17, Junior, Saint Andrew's Priory School, Honolulu, Hawaii
- MA049 Analysis and Development of Novel Computational Complexity Classifications**
Kenneth Ka Au, 15, Freshman, Downingtown High School West Campus, Downingtown, Pennsylvania
- MA050 Fractals and Fugues: Analyzing Music with Math**
Rachel Danielle Perfecto, 16, Junior, Roy C. Ketcham High School, Wappingers Falls, New York
- MA051 An Innovative Instrument for 'n'-SECTING an Angle Performs Classical Constructions and Goes Beyond to Plot n-th Root of Unity**
Abhiroop Lahiri, 18, Senior, South Point High School, Kolkata, West Bengal, India
- MA052 Constructing Inverse Limits with Upper Semi-Continuous Functions**
Yong Zhi Zhou, 17, Senior, Pinetree Secondary School, Coquitlam, BC, Canada
- MA053 Six Lines Passing through Feuerbach Point**
Fedor A. Ivlev, 17, Junior, Kolmogorov's Specialized Educational Scientific Center of MS, Moscow, Russia
- MA054 Hyperbolic Triangles of the Maximum Area and Two Fixed Sides**
Evgeniia Iskanderovna Alekseeva, 16, Junior, GOU Lyceum "Vtoraiia shkola", Moscow, Russia
- MA055 Effects of Motility and Contact Inhibition on Tumor Viability: A Discrete Simulation Using the Cellular Potts Model**
Jonathan F. Li, 17, Junior, Saint Margaret's Episcopal School, San Juan Capistrano, California
- MA056 Solving Differential Equations with an Analog Computer**
Zach Miller, 18, Senior, Cherry Creek High School, Greenwood Village, Colorado
- MA057 Planet Parallax**
Holly Ann Krumm, 15, Freshman, Strasburg Public School, Strasburg, North Dakota
- MA058 Investigating Complexity Class NP-Complete**
Laurence Paul Bordowitz, 18, Senior, Macomb High School, Macomb, Illinois
- MA059 Method of the Areas**
Youness Obari, 16, Sophomore, Demnate High School, Demnate, Morocco
- MA301T Mathematical Modeling in Analysis of Farming Systems of Broiler Chicken**
Sergio Luiz Back, 16, Junior
Edson Granemann dos Passos, 17, Junior
Instituto Federal de Educacao, Ciencia e Tecnologia Catarine, Rio do Sul, Santa Catarina, Brasil
- MA302T Special Transformations of Vectors and Matrices**
Aliaksandr N. Yeutukhovich, 16, Sophomore
Yauhen S. Babakhin, 16, Sophomore
State Educational Institution "Gymnasia #13", Minsk, Belarus
- MA303T Ballot Problem Approached from n-Dimensional Paths**
Te-Wei Hsu, 18, Senior
Justin Tony Hou, 18, Senior
Kaohsiung Municipal Kaohsiung Senior High School, Kaohsiung City, Chinese Taipei
- MA304T Prime Numbers Study Using Computational Methods**
Khaled Mahmoud Al-Hamad, 16, Junior
Mahmoud Majed Mansour, 17, Junior
The Jubilee School, Amman, Amman, Jordan
- MA305T Mathematical Study of the Overflowing of the River Po**
Giovanni Battista Zanaboni, 18, Senior
An-phi Nguyen, 18, Senior
Andrea Labo, 18, Senior
Liceo Scientifico "Lorenzo Respighi", Piacenza, Piacenza, Italy
- MA306T C-MEC Program**
Angel X. Garcia-Colon, 15, Sophomore
Omar L. Serrano-Velazquez, 15, Sophomore
Ramon Power y Giralt, Las Piedras, Puerto Rico
- MA307T Studying the Polar Equation of the Rosette Conchoids Flower**
Dielmarie Negron-Rivera, 17, Junior
Angel Javier Pacheco-Santiago, 16, Junior
Francisco Morales High School, Naranjito, Puerto Rico
- MA308T An Improvement of the Hardy Condition**
Bogdan O. Neterebskiy, 17, Junior
Konstantin A. Anisimov, 16, Junior
Center of Mathematical Education, Saint-Petersburg, Saint-Petersburg, Russia
- MA309T Improviny of Inequalities between Means**
Abylay Galymzhanuly Kuanyshov, 18, Junior
Assel Almazbekovna Aliyeva, 18, Junior
High-School #134, Almaty, Almaty, Kazakhstan
- MA310T Addition Chains with Variations**
Vladyslav Krasnolutsyy, 16, Junior
Dmytro Bondarenko, 17, Junior
Kyivo-Pecherskiy Lycee No. 171 "Leader", Kyiv, Ukraine

MEDICINE AND HEALTH

- ME001 Food Additive or Carcinogen? Carrageenan Inhibits ASB Activity and Induces Cell Invasion Involving RhoA Activation and MMP-9 Secretion**
Prithwis Kumar Mukhopadhyay, 17, Junior, Woodbury High School, Woodbury, Minnesota
- ME002 Role of PKC ι / λ in Carrageenan-induced Inflammatory Pain Response**
Charles David Morris, 18, Senior, Breck School, Minneapolis, Minnesota
- ME003 The Synergistic Effects of Tofenamic Acid and Radiation on Sp1 and Survivin in Head and Neck Cancer**
Shannon Somer Stockton, 16, Junior, Lake Highland Preparatory School, Orlando, Florida
- ME004 Site Directed Mutagenesis of the Anti-Inflammatory Myxoma Viral Protein M-T7**
Navya A. Reddy, 16, Junior, Vanguard High School, Ocala, Florida
- ME005 A Study of T Cell Viability for the Development of Anti-Cancerous Agents**
Katia Samer Chadaideh, 17, Junior, Lake Howell High School, Winter Park, Florida
- ME006 Antibody-Coated Magnetic Nanoparticles: Targeting and Treating Cancer in a Dynamic Environment**
Philip Samuel Schlenoff, 18, Senior, Maclay School, Tallahassee, Florida
- ME007 The Effects of Maternal Smoking and Drug Abuse of Fetal Brain Development**
Mary Elizabeth Smith, 18, Senior, Arkansas School for Mathematics, Sciences, and the Arts, Hot Springs, Arkansas
- ME008 *In vitro* Testing of Propionibacterium Acnes with Specific Avian Antibodies**
Taylor Elizabeth Welu, 17, Junior, Marshall Senior High School, Marshall, Minnesota
- ME009 The Role of PGC-1 α in the Pathogenesis of Parkinson's Disease**
Sonika Reddy, 18, Senior, Fayette County High School, Fayetteville, Georgia
- ME010 A Comparison of the Efficacy of Alternative Therapeutic Agents against Colon, Pancreatic, and Urinary Bladder Cancer Cell Proliferation, *in vitro***
Christopher Daniel Louviere, 16, Junior, Ridgeview High School, Orange Park, Florida
- ME011 A Study of Types I and II Diabetes Using Insulin Gene Microsatellites**
Amy Elizabeth Meyer, 17, Senior, Oakville Senior High School, St. Louis, Missouri
- ME012 Treatment of Diabetic Vascular Disease by Targeting TGF- β 1 Gene**
Samantha Renae Prabakaran, 14, Freshman, Fort Myers High School, Fort Myers, Florida
- ME013 Synthetic Lycopene: Barrier to A549 Human Carcinoma Lyng Cells from UVC Light, 4th Year Study**
Taylor Kade Runyan, 18, Senior, Atoka High School, Atoka, Oklahoma
- ME014 Determining the Antiproliferative Effects and Role of Apoptosis on Human Lung Cancer Cells by Quercetin**
Shannon Renee Sacksteder, 18, Senior, Eastern High School, Pekin, Indiana
- ME015 The Effect of Age on Ability to Perceive High Frequencies**
Julia Kathryn Black, 15, Freshman, Yorktown High School, Arlington, Virginia
- ME016 SL7207 Strain of Attenuated *Salmonella typhimurium* Targets to Inhibit Melanoma in Mice**
Zhonglun Zhao, 18, Senior, The High School Affiliated to Renmin University of China, Beijing, China
- ME017 Brain Activation and Mapping with Functional Magnetic Resonance Imaging**
Shannon Marie Bidwell, 15, Freshman, Dayton Christian High School, Miamisburg, Ohio
- ME018 The Effects of *Cinnamomum cassia* on Glucose Uptake**
Ashley Nicole Hoehn, 17, Senior, Ottoville High School, Ottoville, Ohio
- ME019 Nerve Regeneration: Embryonic Factors Promote Adult Axon Regrowth in a Gastropod Model**
Maria Luisa Rangel, 18, Senior, Weslaco East High School, Weslaco, Texas
- ME020 Do Aromatic Oils Affect Offspring Gender Ratio in *Drosophila melanogaster*?**
Shaghayegh Saeidi, 16, Sophomore, Cocoa High School, Cocoa, Florida
- ME021 Using Interference RNA to Silence Cancer**
Jenna Lynne Pappalardo, 16, Junior, Satellite High School, Satellite Beach, Florida
- ME022 Mixing Prescriptions? The Inactivation of Tamoxifen by SSRIs on *Lumbriculus variegatus***
Nikki Marie Schmidt, 17, Junior, Merino High School, Merino, Colorado
- ME023 Table Troubles**
Nicole Marie Biddinger, 15, Freshman, Bartlesville High School, Bartlesville, Oklahoma
- ME024 Fertility Booster: A Study on the Effect of *Eurycoma longifolia* JACK on Estrous Cycle of Female Rats: A New Hope for the Infertilities**
Muhammad Adib Abas, 14, Freshman, Sultan Mohamad Jiwa Science Secondary School, Sungai Petani, Kedah, Malaysia
- ME025 YWHAZ (14-3-3zeta) Involved in the Metastasis of Lung Adenocarcinoma through Wnt Signaling Pathway**
Tsung-Han Chan, 17, Junior, National Taichung First Senior High School, Taichung City, Taiwan, Chinese Taipei
- ME026 Identification of Biological Insect-larvicides**
Joao Batista de Castro David Junior, 17, Senior, Colegio Estadual Liceu de Maracanaú, Maracanaú, CE, Brasil
- ME027 The Effect of Alcohol on Global DNA Methylation and Gene Expression in Murine Embryonic Fibroblasts**
Jahanzeb Kaikus, 17, Junior, duPont Manual High School, Louisville, Kentucky
- ME028 Phosphodiesterase 10A: A Prospective Target for Development of Antipsychotic Medications**
Jacob Reeh, 19, Senior, Orestad Gymnasium, Copenhagen, Denmark
- ME029 Assessment of Potassium Bromate Concentrations in Bread: A Commonly Used Preservative with Carcinogenic Potential**
Antonio Francisco Rivera Viscal, 17, Junior, Colegio San Ignacio de Loyola, San Juan, Puerto Rico
- ME030 Dendritic Spines: A Window into the Molecular Basis of Autism Spectrum Disorders (ASDs)**
June Xuejun Sun, 16, Junior, Laramie High School, Laramie, Wyoming
- ME031 Novel Role of PARP-4 as a Potential Target in Breast Cancer**
Olga Y. Skirda, 17, Senior, Health Careers High School, San Antonio, Texas
- ME032 Improving the Long-term Functionality of Intracortical Electrodes: Understanding and Mitigating Astrogliosis in Reactive Brain Tissue**
Ashley Marie Sankari, 18, Senior, Jefferson High School, Lafayette, Indiana
- ME033 The Effects of Epoxyeicosatrienoic Acids and their Metabolites on Myocardial Function and Perfusion during Acute Myocardial Ischemia**
Matthew A. Nugent, 16, Junior, Oregon Episcopal School, Portland, Oregon

- ME034** **The Novel Use of Fluorescence Resonance Energy Transfer (FRET) to Observe Apoptosis in Oligodendrocytes**
Pragma Kakani, 18, Senior, Jericho Senior High School, Jericho, New York
- ME035** **Inhibition of Vascular Cell Migration by Bisdemethoxycurcumin: A Bioinformatics Based Approach to Identify Target Genes**
Shalini Ramanan, 16, Junior, Hanford High School, Richland, Washington
- ME036** **Sequence Similarity between Rotavirus and Insulin-Regulating Genes**
Mary Olivia Richardson, 15, Freshman, duPont Manual High School, Louisville, Kentucky
- ME037** **Expression Profiling of Putative microRNA in Epithelial Ovarian Cancer**
Samantha Brooke Halpern, 17, Senior, Roslyn High School, Roslyn Heights, New York
- ME038** **Caspase Dependent Apoptotic Pathways in HCT-116 Colon Cancer Cells**
Jessica Taylor Lovett, 17, Senior, Hebrew Academy of the Five Towns and Rockaway, Cedarhurst, New York
- ME039** **The Double Life of hTERT: Identification of a Novel Function and an Explanation of Mechanism Involving the Epidermal Growth Factor Receptor**
Linda Zhou, 18, Senior, Academy for Medical Science Technology, Hackensack, New Jersey
- ME040** **The Development of Therapeutic Agents from Garlic to Treat Malignant Human Glioblastoma Multiforme Brain Tumors**
Se Woong Jeong, 18, Senior, Roanoke Valley Governor's School for Science and Technology, Roanoke, Virginia
- ME041** **Novel Identification/Subjugation of Prostate Cancer Cells' Intrinsic Resistance Mechanism to Cisplatin**
Jong Hyuck Won, 17, Senior, Langley High School, McLean, Virginia
- ME042** **On the Effectiveness of the Flu Vaccine: A Computational Study**
Shambavi Sadayappan, 16, Senior, Village Academy, Powell, Ohio
- ME043** **High Cholesterol Impairs Water and Gas Transport in Red Blood Cells and Is Ameliorated by the PLA2 Inhibitor ONO-RS-082**
Siddhartha Gautama Jena, 16, Sophomore, International Academy, Bloomfield Hills, Michigan
- ME044** **Improving Stethoscope Hygiene at Two Community Hospitals**
Ariel Lynne Schroeder, 18, Senior, Saint Joseph High School, Natrona Heights, Pennsylvania
- ME045** **Factors Affecting the Prescription Volume (V100) of the Tandem/Ring HDR Applicator**
Anirudh Krishna, 16, Junior, Solon High School, Solon, Ohio
- ME046** **Critical Role of TGFb1/Smad3 Signaling in Hepatic Metabolism: A Novel Therapeutic Target for Metabolic Syndrome**
Samirkumar S Devalaraja, 17, Senior, Thomas Sprigg Wootton High School, Rockville, Maryland
- ME047** **The Affect of Contrast Density and Mixing Procedure on Layering of Contrast in Myelography: An *in vitro* Model**
Jacob Harris Miller, 18, Senior, Mamaroneck High School, Mamaroneck, New York
- ME048** **Small Heat Shock Proteins as a Novel Therapeutic for Experimental Autoimmune Encephalomyelitis: A Potential Treatment for Multiple Sclerosis**
Dave Raj Praharaj, 17, Senior, Virgil I. Grissom High School, Huntsville, Alabama
- ME049** **Structural Basis for the Recognition of RNA by the Fragile X Mental Retardation Protein (FMRP)**
Cynthia Chen, 17, Senior, The Brearley School, New York, New York
- ME050** **Characterization of the Angiogenic Phenotype in Prostate Cancer Progression**
Kaylee Danielle Self, 17, Senior, Parkway High School, Bossier City, Louisiana
- ME051** **Dying Young: Mortality from Pandemic Influenza and Pneumonia by Age Group**
Andrew George Sherlock, 14, Sophomore, Hunter College High School, New York City, New York
- ME052** **BV-2 Cell Response to Detrimental Stimuli**
Madeline Grace Rollins, 15, Junior, Walter Payton College Preparatory High School, Chicago, Illinois
- ME053** **Myocardial Inflammation in Young Adults Exposed to Air Pollution**
Rodolfo Villarreal-Calderon, 17, Senior, Big Sky High School, Missoula, Montana
- ME054** **Are Eosinophils, in Human Lung Cancer, an Independent Prognostic Indicator?**
Akreeti Maskey, 17, Senior, Hamilton High School East, Hamilton, New Jersey
- ME055** **Linking Food and Mood: Insulin Regulation of the Norepinephrine Transporter**
Vidiya Sathananthan, 18, Senior, Martin Luther King, Jr. Magnet High School, Nashville, Tennessee
- ME056** **Baby's Breath: Can I Change the Efficiency of a Baby's Respiratory Rate?**
Destin Stratton, 15, Freshman, Muskogee High School, Muskogee, Oklahoma
- ME057** **Functional Characterization of Wilms Tumor (WT1) Promoter Region in Cancer Cells**
Sarina Amanda Raman, 16, Junior, Mount Hebron High School, Ellicott City, Maryland
- ME058** **Targeting the MAPK Signaling Cascade and Its Effects on Trastuzumab Resistance in Metastatic Breast Cancers**
Emily Rose Summerbell, 18, Senior, Collins Hill High School, Suwanee, Georgia
- ME059** **Microfluidic Device for Quantitative Single-Cell Profiling of Human Pluripotent Stem Cells, Year Two**
Jane Yoonhae Suh, 18, Senior, Palos Verdes Peninsula High School, Rolling Hills Estates, California
- ME060** **Cell Death: A Problem or a Solution?**
Shivam Anami Patel, 17, Junior, White Station High School, Memphis, Tennessee
- ME061** **Rational Drug Design Methods for the Identification of a Novel Negative Allosteric Modulator of a4b2 Nicotinic Receptors**
Ameya Ashish Deshmukh, 16, Junior, Upper Arlington High School, Upper Arlington, Ohio
- ME062** **What Is the Optimal Ratio of Glucose to Fructose that Prevents Fructose Malabsorption?**
Logan Louis Davis-Wallace, 17, Junior, Clovis High School, Clovis, California
- ME063** **Role of TSPYL1, FGIF, and MTF-1 in Gamma-globin Gene Activation for Treatment of Hemoglobinopathies: A Tissue Study in Novel Binary Transgenic Mouse Models**
Prarthana Jignesh Dalal, 16, Junior, Shawnee Mission East High School, Prairie Village, Kansas
- ME064** **The Coronary Calcium Scan: Investigating the Early Prediction and Awareness of Coronary Heart Disease in Women**
Preeti Anita Prakash, 16, Junior, Curtis Senior High School, University Place, Washington
- ME065** **Piece de Resistance: The Synthesis of Complex Dimeric Pyrrole-Imidazole Alkaloid Natural Product Derivatives and their Efficacy in Inhibiting and Dispersing *Pseudomonas aeruginosa* Biofilms**
Justin To, 17, Senior, Oak Grove High School, San Jose, California

- ME066 **Bayesian Modeling of Malaria Dynamics in the Peruvian Amazon: Potential Application to Malaria Eradication and Validation by Penguin Malaria Field Study**
Kai Maroon Kuspa, 17, Senior, Canyon Crest Academy, San Diego, California
- ME067 **Organic Biotalc Extrated from the Fruit Dehydration**
Martha Elvira Gonzalez Apolonia, 18, Freshman, Escuela Preparatoria Oficial Numero 138, San Pedro El Alto, Mexico
- ME068 **Detection of UV Protection: Assessing SPFs in a Bacterial Model**
Wardah Nasir, 16, Sophomore, Westmount Secondary, Hamilton, Ontario, Canada
- ME069 **Oolong Tea Extract Inhibits the Growth and Proliferation of Human Cancer Cells**
On-Ki Lee, 16, Sophomore, Shun Tak Fraternal Association Yung Yau College, the New Territories, Hong Kong, Region of China
- ME070 **Molecular Modeling of Viral Protease Inhibitors: Focus on Dengue Fever**
Andrew Warren Navia, 16, Junior, Lexington High School, Lexington, Massachusetts
- ME071 **Killing Cancer's Cause: A Model to Target Cancer Stem Cells**
Meghan Lynn McHugh, 16, Sophomore, North Attleboro High School, North Attleboro, Massachusetts
- ME072 **Factors Affecting the Regeneration of *Dugesia tigrina***
Marie Danielle Goering, 18, Senior, Lakeview High School, Columbus, Nebraska
- ME073 **Unveiling the Molecular Machinery that Drives Ca²⁺--Triggered Platelet Granule Secretion**
Yue Zhao, 18, Senior, Paul Laurence Dunbar High School, Lexington, Kentucky
- ME074 **The Study of β -lactam penicillins in the Presence of β -lactamase Inhibitors in Penicillin Resistant *Escherichia coli* Containing Class A β -lactamases**
Rebecca Lynn Gregory, 18, Senior, North Carolina School of Science and Mathematics, Durham, North Carolina
- ME075 **Identification of a Novel Signal Pathway and Its Therapeutic Targets for Tobacco Promotion of Lung Cancer**
Angela Zhang, 15, Sophomore, Monta Vista High School, Cupertino, California
- ME076 **A Monomer-Enriched Grape-Seed Polyphenolic Extract Attenuates the Progression of Cognitive Behavioral Dysfunctions in the Tg2576 Transgenic Mouse Model of Alzheimer's Disease**
Phoebe Elizabeth Kurtzman, 17, Senior, Suffern High School, Suffern, New York
- ME077 **Androgen Therapy: A Double-Edged Sword for Prostate Cancer**
Kushal Ulhas Naik, 17, Senior, The Charter School of Wilmington, Wilmington, Delaware
- ME078 **Effect of Anti-Tumor Endothelial Marker 7 Related Antibody on Angiogenesis**
Susmitha Ganti, 16, Sophomore, Central High School, Philadelphia, Pennsylvania
- ME079 **The Effects of Leukotoxin on the Immune System**
Ryan WesLee Lawrence, 17, Sophomore, Starkville Christian School, Starkville, Mississippi
- ME080 **Prostate Cancer Diagnosis Using Metabolomic Fingerprints**
Rahul Ananth Doraiswami, 16, Junior, Foothill High School, Pleasanton, California
- ME081 **Synergistic Effect of Turmeric Force on Gemcitabine Cytotoxicity in Pancreatic Cancer Cells by Modulation of Apoptosis**
Renuka Ramchandran, 14, Freshman, John A. Ferguson Senior High School, Miami, Florida
- ME082 **Does the Dilated Cardiomyopathy Functional Phenotype Predominate over that of Hypertrophic Cardiomyopathy and Restrictive Cardiomyopathy?**
Erin Maria Alexander, 17, Junior, Dr. Michael M. Krop Senior High School, Miami, Florida
- ME083 **A Miraculous Cost-Effective Natural Dietary Intervention that Reverses an Epidemic of Obesity, Diabetes, Hypertension, & Arthritis in the Mississippi Delta: The Effects of Organic Safflower Oil & Flax Seed Oil with Vitamin D & a Multivitamin**
Ericka Maxine Wheeler, 16, Sophomore, Greenwood High School, Greenwood, Mississippi
- ME084 **Glucosaminyl (N-acetyl) Transferase 2 (GCNT2) Gene Expression Highly Influences Breast Cancer Metastasis and Promotes an Epithelial-Mesenchymal Transition (EMT)**
Sherwin Zhang Wu, 17, Senior, Detroit Country Day School, Beverly Hills, Michigan
- ME085 **Towards Building a Respiratory Monitoring Device: Assessing the Accuracy of a Thermistor-based Sensor**
Nicole Yeechi Tsai, 16, Junior, High Technology High School, Lincroft, New Jersey
- ME086 **Phytochemical and Pharmacological Analysis, *in vitro* of the Leaves Extracts of *Rubus florulentus* and *Momordica charantia* L. and Its Bactericide Effect on *Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas aeruginosa* and as a Fungicide in *Candida albicans*, *Rhizopus sp.*, *Aspergillus niger* and *Penicillium sp.***
Emmanuel Alexis Cruz, 18, Senior, Escuela Elvira M. Colon Negron, Santa Isabel, Puerto Rico
- ME087 **Prevalence of Polymorphic CYP2D6 Allele 4 in the Puerto Rican Population**
Nathalie Fuentes, 18, Senior, Jose Gautier Benitez High School, Caguas, Puerto Rico
- ME088 **Super Swabs**
Fatimah Abdelhakim jalal Al din Abdelhakim, 15, Sophomore, Eleventh High School, Almadina, Western Province, Saudi Arabia
- ME089 **Baby Thermo Hat**
Nauf Abdullah Alghamdi, 15, Freshman, Albassam Private School, Dammam, Saudi Arabia
- ME090 **Would a Natural Antiseptic Be More Effective than the Common Alcohol Antiseptic in Eliminating *E. coli*, ATCC(25922) and *S. aureus* ATCC(29213)?**
Zuleika de Jesus-Rodriguez, 14, Freshman, Francisco Ramos Sanchez, Utuado, Puerto Rico
- ME091 **Catechin's Anti-angiogenic Effects in Epithelial Ovarian Cancer**
Brian McTaggart Krug, 16, Junior, John F. Ross C.V.I., Guelph, Ontario, Canada
- ME092 **Candy Confusion II**
Sarah Kathryn Bowles, 15, Freshman, Ackerman High School, Ackerman, Mississippi
- ME093 **Aptamer-conjugated Gold Nanorods for Personalized Detection and Nanothermal Treatment of Glioblastoma Cancer Cells**
Muna Oli, 17, Junior, Eastside High School, Gainesville, Florida
- ME094 **Does Whey Protein Effect a Rat's Weight and Activity Level?**
Travis Robert Clay, 15, Freshman, La Plata R-II High School, La Plata, Missouri
- ME095 **Regulation of the Latent-Lytic Switch of Epstein-Barr Virus by MiRNAs and TGF- β**
Iris J. Xu, 18, Senior, James Madison Memorial High School, Madison, Wisconsin
- ME096 **Nothin' Cools Me Down Like a Hot Cup O' Tea**
Chris Lee Weeks, 17, Sophomore, Trinity Christian School, Williston, North Dakota
- ME097 **The Efficacy of Gene Cell Therapy Using CD11b+ Monocytes Transfected with Protease as a Treatment for Alzheimer's Disease, 3rd Year Study**
Jasmine Samaiya Roberts, 16, Junior, Paul R. Wharton High School, Tampa, Florida

- ME098 Error in MRI: Bias, Random Error, and the Power of Suggestion**
Diane Elizabeth Schulze, 16, Sophomore, Cherry Creek High School, Greenwood Village, Colorado
- ME099 Making of Anti Skin-Infection Cream from Local Materials (Herbs)**
Kehinde Abodunrin, 17, Junior, College of Education Demonstration Secondary School, Ikere Ekiti, Nigeria
- ME100 The Effects of the Antioxidant N-acetyl Cysteine on Breast Cancer Tumor-Initiating Cell Growth**
Steve Charles, 17, Junior, Coconut Creek High School, Coconut Creek, Florida
- ME301T The Effects of Oxygen on Smooth Muscle Cell Function: A Potential Role in Preventing Intimal Hyperplasia**
Ashley Rebecca Santilli, 18, Senior
Emily Kathryn Bostrom, 17, Senior
Burnsville Senior High School, Burnsville, Minnesota
- ME302T Expanding a Gene Expression Profile for Theiler's Virus as a Diagnostic Tool for Multiple Sclerosis**
Addison Lawrence Weiler, 16, Junior
Ava Kathryn Mokhtari, 18, Senior
Breck School, Minneapolis, Minnesota
- ME303T Encapsulate to Mitigate: A Study of the Controlled Release of FITC-Dextran Microencapsulated in PLGA**
Shantanu Abhishek Banerjee, 16, Sophomore
Varun Akella Koneru, 16, Sophomore
Westwood High School, Austin, Texas
- ME305T Potential of Barnacle Cement in Dentistry**
Joseph Qianbo Ang, 17, Senior
Clement Jian Xing Lee, 18, Senior
Timothy Jie Han Sng, 17, Senior
Hwa Chong Institution, Singapore, Singapore
- ME306T Stomp Out Chlamydia!**
Audrey Perry Jaquiss, 16, Junior
Chrystal Lau, 16, Junior
Tatiana Vladimirovna Lupashina, 17, Junior
Little Rock Central High School, Little Rock, Arkansas
- ME307T Mesenchymal Genes Are Upregulated in Putative Murine Mammary Cancer Stem Cells**
Rachel Ann Wilkinson, 15, Sophomore
Katelynn Connell McShane, 15, Sophomore
Nicolet High School, Milwaukee, Wisconsin
- ME308T Ask PEAT: Determining if Online Music Videos Are Safe for Teens with Photosensitive Epilepsy**
Mariah Bruns, 15, Freshman
Annelise Cummings, 14, Freshman
Alexander Eskil Harding, 15, Freshman
Saint Mary's Academy, Portland, Oregon
Cleveland High School, Portland, Oregon
- ME309T Neutralization of *E. coli* Lipopolysaccharide with a Novel Recombinant ASS Protein Treatment**
Gabriel Molina, 16, Junior
Alvin Wang, 16, Junior
Oak Hall School, Gainesville, Florida
- ME310T Internal Combat with Melanoma: Triggering an Immune Response through the Up-Regulation of FAS Using Toll Ligand Combination Treatments**
Laura Katherine Gudvangen, 16, Junior
Tonya Alexia Pavlenko, 16, Junior
William J. Palmer High School, Colorado Springs, Colorado
- ME311T The Effects of Light Therapy on the Growth of *Propionibacterium acnes* and *Staphylococcus epidermidis***
Christine Joy Paguio Tan, 15, Sophomore
Christine Gail Paguio Tan, 15, Sophomore
Keystone School, San Antonio, Texas
- ME312T Generation of a RNA probe for *in situ* Hybridization**
Kelly Kathleen Christensen, 18, Senior
Molly Alysse McMahon, 17, Senior
Monarch High School, Louisville, Colorado
- ME313T A Novel Gallium and Zinc Nitrate Based Intravenous Medicine for the Treatment of *Pseudomonas aeruginosa* Nosocomial Infections**
Aditya Samir Mazmudar, 15, Sophomore
Atif Javed, 17, Junior
Fairfax High School, Fairfax, Virginia
- ME314T Cardiovascular Risk Factors: The Effect on Alzheimer's Disease Pathology, Brain Volumes and Cognition in Asymptomatic Subjects**
Marcela Lizeth Erazo, 17, Senior
Lauren Elizabeth Browne, 18, Senior
Fox Lane High School, Bedford, New York
- ME315T Caution! You Are Not Sitting Right!: A Pad that Guides You to the Right Sitting Posture**
Tyma Mohammed Hezam, 16, Sophomore
Aminah Saleh Alsaihati, 16, Sophomore
Hayfa Khaled Al Bassam, 16, Sophomore
Dhahran Ahliyya Schools, Dammam, Eastern Province, Saudi Arabia
- ME316T The Effect of Adrenal Fatigue on Different Age Groups**
Caroline Grand, 16, Sophomore
Caroline Couvillion, 16, Sophomore
Saint Joseph's Academy, Baton Rouge, Louisiana
- ME317T The Identification of Methicillin-resistant *Staphylococcus aureus* in Potential Carriers Associated with High-risk Environments**
Tyler Lee Nelson, 16, Junior
Margaret Marie Wilmouth, 17, Junior
Kenda Lisanne Laber, 16, Junior
Billings Central Catholic High School, Billings, Montana
- ME318T Remote Ischemic Preconditioning**
Naman Gupta, 17, Senior
Anshum Sood, 17, Senior
Anuhya Venkata Ghorakavi, 17, Senior
Folsom High School, Folsom, California
- ME319T The Effects of Caloric Restriction on the Subsequent Stress Resistance and Chemosensation of *Caenorhabditis elegans***
Sudarshan Bhat, 18, Senior
Priyanka Athavale, 17, Senior
Lynbrook High School, San Jose, California
- ME320T Engineering a Novel Genetics-Based Early Disease Detection Mechanism Designed Using an Ontology-Driven Semantically Annotated Microarray Repository with Thermal Gradient Focusing Mass Spectrometry**
Ritik Malhotra, 17, Senior; Tony Ho, 17, Senior
Lynbrook High School, San Jose, California
- ME321T Epigenetic Biomarker Assays for Colon Cancer Screening**
Benjamin Paul Song, 16, Junior
Quan Chen, 18, Senior
Methacton High School, Eagleville, Pennsylvania
- ME322T The Effectiveness of Adding a Photosensitizer to the Photodynamic Treatment of Infected Tooth Roots and Dental Implants Under Anaerobic Conditions**
Adam Brandon Oppenheimer, 16, Sophomore
Mark Ryan Oppenheimer, 14, Freshman
Hilton Head Preparatory School, Hilton Head Island, South Carolina
- ME323T The Relationship between Functional Vision and Retinal Cell Response in C57BL/6 Mice**
Sanjay Menon, 17, Senior;
Peter Bau, 17, Senior
Chamblee Charter High School, Chamblee, Georgia
- ME324T The Effects of Clove Oil on Bacteria Found on Athletic Equipment**
Katie Lynn McLaughlin, 18, Senior
Dixie Lee Renfrow, 18, Freshman
Wetumpka High School, Wetumpka, Alabama

MICROBIOLOGY

- MI002 A Creature Feature: The Monsters that Came from the Ketchup Packets**
Hunter A. White, 18, Senior, Crystal River High School, Crystal River, Florida
- MI003 Prevention of Central Venous Catheter Associated Infections: A Study of Efficacy of Silver Nanoparticles on Reducing Bacterial and Fungal Colonization and Biofilm Formation**
Stephanie Yeeshan Hsiang, 15, Sophomore, Niceville High School, Niceville, Florida
- MI004 Evaluation of *Burkholderia pyrrocinia* (FL728) and *Paenibacillus lentimorbus* (FL92) for the Presence of Genes Encoding the Biosynthesis of Pyrrolinitrin, Pyoluteorin, Phenazine, and 2,4-diacetylphloroglucinol Antibiotics**
Stephanie Page Hoskins, 17, Senior, Lincoln Park Academy, Fort Pierce, Florida
- MI005 The Efficiency of Green Tea in Inhibiting Transformation**
Kiyokuni Yamada, 16, Sophomore, Glynn Academy, Brunswick, Georgia
- MI006 Waste to Energy: Microbial Fuel Cells**
Christopher Austin Paschal, 15, Sophomore, Glynn Academy, Brunswick, Georgia
- MI007 LNSV vs. TBSV: Effect of Virus Competition and Dominance in Different Host Types**
Aradhana Sinha, 13, Freshman, Salinas High School, Salinas, California
- MI008 Will *Melaleuca alternifolia* Enhance the Effects of Antibiotics against Resistant *E.coli* Strains (35218 and 25922)?**
Cassandra Lee Gutierrez, 17, Senior, Grants High School, Grants, New Mexico
- MI009 *Vitis labrusca* Anthocyanin Identification and Their Antibacterial Effects on *Capra hircus* Hoof Rot Bacteria**
Sarah Marie Cox, 15, Sophomore, Zane Trace Local Schools, Chillicothe, Ohio
- MI010 Silver Nanoparticles and Spectroscopy: Powerful Techniques for Bacterial Detection on Bioterrorism**
Veronica Maria Biaggi, 16, Sophomore, Southwestern Educational Society, Mayaguez, Puerto Rico
- MI011 Utilization of the Fungus *Aspergillus niger* on Wastewater Treatment II**
William Lopes, 20, Senior, Fundacao Escola Tecnica Liberato Salzano Vieira da Cunha, Novo Hamburgo, Rio Grande do Sul, Brasil
- MI012 *Matricaria chamomilla* Extract: An Alternative Strategy on the Fight against Acne**
Cassio Felipe Stumm, 18, Senior, Fundacao Escola Tecnica Liberato Salzano Vieira da Cunha, Novo Hamburgo, Rio Grande do Sul, Brasil
- MI013 The Effectiveness of Using Hand Sanitizer in a School Setting**
Megan Mae Khoury, 16, Junior, Trinity School of Midland, Midland, Texas
- MI014 A Simple and Quick Detection of Panama Disease Pathogen**
Chengyan Zhan, 18, Senior, Fuzhou No.3 Middle School, Fuzhou, Fujian, China
- MI015 Showerhead Bacteria: What Dangerous Microorganisms Are Lurking Inside?**
Kaitlin Alissa Loyd, 16, Junior, Bartlesville High School, Bartlesville, Oklahoma
- MI016 The Effect of Different Inocula and Media on the Power Output of Microbial Biobatteries**
Sarah Katherine Hooper, 17, Junior, Charlottesville High School, Charlottesville, Virginia
- MI017 Effect of Trans-cinnamaldehyde on Reducing Attachment and Invasion of Uropathogenic *Escherichia coli* in Urinary Tract Epithelial Cells**
Amoolya Narayanan, 16, Junior, Glastonbury High School, Glastonbury, Connecticut
- MI018 Killer Extracts: A Study on the Antibacterial Effectiveness of Medicinal Plants of the US Virgin Islands**
Eliza Walton Mongeau, 16, Sophomore, The Good Hope School, Frederiksted, St.Croix, Virgin Islands
- MI019 Bacterial Silencing: The Discovery of Quorum Quenching Soil Microbes for the Development of Antimicrobial Compounds**
Sonia Grace Sundar Rao, 17, Senior, Camdenton R-3 High School, Camdenton, Missouri
- MI020 Antimicrobial Activity of a Phenolic Compound Extracted from the Rind of *Punica granatum* against *Klebsiella pneumoniae*, *Haemophilus influenzae* and *Acinetobacter* Species**
Ghayda Ismat Alhawamdeh, 15, Sophomore, Jumana Secondary School for Girls, Ramtha, Irbid, Jordan
- MI021 Evolutionary Study of *P. aeruginosa* in Chronic Lung Infections of Cystic Fibrosis Patients**
Mikkel Mohr Madsen, 19, Senior, Middelfart Gymnasium & HF, Middelfart, Fyn, Denmark
- MI022 Antibiotic Sensitivity of MRSA in Different Populations**
Luis Alejandro Acaba, 16, Sophomore, Academia del Perpetuo Socorro, San Juan, San Juan, Puerto Rico
- MI023 UV Radiation vs. Mutation: Effects of Radiation on Antibiotic Resistance**
Ashley Marie Miller, 17, Junior, Aberdeen Central High School, Aberdeen, South Dakota
- MI024 Bacteria Saving the Environment: Factors Influencing the Phenol Tolerance of Soil Bacterium *Pseudomonas putida***
Kristina Aare, 18, Senior, Narva Senior High School of the Humanities, Narva, Ida-Virumaa, Estonia
- MI025 The Effects of Grazer Exclusion on the Colonization of Hard Substrates by Microbial Communities**
Joshua Andrew Lewin-Jacus, 18, Senior, Lynbrook Senior High School, Lynbrook, New York
- MI026 Attachment Factor Secretion in Uropathogenic *E. coli* Bacteria**
Erica Brooke Portnoy, 16, Junior, Commack High School, Commack, New York
- MI027 Altering Lentiviral Tropism by Pseudotyping with Specific Receptor-Mediated Proteins**
Thomas Scott Silver, 16, Sophomore, Bergen Academy for Medical Science and Technology, Hackensack, New Jersey
- MI028 Development of Antibacterial Resistance in Bacteria Chronically Exposed to Triclosan**
Aleksandar Jamborcic, 18, Senior, Northwest Career and Technical Academy, Las Vegas, Nevada
- MI029 Thermophilic Microbes of the Elko Hot Hole Geothermal Area**
Kirsten Rae Perry, 16, Sophomore, Elko High School, Elko, Nevada
- MI030 Comparison and Identification of Antibiotics Produced by Bacteria in High-Nutrient and Low-Nutrient Environments**
Hee Sung Park, 18, Senior, Carlsbad High School, Carlsbad, New Mexico
- MI031 pVISIA, Vaccine Vector for Antigen Presentation**
Vishwajith Sridharan, 18, Senior, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia
- MI032 The Effect of UV-C Radiation on Catalase Activity in *Staphylococcus epidermis* and *in vitro***
Andrew Nickolas Abboud, 17, Junior, Tippecanoe High School, Tipp City, Ohio
- MI033 A Solution to the Worldwide Malaria Epidemic: A Comprehensive Study of Iron and Nitric Oxide's Effect on the Growth and Survival of *Toxoplasma gondii***
Matthew Karmen McIntyre, 17, Junior, Yorktown High School, Yorktown Heights, New York
- MI034 The Interactions of CotO Suggest a Novel Method of Spore Inactivation**
Jack Benjamin Greisman, 18, Senior, Stuyvesant High School, New York, New York

- MI035** **The Growth of Microflora on Silicone Wristbands**
Timothy Devon Morris, 17, Junior, Central Virginia Governor's School for Science and Technology, Lynchburg, Virginia
- MI036** **Quantitative Analysis of the Effect of Temperature on Bacterial Growth Rates**
Peter Lee Zhan, 16, Junior, Aragon High School, San Mateo, California
- MI037** **Development and Application of Novel Screen for Detecting Biofilm-Inhibiting Metabolites in Four Bacteria Strains: *E. coli*, *B. subtilis*, *A. tumefaciens* and *P. aeruginosa***
Christina Kun Wang, 17, Junior, Shanghai American School, Shanghai, Shanghai, China
- MI038** **Reexamining the Mechanism-of-Action of Hoechst 33342 upon *Candida albicans* and *Saccharomyces cerevisiae* Yeast Cells**
Stanford Jeremy Schor, 17, Senior, Brighton High School, Rochester, New York
- MI039** **A Comparative Study of Extended Spectrum Beta-Lactamase (ESBL) and Non-ESBL *Escherichia coli*: Screening for Multidrug Resistances and Plasmid Analyses Using Miniprep and Plasmid Curing Methods**
Taylor Diahann Gaines, 14, Freshman, Seneca High School, Seneca, Missouri
- MI040** **Evaluating Antimicrobial Activity of Organically Synthesized Oximes and Naturally Occurring Polyphenols**
Jordanne Nicole Wright, 17, Junior, Seneca High School, Seneca, Missouri
- MI041** **Antifungal Effects and Identification of *Eisenia foetida* Bacteria on *Batrachochytrium dendrobatidis* (Bd), an Amphibian Pathogenic Fungus, Year II**
Jayton Lewis Rainey, 16, Junior, Slaton High School, Slaton, Texas
- MI042** **Identification of Human Pathogens in Commercially-Available Cigarettes**
Tyler Daniel Kubina, 17, Junior, Tuscarawas Valley High School, Zoarville, Ohio
- MI043** **Using Reverse Vaccinology to Identify Gene Candidates for Use in a Vaccine to Prevent *Escherichia coli*-induced Post-weaning Diarrhea in Swine (*Sus domestica*)**
Somer Marie Drummond, 18, Senior, Breck School, Golden Valley, Minnesota
- MI044** **Antibacterial and Anti-inflammatory Effects of Myricetin against an Acne-Causing Bacterium (Third Year Study)**
Lori Kim, 17, Junior, Homeschool, Salt Lake City, Utah
- MI045** **Watch H₂O₂!**
Augusto German Niez Gay, 17, Senior, Instituto San Jose Adoratrices, Concordia, Entre Rios, Argentina
- MI046** **Impact of Di(2-ethylhexyl)phthalate(DEHP) on the Mortality, Growth, and Reproduction of *Caenorhabditis elegans***
Chia Yu Jaja Liao, 15, Sophomore, Wilson Senior High School, Florence, South Carolina
- MI047** **Purification and Identification of a Peptide Antibiotic Produced by the Human Microbiome Bacterium *Bacillus flexus***
Andrew James Macgregor, 17, Junior, Butte High School, Butte, Montana
- MI048** **Germes versus Spices: The Power of Flavor against Pathogenic Bacteria**
Sajal Kumar Tiwary, 14, Freshman, Sumner Hill Junior High School, Clinton, Mississippi
- MI049** **Effects of Ibuprofen on *H. littoralis* Feeding Reflex**
Jeannette A. Daida, 15, Sophomore, Huron High School, Ann Arbor, Michigan
- MI050** **Broccoli Going Green and Its Effect on Bacteria Growth 2010**
Alexis Diamond Kennedy, 15, Freshman, Paul Laurence Dunbar High School, Baltimore, Maryland
- MI051** **Screening Hawaiian Marine Derived Yeast and Fungi for Production of Anti-Bacterial Compounds**
Genardine Arizala, 17, Senior, Waipahu High School, Waipahu, Hawaii
- MI052** **Investigating Cell to Cell Clumping on a Molecular Basis in the Bacterium *Azospirillum brasilense***
Taylor Wesley Jones, 17, Junior, Alcoa High School, Alcoa, Tennessee
- MI053** ***Cinnamomum verum* (cinnamon) as a Natural Fungicide**
Ruth M. Martell, 15, Sophomore, Centro Residencial de Oportunidades Educativas, Mayaguez, Puerto Rico
- MI054** **Fighting BacII, Phase III: The Effects of Flavonoid Fractions from Cranberry Extract Inhibiting Proliferation of *Escherichia coli***
Jordan Mark Grainger, 17, Junior, Rio Rancho High School, Rio Rancho, New Mexico
- MI055** **Evaluation of the Killing Effects of Antibiotics with Equine Polymorphonuclear Neutrophils against *Streptococcus equi* and *Rhodococcus equi***
Rachel Marie Rudlaff, 17, Senior, Kalamazoo Area Mathematics and Science Center, Kalamazoo, Michigan
- MI056** **Microbial Inhibitory Activities of Extracts from Seven Philippine Seaweeds**
MarcArthur Jordan Irlandez Limpiado, 16, Sophomore, Philippine Science High School-Eastern Visayas Campus, Tacloban City, Leyte, Philippines
- MI057** **Irradiation Extermination, Part II: A Portable System to Eliminate Water-Borne Microorganisms**
Kelli Ann Lynch, 16, Sophomore, Rocky Mountain High School, Fort Collins, Colorado
- MI058** **Dairy Farmers' Dream II**
Matthew Joseph Schaeffbauer, 15, Freshman, Strasburg Public School, Strasburg, North Dakota
- MI059** **What's in Your Shower? Metal vs. Plastic**
Bea Ann Fischer, 18, Senior, Ashley Public School, Ashley, North Dakota
- MI060** **The End Zone: Measuring Antimicrobial Effectiveness with Zones of Inhibition**
Yarely Quintana, 15, Freshman, Farmington High School, Farmington, New Mexico
- MI061** **Evaluating the Role of the ESCRT Complex in Host/Cell Interaction and Stress Response of *Candida albicans***
David Kenneth Tang-Quan, 17, Junior, Palos Verdes Peninsula High School, Rolling Hills Estates, California
- MI301T** **The Effects of EDTA/Tetracycline on *Wolbachia pipientis***
Edwin Haro Chavez, 16, Junior
Michael Sean Sturdivant, 17, Senior
E.E.Waddell High School, Charlotte, North Carolina
- MI302T** **Assays in the Determination of Hemolytic Bacterial Colonies on Paper Currency and Sterilization Techniques Using Silver Nitrate as a Microbial Inhibitor**
Paden Thomas Brunault, 14, Freshman
Miles Robert Neslaw, 14, Freshman
Edgewater High School, Orlando, Florida
- MI303T** **Fruit Punch: An Epic Knock-Out Match between the Antioxidant Heavy-Weight Champions!**
Sarah Michelle McIntyre, 17, Junior
Ariel Isabelle Burnett, 17, Junior
Stanton College Preparatory High School, Jacksonville, Florida
- MI304T** **The Antimicrobial Effects of Commercial Spices and Plant Extracts on *Escherichia coli* O157:H7 in Ground Beef**
Sumedha Ravishankar, 15, Sophomore
Sirtaj Bir Singh, 15, Sophomore
Empire High School, Tucson, Arizona
- MI305T** **The Investigation of Antimicrobial Properties of Bark from Selected Local Trees**
Allison Elizabeth Bye, 18, Senior
Haeli Elizabeth Turner, 17, Senior
North Toole County High School, Sunburst, Montana

- MI306T Investigating the Antimicrobial Properties of the Flatulence and Hemolymph of *Drosophila melanogaster***
 Joanne Marie Guidry, 18, Senior
 Robert Matthew Daitzman, 18, Senior
 Loudoun Academy of Science, Sterling, Virginia
- MI307T Evolution of the H5N1 Virus: A Study of how Single Nucleotide Polymorphisms Affect Host and Regional Variability in the H5N1 Virus**
 Boning Han, 18, Senior
 Lauren Hannah Stephens, 17, Senior
 North Central High School, Indianapolis, Indiana
- MI308T Evolution through Ribosomal Proteins**
 Rasheen Gartrell Powell, 15, Sophomore
 Fiona Amy Lee Hennig, 15, Sophomore
 City Honors School, Buffalo, New York
- MI309T Host Gene Expression Profiling during TBSV Infection of *Saccharomyces cerevisiae***
 Tamas Nagy, 17, Junior
 Patrick Durfee Michael, 16, Junior
 Paul Laurence Dunbar High School, Lexington, Kentucky
- MI310T Inhibition of Beta-Lactamases: Determining the Efficacy of Saw Palmetto, Cholecalciferol (Vitamin D3), Glycerol Monolaurate, and *Lactobacillus acidophilus* as Beta-Lactamase Inhibitors**
 # Ishan Harshad Mehta, 15, Sophomore
 # Nithin Reddy Tumma, 16, Sophomore
 Port Huron Northern High School, Port Huron, Michigan
- MI311T Host Range Mutations of the Sindbis Virus**
 Myles Xavier Hodge, 16, Junior
 Mykellah Brianna Jarvis, 17, Junior
 Wake Early College of Health and Sciences,
 Raleigh, North Carolina
 Knightdale High School, Knightdale, North Carolina
- MI312T Get Pumped for Sickness**
 April Lauren Stoops, 17, Senior
 Jennifer Lynn Turner, 18, Senior
 Glen Rose High School, Malvern, Arkansas

PHYSICS AND ASTRONOMY

- PH001** **The Design of a High Resolution AC Magnetic Susceptometer**
Stephen Alexander McCrory, 18, Senior, Pensacola High School, Pensacola, Florida
- PH002** **Self-Assembly of DyW30 Molecules on Graphene-based Nanotransistors**
Austin Evanne Coye, 16, Sophomore, Lake Highland Preparatory School, Orlando, Florida
- PH003** **Isolation of Magnetic Properties of Corona Plasma Particles in an Electro-Hydrodynamic Thruster**
Garen Manoogian, 18, Junior, Vanguard High School, Ocala, Florida
- PH004** **Electronic Characteristics of Semi-conducting Nanotubes**
Justin Wesley Brooks, 18, Senior, Lyman High School, Longwood, Florida
- PH005** **Measurement of the Effects that Bell Vibrations Have on the Sound of a Trumpet**
Alan Earl Marcus, 16, Junior, Lake Brantley High School, Altamonte Springs, Florida
- PH006** **The Effect of Temperature and Salinity on the Accuracy of Locating an Underwater Object Using Multilateration**
Erin Nicole Lewis, 17, Junior, Harmony High School, Harmony, Florida
- PH007** **The Effects of the Core Construction of a Golf Ball on Its Elasticity**
David Thomas Rosenberg, 17, Junior, University School of Milwaukee, Milwaukee, Wisconsin
- PH008** **Is Luke Skywalker's Home Planet, Tatooine, Physically Plausible?**
Albert D. Kim, 18, Senior, Winona Senior High School, Winona, Minnesota
- PH009** **Plasma Production Varying with Electrode Gauge**
Kelly Elizabeth Gray, 16, Sophomore, Union County High School, Lake Butler, Florida
- PH010** **The Dynamics of Induced Hovering Flight in an Oscillating Airflow at Various Frequencies**
Nathaniel James Thompson, 18, Senior, Brush High School, Brush, Colorado
- PH011** **How Will Coil Variance and Displacement Affect Signal Transmission by Electromagnetic Coupling?**
Nathan Alexander Schwan, 15, Sophomore, DeSoto County High School, Arcadia, Florida
- PH012** **Research of Emission Current in Luminescent Lamps**
Oleg Fedorovich Sevryukov, 17, Junior, Lyceum # 87, Nizhny Novgorod, Nizhegorodskaya, Russia
- PH013** **Sandstorm in a Teacup: Patterns in a Vibrated Granular Layer**
Ivan Alexandrovich Lazarevich, 16, Junior, Lyceum # 40, Nizhny Novgorod, Nizhegorodskaya, Russia
- PH014** **Solar Sails: Which Design Is Most Efficient?**
Noah James Gagnon, 17, Senior, Gagnon Home School, Goodrich, Michigan
- PH015** **Nonlinear Diffusion Dynamics Measured by Using a Simple Light-Transmission Method**
Yu-Sheng Huang, 17, Junior, National Chia-yi Senior High School, Chaayi City, Chinese Taipei
- PH016** **A Mathematical Model of Spiral Galaxy Evolution**
Harrison Hugh Gaebler, 17, Junior, Bloomington High School North, Bloomington, Indiana
- PH017** **Sounds from Above**
Monica Alejandra Torres, 14, Freshman, United High School, Laredo, Texas
- PH018** **Adiabatic Quantum Evolution for NP-Complete and Physical Problems**
Yale Wang Fan, 18, Senior, The Catlin Gabel School, Portland, Oregon
- PH019** **Experimental Study of Viscosity Using Stokes' Law: Examining and Correcting Stokes' Law's Limitations in Viscometry**
Katrina Lynn Hui, 15, Sophomore, Richland High School, Richland, Washington
- PH020** **Assessing Changes in Collagen Levels of Prostate Tissue from Castrated Rats Using Non-linear Optics**
Bruna Favetta, 16, Junior, Escola Americana de Campinas, Campinas, Sao Paulo, Brasil
- PH021** **The Effect of Relative Drag on Sonic Sled Velocity**
Alexander Matthew Atkinson, 15, Freshman, Oakton High School, Vienna, Virginia
- PH022** **Assessing the SBOS Method of Identifying T Tauri Stars**
Inga Saathoff, 16, Junior, Oil City Area Senior High School, Oil City, Pennsylvania
- PH023** **Reducing the Computation Time of a N-Body Galactic Simulation**
Evan Haley Fletcher, 17, Senior, Kalamazoo Area Mathematics and Science Center, Kalamazoo, Michigan
- PH024** **Electromagnetic Induction**
Christopher Micheal Heintz, 15, Sophomore, West Geauga High School, Chesterland, Ohio
- PH025** **The First Electronic Structure Calculations and Determination of Related Properties for Radium**
Aryan Iden Khojandi, 18, Senior, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia
- PH026** **Traveling the Interplanetary Superhighway: An Autonomous Spacecraft Navigation System**
Erika Alden DeBenedictis, 18, Senior, Albuquerque Academy, Albuquerque, New Mexico
- PH027** **Clockwork in M1**
Travis Nathaniel Crockett, 16, Sophomore, V. Sue Cleveland High School, Rio Rancho, New Mexico
- PH028** **Detecting Cosmic Rays in Your Garage**
Matthew Russell Eskridge, 15, Sophomore, Covenant Christian Academy, Huntsville, Alabama
- PH029** **Evaluation of Astrometry as a Tool for Finding Exoplanets**
Joseph Steven Mangelsen, 17, Senior, Southside High School, Greenville, South Carolina
- PH030** **Efficiency of Thermoelectric Power Conversion in Bi2Te3**
Daniela Jane Flax, 15, Freshman, Lincoln Park High School, Chicago, Illinois
- PH031** **Study of Magnetic Properties for Nanocrystalline Materials**
Daniel Neimark, 17, Senior, Religious Comprehensive "AMIT" High School, Beer Sheva, Israel
- PH032** **Fission Vision: The Detection of Prompt and Delayed Induced Fission Gamma Radiation, and the Application to the Detection of Proliferated Nuclear Materials**
Taylor Ramon Wilson, 15, Sophomore, The Davidson Academy of Nevada, Reno, Nevada
- PH033** **Finding the Minimum Energy Conformation of Protein-like Heteropolymers by Greedy Neighborhood Search**
Joon Suk Huh, 18, Senior, Home School, Yongin-si, Gyeonggi-do, South Korea
- PH034** **Safe Electrical Wall Socket**
Woroud N.H Alrimawi, 15, Sophomore, Qasem Alrimawi Secondary School, Beit Rima, Ramallah, Palestine
- PH035** **The Flexible Car Bumper**
Mahmoud S.A Iriqat, 16, Junior, The Arab Institute School, Abu Dees, Ramallah, Palestine
- PH036** **An Improved Metric for Visual Differentiation Using Colour-Modified Clinical Eye Charts**
Jonathan David Sapolinski, 16, Junior, Redeemer Baptist School, North Paramatta, New South Wales, Australia
- PH037** **GapRite - A Simple Method for Setting Safe Gaps between Vehicles when Driving**
Harry Ned Anderson, 15, Sophomore, Lyneham High School, Lyneham, ACT, ACT, Australia

- PH038 Point of Impact**
James Luke South, 16, Sophomore, Tishomingo County High School, Luka, Mississippi
- PH039 The Efficiency of a Small Particle Accelerator at Irradiating Various Targets and Producing Radiation**
Adam Joseph Bowman, 14, Freshman, Montgomery Bell Academy, Nashville, Tennessee
- PH040 Pascal's Principle Applied to a Footbridge for the Disabled #**
Erick Esteban Lara Pacheco, 15, Senior, Centro Escolar Zama, Estado de MØxico, Coacalco, Mexico
- PH041 For the Love of Tennis**
Dannie Lynn Fountain, 16, Junior, Saint Clair High School, St. Clair, Michigan
- PH042 Development of a Resonant Optical Cavity Simulation #**
Moyukh Chatterjee, 18, Senior, High Technology High School, Lincroft, New Jersey
- PH043 A Comparison of Similar Planetary Systems of WASP-2 #**
Travis Le, 15, Sophomore, Punahou School, Honolulu, Hawaii
- PH044 Magnets vs. Temperature**
George Daniel Messersmith, 15, Freshman, Lakeside Junior High School, Hot Springs, Arkansas
- PH045 Hidden Sounds: Harmonic Symmetry of Human Voices (Continuation Year Two) #**
Ellen Marie Price, 17, Junior, Jefferson County International Baccalaureate School, Birmingham, Alabama
- PH046 Stealth Science: Does Surface Area and Angle Measure of a 3-D Object Affect the Scattering of Visible Light as Measured by a Lux Meter Making the Object More or Less Stealthy?**
Eric Alexander Riehl, 15, Freshman, Westminster Christian School, Palmetto Bay, Florida
- PH047 Satellite Constellations: A New Way for Determining Atmospheric Densities #**
Cayley Erin Dymond, 14, Sophomore, North Point High School for Science, Technology, and Industr, Waldorf, Maryland
- PH048 Analysis and Synthesis of Quantum Gates Based on Hybrid Logic**
Anugraha Rajendran, 18, Senior, Tualatin High School, Tualatin, Oregon
- PH049 A Theoretical Study of the Reflection of Electromagnetic Waves from Two Reflection Type Diffraction Gratings**
Sourav Sarkar, 17, Senior, Ramakrishna Mission Vidyalaya, Narendrapur, Kolkata, India
- PH050 Innovative Method for Determination of "Hard" and "Easy" Axes in the Transparent Magnetic Films**
Sergiy Lavrentyev, 16, Junior, HC "School-lyceum" No. 3 Them. Makarenko, Simferopol, Crimea, Ukraine
- PH051 Solar Interaction with Earth Climate at the North Pole**
Alex Rafael Padilla-Cruz, 16, Junior, Ines Maria Mendosa, Cabo Rojo, Puerto Rico
- PH052 Development of a High Speed Flash Technique for Compact Digital Cameras**
Ryan Peng, 18, Senior, Centennial Collegiate, Saskatoon, Saskatchewan, Canada
- PH053 Galaxy in a Bucket: Understanding Spiral Galaxy Formation Using a Simple Modeling System #**
Nikita Michael Bogdanov, 16, Sophomore, Albuquerque Academy, Albuquerque, New Mexico
- PH054 Observing and Manipulating Plasma in Regards to Electrical Phenomenon**
Cornelius Christoffel van Wyk, 16, Junior, James. W. Mitchell High School, Trinity, Florida
- PH055 The Dilatant and Impact Resistant Properties of a Cornstarch Suspension**
Washington Kumar Nair, 16, Junior, Tafuna High School, Pago Pago, American Samoa
- PH056 A Study of Nanostructured Titanium Coat of Cathode Foil by SPM**
Sergey Vyacheslavovich Shpak, 18, Junior, GOU Lyceum 1511, Moscow, Russia
- PH057 Mathematical Music**
Nathan Lynn Kinneberg, 18, Senior, Dakota Prairie High School, Petersburg, North Dakota
- PH058 Can I Verify that the Gravitational Acceleration of an Object Rolling Down an Inclined Plane Is in Fact 9.8 m/s Squared?**
Samantha Rae Johnson, 14, Freshman, Lighthouse Christian Academy, Bloomington, Indiana
- PH059 Sparkling Physics**
Caoimhe Bond, 16, Sophomore, Loreto College, Coleraine, Londonderry, Northern Ireland
- PH060 Regression Analysis of Color and Redshift for Quasi-Stellar Radio Sources**
Dylan Cunningham Greaves, 16, Junior, American Heritage School, Plantation, Florida
- PH061 How Are Wind Fields Disturbed?**
Nicolas Raul Watkins, 17, Junior, Captain John L. Chapin High School, El Paso, Texas
- PH301T Research of Atmosphere Influence on Propagation of Electromagnetic Wave**
Lilia Nikolaeвна Khrapunova, 16, Sophomore
Antonina Mikhailovna Toropkina, 15, Sophomore
Anastasia Andreevna Shaykina, 15, Freshman
School # 2 of Dzerzhinsk, Dzerzhinsk,
Nizhegorodskaya, Russia
Lyceum # 40, Nizhny Novgorod, Nizhegorodskaya, Russia
- PH302T How Do Different Colored Light Waves Affect the Speed of a Solar Paneled Car?**
Sarah Kathryn Meng, 16, Sophomore
Heather Michele Ham, 16, Sophomore
Union Grove High School, McDonough, Georgia
- PH303T H- α [O III] Photometry of Galactic Plane Candidate Planetary Nebulae**
Laree Danielle Gardner, 18, Senior
Genevieve Ying Wang, 18, Senior
Stephen J Morrison, 16, Junior
Grosse Pointe North High School,
Grosse Pointe Woods, Michigan
Grosse Pointe South High School,
Grosse Pointe Farms, Michigan
- PH304T Electrostatic Power Amplification**
Tucker J Leavitt, 15, Freshman
Samuel Davis Kater, 15, Freshman
Animas High School, Durango, Colorado
- PH305T Validation of Parabolic Ion Trap Geometries for Application within Quantum Computing**
Jennifer Wang, 17, Senior
Grace Calvert Young, 17, Junior
Montgomery Blair High School, Silver Spring, Maryland
The Potomac School, McLean, Virginia
- PH306T What Color Light Shines Best through Fog?**
Andrew Quinn Ross, 15, Freshman
Jed Donald Grow, 14, Freshman
Clearfield High School, Clearfield, Utah
- PH307T Utilizing a Variant of the Lorentz Force Equation to Analyze Magnetosphere Supplementation and Shielding from Ionizing Radiation**
Jonathan Tyler Calton, 17, Junior
Alex Allan Curry, 16, Freshman
Sunlake High School, Land O Lakes, Florida
- PH308T Measurement of the Earth-Moon Distance by a Dynamic Method**
Lucas Andres Conci, 18, Senior
Juan Jose Velasco, 18, Senior
Instituto Parroquial Bernardo D'Elpa, Villa Carlos Paz, Cordoba, Argentina

PH309T Humidity Detector

Jose Omar Chavez Garcia, 16, Junior

Karen Anali Garcia Medina, 17, Senior

Colegio de Bachilleres del Estado de Sinaloa, Guamuchil,
Sinaloa, Mexico

**PH310T Investigation of Corn Cob Ash (CCA) as a Material for
Semiconducting Temperature Sensor**

Hanna Frusein Siman Escobido, 16, Sophomore

Kristine Ann Morata Fernandez, 16, Sophomore

Brayl Gutierrez Ymbol, 16, Sophomore

Caraga State University - Cabadbaran Campus,

Cabadbaran City, Agusan del Norte, Philippines

PH311T Muon Detection at Elevation

Taylor Tsuyoshi Shong Wong Nakamura, 16, Junior

Michael Owen Flynn, 17, Junior

Maui High School, Kahului, Hawaii

PLANT SCIENCES

- PS001** **What's Your Flavonoid?**
Brianna Leilani Bourgeois, 17, Junior, Lutchter High School, Lutchter, Louisiana
- PS002** **Identification of a Super Hybrid Rice Variety, Guangzhan 635/1128, Using Simple Sequence Repeat Molecular Markers**
Tiffanie Faye Stone, 18, Senior, Academy for Science and Agriculture, Vadnais Heights, Minnesota
- PS003** **Analysis of Plant Promoter Expression Abilities as an Alternative to Viral Promoters in Transgenic Produce**
Stephen Taylor Bethel, 17, Junior, Lake Brantley High School, Altamonte Springs, Florida
- PS004** **Optimizing Root Growth in Arabidopsis by Root Competition and Phosphate Deficiency**
Brigitte Mercedes Wittmer, 15, Sophomore, Episcopal High School of Jacksonville, Jacksonville, Florida
- PS005** **Microbial Ecology: Interactions of Coliforms with *Medicago sativa***
Kelly Nicole Howard, 17, Junior, The Villages Charter High School, The Villages, Florida
- PS006** **The Cross Pollination of an Edible Pumpkin with a Powdery-Mildew Resistant Pumpkin to Create an Edible Powdery-Mildew Resistant Pumpkin**
Jacob Donald Ness, 17, Junior, New Milford High School, New Milford, Connecticut
- PS007** **Plant Tissue Culture: Screening of Blueberries' Vulnerability to Bacterial Leaf Scorch Disease**
Lauren Marie Cook, 16, Junior, Spalding High School, Griffin, Georgia
- PS008** **Algae--the Green Fuel: Optimizing Growth and Lipid Composition in Algae through Environmental Stress**
Wenxi Li, 16, Sophomore, Thomas Chilton Jasper High School, Plano, Texas
- PS009** ***Impatiens shimianensis* sp. nov (Balsaminaceae): A New Species from Southwest China Based on Morphological and Molecular Evidence**
Gechen Zhang, 17, Junior, Rockwood Summit High School, Fenton, Missouri
- PS010** **The Champion of Photosynthesis or When 3 = 4: Are the Photosynthesis Pathways for C3 and C4 Plants All They Are Cracked Up To Be when Exposed to Varying Amounts of Light?**
Loida Garcia Guajardo, 15, Sophomore, Park Christian School, Moorhead, Minnesota
- PS011** **Is There Gene Flow from Genetically Modified *Glycine max* to Other Organisms?**
Benjamin Elliott Lewis, 16, Junior, Jackson High School, Jackson, Ohio
- PS012** **Aqueous Extract of Lemon Leaves as a Novel Powerful Insecticide against *Trialeurodes vaporariorum* (Whitefly)**
Xiangbo Meng, 17, Junior, Beijing 101 Middle School, Beijing, China
- PS013** **A Preliminary Study on the Role of Auxin Distribution in Stress Avoidance of Plant Roots**
Yilin Fan, 17, Senior, The High School Affiliated to Renmin University of China, Beijing, China
- PS014** **Fertilizer Influence in Germination and Seedlings Production of a Brazilian Atlantic Rainforest Species - *Schinus terebenthifolius***
Daiane Fraga Dias, 16, Junior, Colegio Fundacao Bradesco Gravatai, Gravatai, Brasil
- PS015** **Antimicrobial Effect of *Cuminum cyminum* Fruit Extract and Isolation of Its Active Components**
Fangzhou Xiao, 17, Junior, No. 2 Secondary School Attached to East China Normal Unvers, Shanghai, China
- PS016** **A Comparison of the Efficacy of Standard Commercial Mouthwash vs. Herbal-Based Mouthwash on the Control of Oral Plaque Formation**
Kaitlin Elizabeth Larkin, 16, Junior, Wentzville Holt High School, Wentzville, Missouri
- PS017** **The Very Variable Shin Oak**
Nathan Caleb Taylor, 16, Sophomore, Taylor Home School, Lamesa, Texas
- PS018** **The Effects of *Allium sativum* on the Germination and Seedling Growth of *Oryza sativa***
Austin Blake Pierce, 15, Freshman, South Pemiscot High School, Steele, Missouri
- PS019** **How Much Nitrogen Does *Glycine max* Add to the Soil?**
Matthew S. Gerdes, 15, Freshman, Franklin Public School, Franklin, Nebraska
- PS020** **Phytoremediation: Does Age Make a Difference?**
Kaylene Jay Ramos, 18, Senior, Box Elder High School, Box Elder, Montana
- PS021** **The Effects of Seawater pH on Kelp (*Saccharina latissima* and *Agarum clathratum*) Egg Development**
Colin Zheng, 16, Sophomore, Juneau-Douglas High School, Juneau, Alaska
- PS022** **The Effects of Selected Isomers and Heavy Metals on the Chemical Kinetics of Polyphenol oxidase**
Laura Jessica Chesnut, 16, Junior, Miami High School, Miami, Oklahoma
- PS023** **Utilizing Solar Energy and Magnetism to Accelerate Plant Growth and Seed Germination & Enriching Sand or Infertile Soil with All the Requirements of Plants, to Obtain Fertile Lands Ideal for Agriculture**
Zeina Hani Khalaji, 17, Junior, Modern Montessori School, Amman, Jordan
- PS024** **Under the Rainbow - Phase 3: How Different Colored Light Affects Vegetable Plants**
Katharine Nicole Beason, 16, Junior, James Madsion High School, San Antonio, Texas
- PS025** **A Comparison of DNA between Flower Cultivars with an Emphasis on Rosa Species**
Libby Sophia Wiswall, 18, Senior, Aberdeen Central High School, Aberdeen, South Dakota
- PS026** **The Effects of Kochia Extracts on the Susceptibility of *Solanum tuberosum* to Potato Virus Y (PVY)**
Misha Ann Kearns, 18, Senior, North Toole County/ Sunburst High School, Sunburst, Montana
- PS027** **Biodiesel from Sunflowers Phase III - An Analysis of Planting Dates, Soil Temperature, and Oil Content**
Jordan T. Lestina, 17, Junior, Dove Creek High School, Dove Creek, Colorado
- PS028** **Effect of Metal Halide and Fluorescent Lighting on the Overall Health of *Phaseolus vulgaris***
Jarek Alan VanOrder, 16, Sophomore, Mecosta Osceola Math, Science & Technology Center, Big Rapids, Michigan
- PS029** **Sustained Algae Growth in an Enclosed Agitated Environment**
Kaylee Shandale Glenn, 15, Sophomore, Weber High School, Pleasant View, Utah
- PS030** **Determining the Environmental Impact Created by the Replacement of Indigenous Wetland Species (Specifically *Typha latifolia*) by the Invasive Species *Phragmites australis***
Chase Wyatt Bourgeois, 18, Senior, Syracuse High School, Syracuse, Utah
- PS031** **Conservation of an Endangered Plant, *Nymphoides indica*, by a Simple and Novel Method**
Noriaki Namba, 17, Junior, Niigata Prefectural Kashiwazaki Shoyo Secondary Education Sc, Kashiwazaki-shi, Niigata, Japan
- PS032** **Hybrid Fitness among Members of Wild and Cultivated *Rubus L.* (Blackberry and Raspberry)**
Jared Bryce Weaver, 9, Senior, Southern Utah Center for Computer, Engineering, and Science, Cedar City, Utah

- PS033 **Does *Azadirachta indica* Affect the Motility and Life Cycle of *Meloidogyne inconnita*?**
Swetha Krishna Doppalapudi, 15, Sophomore, Morgantown High School, Morgantown, West Virginia
- PS034 **The Cranberry Effect, Year V: The Quantification of Trans-Resveratrol in *Vaccinium macrocarpon* vs. *Vitaceae* Species for Economical Extraction Benefits**
Erin Renae Brasser, 16, Sophomore, South O'Brien Community School District, Paullina, Iowa
- PS035 **Dependence of Leaf Litter Decomposition on Species and Temperature**
Vincent Huang Lin, 15, Freshman, Falmouth High School, Falmouth, Massachusetts
- PS036 **Optimizing Novel *Phragmidium violaceum* in vitro Inoculations for Advancing *Rubus armeniacus* Biological Control (Year III)**
Ann Christine Bernert, 17, Junior, West Linn High School, West Linn, Oregon
- PS037 **The Potential Allelopathic Suppression of Kudzu (*Pueraria montana*)**
Mason Cole McFarland, 18, Senior, Jefferson County International Baccalaureate School, Birmingham, Alabama
- PS038 **Identifying the Fungal Root Associates of *Platanthera orbiculata***
Willaby Helen Shuster, 18, Senior, Mount Edgecumbe High School, Sitka, Alaska
- PS039 **Molecular Taxonomy of Indigenous Hawaiian Ferns**
Amelia Harvey, 17, Senior, Kamehameha High School-Kapalama, Honolulu, Hawaii
- PS040 **Loss of Turgor Pressure: through Phototropism or Photosynthesis?**
Sarah Victoria Warkander, 14, Sophomore, Rutherford High School, Panama City, Florida
- PS041 **Effects of SGB Liquids on *Triticum aestivum***
Kaysha Michaela Ousley, 18, Senior, Mansfield High School, Mansfield, Missouri
- PS042 **Growth Form in Intertidal Lichen Zonation**
Luizetta Vadimovna Navrazhnykh, 16, Sophomore, Florida Atlantic University High School, Boca Raton, Florida
- PS043 **The Effects of pH Level on Seed Germination and Plant Growth**
Tyler Madison Gaines, 15, Sophomore, Beaufort Academy, Beaufort, South Carolina
- PS044 **Investigation of Antimicrobial Property of *Ervatamia coronaria* Flower**
Kaushik Srivatsan Krishna Swamy, 16, Junior, Jawahar Navodaya Vidyalaya, Mandya District, Karnataka, India
- PS045 **Leaf Extracts of *Euphorbiaceae* Can Eradicate the Field Crab *Somanniathelphusa sexpunctata***
Malinee Meeta, 16, Sophomore, Phanomsarakam Phanomadunwitthaya, Chachoengsao, Thailand
- PS046 **The Susceptibility Degrees of the Variety of *Coffea arabica* Species to the Coffee Berry Borer (*Hypothenemus hampei*)**
Genesis Maldonado, 17, Senior, Colegio Congregacion Mita, San Juan, Puerto Rico
- PS047 **The Effect of Anti-Oxidants on Plant Dynamics through Fertilizer Use Efficiency**
Supritha Nilam, 17, Senior, Sir Winston Churchill Secondary School, St. Catharines, Ontario, Canada
- PS048 **Algae Growth, Year Two**
Mallory Anne Eitel, 15, Sophomore, La Plata R-II High School, La Plata, Missouri
- PS049 **The Pesticidal Effects of the Antioxidant Lutein on Agriculture**
Alyson Denae Hubrig, 18, Senior, Hankinson High School, Hankinson, North Dakota
- PS050 **Diversity of Foliar Fungal Endophytes in Wild and Cultured *Metrosideros polymorpha* Inferred from Environmental PCR and ITS Sequence Data**
Mali'o Wanda Kodis, 18, Senior, Waiakea High School, Hilo, Hawaii
- PS051 **Soil Absorption vs. Plant Growth**
Jami Renee Delgadillo, 18, Senior, Americas High School, El Paso, Texas
- PS052 **Aspen in a State of SADness: A Statistical Analysis of the Decline of *Populus tremuloides*, Phase II**
Nikki Taylor Buhrdorf, 16, Sophomore, Hotchkiss High School, Hotchkiss, Colorado
- PS301T **Hydroponics T(w)ool**
Drake Charles Duhon, 18, Senior
Anitress Jahnae' Vaughn, 17, Senior
Lutcher High School, Lutcher, Louisiana
Saint James High School, Saint James, Louisiana
- PS302T **The Effects of Sodium Benzoate on *Brassica rapa*'s Growth Rate, Maturity Rate, and Fecundity**
Claudia Nicole Dennler, 16, Sophomore
Samantha Rose Dennler, 14, Freshman
Pershing County High School, Lovelock, Nevada
- PS303T **Phytochemistry and Antioxidant Activity of *Gunnera tinctoria* Stem**
Sharon Priscila Castro Perez, 17, Freshman
Diego Ignacio Baeza, 17, Freshman
Instituto Cristiano Gracia y Paz, Valdivia, De los Rios, Chile
- PS304T **Finding a Transcription Factor in *Eucalyptus grandis* that Regulates Wood Formation**
Jason Ye, 16, Sophomore
Rebekah Bau, 17, Junior
Cedar Shoals High School, Athens, Georgia
- PS305T **Falling Pattern of *Tabebuia* Seeds Was Affected by Their Internal/External Characteristics and Physical Structure**
Nuti Hutasingh, 15, Sophomore
Katthida Cheevarungnapakul, 16, Sophomore
Norapon Charoentanachot, 16, Sophomore
Bodindecha (Sing Singhaseni) School, Wangthonglang, Bangkok, Thailand
- PS306T **Modification of Breeding Rice Grains through Artificial Colors, Flavor and Smell Used in Prevention of Grain-Consuming Birds**
Saifon Nopnipa, 17, Sophomore
Aphitchaya Noppalart, 16, Sophomore
Phanomsarakham "Phanomadunwitthaya" School, Phanomsarakham, Chachoengsao, Thailand
- PS307T **Automatic System for Agriculture Irrigation**
Ali Al Akbar Ahmad Jouni, 18, Freshman
Bilal Mohamad Ghamloush, 17, Junior
Mohamad Ahmad Ghaddar, 17, Junior
Ghaziyi Official High School, Saida, South, Lebanon
- PS308T **Steam Sterilization to Replace Field Burning**
Bradly Jarred Hamburger, 18, Senior
Joel Philip Hamburger, 18, Senior
Tillamook High School, Tillamook, Oregon
- PS309T **SERA-2020**
Tugberk Vural, 16, Sophomore
Aytekin Guclu, 18, Senior
Nevvar Salih Isgoren Industrial Vocational High School, Izmir, Turkey
- PS310T **Poo to New**
Sarah Jones, 16, Sophomore
Trent James Vickers, 17, Junior
DeKalb County High School, Smithville, Tennessee

FINALIST STATISTICS

CATEGORY	TOTAL FINALISTS	PREV ISEF	-- SEX --		----- GRADE -----			
			M	F	9	10	11	12
Animal Sciences	93	17	44	49	17	16	18	42
Behavioral and Social Sciences	96	13	41	55	11	17	37	31
Biochemistry	66	6	29	37	5	11	26	24
Cellular and Molecular Biology	80	18	34	46	5	11	28	36
Chemistry	89	10	50	39	11	12	30	36
Computer Science	71	16	59	12	7	12	27	25
Earth Science	40	7	17	23	2	9	15	14
ENG: Electrical and Mechanical	144	17	102	42	22	27	34	61
Environmental Management	116	14	45	71	6	27	37	46
ENG: Materials and Bioengineering	110	15	64	46	9	14	30	57
Energy and Transportation	107	21	72	35	17	25	37	28
Environmental Sciences	123	13	45	78	17	29	34	43
Mathematics	80	7	59	21	8	11	32	29
Medicine and Health	152	34	61	91	18	26	44	64
Microbiology	84	16	41	43	8	21	26	29
Physics and Astronomy	86	16	57	29	13	22	27	24
Plant Sciences	74	12	32	42	7	24	22	21
Team Project Finalists*	642	69	329	313	71	126	199	246
---- TOTAL ----	1611	252	852	759	183	314	504	610

* There are 288 total team projects.