Twin Cities Regional Science Fairs Awards
March 2-3, 2018

Students selected to compete at International Science and Engineering Fair in Pittsburgh, Pennsylvania in May, 2018 are:

ISEF Finalist (Twin Cities)

1033T	Justin Duffy	Mast Cell Quantity and Localization in the Heart, Quadriceps, and Diaphragm of a Duchenne Muscular Dystrophy Model
1112T	Manashree Padiyath	Pulp Fiction?! Lead remediation with biochar made from the Apiaceae (Carrot) plant family (Year 2)
1049T	Everett Kroll	3D Printable Biocompatible Prosthetic Foot

ISEF 1st Alternate (Twin Cities)

1099T	Claire Wentzlaff	The Effect of Non-Pathogenic Bacteria on the Invasive Species Lemna minor (Duckweed), Year II

ISEF 2nd Alternate (Twin Cities)

1087T	Garrett Johnson, Taylor Hermansen	Effects of pollution on algae oxygen production within 24 hours of exposure

ISEF 3rd Alternate (Twin Cities)

1098T	Rachel TerHaar, Arika Robinson	The Effects of Glyphosate on Pomacea bridgesii

ISEF Finalist (St. Paul)

1144S   Flannery Enneking-Norton   Exploring the facilitative relationship between Rhamnus cathartica and Lumbricidae

1157S   Michael Hall, Daniel Ellis   CARL: A Convolutional Neural Network Powered Self-Driving Car

ISEF 1st Alternate (St. Paul)

1162S   Camryn Franke   Optimizing Escherichia coli Energy Usage for Chemotaxis and Reproduction Through Experimental Evolution

ISEF 2nd Alternate (St. Paul)

1051S   Enrique Vazquez, Liam Morrissey   The Smart IUD: A novel approach to bioinformatics

ISEF Finalist (Western)

1038W   Cole Maxwell   More than skin deep: Deciphering the role of Bartonella henselae infection in melanoma metastasis (Phase 2)

1050W   Siyuan Ma, Alexander Anderson   Holding Your Heart in Your Hand: 3D-Printing a Mechanically Accurate Aortic Valve Model

1139W   Leonardo Clarke   The Relationship Between the Primary Pulsation Period and the Blazhko Effect in RR Lyrae Variables

ISEF 1st Alternate (Western)

1158W   Parthiv Krishna   Development of Autonomous Unmanned Aerial Systems for Semi-Dense Point Cloud Generation in Disaster Scenarios

ISEF 2nd Alternate (Western)

1078W   Pranav Rupireddy   Untangling Parkinsonian Dynamics: Analyzing Spatio-Temporal Neural Spiking Patterns under Second-Order Network Structures in Parkinsonian-like networks

ISEF 3rd Alternate (Western)

1070W   Samuel Aronson, Alex Cheng   Predicting the risk of chemotherapy-induced cardiotoxicity in breast cancer patients using supervised machine learning

3M Sponsor Award

1069W   Kerui Yang   A Simple and Inexpensive Sensor for Glucose and
                                            Fluoride Using Boric Acid

Orbital ATK Sponsor Award

1110W   Avni Jain   Wastewater Treatment: Utilizing hydroponics to develop
                                            a novel and sustainable solution to nutrient pollution

Dow Water and Process Solutions Sponsor Award

1104T   Reed Thoma   Methane Production From Manure

Ecolab Sponsor Award

1088T   Haley Jostes   Using Ceratophyllum Demersum as a Water Filter and
                                            Fertilizer in an Organic Farming Cycle

Isthmus Engineering and Manufacturing Sponsor Award

1101T   Milan Jostes   Concussion Sensing Helmet

Premier Bank Sponsor Award

1118W   Aaron Bae   Characterizing the Measles Virus: Analyzing Pediatric
                                            Hospitalizations from 1997-2012

Broadway Party and Tent Rental Sponsor Award

8052S   Soren Sackreiter   Solar Equations

Office Depot Sponsor Award

1112T   Manashree Padiyath   Pulp Fiction?! Lead remediation with biochar made from
                                            the Apiaceae (Carrot) plant family   (Year 2)

City of St. Paul Youth Fund Sponsor Award

8006S Olivia Rencher   How similar are Identical Twins in physical and behavioral traits?

Minta'hoe Catering and Events Sponsor Award

1120W Irene Choi   DNA-Engineering Bacteria with CRISPR-Cas9 and lambda-Red Recombinant System

Graduate Women in Science Projects

6002W Riley McSherry   Adults v.s. Kids Multitasking
7018W Dureti Gamada   What is the effect of naturally sweetened coke on teeth compared to other coca cola products?
8063S Grace Bettenburg   How Does Microwave Radiation Affect Plant Growth?
1044W Kathryn Sherman   Assessing Alternative Medicine With Staphylococcus Epidermidis
1106T Casey Hennessy   Efficiency Improvement of Photovoltaic Solar Cells Using Forced Air Convection
1120W Irene Choi   DNA-Engineering Bacteria with CRISPR-Cas9 and lambda-Red Recombinant System
1099T Claire Wentzlaff   The Effect of Non-Pathogenic Bacteria on the Invasive Species Lemna minor (Duckweed), Year II

Graduate Women in Science Papers

503   Maggie Banks   Fruity Power: Making A Biodegradable Battery
513   Eva Luangdetmalay   Bacteria in Chicken
514   Claire Geis   Painkillers
155   Manashree Padiyath   Pulp Fiction: Lead remediation with biochar made from the Apiaceae (Carrot) plant family (Year 2)
154   Diana Zhu   Global pattern of solar cycle impacts on nitrogen dioxide levels
199   Mira Zelle   Carbon Sequestration and Ocean Acidification in Minnesota Lake
112   Kerui Yang   A Simple and Inexpensive Sensor for Glucose and Fluoride Using Boric Acid

3M Film and Materials Resource Division

1158W	Parthiv Krishna	Development of Autonomous Unmanned Aerial Systems for Semi-Dense Point Cloud Generation in Disaster Scenarios
1157S	Michael Hall, Daniel Ellis	CARL: A Convolutional Neural Network Powered Self-Driving Car
7035S	Maggie Fuller	How does the amount of beating time affect the outcome of a meringue
8052S	Soren Sackreiter	Solar Equations
7070S	Sophia Carey	Trashion

3M Commercial Solutions Division

1124S	Isabel Dieperink, Valerie Bares	Adding Calcium Chloride to Improve Bacterial Adhesion in a Xylem Filter: A Novel Mechanism for Water Filtration
1110W	Avni Jain	Wastewater Treatment: Utilizing hydroponics to develop a novel and sustainable solution to nutrient pollution
1062T	Abigail Fors	Light It Up
8011S	Colin Farnham	The Antimicrobial Properties of Natural Substances
8012S	Annelise Purcell	Can i use the amylase enzyme to break down bioplastics?

3M Inventor Recognition

1157S	Michael Hall, Daniel Ellis	CARL: A Convolutional Neural Network Powered Self-Driving Car
1156W	James Clinton, David Mah	Weed Spotting: Using Machine Learning to Identify Dandelions
1139W	Leonardo Clarke	The Relationship Between the Primary Pulsation Period and the Blazhko Effect in RR Lyrae Variables
1111W	Stanley Kohls	Comparison of adsorption and absorptive methods of metal immobilization in the in vitro quaternary treatment of AMD with Oedogonium spp.
1112T	Manashree Padiyath	Pulp Fiction?! Lead remediation with biochar made from the Apiaceae (Carrot) plant family (Year 2)
1069W	Kerui Yang	A Simple and Inexpensive Sensor for Glucose and Fluoride Using Boric Acid
1088T	Haley Jostes	Using Ceratophyllum Demersum as a Water Filter and Fertilizer in an Organic Farming Cycle
1097W	Ayush Shah	Development of a Polymer-Based Fertilizer From Readily Accessible Food Waste
1138T	Abigail Banks-Hehenberger	The Metal at the End of the Rainbow: Using Digital Spectroscopy to Draw Correlations Between Molarity of Solute and Line Intensity of Heavy Metal Ions to Identify Pollutants in Urban Water Sources
1062T	Abigail Fors	Light It Up

Inspiring Excellence Project

7090W	Peter Velgersdyk	Rocket Splash Off; The Impact of Fin Area on the Distance and Altitude of a Rocket's Flight
8041S	Seamus Dougherty	How Do Various Flying Organisms Differ From Mechanical Objects In Flying Technique and Design?
1004W	Namrata Padmanabhan	Effects of Acromyrmex sp. Microbiome on Atta sp. Escovopsis
1103T	Nawal Mahamed	The effect of heat on neodymium magenst

Inspiring Excellence Teacher

Tim Chase

MN American Society of Microbiology

6012T	Esau Estrada	How many germs at Eagle Ridge Middle School?
7082W	Benjamin Ertl	5 Second Rule?
8057S	Isadora McGinley Myers	Light and Airborne Mold Growth
1132T	Kerrie Schaefers	Does irradiated chicken have more bacteria than fresh or frozen chicken?
1124S	Isabel Dieperink, Valerie Bares	Adding Calcium Chloride to Improve Bacterial Adhesion in a Xylem Filter: A Novel Mechanism for Water Filtration
1126W	Addison Gleekel, Melinda Samaratunga	Turning the tide against ocean pollution: Investigating the role of VanK in aromatic acid chemotaxis

Minnesota Ag in the Classroom Projects

8068S	Will Schmitt	Something Out of Nothing: Using Greywater to Grow Plants Aeroponically
1088T	Haley Jostes	Using Ceratophyllum Demersum as a Water Filter and Fertilizer in an Organic Farming Cycle
1143W	Ravi Chepuri	Feeding the World: Efficient Soybean Modification with DNA Replicons

United States Department of Agriculture Research

6019T	Matthew Trussell	Oil vs Water
7051W	Gordon Novak	Water Purification
8067T	Dylan Kist	Cat Grass Vs. Limestone & Sulfur
1142S	Luke Chen	Freezing Point Depression in Brassica rapa using Methyl Alcohol
1144S	Flannery Enneking-Norton	Exploring the facilitative relationship between Rhamnus cathartica and Lumbricidae

American Chemical Society

1069W	Kerui Yang	A Simple and Inexpensive Sensor for Glucose and Fluoride Using Boric Acid

American Chemical Society Honorable Mention

1062T	Abigail Fors	Light It Up
1064T	Meagan Haase	Electro-Lemon
8012S	Annelise Purcell	Can i use the amylase enzyme to break down bioplastics?

Bright Futures Award

6036T	Tim Trussell	Hit Me With Your Best Shot

MN Chapter of American Fisheries

7050T	Amanda McKellips, Grace Weitzel	Zebra Mussels' Preferred Water Conditions
1099T	Claire Wentzlaff	The Effect of Non-Pathogenic Bacteria on the Invasive Species Lemna minor (Duckweed), Year II

MN State Horticulture Award

6037T	Yordanos Eshete	Chemical Plants
7096T	Therese Phan	How Do Plants Respond To Classical Music?
7098S	Bodie Treiber	Coffee For Compost
8065T	Zachary Friedmann	Feeding Plants Sugar
1144S	Flannery Enneking-Norton	Exploring the facilitative relationship between Rhamnus cathartica and Lumbricidae

US Air Force (St. Paul)

8041S	Seamus Dougherty	How Do Various Flying Organisms Differ From Mechanical Objects In Flying Technique and Design?
8061S	James Kahn	How Does The Area Of The Nozzle Affect The Total Impulse Of A Solid State Rocket
1157S	Michael Hall, Daniel Ellis	CARL: A Convolutional Neural Network Powered Self-Driving Car
1157S	Michael Hall, Daniel Ellis	CARL: A Convolutional Neural Network Powered Self-Driving Car

US Air Force (Twin Cities)

1101T	Milan Jostes	Concussion Sensing Helmet
1108T	Daniel Habiger	Bernoulli's Principle
6023T	Jarissett Reyes Volkov, Herani Moses	Getting A Bang
6023T	Jarissett Reyes Volkov, Herani Moses	Getting A Bang

US Air Force (Western)

1158W	Parthiv Krishna	Development of Autonomous Unmanned Aerial Systems for Semi-Dense Point Cloud Generation in Disaster Scenarios
1139W	Leonardo Clarke	The Relationship Between the Primary Pulsation Period and the Blazhko Effect in RR Lyrae Variables
8036W	Iesh Gujral	Effect of blade design on the energy produced by wind turbine under varying wind speeds
7090W	Peter Velgersdyk	Rocket Splash Off; The Impact of Fin Area on the Distance and Altitude of a Rocket's Flight

Naval Science Award (St. Paul)

8073S	Peter Wenger	Little Green Fuel
7066S	Ayden Brudnak Voss	Build A Raft Powered By Surface Tension
1095S	Elsa Runquist	Tardigrade Abundance as a Bioindicator for Water Quality
1031S	Phillip Bragg	Converting Morphine to Methadone: A Systematic Review
1127S	Jeffrey Huang	Investigating the effects of the light-dark cycle and wavelength of light on the length of bioluminescence of P. lunula

Naval Science Award (Twin Cities)

8058T	Kienan Block	Boat Wake
8033T	Anna Schafhauser	Global Warming vs. Marine Life
1101T	Milan Jostes	Concussion Sensing Helmet
1154T	Alexa Tinder	Developing a Renewable, Sustainable Energy Source: Algae Biofuel

Naval Science Award (Western)

7051W	Gordon Novak	Water Purification
1158W	Parthiv Krishna	Development of Autonomous Unmanned Aerial Systems for Semi-Dense Point Cloud Generation in Disaster Scenarios
1110W	Avni Jain	Wastewater Treatment: Utilizing hydroponics to develop a novel and sustainable solution to nutrient pollution

Teacher Excellence

Elizabeth Pearson   St Charles Borromeo School

ISEF Alumni Award - Timara Underbakke

6036T   Tim Trussell   Hit Me With Your Best Shot

ISEF Alumni Award - Dr. Kyrstin Ball

6006T   Carissa Chow   Instant Ice Pack Science

ISEF Alumni Award - Kyra Zimmerman

7065S   Hemetii Apet   Taking Out Toxic Gases and Pollutants: Biochemistry Air Filters

Caffeinated Student Award

8066W   Quentin Hughes, Vaughn Hughes   As the World Moves to Vertical Farming, is Human Nutrition Compromised? Testing the Brix Factor of Ocimum Basilicum using Refractometer Analysis

8004W   Maeve Katics   How does an educational campaign impact the recycling habits of different age groups?

Joel Wagner Caring Bridge Award

8022S   Betsy Hofer   How Do Essential Oils Affect The Apoptosis Of HL-60 Cancer Cells

American Meteorological Society (St. Paul)

1095S Elsa Runquist   Tardigrade Abundance as a Bioindicator for Water Quality

8042S Fiona Mundy   Which Filter Works the Best for Filtering Out Microfibers Released in the Wash Cycle

American Meteorological Society (Twin Cities)

1088T Haley Jostes   Using Ceratophyllum Demersum as a Water Filter and Fertilizer in an Organic Farming Cycle

1100T Diana Zhu   Global Pattern of Solar Cycle Impacts on Nitrogen Dioxide Levels

American Meteorological Society (Western)

1089W Neil Khadilkar   Global Climate Change - Hoax or Reality: A stochastic simulation of macroscale causal factors and effects on life indicators

1110W Avni Jain   Wastewater Treatment: Utilizing hydroponics to develop a novel and sustainable solution to nutrient pollution

American Psychological Association (St. Paul)

1009S Natalie Braga   I Forgot The Title: The Effect of Distractions on Memory

American Psychological Association (Twin Cities)

1015T Kayla Gant   Can you remember

American Psychological Association (Western)

1057W Morgan Robinson   Mapping the USP33 Gene and Its Involvement in Cardiomyocyte Regeneration in Neonatal Mice

Association of Women Geoscientists (St. Paul)

7076S   Elsa Mechelke   Friction:

Association of Women Geoscientists (Twin Cities)

1088T   Haley Jostes   Using Ceratophyllum Demersum as a Water Filter and
                                       Fertilizer in an Organic Farming Cycle

Association of Women Geoscientists (Western)

7099W   Leihanah Weinacht   Hydroponics: Design on a Dime

ASU Walton Sustainability Solutions Initiatives (St. Paul)

1127S   Jeffrey Huang   Investigating the effects of the light-dark cycle and
                                       wavelength of light on the length of bioluminescence of
                                       P. lunula
1135S   Riley Will   A Study of the Effects of a Biotinylated Peptide from
                                       BAM on the Growth of Escherichia coli

ASU Walton Sustainability Solutions Initiatives (Twin Cities)

1138T   Abigail Banks-Hehenberger The Metal at the End of the Rainbow: Using Digital
                                       Spectroscopy to Draw Correlations Between Molarity of
                                       Solute and Line Intensity of Heavy Metal Ions to Identify
                                       Pollutants in Urban Water Sources
1114T   Nancy Wang   Disaster Resistant House

ASU Walton Sustainability Solutions Initiatives (Western)

1058W   Emily Schulenberg   How Glutathione-S-Transferase Genes Affect the
                                       Longevity of isp-1 Mutated C. elegans Worms
1075W   Gabrielle Evans   Identification and evaluation of function of conserved
                                       and mutated regions of the RyR1 and RyR2 between
                                       species.

Intel Excellence in Computer Science (St. Paul)

1076S   Rachel Khodursky   On the Prevalence of Antibiotic Resistance

Intel Excellence in Computer Science (Twin Cities)

1101T   Milan Jostes   Concussion Sensing Helmet

Intel Excellence in Computer Science (Western)

1070W   Samuel Aronson, Alex Cheng   Predicting the risk of chemotherapy-induced cardiotoxicity in breast cancer patients using supervised machine learning

Mu Alpha Theta (St. Paul)

1031S   Phillip Bragg   Converting Morphine to Methadone: A Systematic Review

Mu Alpha Theta (Twin Cities)

1014T   Sean Floersch   The Effect Bluetooth Phones Have on Driving Versus Handheld Phones

Mu Alpha Theta (Western)

1089W   Neil Khadilkar   Global Climate Change - Hoax or Reality: A stochastic simulation of macroscale causal factors and effects on life indicators

NASA Earth System Science Award (St. Paul)

7052S   Kaya Solheid   Tracking Particulate Matter Pollution From Trains Using The Magnetic Susceptibility Of Tree Leaves

NASA Earth System Science Award (Twin Cities)

1088T   Haley Jostes   Using Ceratophyllum Demersum as a Water Filter and Fertilizer in an Organic Farming Cycle

NASA Earth System Science Award (Western)

1089W   Neil Khadilkar   Global Climate Change - Hoax or Reality: A stochastic simulation of macroscale causal factors and effects on life indicators

National Oceanic and Atmospheric Administration (St. Paul)

8030S   Alharith Dameh   Does Your Water Fit the EPA's Standards (and how does it affect you)?

National Oceanic and Atmospheric Administration (Twin Cities)

1100T   Diana Zhu   Global Pattern of Solar Cycle Impacts on Nitrogen Dioxide Levels

National Oceanic and Atmospheric Administration (Western)

1089W   Neil Khadilkar   Global Climate Change - Hoax or Reality: A stochastic simulation of macroscale causal factors and effects on life indicators

Ricoh Sustainable Development Award (St. Paul)

1076S   Rachel Khodursky   On the Prevalence of Antibiotic Resistance

Ricoh Sustainable Development Award (Twin Cities)

1087T   Garrett Johnson, Taylor Hermansen   Effects of pollution on algae oxygen production within 24 hours of exposure

Ricoh Sustainable Development Award (Western)

1156W   James Clinton, David Mah   Weed Spotting: Using Machine Learning to Identify Dandelions

Society for In Vitro Biology (St. Paul)

Society for In Vitro Biology (Twin Cities)

Society for In Vitro Biology (Western)

1041W   Devika Narayan   Understanding the Effects of Insulin on Amyloid-Beta Fibril Formation in Alzheimer's Patients

US Metric Association (St. Paul)

1083S   Roland Berg, Veronica   D(O2) You Lake Healthy Aquatic Ecosystems?
Sannes, Lauren Mendoza

US Metric Association (Twin Cities)

1152T   Mitchell Remarcik   How lights affect plants

US Metric Association (Western)

1139W   Leonardo Clarke   The Relationship Between the Primary Pulsation Period and the Blazhko Effect in RR Lyrae Variables

Yale Science and Engineering Association Inc. (St. Paul)

1031S   Phillip Bragg   Converting Morphine to Methadone: A Systematic Review

Yale Science and Engineering Association Inc. (Twin Cities)

1049T   Everett Kroll   3D Printable Biocompatible Prosthetic Foot

Yale Science and Engineering Association Inc. (Western)

1078W   Pranav Rupireddy   Untangling Parkinsonian Dynamics: Analyzing Spatio-Temporal Neural Spiking Patterns under Second-Order Network Structures in Parkinsonian-like networks

Stockholm Junior Water Prize (St. Paul)

1134S	Lia Wallace, Stephanie Hulander	Let's take it BAC(teria) to water

Stockholm Junior Water Prize (Twin Cities)

1112T	Manashree Padiyath	Pulp Fiction?! Lead remediation with biochar made from the Apiaceae (Carrot) plant family (Year 2)
1149T	Katie Lyon, Gregory Johnson	Effectiveness of Chlorella Algae in the Bioremoval of Sodium ions from an Artificial Pond Ecosystem
1104T	Reed Thoma	Methane Production From Manure
1086T	Tatum Frey, Grace Campbell	Effects of Fertilizers on Orthophosphate Levels in Fresh Water Lakes

Stockholm Junior Water Prize (Western)

1110W	Avni Jain	Wastewater Treatment: Utilizing hydroponics to develop a novel and sustainable solution to nutrient pollution
1079W	Sydney Weinandt, Sam Swanson	Survival of the Fittest: How Microbes Survive in Underwater Volcanos

Research Papers MS Advancing to State Fair Competition

503	Maggie Banks	Fruity Power: Making A Biodegradable Battery
507	Jayden Chow	What's The Hang
510	Alharith Dameh	Does Your Water Meet the EPA's Standards (and how does it affect you)?
522	Lark Davis	Bombs Away: The Impact of Citric Acid on the time it takes for a bath bomb to dissolve
515	Drew Fisher	Hockey Pucks
512	Natalie Hua	Ant Farms in Different Temperatures
511	Quentin Hughes, Vaughn Hughes	As the World Moves to Vertical Farming, is Human Nutrition Compromised? Testing the Brix Factor of Ocimum Basilicum using Refractometer Analysis
513	Eva Luangdetmalay	Bacteria in Chicken
509	Amanda McKellips, Grace Weitzel	Zebra Mussels' Preferred Water Conditions
508	Zoe Olson	Limonene Styrofoam Dissolution
523	Harini Senthilkumar	The effects of Shoe heels on Posture and Stride length
502	Rikhil Seshadri	Low Cost Supercapacitors for Energy Storage
518	Elianan Sileshe	How Does Temperature Affect Light Intensity
505	Jorden Thondup	Do Different Types of Liquids and Temperatures Affect Evaporation Rate?
516	Tim Trussell	Hit Me With Your Best Shot
519	Peter Velgersdyk	Rocket Splash Off: The Impact of Fin Area on the Altitude and Distance of a Rocket's Flight
520	Annika Veurink	Nature's Solvents Vs. Man's Mining: The Impact of Natural Resources on Water pH

Research Papers MS Third Place

502	Rikhil Seshadri	Low Cost Supercapacitors for Energy Storage

Research Papers MS Second Place

519	Peter Velgersdyk	Rocket Splash Off: The Impact of Fin Area on the Altitude and Distance of a Rocket's Flight

Research Papers MS First Place

511	Quentin Hughes, Vaughn Hughes	As the World Moves to Vertical Farming, is Human Nutrition Compromised? Testing the Brix Factor of Ocimum Basilicum using Refractometer Analysis

Research Papers HS Advancing to JSHS

137	David Ahrens, Christiana Wilke, Cassidy Roland	Spilling the Beans: A Ground-breaking Approach to Mitigate Phosphorus Loss in Urban Agriculture
234	Samuel Aronson, Alex Cheng	Predicting the risk of chemotherapy-induced cardiotoxicity in breast cancer patients using supervised machine learning
205	Sorcha Ashe	Nerve Cell Distribution Among the Eight Arms of Octopus vulgaris
224	Aaron Bae	Characterizing the Measles Virus: Analyzing Pediatric Hospitalizations from 1997-2012
280	Abigail Bauleke	Does Breathing Too Much While Swimming Affect the Speed of a Swimmer?
168	Ross Boekhoff Jr.	The Importance of the Initial Growth of the Plant
263	Phillip Bragg	Converting from Morphine to Methadone: A Systematic Review
238	Emma Carr	Sex, Mice, and Alzheimer's: Linking neurodegenerative disease and gender through mouse models
219	Ravi Chepuri	Feeding the World: Efficient Soybean Modification with DNA Replicons
180	Savannah Christenson	Proteins Breaking Down in Foods
108	Maya Czeneszew, Erica Iliarski	Terminating Tuberculosis: Creating a Bacterial Model to Determine the Genetic Basis for Rifampicin Tolerance
217	Isabel Dieperink, Valerie Bares	Adding Calcium Chloride to Improve Bacterial Adhesion in a Xylem Filter: A Novel Mechanism for Water Filtration
292	Justin Duffy	Mast Cell Quantity and Localization in the Heart, Quadriceps, and Diaphragm of a Duchenne Muscular Dystrophy Model
156	Flannery Enneking-Norton	Exploring the facilitative relationship between Rhamnus cathartica and Lumbricidae
295	Michael Finch	Leadership: A Study in Political Psychology
305	Abigail Fors	The Effect of Temperature on Luminol's Brightness
268	Felisha Fox, Michael Pupel	Pain-Averting Device (PAD) for Injections
322	Camryn Franke	Optimizing Escherichia coli Energy Usage for Chemotaxis and Reproduction Through Experimental Evolution
308	Connor Funk	Tennis Racquet Physics: The Effect of Impact Location on Ball Bounce
215	Addison Gleekel, Melinda Samaratunga	Turning the tide against ocean pollution: Investigating the role of VanK in aromatic acid chemotaxis
267	Makayla Haddorff	Effect of Hands-on and Hands-off Cell Phone Conversations on Reaction Time
139	Audra Hakanson	The Effectiveness of Ultraviolet Light and Iodine Tablets on Natural Water Purification
221	Michael Hall, Daniel Ellis	CARL: A Convolutional Neural Network Powered Self-Driving Car
299	Casey Hennessy	Efficiency Improvement of Photovoltaic Solar Cells Using Forced Air Convection

202	Jeffrey Huang	Investigating the effects of the light-dark cycle and frequency of light on the length of bioluminescence of P. lunula
135	Avni Jain	Wastewater Treatment: Utilizing hydroponics to develop a novel and sustainable solution to nutrient pollution
136	Garrett Johnson, Taylor Hermansen	Effects of pollution on oxygen production in algae
143	Haley Jostes	Using Ceratophyllum Demersum as a Water Filter and Fertilizer in an Organic Farming Cycle
130	Milan Jostes	Concussion Sensing Helmet
237	Benjamin Keninger	The Use of Color in Order to Affect Perception of Taste
107	Rachel Khodursky	On the Prevalence of Antibiotic Resistance
290	Louise Kim, Spencer Yueh	Unplugged: Quantifying the effect of technology on adolescent sleep and mood
163	Katelyn Kleiter	Mushroom Packaging
131	Everett Kroll	3D Printable Biocompatible Prosthetic Shank
158	Annie Lam	The Effect of Acute Copper Exposure On Object Recognition Memory in Zebrafish (Danio Rerio)
183	Sarah Leipnitz	Percentage of Sugar in Different Kinds of Sugar
228	Samuel Leville, Abigail Roh	Understanding Empathy in the Digital Age: Characterizing online patient support using a lexical analysis tool
125	Siyuan Ma, Alexander Anderson	Holding Your Heart in Your Hand: 3D-Printing a Mechanically Accurate Aortic Valve Model
233	Cole Maxwell	More than skin deep: Deciphering the role of Bartonella henselae infection in melanoma metastasis (Year 2)
258	Lillianna (Lily) Murphy	Texting V.S. Talking While Driving
160	Matthew Nguyen	Designing Storm Walls to Reduce Wave Erosion
225	Andrew Noecker	Fantasy Baseball and New Statistical Measurements
155	Manashree Padiyath	Pulp Fiction: Lead remediation with biochar made from the Apiaceae (Carrot) plant family (Year 2)
174	Thomas Peterson, Kylie Spangler	Engineering a Single Coherent Protocol to Determine Capabilities of the Diphtheria Immunotoxins DT2219 and DT2219(5C+2A) in Killing Non-Hodgkin B-cell Lymphoma
105	Darlene Radichel, Karthik Papisetty	Inhibiting Cancer Progression by Removing CSPG4: Bringing New Ideas to Life Using CRISPR Technology
104	Ava Raffel, Mary O'Grady	Facing off with FSHD: Pioneering a cure for muscular dystrophy through gene editing
157	Elsa Runquist	Tardigrade Abundance as a Bioindicator for Water Quality
194	Austen Scheuneman	Effects of different colored lights on yeast's time to activate
282	Laura Stauffer	Significance of Musical Background in the Hand/Foot Coordination of students
249	Katie Struzyk	Does Color Affect Reaction Times During Tests?
144	Rachel TerHaar, Arika Robinson	The Effects of Glyphosate on Pomacea bridges
198	Emilia Topp-Johnson	Behind the Kernels VI: An Identification and Assessment of Potential Endophytic Mutualists

Research Papers HS Third Place

135   Avni Jain   Wastewater Treatment: Utilizing hydroponics to develop a novel and sustainable solution to nutrient pollution

290   Louise Kim, Spencer Yueh   Unplugged: Quantifying the effect of technology on adolescent sleep and mood

Research Papers HS Second Place

143   Haley Jostes   Using Ceratophyllum Demersum as a Water Filter and Fertilizer in an Organic Farming Cycle

Research Papers HS First Place

156   Flannery Enneking-Norton   Exploring the facilitative relationship between Rhamnus cathartica and Lumbricidae

Broadcom MASTERS (St. Paul)

8022S	Betsy Hofer	How Do Essential Oils Affect The Apoptosis Of HL-60 Cancer Cells
7035S	Maggie Fuller	How does the amount of beating time affect the outcome of a meringue
7088S	Max Mills	How does the mass and velocity of an object affect the amount of energy generated by a generator
8063S	Grace Bettenburg	How Does Microwave Radiation Affect Plant Growth?
7012S	Lyra Sato	Grading Your Sense Of Smell
7065S	Hemetii Apet	Taking Out Toxic Gases and Pollutants: Biochemistry Air Filters
7064S	Kevin Torstenson	How does the grit of sandpaper used on pinewood derby car axles affect how far it goes after rolling down a ramp?
8030S	Alharith Dameh	Does Your Water Fit the EPA's Standards (and how does it affect you)?
8047S	Sebastian Zarkower	Effect of biodegradable darts on flight characteristics
7076S	Elsa Mechelke	Friction:
7008S	Betty Hebble	Work Out Your Brain
8073S	Peter Wenger	Little Green Fuel
7083S	Katherine Kozak	Does antibacterial soap that contains Benzalkonium Chloride kill more bacteria than traditional soaps?
8012S	Annelise Purcell	Can i use the amylase enzyme to break down bioplastics?
8009S	Izabella Usitalo	Remember Me
8068S	Will Schmitt	Something Out of Nothing: Using Greywater to Grow Plants Aeroponically
8052S	Soren Sackreiter	Solar Equations
8069S	Isabella Shapland	Fun(gi) in the Sun
7001S	Caitlyn Budd	Paw Dominance in Dogs
8056S	Owen Finlay	Can Mushrooms Degrade Crude Oil?
7038S	Una Jhocson	The Staying Power of Hair Dyes on Blonde Hair
7024S	Gajan Dileepan	How does the amount of sugar in soda affect the amount of decay in teeth?

Broadcom MASTERS (Twin Cities)

6019T	Matthew Trussell	Oil vs Water
6036T	Tim Trussell	Hit Me With Your Best Shot
6006T	Carissa Chow	Instant Ice Pack Science
8034T	Rikhil Seshadri	Low Cost, Non-aqueous Electrolyte Based Supercapacitors for Energy Storage
6004T	Maggie Banks	Fruity Power: Making A Biodegradable Battery
8020T	Jasper Strayer, Aaden Spencer	How Effective Are Different Types of Antifungal Medication?
6035T	Joshua Trussell	The Heat is On
8050T	Nickolas Zander	Mailbox Mail Sensor
7029T	Arjun Acharya	The Electrolysis of Water
6023T	Jarissett Reyes Volkov, Herani Moses	Getting A Bang
7048T	Nyla Truzy	Reuse Leftovers To Make Paint
6031T	Aditya Shoor	Wi - No - Fi
7096T	Therese Phan	How Do Plants Respond To Classical Music?
8001T	Natalie Hua	Ant Farms
7063T	Michael Siv	Box n eggs

Broadcom MASTERS (Western)

8004W	Maeve Katics	How does an educational campaign impact the recycling habits of different age groups?
7053W	Annika Veurink	Nature's Solvents Vs. Man's Mining: The Impact of Natural Resources on Water pH
7099W	Leihanah Weinacht	Hydroponics: Design on a Dime
7067W	Trisha Samba, Romy Peterson, Luke Rowen	An inexpensive portable water filter for disaster relief
7018W	Dureti Gamada	What is the effect of naturally sweetened coke on teeth compared to other coca cola products?
8036W	Iesh Gujral	Effect of blade design on the energy produced by wind turbine under varying wind speeds
7090W	Peter Velgersdyk	Rocket Splash Off; The Impact of Fin Area on the Distance and Altitude of a Rocket's Flight
7082W	Benjamin Ertl	5 Second Rule?
8070W	Lulu Skroch, Tori Reisberg	What is the affect of macronutrient solutions on plant germination in a hydroponic system?
8066W	Quentin Hughes, Vaughn Hughes	As the World Moves to Vertical Farming, is Human Nutrition Compromised? Testing the Brix Factor of Ocimum Basilicum using Refractometer Analysis

State Science Fair MS

6002	Riley McSherry	Adults v.s. Kids Multitasking
6004	Maggie Banks	Fruity Power: Making A Biodegradable Battery
6006	Carissa Chow	Instant Ice Pack Science
6017	Benjamin Wappes	Water Balloons
6019	Matthew Trussell	Oil vs Water
6023	Jarissett Reyes Volkov, Herani Moses	Getting A Bang
6024	Adriana Rice	Can Magnets Generate Power
6031	Aditya Shoor	Wi - No - Fi
6033	Collin Boyum, Gerald Johnson	The Effect of Mint on Water Temperture
6035	Joshua Trussell	The Heat is On
6036	Tim Trussell	Hit Me With Your Best Shot
6039	Mitchell Spack	What is the Farthest Distance Bluetooth can Connect?
7001	Caitlyn Budd	Paw Dominance in Dogs
7008	Betty Hebble	Work Out Your Brain
7012	Lyra Sato	Grading Your Sense Of Smell
7016	Margaret Weiss, Mari Rummel	Testing Glasser's Choice Theory of Power in Children
7017	Sophia Cruz	The 5 Second Rule
7018	Dureti Gamada	What is the effect of naturally sweetened coke on teeth compared to other coca cola products?
7022	Elsa Bildtsen	Does a Sugary Breakfast Affect Your Test Score?
7023	Hannah Coonan, Brenna McLean	Hydan Veggies
7024	Gajan Dileepan	How does the amount of sugar in soda affect the amount of decay in teeth?
7026	Harini Senthilkumar	The effects of Shoe heels on Posture and Stride length
7029	Arjun Acharya	The Electrolysis of Water
7033	Lark Davis	Bombs Away: The impact of citric acid on the time it takes for a bath bomb to dissolve.
7035	Maggie Fuller	How does the amount of beating time affect the outcome of a meringue
7038	Una Jhocson	The Staying Power of Hair Dyes on Blonde Hair
7040	Audra Johnson	Changes in Density, Gases, and Temperature
7043	Toby Parcon	The Effect of Mint on Water
7045	Benjamin Ryan	Which Filtration Material Leads to the Best Drinking Water?
7046	Amira Sinclair, Natol Nejo	What are the corrosive effects of sour candy?
7047	Jorden Thondup	Do Different Types of Liquids and Temperatures Affect Evaporation Rate?
7048	Nyla Truzy	Reuse Leftovers To Make Paint
7050	Amanda McKellips, Grace Weitzel	Zebra Mussels' Preferred Water Conditions
7051	Gordon Novak	Water Purification

7053	Annika Veurink	Nature's Solvents Vs. Man's Mining: The Impact of Natural Resources on Water pH
7059	Elianan Sileshe	How Does Temperature Affect Light Intensity?
7063	Michael Siv	Box n eggs
7064	Kevin Torstenson	How does the grit of sandpaper used on pinewood derby car axles affect how far it goes after rolling down a ramp?
7065	Hemetii Apet	Taking Out Toxic Gases and Pollutants: Biochemistry Air Filters
7067	Trisha Samba, Romy Peterson, Luke Rowen	An inexpensive portable water filter for disaster relief
7068	Isabell Agner	Oh No... My Wig's On Fire
7074	Katie Healey	Toxic Temptation? Putting nail polish to the test...
7076	Elsa Mechelke	Friction:
7077	Levi Nichols	How Does the Rice:Water Ratio of Rice Glue Affect the Strength of the Glue?
7082	Benjamin Ertl	5 Second Rule?
7083	Katherine Kozak	Does antibacterial soap that contains Benzalkonium Chloride kill more bacteria than traditional soaps?
7085	Zach Behme, Henry Peterson	What Type of Salt Melts Ice Fastest?
7088	Max Mills	How does the mass and velocity of an object affect the amount of energy generated by a generator
7090	Peter Velgersdyk	Rocket Splash Off; The Impact of Fin Area on the Distance and Altitude of a Rocket's Flight
7092	Adam Gaudio	How Does pH in Water Affect Plant Type
7093	Zachariah Johnson	Taking the Bull by its Thorns: Will Winter Rye Control the Spread and Growth of Bull Thistle?
7096	Therese Phan	How Do Plants Respond To Classical Music?
7099	Leihanah Weinacht	Hydroponics: Design on a Dime
8001	Natalie Hua	Ant Farms
8004	Maeve Katics	How does an educational campaign impact the recycling habits of different age groups?
8009	Izabella Usitalo	Remember Me
8012	Annelise Purcell	Can i use the amylase enzyme to break down bioplastics?
8017	Clare Friar	Comparing the Nutritional Differences of Organic and Conventional Apples
8019	Abirami Rajasekaran	Carbon Conundrum
8020	Jasper Strayer, Aaden Spencer	How Effective Are Different Types of Antifungal Medication?
8022	Betsy Hofer	How Do Essential Oils Affect The Apoptosis Of HL-60 Cancer Cells
8030	Alharith Dameh	Does Your Water Fit the EPA's Standards (and how does it affect you)?
8034	Rikhil Seshadri	Low Cost, Non-aqueous Electrolyte Based Supercapacitors for Energy Storage
8036	Iesh Gujral	Effect of blade design on the energy produced by wind turbine under varying wind speeds

8041	Seamus Dougherty	How Do Various Flying Organisms Differ From Mechanical Objects In Flying Technique and Design?
8042	Fiona Mundy	Which Filter Works the Best for Filtering Out Microfibers Released in the Wash Cycle
8043	Zoe Olson	Limonene Styrofoam Dissolution
8045	Eliana Scheldberg	Making Pollution A Solution
8047	Sebastian Zarkower	Effect of biodegradable darts on flight characteristics
8050	Nickolas Zander	Mailbox Mail Sensor
8052	Soren Sackreiter	Solar Equations
8056	Owen Finlay	Can Mushrooms Degrade Crude Oil?
8063	Grace Bettenburg	How Does Microwave Radiation Affect Plant Growth?
8066	Quentin Hughes, Vaughn Hughes	As the World Moves to Vertical Farming, is Human Nutrition Compromised? Testing the Brix Factor of Ocimum Basilicum using Refractometer Analysis
8068	Will Schmitt	Something Out of Nothing: Using Greywater to Grow Plants Aeroponically
8069	Isabella Shapland	Fun(gi) in the Sun
8070	Lulu Skroch, Tori Reisberg	What is the affect of macronutrient solutions on plant germination in a hydroponic system?
8071	Nova Midwinter	Should robots have tails?
8073	Peter Wenger	Little Green Fuel

State Science Fair HS

1001	Sorcha Ashe	Nerve Cell Distribution Among the Eight Arms of Octopus vulgaris
1002	Theo Coval, Emma Beveridge	Horseshoe Crab Sanctuary: Year 1
1003	Annie Lam	The Effect of Acute Copper Exposure On Object Recognition Memory in Zebrafish (Danio Rerio)
1004	Namrata Padmanabhan	Effects of Acromyrmex sp. Microbiome on Atta sp. Escovopsis
1009	Natalie Braga	I Forgot The Title: The Effect of Distractions on Memory
1010	Tucker Brown	Office space vs productivity
1018	Louise Kim, Spencer Yueh	Unplugged: Quantifying the effect of technology on adolescent sleep and mood
1019	Samuel Leville, Abigail Roh	Understanding Empathy in the Digital Age: Characterizing online patient support using a lexical analysis tool
1021	Christine Maina	Beauty in the Eye of the Beholder
1022	Ishan Nadkarni, Nathan DeMichaelis	Platform for Peak Performance: Enhancing Student Learning and Comprehension Online vs. In Text
1024	Spencer Sweeney	Effects of Improved Sleep on High School Teenagers in Test Scores and Confidence
1029	Boatemaa Agyeman-Mensah, Sahana Mangipudi	Breast Cancer Screenings for Women - A Decision Tree for General Practitioners and OB-GYNS
1030	Katherine Berge	What is the Fat Percentage in Different Types of Nuts?
1031	Phillip Bragg	Converting Morphine to Methadone: A Systematic Review
1032	Mitchell Drobnick	What helmet designs best prevent concussions
1033	Justin Duffy	Mast Cell Quantity and Localization in the Heart, Quadriceps, and Diaphragm of a Duchenne Muscular Dystrophy Model
1034	Nell Ganley, Simren Samba	Immune System Boosting Products
1038	Cole Maxwell	More than skin deep: Deciphering the role of Bartonella henselae infection in melanoma metastasis (Phase 2)
1039	Ella Menke	Cooling Vitamin C
1041	Devika Narayan	Understanding the Effects of Insulin on Amyloid-Beta Fibril Formation in Alzheimer's Patients
1042	Ava Raffel, Mary O'Grady	Facing off with FSHD: Pioneering a cure for muscular dystrophy through gene editing
1043	Alexa Reynders, Benjamin Larson	Vertical Flow Assay Detection for GM2-AP in Simulated Urine of Non Small Cell Lung Cancer Patients
1044	Kathryn Sherman	Assessing Alternative Medicine With Staphylococcus Epidermidis
1045	Lana Trautman, Catherine Pirtle	Mesenchymal Missiles: Utilizing Stem Cells to Revolutionize Targeted Cancer Treatment
1047	Felisha Fox, Michael Pupel	Pain-Averting Device(PAD) for Injections
1049	Everett Kroll	3D Printable Biocompatible Prosthetic Foot

1050	Siyuan Ma, Alexander Anderson	Holding Your Heart in Your Hand: 3D-Printing a Mechanically Accurate Aortic Valve Model
1051	Enrique Vazquez, Liam Morrissey	The Smart IUD: A novel approach to bioinformatics
1053	Emma Carr	Sex, Mice, and Alzheimer's: Linking neurodegenerative disease and gender through mouse models
1054	Brandon Lai	MyoR Regulation of Skeletal Muscle Regeneration
1055	Thomas Peterson, Kylie Spangler	The Key to a Cure: Unlocking new cancer treatments using immunotoxins
1056	Darlene Radichel, Karthik Papisetty	Inhibiting Cancer Progression by Removing CSPG4: Bringing New Ideas to Life Using CRISPR Technology
1058	Emily Schulenberg	How Glutathione-S-Transferase Genes Affect the Longevity of isp-1 Mutated C. elegans Worms
1060	Aarthi Vijayakumar, Michelle Sung	Validation of Cre Specificity in PCP2-Cre GCaMP6 Transgenic Mice
1062	Abigail Fors	Light It Up
1064	Meagan Haase	Electro-Lemon
1069	Kerui Yang	A Simple and Inexpensive Sensor for Glucose and Fluoride Using Boric Acid
1070	Samuel Aronson, Alex Cheng	Predicting the risk of chemotherapy-induced cardiotoxicity in breast cancer patients using supervised machine learning
1072	Molly Carroll, Mari Leland	Breaking the Barrier to Safe Food: Identifying Functions for Disruption of Foodborne Pathogen Biofilms
1073	Mani Chadaga, Akshay Nambudiripad, Alexander Hydrie	Utilizing Python-scripted Neural Networks to Identify the most Indicative Factors of Heart Disease
1074	Saahil Chadha, Elena Romashkova	Evaluating Protein Reconstruction Methods using Kai Circadian Rhythm Proteins
1075	Gabrielle Evans	Identification and evaluation of function of conserved and mutated regions of the RyR1 and RyR2 between species.
1076	Rachel Khodursky	On the Prevalence of Antibiotic Resistance
1078	Pranav Rupireddy	Untangling Parkinsonian Dynamics: Analyzing Spatio-Temporal Neural Spiking Patterns under Second-Order Network Structures in Parkinsonian-like networks
1079	Sydney Weinandt, Sam Swanson	Survival of the Fittest: How Microbes Survive in Underwater Volcanos
1080	David Ahrens, Christiana Wilke, Cassidy Roland	Spilling the Beans: A Ground-breaking Approach to Mitigate Phosphorus Loss in Urban Agriculture
1086	Tatum Frey, Grace Campbell	Effects of Fertilizers on Orthophosphate Levels in Fresh Water Lakes
1087	Garrett Johnson, Taylor Hermansen	Effects of pollution on algae oxygen production within 24 hours of exposure
1088	Haley Jostes	Using Ceratophyllum Demersum as a Water Filter and Fertilizer in an Organic Farming Cycle
1089	Neil Khadilkar	Global Climate Change - Hoax or Reality: A stochastic simulation of macroscale causal factors and effects on life indicators
1091	Kent Le-Vu	Effects of H202 on Seeds

1095	Elsa Runquist	Tardigrade Abundance as a Bioindicator for Water Quality
1097	Ayush Shah	Development of a Polymer-Based Fertilizer From Readily Accessible Food Waste
1098	Rachel TerHaar, Arika Robinson	The Effects of Glyphosate on Pomacea bridgesii
1099	Claire Wentzlaff	The Effect of Non-Pathogenic Bacteria on the Invasive Species Lemna minor (Duckweed), Year II
1100	Diana Zhu	Global Pattern of Solar Cycle Impacts on Nitrogen Dioxide Levels
1101	Milan Jostes	Concussion Sensing Helmet
1102	Dylan Vincent, Nathan Tank	Cellophane to Sensor: Designing a Low-cost Method for Detecting and Characterizing Oil in Water
1103	Nawal Mahamed	The effect of heat on neodymium magenst
1104	Reed Thoma	Methane Production From Manure
1105	Ushmil Azad	Energy Consumption of Cooking Oil Using a Calorimeter
1106	Casey Hennessy	Efficiency Improvement of Photovoltaic Solar Cells Using Forced Air Convection
1110	Avni Jain	Wastewater Treatment: Utilizing hydroponics to develop a novel and sustainable solution to nutrient pollution
1111	Stanley Kohls	Comparison of adsorption and absorptive methods of metal immobilization in the in vitro quaternary treatment of AMD with Oedogonium spp.
1112	Manashree Padiyath	Pulp Fiction?! Lead remediation with biochar made from the Apiaceae (Carrot) plant family (Year 2)
1114	Nancy Wang	Disaster Resistant House
1115	Marwah Ismail	Effects of UV Radiation on Different Types of Cotton
1116	Katelyn Kleiter	Mushroom Packaging
1118	Aaron Bae	Characterizing the Measles Virus: Analyzing Pediatric Hospitalizations from 1997-2012
1120	Irene Choi	DNA-Engineering Bacteria with CRISPR-Cas9 and lambda-Red Recombinant System
1121	Kiah Christopherson	Affects of Pollution on Microorganism Populations
1122	Maya Czeneszew, Erica Iliarski	Terminating Tuberculosis: Creating a Bacterial Model to Determine the Genetic Basis for Rifampicin Tolerance
1124	Isabel Dieperink, Valerie Bares	Adding Calcium Chloride to Improve Bacterial Adhesion in a Xylem Filter: A Novel Mechanism for Water Filtration
1126	Addison Gleekel, Melinda Samaratunga	Turning the tide against ocean pollution: Investigating the role of VanK in aromatic acid chemotaxis
1127	Jeffrey Huang	Investigating the effects of the light-dark cycle and wavelength of light on the length of bioluminescence of P. lunula
1128	Brianna Kieffer	What Mouthwash Kills The Most Bacteria?
1129	Emma Meyer	Zapping Zits
1131	Marwa Osman	Effects of Garlic on E. Coli
1132	Kerrie Schaefers	Does irradiated chicken have more bacteria than fresh or frozen chicken?
1135	Riley Will	A Study of the Effects of a Biotinylated Peptide from BAM on the Growth of Escherichia coli

1138	Abigail Banks-Hehenberger	The Metal at the End of the Rainbow: Using Digital Spectroscopy to Draw Correlations Between Molarity of Solute and Line Intensity of Heavy Metal Ions to Identify Pollutants in Urban Water Sources
1139	Leonardo Clarke	The Relationship Between the Primary Pulsation Period and the Blazhko Effect in RR Lyrae Variables
1141	Grace Aerts, Alice Andrastek, Emma McGrew	Seed Germination
1142	Luke Chen	Freezing Point Depression in Brassica rapa using Methyl Alcohol
1143	Ravi Chepuri	Feeding the World: Efficient Soybean Modification with DNA Replicons
1144	Flannery Enneking-Norton	Exploring the facilitative relationship between Rhamnus cathartica and Lumbricidae
1145	Fatima Garza-Ramon	Square Foot Gardening Vs. Normal Gardening
1147	Fiona Kinney, Abby Samuel, Faben Bekele	Cloning African Violets: Using the Stem, Flower and Leaf to Achieve the Most Accurate Replica
1149	Katie Lyon, Gregory Johnson	Effectiveness of Chlorella Algae in the Bioremoval of Sodium ions from an Artificial Pond Ecosystem
1153	Rachel Ryan	Rehabilitation of Soil with the Use of Polymers
1156	James Clinton, David Mah	Weed Spotting: Using Machine Learning to Identify Dandelions
1157	Michael Hall, Daniel Ellis	CARL: A Convolutional Neural Network Powered Self-Driving Car
1158	Parthiv Krishna	Development of Autonomous Unmanned Aerial Systems for Semi-Dense Point Cloud Generation in Disaster Scenarios
1159	Maxwell Rader, Christopher Simmons	Robotic Exoskeleton for Rehabilitation Applications
1162	Camryn Franke	Optimizing Escherichia coli Energy Usage for Chemotaxis and Reproduction Through Experimental Evolution
1163	Xee Thao	Determining if Methyl IAA is Naturally Present in Arabidopsis thaliana

Excellence Award

1130W	Alana Mueller	Which Household Cleaners Clean the Best?
1101T	Milan Jostes	Concussion Sensing Helmet
1055W	Thomas Peterson, Kylie Spangler	The Key to a Cure: Unlocking new cancer treatments using immunotoxins
1053W	Emma Carr	Sex, Mice, and Alzheimer's: Linking neurodegenerative disease and gender through mouse models
8030S	Alharith Dameh	Does Your Water Fit the EPA's Standards (and how does it affect you)?
7082W	Benjamin Ertl	5 Second Rule?
7033W	Lark Davis	Bombs Away: The impact of citric acid on the time it takes for a bath bomb to dissolve.
7046W	Amira Sinclair, Natol Nejo	What are the corrosive effects of sour candy?
1025S	Grace Dombrow Jr., Neesha Moore Sr.	Jell-o Mate
7009S	Gay Htoo	How Does Music Affect Your Concentration
7059T	Elianan Sileshe	How Does Temperature Affect Light Intensity?
8019W	Abirami Rajasekaran	Carbon Conundrum
8022S	Betsy Hofer	How Do Essential Oils Affect The Apoptosis Of HL-60 Cancer Cells
8046S	Samuel Skinner	How Does the Temperature of a Superabsorbant Polymer Affect the Rate it Absorbs Water?
8068S	Will Schmitt	Something Out of Nothing: Using Greywater to Grow Plants Aeroponically

Emerging Scientist

1130W	Alana Mueller	Which Household Cleaners Clean the Best?
1104T	Reed Thoma	Methane Production From Manure
1138T	Abigail Banks-Hehenberger	The Metal at the End of the Rainbow: Using Digital Spectroscopy to Draw Correlations Between Molarity of Solute and Line Intensity of Heavy Metal Ions to Identify Pollutants in Urban Water Sources
7046W	Amira Sinclair, Natol Nejo	What are the corrosive effects of sour candy?
7018W	Dureti Gamada	What is the effect of naturally sweetened coke on teeth compared to other coca cola products?
8002T	Katherine Coppa	Fears Through the Ages
8041S	Seamus Dougherty	How Do Various Flying Organisms Differ From Mechanical Objects In Flying Technique and Design?
8030S	Alharith Dameh	Does Your Water Fit the EPA's Standards (and how does it affect you)?
7051W	Gordon Novak	Water Purification
6015W	Norah Telander	Gummy Osmosis
7092S	Adam Gaudio	How Does pH in Water Affect Plant Type
8063S	Grace Bettenburg	How Does Microwave Radiation Affect Plant Growth?
8031T	Matthew Korf	Water Filtration
6024W	Adriana Rice	Can Magnets Generate Power
8005S	Erika Kyba	Can a Smile Affect One's Opinions?

School Trophies

Annunciation Catholic School
Augsburg Academy for Health Careers
Battle Creek Middle School
Benilde-St. Margaret's High School
Blake School
Blessed Trinity Catholic School
Breck High School
Breck Middle School
Burnsville Senior High School
Calvin Christian School (Edina)
Capitol Hill Magnet
Central High School (St. Paul)
Central Middle School (Eden Prairie)
Chanhassen High School
Chaska High School
Como Park Senior High School
Concordia Academy (Roseville)
Cyber Village Academy
Eagle Ridge Middle School
East Ridge High School
Eden Prairie High School
Edina High School
Friends School of Minnesota
Highland Park High School
Highland Park Middle School
Hill-Murray School
Hopkins West Junior High School
Humboldt Senior High School
Laura Jeffrey Academy Charter
Math and Science Academy
Metcalf Middle School
Midwinter Academy
Minnehaha Academy North Campus
Minnetonka East Middle School
Minnetonka Senior High School
Minnetonka West Middle School
Mounds View High School
Mueller Academy
Murray Middle School
Nativity of Our Lord School
New Life Academy
Nicollet Middle School
Oak-Land Middle School
Orono Senior High School
Parnassus Preparatory School
Presentation of the Blessed Virgin Mary
Richfield Middle School

Saint Ambrose of Woodbury Catholic School
St. Charles Borromeo School
St. Croix Preparatory Academy
St. Helena Catholic School
St. Paul Academy & Summit School
St. Thomas More Catholic School
Stillwater Area High School
Stillwater Junior High School
Transfiguration Catholic School
Washburn High School
Washington Technology Magnet School
Wayzata High School
Woodbury Senior High School