

**The 68th Annual**

CALIFORNIA  
**SCIENCE &  
ENGINEERING**  
**FAIR 2019**



PRESENTED BY

***NORTHROP GRUMMAN***



**April 29-30, 2019**

California Science Center  
Exposition Park • Los Angeles



## OFFICE OF THE GOVERNOR

April 29, 2019

California Science Center,

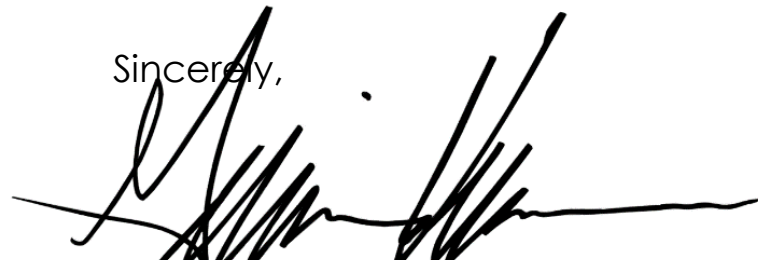
Greetings to everyone attending the 68th annual California Science & Engineering Fair and congratulations to all the participants.

I am excited that so many young Californians have such a strong passion for science. Your projects are remarkable and I applaud you for earning a spot in this statewide competition. California is a world leader in scientific discovery and innovation, and I am confident that with your help, our state will continue that legacy.

Thanks to all of the competition's judges and organizers for contributing their time and talents to our students. I also appreciate the teachers, parents, and other influential adults whose support has helped nurture and develop these bright young minds.

On behalf of California, I send my very best wishes for a memorable and spirited competition.

Sincerely,



Gavin Newsom



April 29, 2019

We are pleased to welcome you to the 68th Annual California Science and Engineering Fair. The very first science fair west of the Mississippi River took place in Los Angeles in 1952 with 237 students. It has since grown to become the official science fair competition for the State of California with nearly 1,000 students from every region of the state competing in over twenty different scientific disciplines.

California Science &  
Engineering Fair Board

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Philip M. Fine, Ph.D.

Christopher M. Gould, Ph.D.

Thomas R. LeBon, Ph.D.

Geraldine J. Peters, Ph.D.

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Since that first Science Fair, advances in science, technology, engineering and mathematics (STEM) have transformed our world with countless innovations and breakthroughs. The innovations that you are thinking of today will change the way we interact with the world around us and with each other. Every single one of the young men and women whose curiosity has led them to present their projects here today will also lead us into the future.

This extraordinary event is hosted and produced by the California Science Center Foundation and the dedicated volunteers of the California Science and Engineering Fair Board. It is made possible by the generous contributions of our donors, and the hard work and enthusiasm of our volunteer staff and judges as well as the staff of the California Science Center.

We are deeply grateful to all the supporters of this statewide competition, with a very special thanks to our Presenting Benefactor, Northrop Grumman Corporation, for its tremendous generosity and commitment to making this event a reality. We also wish to acknowledge: Chevron Corporation, Broadcom Foundation, Gilead Sciences, Inc., THE MUSES of the California Science Center Foundation, The Ralph M. Parsons Foundation, United Airlines, and The Cheryl Saban Self-Worth Foundation for Women and Girls for their generous support.

The students participating in today's Science and Engineering Fair are the promising young innovators, explorers and leaders of tomorrow. Hard work and discipline brought you here today, and the work you are doing is not only exciting, it is important. We admire and applaud you!

Congratulations and best of luck to you all!

Sincerely,

A handwritten signature in black ink that reads "Barbara B. Henderson". The signature is fluid and cursive, with a long horizontal stroke at the end.

Barbara B. Henderson  
Chair  
2019 California Science & Engineering Fair

700 Exposition Park Drive  
Los Angeles, California  
90037

[www.californiasciencecenter.org/](http://www.californiasciencecenter.org/)  
CSSF

## **2019 California Science & Engineering Fair Board**

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**CALIFORNIA SCIENCE & ENGINEERING FAIR**

**2019 Special and Recognition Awards**

To sponsor a Special or Recognition Award at the 2020 California Science & Engineering Fair, please contact Bob Anderson, Director of External Awards at CSEFExtAwards@gmail.com.

***SPECIAL AWARDS***

- Cheryl Saban Self-Worth Foundation Scholar Prizes, *Cheryl Saban Self-Worth Foundation for Women and Girls*
- Herbalife Nutrition Award, *Herbalife Nutrition*
- LA BioMed Award for Excellence in Biochemistry and Molecular Biology, *LA BioMed, Los Angeles Biomedical Research Institute at Harbor-UCLA Medical Center*
- Math Teacher's Awards for Achievement in Mathematical Sciences and in Computational Systems and Analysis, *Anonymous*
- Past Chairpersons' Humanitarian Award, *Liz Snyder and Hal Snyder*
- SoCalGas Energy Awards, *SoCalGas, Southern California Gas Company*
- South Coast AQMD Air Quality Awards, *South Coast Air Quality Management District*
- Southern California National BioGENEius Award, *SoCalBio, Southern California Biomedical Council*
- USC Center for Economic and Social Research Special Award, *USC Center for Economic and Social Research*

***RECOGNITION AWARDS***

- A&WMA Environmental Leadership Awards, *Air and Waste Management Association, West Coast Section*
- AACC Clinical Chemistry Awards, *AACC, Southern California Section of American Association for Clinical Chemistry*
- AIPG Geoscience Awards, *AIPG, American Institute of Professional Geologists, California Section*
- Biophysics Award, *Biophysical Society*
- Biosero Innovation Award, *Biosero, Inc.*
- Bone Clones Research Award, *Bone Clones Osteological Reproductions*
- CAPS Science Achievement Award, *California Association of Professional Scientists*
- Center for Plant Cell Biology Awards, *Center for Plant Cell Biology, University of California, Riverside*
- CSBPA Best Coastal Science Awards, *CSBPA, California Shore and Beach Preservation Association*
- Director's Award for Most Innovative Alternative Energy Project, *Bob Anderson, California Science & Engineering Fair Director of External Awards*
- Doctors Sushila and Chandi Charan Kar Award, *Sheila Kar Health Foundation*
- Lemelson Early Inventor Prize, *Society for Science and the Public partnered with The Lemelson Foundation*
- Plug In America EV Excellence Awards, *Plug In America*
- SPIE Optics and Photonics Recognition Awards, *SPIE, The International Society for Optics and Photonics*
- STEM World Visionary Award, *STEM World*
- UCLA Brain Research Institute Awards, *Brain Research Institute, University of California, Los Angeles*
- USC Center for Economic and Social Research Recognition Award, *USC Center for Economic and Social Research*



**California Science Center**  
**CALIFORNIA SCIENCE & ENGINEERING FAIR**  
**2019 SCHEDULE OF ACTIVITIES**

**Monday, April 29, 2019**

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10:00 a.m.	Registration opens
1:00 - 3:00 p.m.	Affiliated County and Regional Fairs Conference Location: California Science Center Administrative Offices, Conference Room 3 (Fourth Floor)
1:30 - 2:30 p.m.	Public Seminar: <i>How to Talk with a Judge</i> Location: MUSES Room, Wallis Annenberg Building
3:00 - 4:30 p.m.	* Public Viewing of Fair Projects Students are asked to be present at their displays
3:30 p.m.	Registration closes
5:00 - 6:00 p.m.	* <b>Opening Ceremony and Keynote Address</b> Location: Big Lab, Wallis Annenberg Building Speaker: Prof. Frances Arnold, <i>Linus Pauling Professor of Chemical Engineering, Bioengineering and Biochemistry at the California Institute of Technology – Nobel Prize, Chemistry, 2018</i>

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**Tuesday, April 30, 2019**

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7:00 a.m.	Science Center opens for judges and participants only
8:00 a.m.	* <b>Student Orientation</b> Location: Big Lab, Wallis Annenberg Building
8:00 a.m.	All judges examine project displays before the First Judging Session. No interviews will be conducted at this time because students should <i>not</i> be present until 8:30 a.m.
8:30 - 10:30 a.m.	* <b>First Session of Judging</b> for all awards, in parallel. Includes: All Category Awards, All Special and Recognition Awards, Science Fair Student of the Year project reviews
9:00 a.m. - 12:00 p.m.	California Science & Engineering Fair Teacher of the Year Interviews Location: California Science Center Administrative Offices, Conference Room 3 (Third Floor)
10:30 - 11:00 a.m.	<b>Scheduled Break in Judging.</b> Students are free to leave the display area now. No interviews by any judges (for either Fair or external awards) will be conducted during this time.

## Schedule of Activities

**Tuesday, April 30, 2019**

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- 11:00 a.m. - 12:30 p.m. \* **Final Session of Judging** for Category and Special Awards. Recognition Awards presented to winners at their projects.
- 12:30 p.m. Judging Ends. All participants must exit the Science Center. All displays must remain in place until the Removal Time (below).
- 12:30 p.m. Students are now free. First among the local opportunities is the Science Fair Seminar at 2:00 p.m. Other sites include California Science Center and IMAX Theater, Natural History Museum of Los Angeles County, California African American Museum, and USC.
- 12:30 p.m. California Science & Engineering Fair Student of the Year Finalists Announced  
Location: Under the Rotunda, outside Science Center south doors
- 1:30 p.m. California Science & Engineering Fair Student of the Year Interviews  
Location: California Science Center Administrative Offices, Conference Room 3 (Third Floor)
- 1:30 - 3:30 p.m. **Project Removal**  
No projects may be removed before this time. All projects must be removed during this time. Unclaimed projects will be discarded.
- 2:00 - 3:00 p.m. Special showing of *Science Fair* from National Geographic  
Location: MUSES Room, Wallis Annenberg Building
- 4:00 - 5:30 p.m. \* **Awards Ceremony**  
Location: Big Lab, Wallis Annenberg Building  
*Closed to the public.*  
Only participants and award presenters will be admitted to the ceremony.

### **Awards Ceremony Viewing Locations**

**IMAX Theater** for Junior Division ticket holders

**MUSES Room** for Senior Division ticket holders

Only persons holding a ceremony viewing ticket will be admitted to these viewing rooms. Each CSEF participant will be given one division-specific ticket for distribution to an accompanying guest.

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\* Photographs will be taken, and press interviews (newspaper, radio, and TV) may be held at these times. Fair photographs will be posted to the World Wide Web. Please dress appropriately.



Junior Division  
**Aerodynamics/ Hydrodynamics**

Project Name	GdProject Title	Advisor	County
J0101 Aatresh, Arhana V.	8 Over the Wing: Effect of Wind Speed, Temperature, and Wing Angle on an Electrically Propelled Blown Wing's Performance	Mrs. Kameswari Rayaprolu	Santa Clara
J0102 Araujo, Natalie Centeno, Fredy Perez, Melissa	8 Blade Power 8 8	Mrs. Carly Mahoney	Riverside
J0103 Badawi, Ali H.	6 AnyFIN Is Possible! Testing Various Flyfishing Structures to Determine Which Fly Structure Has the Best Surface Tension	Mrs. Rula Alshanableh	Los Angeles
J0104 Bell, Emily E.	8 Fin Shape's Effect on Altitude	Ms. Angela Ward	Kern
J0105 Cho, Jacob N.	7 Golf Ball Aerodynamics	Mr. John Briner	Orange
J0106 Dao, Warren K.	8 Which Nose Cone Is the Best when Flown?	Mr. Nathaniel Sapalicio	Los Angeles
J0107 Dick-Peddie, Jennifer A.	7 Designing an Autogyro to Accurately Deliver a Payload to a Designated Landing Zone with the Slowest Descent Rate	Mrs. Juliana West	Santa Clara
J0108 Ekholdt, Lila E.	7 Panel Potential	Mr. David Haller	Humboldt
J0109 Gloster, Eoghan T.	8 Impact of the Depth of the Dagger Board during Different Points of Sailing	<none acknowledged>	Santa Barbara
J0110 Gross, Maxwell P.	8 How Proximity to a Surface Affects the Lift of an Aircraft	Mr. Wayne Conley	Santa Cruz
J0111 Huang, Charles Z.	7 Dual-Purpose Boba Straw: Design and Implementation of a Novel Straw for Choke-Free and Pleasant Drinking Experiences	Mrs. Heather Mackewicz	Santa Clara
J0112 Jackson, lamanni A.	7 The Coanda Effect: Does Temperature Influence Its Power?	Mrs. Laura Schultz	Kern
J0113 Land, Aidan D.	7 Wingin' It: Design and Construction of a Modular Model Aircraft for Wing Studies	Dr. Robert Dubrow	San Mateo
J0114 Maggiora, Megan M.	7 The Effect of Blade Variables on Wind Turbines	Ms. Michelle Talavera	San Benito
J0115 Manley, Gracyn E.	8 The Power of Wind: What Effect Does Blade Angle Have on the Voltage Output of a Wind Turbine?	Mrs. Rita Armstrong	Ventura
J0116 Ok, Martin	6 Frisbee Aerodynamics: The Effects of Varying Weights and Angles	Mrs. Elizabeth Kayee Conrad	Orange
J0117 Okawa, Michael J.	7 I'm a Big Fan: Determining What Shaped Blades Most Effectively Generate Power in Wind Turbines	Mr. Shaine Rasmussen	Mendocino
J0118 Paris, Hunter S.	8 Parachute Predicament	Ms. Gaea Reid	Mendocino
J0119 Pfahler, Beckett D.	7 Airfoil Shape Effect on Lift	Mrs. Sabitha Chanduri	Los Angeles
J0120 Pinto, Isabelle C.	8 Blown Away! How Does the Camber of a Wing Affect Turbulence with a Crosswind during Takeoff?	Mr. Sunil Pinto	San Bernardino
J0121 Smith, Maddox J.	7 I'm Your Wingman: Aerodynamics of Wings and Winglets	Mr. Eric Lawrence	Kern

## Junior Division Alternative Energy

Project	Name	Gd	Project Title	Advisor	County
J0201	Allende, Jorge A. Schuster, Owen L.	6 6	Making a Change for People Who Can't Afford Electricity	Ms. Shalyn Alton	Mendocino
J0202	Amarante, Breann M. Rocha, Jacqueline D.	7 7	Biodegradable Energy: Anaerobic Bacteria to Produce Renewable Energy from Compostables	Mrs. Stephanie Salas	Fresno
J0203	Doan, Vincent V.	7	Waste Heat Recovery Utilizing Bismuth- Telluride Thermoelectric Generators and Lauric Acid Phase Change Material	Mr. John Briner	Orange
J0204	Hubbard, Aryah	7	From Trash to Gas	Mrs. Rodora Antonio	Sacramento
J0205	Interiano, Catalina I. Perez, Johanna F.	7 7	Urine's Potential as a Biofuel	Mr. Robert Perez	Alameda San Francisco
J0206	Kakarla, Aditya S.	8	Using Phosphorescence to Increase Solar Panel Output	Mr. Sudhir Kakarla	Kern
J0207	Kamal, Muhammed Qaanith	7	Enabler: Power Generation Re-Imagined	Ms. Kennette Molway	Orange
J0208	Kumar, Riya	7	How Poop Can Power the Planet: Microbial Fuel Cells	Mrs. Ashley McKinley	Contra Costa
J0209	Lawrenz, Lillian H.	7	Temperature: The Impact on Windmill Power Output	Ms. Mairs Ryan	San Diego
J0210	Li, Brian M. Li, Emma M.	7 7	Designing and Implementing a Novel Solar Panel Tracker System Leveraging Reinforcement Learning Technique	Mrs. Vina Sethi	Alameda
J0211	Macias, Selena R.	7	Solar Energy to the Test	Mr. Joe Linares	Fresno
J0212	Mehrinfar, Samira M.	8	A Healthier Way to Fuel	Mr. John Briner	Orange
J0213	Prawira, Jordan	7	Spira Mirabilis: Improving the Performance of Archimedes Wind Turbine with Logarithmic Spiral Concept	Ms. Aily Salikin	San Joaquin
J0214	Schmidt, Caroline M. Streitman, Scarlett G.	8 8	WAVE Goodbye to Fossil Fuels: It's Time to SEA Energy Differently!	Mrs. Roxanne Hunker	San Diego
J0215	Togami, Alison L.K.	8	Dye-Sensitized Solar Cells Made with Fruits	Mr. Brad Penkala	Santa Barbara
J0216	Yoo, Marcus J.	7	Gravity Battery	Mrs. Bing Liu	Orange
J0217	Younes, Luca G.	6	Wave Energy Optimization	Mrs. Joanne Tinkham	San Mateo

Junior Division  
**Applied Mechanics & Structures**

Project	Name	Gd Project Title	Advisor	County
J0301	Alers, Lyra	7 Reuse of Plastic Waste in Concrete Bricks	Mr. Glenn Alers	Santa Cruz
J0302	Barrett, Vivienne K.	8 Hydraulic Powered Robotic Cardboard Arm	Ms. Kristen Barrett	Santa Cruz
J0303	Bhatkar, Ayaan S., Jr.	8 Minimizing Earthquake Damage for Buildings	Ms. Najwan Nasereldin	San Diego
J0304	Bishop, Heidi C.	7 Shake It Up: The Effect of Temperature on Building Materials During an Earthquake	Mrs. Kathy Blakemore	Riverside
J0305	Catanzaro, Marcus A.	7 Rock and Roll Derailment: Reducing Harmonic Oscillation in Trains	Mr. Pat Hollis	San Diego
J0306	Chen, Justin T.	6 The Portable Comfort Zone	Ms. Joele Hodgson	Los Angeles
J0307	Demegillo, Catherine M.	8 Comparing Grip Materials to a Cylinder Using a Hydraulic Arm	Mr. Tommy Mendibles	San Diego
J0308	Felts, Christian M.	8 Determining Factors that Increase Speed in Pinewood Derby Cars	Mr. Bret Mueller	Tuolumne
J0309	Frutos, Nicholas J.	6 Rocking the Boat	Mr. Oscar Garcia	Kern
J0310	Garza, Jack W.	8 The Effect of Weight on Flywheel Performance	Mrs. Marilyn Garza	Santa Barbara
J0311	Gianola Cook, Alexander C. Hand, William D.	8 Measuring Optical Disc Storage Capacity 8	Ms. Emily Scavarda	Monterey
J0312	Golwala, Aadit	7 Offshore Floating Wind Turbines: Reducing Complexity and Cost by Turning the Entire Structure into the Wind	Mrs. Heather Mackewicz	Santa Clara
J0313	Grigorian, Jake P.	8 Which Robotic Apparatus Toggles a Flag the Most Efficiently?	Mrs. Lida Gevorkian	Los Angeles
J0314	Harikrishna, Abhinav Swarnapuri, Tanish	7 Need a Hand? Arduino-based Prosthetic Hand 7 Hand	Mrs. Kanchan Bhandare	Santa Clara
J0315	Harris, Parker J.	8 Protective Barrier for Classrooms	Mrs. Bridget Biernacki	San Diego
J0316	Juluri, Ishan Z.	6 The Effect of Tuned Mass Dampers on Oscillating Buildings	Dr. Youseff Ismail	Santa Clara
J0317	Kilmer, Samantha N.	7 Shake It Off	Mrs. Caren Gastello	San Benito
J0318	Mala, Talha	8 Follow That Sun! How Does the Output of a Solar Tracker Vary from the Output of a Solar Panel?	Mrs. Selena Khan	Los Angeles
J0319	Menon, Lakshmi	8 Developing a Multimodal Robotic Scoop	Mrs. Roxanne Hunker	San Diego

Junior Division  
**Applied Mechanics & Structures**

Project	Name	Gd	Project Title	Advisor	County
J0320	Ngo, Nadine Paula T. Sandhu, Aasees K.	7 7	The Smart Socket	Mr. Nelson Hori Mrs. Sarah Rahman	Santa Clara
J0321	Nguyen, Alexander T.	8	Exoskeleton Actuation	Ms. Eileen Resnick	Santa Clara
J0322	Nikolian, Alex V.	8	R.O.E.D. (Robotic Ocean Exploring Device)	Mr. Josue Hernandez	Los Angeles
J0323	Olson, Quinn K.	6	Shock Absorption: Can You Feel It?	Dr. Robert Dubrow	San Mateo
J0324	Pelz, Joseph R.	8	The Effect of Suspension on Jumping a Mountain Bike	Ms. Joellen Pelz	Santa Cruz
J0325	Saldavia, Nicholas S.	6	Fallen Arches: The Surprising Strength of Eggshells	Mrs. Tammy Arghavani	Santa Cruz
J0326	Vu, Brianna H.	8	The Textile Strength of Homemade Bioplastic	Mr. John Briner	Orange
J0327	Wong, Bryce	8	Give Your Back a Break: Improving Backpacks through Biomechanics	Ms. Megan Margeson	Los Angeles

Junior Division  
**Behavioral & Social Sciences**

Project	Name	Gd	Project Title	Advisor	County
J0401	Afra, Aviya S.	7	Investigating the Correlation between Demographics and Attitudes towards Contemporary Social Movements	Mrs. Roxanne Hunker	San Diego
J0402	Bryant, Michelle D.	7	Children Value Something More If They Worked for It	Ms. Debbie Culley	San Diego
J0403	Chahine, Samsara	8	Single-Use Plastic Straws: Taken by Habit, by Preference, or with Ignorance?	Mr. Brad Penkala	Santa Barbara
J0404	Coria, Danna	7	Can You Take the Heat?	Mrs. Elizabeth Kayee Conrad	Orange
J0405	Das, Jai K.	7	The Color of Aggression: Does Yellow-Green Lighting Cause More Aggressive Responses in Humans than Blue Lighting?	Mr. Adrian Das	Tulare
J0406	Hecht, Sydney N.	8	Testing the Impact of Gender on a Variation of the Prisoner's Dilemma	Mrs. Roxanne Hunker	San Diego
J0407	Hussain, Safaa F.	8	Reward, Praise, and Criticism: Tangible vs. Intangible Reward Expectancy: What Works Best?	Mrs. Swapna Mayya	Santa Clara
J0408	Ikeda, Robert T. K	7	Does Parental Guidance Affect Smartphone Addiction?	Mrs. Kristi McCracken	Tulare
J0409	Kasad, Paloma S. Vizcaino, Emilio T.	7 7	Technology's Blue Light and Its Effect on Our Sleep	Mr. Alex Hofsteen	Monterey
J0410	Louie, Arwen X.	7	The Color of Personalities: Introversiion, Extroversiion, and the Surprising Effect of Gender on Artistic Expression	Mrs. Nicole Mitchell	Ventura
J0411	Manfredo, Gianna N.	6	According to the Social Learning Theory, At What Age Can Parents Influence a Child's Political Views?	Mrs. Heather Bridger	Fresno
J0412	Mukherjee, Aarya	8	Puff the Vaping Dragon: A Study of Knowledge and Interest in E-cigarettes among Middle School Students	Dr. Robert Dubrow	San Mateo
J0413	Mullen, Eleanor L.	8	Stop, You're on Camera! The Effects of Emotional and Consequential Messaging on Driving Behaviors	Ms. Gladys Vaca	San Francisco
J0414	Olayiwola, Darius	7	Is Gaming Good or Bad?	Mr. Mykel Gaspar	Contra Costa
J0415	Oliver, Rinoa J.	7	Factors Affecting the California Science and Engineering Fair Results	Dr. Jane Zones	Santa Cruz
J0416	Pupko Ginsberg, Eduardo M.	8	All for One, or One for All?	Ms. Lily Deveau	San Diego
J0417	Quezada, Adriana J.	7	The Science of Stuttering	Mrs. Gena Heins	San Diego

Junior Division  
**Behavioral & Social Sciences**

Project	Name	Gd	Project Title	Advisor	County
J0418	Richland, Ayla C.	7	A Catchy Bug	Mr. Eric Hartung	Los Angeles
J0419	Ritter, Emily	6	Give and Take	Mrs. Blair Gonzalez	Santa Cruz
J0420	Savant, Ainsley E.	8	Vigor and Verts: Are Introverts or Extroverts Healthier?	Mrs. Gena Heins	San Diego
J0421	Sherf, Audrey T.	7	Effects of Text Modifications on Reading Fluency Levels of Dyslexic Students	Ms. Gaea Reid	Mendocino
J0422	Stambaugh, Eden E.	7	Developing Empathy in Adolescents	Ms. Debbie Culley	San Diego
J0423	Vasquez, Alexa	8	Media Mindlessness	Mrs. Kathryn Cooney	Riverside
J0424	Wodarz, Paulina F.	8	The Evolution of Human Feelings through Writing over Two Hundred Years	Mrs. Sandi O'Brien	Orange

Junior Division  
**Biochemistry/ Molecular Biology**

Project	Name	Gd	Project Title	Advisor	County
J0501	Belbese, Haya M.	8	The Road to the Cure of Alzheimer's	Ms. Najwan Nasereldin	San Diego
J0502	Bhattacharya, Konish	8	Green Synthesis of Silver Nanoparticles Using Asparagus Extract and Their Use as Antibacterial Agent	Mr. Michael Matthews	Santa Cruz
J0503	Chen, Gordon Z. Huang, Jacob Z.	8 8	Inhibiting Rabies at the Molecular Level	Ms. Tina Kim	Santa Clara
J0504	Chu, Conner L.	8	Wave Rave: A Competitive ELISA for the Quantitative Analysis of Vitamin B12 before and after Micro-Radiation Exposure	<none acknowledged>	Los Angeles
J0505	Daw, Arianne G.	8	How Do Genetics Affect the Way People Respond to Drugs?	Mr. Ahmad Rice	San Diego
J0506	Debnath, Kirin	6	Making Better Bread by Modifying a Yeast	Dr. Jayanta Debnath	San Mateo
J0507	Duarte, Cesar	7	Where Is the C?	Mrs. Christina File	Kern
J0508	Ghosh, Ishan	8	Evaluating Effectiveness of Select Natural Remedies: Anticoagulating Properties on Bovine Plasma: An in vitro Study	Mr. John Wood	Orange
J0509	Katikireddy, Samaya Kundu, Roma	6 6	Variation of DNA Yield from Different Plant Species: GMO vs Organic vs Non-GMO	Mrs. Ginger Byrd	Fresno
J0510	Lin, Julianne G.	7	How to Maximize Iron Absorption from Food	Ms. Karen Chen	Fresno
J0511	Luc, Chelsey H. Zheng, Michelle J.	8 8	How Do Different Types of Flour in Sourdough Starter Affect the Resulting Bread?	Mr. Raymond Gonzales	Ventura
J0512	Marshburn, Timothy R.	8	Tricking the Brain Into Smelling Differently	Mrs. Bridget Biernacki	San Diego
J0513	Nepomuceno, Lea A.	8	Different Percentages of L-Ascorbic Acid Affecting the Percutaneous Absorption of Frozen Pig Skin Tissue	Mr. Tommy Mendibles	San Diego
J0514	Pandey, Samagra	8	Effect of a Yeast Suspension's Aeration Length on its Metabolic Rate	<none acknowledged>	Orange
J0515	Pfleger, Tristan	8	Are Minke Whales or Mice More Closely Related to Humans?	Ms. Emily Scavarda	Monterey
J0516	Ramanujam, Disha	7	Which Has More DNA Degradation: Organic or Non-Organic Plant Produce?	Dr. Brian Dorsey	Los Angeles
J0517	Rameson, Kylie J.	8	How Temperature Affects the Expression of a Jellyfish Glow Gene	Mr. Tyler Rameson	Santa Barbara
J0518	Rorty, Flynn A.	7	Starch Struck: The Effect of Dietary Amylase on Starch Digestion	Ms. Claire LeGall	Santa Cruz
J0519	Sahagun, William Ian Lyle B.	8	Investigating the Inhibitory Effect of Psidium guajava Leaf Extract on Carbohydrate Digestive Enzymes	Mrs. Cynthia Hanna	San Bernardino
J0520	Senthil, Nikita	8	Feed the Diatoms: The Effect of Iron Filings on the Oxygen Production of Thalassiosira Diatoms	Mrs. Swapna Mayya	Santa Clara
J0521	Stewart, Nala E.	8	Skunk Attack!	Mrs. Renee Rosas	Riverside
J0522	Truong, An V. Truong, Tu V.	8 7	Effect of pH on Teeth Staining	Dr. Thy Nguyen	Kern
J0523	Whetsel, Isabelle C.	8	Glorious Gluten: An Experiment Measuring the Amount of Gluten in Different Flours	Mrs. Emily Hoffman	Los Angeles

## Junior Division Chemistry

Project	Name	Gd	Project Title	Advisor	County
J0601	Alexander, Kyle A.	7	Electrolysis of Water	Mrs. Tricia Dunlap	Tuolumne
J0602	Allen, Lucile L.B.	8	How to Build a Better Cupcake	Mrs. Susan Sherwood	Tulare
J0603	Alvarez, Raven J.L.	8	Using Chemistry to Remove Carbon Dioxide from the Atmosphere	Mr. Nicholas Dedini	Humboldt
J0604	Berry, Trevor K.	6	Studying the Decomposition of Cotton and Polyester Fabric	Mrs. Heather Bridger	Fresno
J0605	Bluml, Sabrina B. Chand, Shruti	8 8	How to Produce the Most Fizz with Bath Bombs	Mrs. Emily Hoffman	Los Angeles
J0606	Byrne, Brendan C. Schilling, Evelyn M.	8 8	Fueling the Future: Beyond the Limits of Water?	Mr. Steve Wait	Santa Cruz
J0607	Chatha, Himmut	6	Testing Different Methods of Water Electrolysis: Lead Pencil Electrodes vs. Metal Thumbtack Electrodes	Mrs. Katherine Auffant	Kern
J0608	Chen, Eva Y.	8	Revisit to the Synthesis of 1-(2-fluorophenyl)-1H-imidazole	Mrs. Reggie McLean	Fresno
J0609	Chen, Maxwell Y.	7	How Can We Efficiently Generate Hydrogen from Water?	Dr. Yi Peng	Santa Cruz
J0610	Connolly, Aralyn Tsai, Claire	7 7	The Effect of Temperature and Light Exposure on Pigments in Picked Leafy Greens	Ms. Yunpei Tsai Mr. Don Angelo	Santa Clara
J0611	Dhamim, Noorah Fathima	8	A Bio-Friendly Oil Spill Remover	Ms. Najwan Nasereldin	San Diego
J0612	Feague, Ingrid J.	6	Taming Coulomb: How Solutes Affect the Reaction of Sodium Immersed in Water	Mr. Ben Vanderplas	Santa Cruz
J0613	Gonzalez, Clarissa A.	7	The Chemical Reactions of a Lava Lamp	Mrs. Helen Yap	Ventura
J0614	Hessler, Hannah K.	8	Can Dry D-cell Batteries Oxidize Carbon Monoxide to Save Your Life in a Fire?	Mrs. Felicia Patton	Kern
J0615	Kamarshi, Hemani V.	6	Investigating Amounts of Vitamin C in Cut Fruits Left in Refrigerator over Time	Mrs. Corinna Chung	Santa Clara
J0616	Kiran, Aditi B.	6	Effect of the Amount of Glycerin on the Strength of Starch-Based Bioplastics	Mrs. Vimala Sampath	Alameda
J0617	Lai, Malvyn	8	Catalyst Efficiency for Producing Energy Fuels by Water Splitting	Mr. Huy Tran	San Diego
J0618	Lin, Grace	8	Keep the Ice Warm: Measuring How Initial Temperature Affects Sodium Acetate Hand Warmers	Mrs. Emily Hoffman	Los Angeles
J0619	MacAvoy, Alexis T.	8	Designing Efficient, Low-Cost, Eco-Friendly Activated Carbon for Removal of Heavy Metals from Water	Mr. Brittan Bounds	San Mateo
J0620	Magugat, Justin R.	7	Boiling under Pressure	Mrs. Alison Hamm	Kern



## Junior Division Chemistry

Project	Name	Gd	Project Title	Advisor	County
J0621	Manns, Taryn E.	6	Fe-ueling Iron Absorption	Mrs. Sarah Burleson	Kern
J0622	Menefee, Ryan R.N.	8	Does the pH of Water Exposed to Hydrogen and Oxygen Change after Separation by Electrolysis?	Mr. Willie Mitchell	Solano
J0623	Perez, Anthony F.	7	Salt, Salt, Salt!	Mrs. Elizabeth Kayee Conrad	Orange
J0624	Puga, Daniel	7	Metal Corrosion: How Oxygen Affects the Rate of Corrosion in a Wet/Dry Case	Mr. Patricio Puga	Kern
J0625	Reyes, Alana S.	7	Which Element Produces the Greatest Amount of Hydrogen in the Electrolysis of a Water and Sodium Hydroxide Solution?	Mrs. Rosemary Lopez	Fresno
J0626	Sajid, Uzair	8	The Emergence of a New Fuel Cell	Mr. Ahmed Sajid	Los Angeles
J0627	Stys, Summerlyn R.	7	Sugar and a Drink: How Hot Can It Get?	Ms. Chelsea Humkey	San Diego
J0628	Truong, Sofia N.	8	Corrosion in Motion	Mrs. Sharalene Dickens	Kern
J0629	Vogety, Shreya	7	Factors Affecting Crime Scene Investigations	Mr. Ramanagopal Vogety	Contra Costa
J0630	Watson, Sophia M.D.	7	Bang! The Chemistry of Black Powder	Ms. Kathleen Devlin	San Bernardino
J0631	Yang, Jason	7	Solving the Global Water Crisis	Mrs. Rosemary Lopez	Fresno
J0632	Yang, Lily	8	Electrolyte Challenge	Mrs. Adrienne Griffith	Riverside

## Junior Division Cognitive Science

Project	Name	Gd	Project Title	Advisor	County
J0701	Bartsch, Andrew R.	8	Playing Fortnite: A Distraction for Pain to the Brain	Mr. Michael Bridges	San Diego
J0702	Collom, Paige E.	6	Does Right Brain Stimulation Affect Reading Comprehension for Dyslexic Students?	Mr. Donald Scott	Placer
J0703	Copeland, Kylie D. Houk, Alexandra A.	8 8	Effects of Auditory Cues on Recall of Visual Materials	Mrs. Roxanne Hunker	San Diego
J0704	Dajani, Hamza	7	Reading, Focus, and the Elderly	Mrs. Rula Alshanableh	Los Angeles
J0705	Ehsan, Victoria V. Nieves Ellis, Roeszele S.	8 8	Assessing Responses to Music in Alzheimer's and Dementia Patients	Mrs. Roxanne Hunker	San Diego
J0706	Elasaad, Leila S. Ryan, Leia A.	7 7	Attention vs. Retention: Effects of Notetaking on Short and Long Term Memory	Mrs. Roxanne Hunker	San Diego
J0707	Harianawala, Adnan Hoang, Matthew J.	6 6	Testing Creativity in Different Ages	Mrs. Tracy Chung	Orange
J0708	Hoffmann, Angie R.	7	Does Age or Gender Affect Change Blindness?	Ms. Megan Margeson	Los Angeles
J0709	Hollars, Nina M.	7	Mind over Motion: The Motion-After Effect	<none acknowledged>	Calaveras
J0710	Huda, Arissa Jin, Michelle Z.	8 8	The Effect of Fear on Spatial Perception	Ms. Tina Kim	Santa Clara
J0711	Joshi, Swaraa Omer, Inaaya	7 7	The Effects of Stress on Memory and Performance	Mr. Omer Siddiqui	San Mateo
J0712	Kareem, Rozita	7	Can Chewing Gum Help with Concentration?	Ms. Najwan Nasereldin	San Diego
J0713	Kaur, Simratpreet	7	Head Rush	Ms. Reagan Rostain	Kern
J0714	Richards, Lydia M.	7	Total Recall: Testing Memory during Expected and Unexpected Events	Mr. Nick Richards	Santa Cruz
J0715	Thaper, Mehar K. Weston, Jamie (Jane) A.E.F.	7 7	Effects of Transient Emotions on Short Term Memory	Mrs. Roxanne Hunker	San Diego
J0716	Thomsen, Keddy A.	7	Identifying Color Blindness in the Primary Grades	Mrs. Franziska Shelton	Santa Barbara
J0717	Ugoretz, Hattie M.	8	The Music of Memory: How Singing Affects the Ability to Learn	Mr. James Jackson	Santa Barbara
J0718	Vinay, Ananya	8	Disruption of Circadian Rhythm: A Big Price to Pay if We Disregard Nature's Zeitgeber	Ms. Kay Barrie	Fresno
J0719	Weddington, Owen K.	8	The Ikea Effect: How Does Participation Influence Perceived Value?	<none acknowledged>	Santa Barbara

Junior Division  
**Earth & Environmental Sciences**

Project	Name	Gd	Project Title	Advisor	County
J0901	Afewerki, Essey T.	7	Effect of Fire on Soil	Dr. Teamrat Ghezzehei	Merced
J0902	Aswad, Farah Z.	7	Growing Algae in Different Conditions	Ms. Najwan Nasereldin	San Diego
J0903	Billingsley, Luke R. Buti, Trevor W.	7 7	Waters of Change	Mrs. Makenzie Neves	Nevada
J0904	Conner, Cameron J.	6	Does Air Quality at Schools Near the Freeway Make the Grade?	Ms. Maryam Aliari	Riverside
J0905	Coontz, Sean T.	7	Which Wastewater Treatment Plant Discharges More Microfibers into Humboldt Bay?	Mr. Nicholas Dedini	Humboldt
J0906	de Andrade, Julia K.	7	Which Surface Is the Most Reflective?	Mrs. Chelsea Humkey	San Diego
J0907	Esch, Adam L. Millikin, Grace Z.	7 7	Lichen Diversity: An Environment Indicator of Air Quality	Mrs. Roxanne Hunker	San Diego
J0908	Gerving, John H.	8	Predicting Wildfires with Neural Networks: An Approach to Preventing California Wildfires	Mr. Nicholas Dedini	Humboldt
J0909	Goodman, Abigail W.	7	Stay Cool under Fire: Can Pre-moistening Soil beneath a Prescribed Burn Site Reduce Soil Temperatures?	Mr. Ron Goodman	Santa Cruz
J0910	Kosaraju, Reshma	7	Application of Meteorological Data to Predict the Chances of a Forest Fire Using Machine Learning and Neural Networks	Mr. Hari Kosaraju	Santa Clara
J0911	Kyo, Rebecca A.	8	What Is the Effect of Mixing Sand with Soil on the Moisture of the Soil?	Mrs. Joanne Ramirez	Los Angeles
J0912	Luke, Charles O.	8	Shedding of Polymeric Microfiber Particulate from Synthetic MTLs: Dryer Emissions as a Source of Environmental Pollution	Mrs. Ruth Gramajo	Los Angeles
J0913	Luu, Ethan D. Wang, Sophie	8 8	A Catastrophic Pacific	Mr. John Briner	Orange
J0914	Lyssand, Solveig I.	7	The Effects of Changing Heights and Locations on Air Pollution Levels	Mrs. Alisa Coan Ross	Humboldt
J0915	Manriquez, Madeline H.	7	What Materials Last Longer in Wave Erosion?	Mrs. Marilyn Reed	San Diego
J0916	Mendonca, Sofia C.	6	Energy Production in a Soil Microbial Fuel Cell Using a Variety of California Soils	Ms. Pam Cruz	Fresno
J0917	Moreno, Holden F.	8	The Effect of Varying Air Pressure on the Fluidity of Different Sand Types	Mrs. Shannon Harris	Kern

Junior Division  
**Earth & Environmental Sciences**

Project	Name	Gd	Project Title	Advisor	County
J0918	Murray, Erin T.	7	Which Beach Has More Toxic Phytoplankton?	Mr. Donald Geising	San Diego
J0919	Naftaly, Ellie G.	8	Does Dirt Drain?	Ms. Laura Ulvaeus	Santa Barbara
J0920	Pillay, Rishank	7	Comprehensive Study of Tiday Pool Populations	Mr. John Briner	Orange
J0921	Scussat, Margherita F.	8	Impact of Rainfall on the Salinity and Water Level of Groundwater Wells	Mr. Brad Penkala	Santa Barbara
J0922	Tattersfield, Fabilu D.	8	Is There Water Contamination in Three Rivers, CA?	Mrs. Susan Sherwood	Tulare
J0923	Tianshi, Kyle P.	7	Detecting Invisible Particles in Water Using Laser Microscopy and Image Processing	Mrs. Melissa Mayne	San Diego
J0924	Totten, Amelia D.	7	Does Air Pollution Affect Ocean Life?	Mrs. Rodora Antonio	Sacramento
J0925	Wang, Jason C.	8	Big Data Analysis of Climate Change: Extreme Temperature, Rain, Snow, and Ice Trends	Mrs. Jessica Renault	Los Angeles

Junior Division  
**Electronics & Electromagnetics**

Project	Name	Gd	Project Title	Advisor	County
J1001	Alivov, Daniel Y. Alivov, Diana Y.	7 7	Bluetooth Controlled, GPS Guided Robotic Car	Ms. Yahya Alivov	Santa Cruz
J1002	Alwazir, Ayat A.	8	Health Band	Ms. Najwan Naserelddin	San Diego
J1003	Alwazir, Solaiman A.	8	Disaster Drone	Ms. Najwan Naserelddin	San Diego
J1004	Ambavankar, Rishabh V.	7	Laser Communication	Mr. Vijay Ambavaneekar	Sacramento
J1005	Barlahan, Noah I. Co, Ryan P. Flint, Jeremy Z.	7 7 7	Making Hydropower More Environmentally Friendly	Mrs. Sarah Rahman	Santa Clara
J1006	Brar, Harjaisal S.	7	A Novel Approach to Detecting Fires	Mr. Andrew Rathe	Kern
J1007	Cain, Noah M.	8	Making Air Quality Monitoring More Accessible and Affordable through IOT Devices	Mrs. Maura McClellan	San Bernardino
J1008	Cheema-Sabir, Basim A. Robertson, Katherine C. Shen, Michael L.	7 7 7	A Cost-Effective Prosthetic Hand for Transradial Amputees	Mrs. Sandra Lee	Orange
J1009	Dadlez, Joseph S.	8	Engineering an Independent Robotic Sidewalk Weed Killer	<none acknowledged>	Riverside
J1010	Deshpande, Hrishikesh S. Krishnamurthy, Adarsh Murthy, Sachit	8 8 8	FiresNearYou: Detecting Wildfires Using Smoke Sensors	Mrs. Rasika Deshpande	Sacramento
J1011	Diaz-Cruz, Alexander F. Punla, Mylah H.	7 7	Sensored White Cane	Mrs. Virginia Price	San Bernardino
J1012	Freeman, Ron A.	8	ZeroAQI: An Affordable, Portable, Open-Source Air Particulate Matter Sensor	Mrs. Christine Evans	San Mateo
J1013	Gokaraju, Sindhu Gokaraju, Sneha	7 7	The Dangers of Technology: How Much Radiation Do Household Devices Emit?	Mr. Alex Hofsteen	Monterey
J1014	Henry, Sandul A.	8	Which Type of Capacitor Charges the Fastest?	Mrs. Ruth Gramajo	Los Angeles
J1015	Hutchison, Braedyn D.	8	Powered Infrastructure: Reducing Electric Vehicle Range Limitation and Charging Downtime via Resonant Inductive Coupling	Ms. Jenny Lam	Orange
J1016	Jagdish, Neel Phatak, Siddharth A.	6 6	Blue Light Exposed	Mrs. Kanchan Bhandare	Santa Clara
J1017	L'Heureux, Jade L.	6	Infinity Rover	Ms. Shalyn Alton	Mendocino

Junior Division  
**Electronics & Electromagnetics**

Project	Name	Gd	Project Title	Advisor	County
J1018	Lee, Nicholas J.	6	Stop, Slow, Go!	Ms. Joyann Sofio	Los Angeles
J1019	MacAvoy, Julia B.	6	Miniature Wireless Charging: The Future of Charging Hearing Aids	Mr. Brittan Bounds	San Mateo
J1020	Mala, Affan	8	LiFi, A Bright Idea: Using Sound Output to Analyze the Effect of Distance on Data Transmission through Light Waves	Mrs. Selena Khan	Los Angeles
J1021	Manfredo, Colin J.	8	Can a Low Head Hydroelectric Turbine Be Placed in Weirs to Create a Substantial Amount of Electricity?	Mrs. Heather Bridger	Fresno
J1022	McWilliams, Jessica L.	8	Crash Avoidance System	Mrs. Erin Schumacher	San Diego
J1023	Mogali, Abhiram S.	8	IOT Based Fast Wildfire Detection System	Mrs. Dina Nelson	Sacramento
J1024	Moussa, Kirolls M.	6	Wifi Signals	Mrs. Lisa Lorch	Riverside
J1025	Peterson, Drew M.	8	The Road Safe: A Box to Lock Up Your Phone while Driving	Mrs. Bridget Biernacki	San Diego
J1026	Raghunathan, Adhip	7	Novel Electrochromic System to Regulate Internal Lighting	Mrs. Swapna Mayya	Santa Clara
J1027	Randhawa, Agam S.	6	A Cheap Adjustable Distance Sensing Electric Cane to Help the Blind	Mrs. Katheryn Leishman	Orange
J1028	Salem, Kaushik	8	A Target Acquisition System for Landing Auto-Pilot Aircrafts in Constrained Spaces Using Modified Hough Transform	Mr. Singur Salem	Santa Clara
J1029	Shen, William	8	Most Effective Coilgun	Dr. Likun Shen	Santa Barbara
J1030	Siegel, Daniel	8	Surround3: The Design and Construction of a Sensor-Enhanced Probing Cane to Help the Visually Impaired	Ms. Shelly Bethke	Santa Clara
J1031	Sridharan, Agastya	7	A 3D Autostereoscopic Quasi-Static Volumetric Display	Mrs. Erin Schumacher	San Diego
J1032	Tran, Nathan Hai	8	Robotics Preserving Our Natural Environment through Recyclable Objects	Mrs. Susan Wright	Fresno
J1033	Venkatraman, Anirudh	8	Tremor Monitor: Detecting Signs of Parkinson's Disease Using Piezoelectricity	Mrs. Swapna Mayya	Santa Clara
J1034	Xu, Paulina	7	A New Way of Travel	Mr. Jerry Xu	Santa Clara

Junior Division  
**Environmental Engineering**

Project	Name	Gd	Project Title	Advisor	County
J1101	Ahmed, Javeria Buriel, Ynna B. Chen, Rosie	7 7 7	Greenhouse of the Future: A Low Maintenance, Low Cost, and Space Efficient Greenhouse Alternative	Mrs. Sarah Rahman	Santa Clara
J1102	Barnard, Mardi	8	Do Soil Types Influence the Movement of Salt in the Soil when Treated with a Soil Wetting Aid?	Mrs. Diane Loflin	Fresno
J1103	Barnard, Maylene	8	Can an Organic Compound like Crude Glycerin Improve the Water Holding Capacity of Soil?	Mrs. Diane Loflin	Fresno
J1104	Blanco-Sarmiento, Romina Gutierrez, Miranda R. Honer, Sarah C.	7 7 7	Autonomous Marine Plastic Collection Robot	Mrs. Sarah Rahman Mrs. Veronica Mendoza	Santa Clara
J1105	Boles, Claire M.	7	Decomposing Drinking Straws	Mrs. Leslie Dixon	Glenn
J1106	Brands, Charlotte L. Pepper, Stella J.	6 6	It All Flows to the Ocean	Ms. Kristine Pepper	Humboldt
J1107	Brasher, Zachary L.	6	Terminating Turbidity: Using a Turbidimeter and Flocculant to Reduce Suspended Solids in Local Water to Drinkable Levels	Mrs. Cherise Leonard	Riverside
J1108	Crimaldi, Melia P.	7	Cooling the Urban Heat Island Effect!	Ms. Debbie Culley	San Diego
J1109	Dow, Gabriella F.	6	Using Calcium to Combat Acid Rain	Mrs. Renee Keasey	Santa Cruz
J1110	Drake, Ryan E.	8	A New Desalination Method: Comparing Non- Toxic Carboxylic Acid Directional Solvent's Ability to Reduce Salinity Levels	Mr. Daniel Bolechowski	Riverside
J1111	Fong, Sarah M.R	8	H2O Generator	Mrs. Kathy Eno	Los Angeles
J1112	Ghasemi, Kian R.	8	Utilizing Magnetic Fields and Activated Carbon to Develop a Novel Microparticle Filtering System	Mrs. Ruth Gramajo	Los Angeles
J1113	Ghosh, Ayush	6	Reducing Ocean Acidification Using Aquatic Plants	Ms. Lindsay Holt	Santa Clara
J1114	Gomez, Nicholas D.	6	Soundwaves: Goodbye to Noise Pollution	Mr. Keith Armbruster	Riverside
J1115	Gupta, Akshit	8	Surface Water Cleaning Ro-Boat	Mr. Robert Evans	Orange
J1116	Haddox, Elaine N.	7	MucilaGenius	Mr. Jeremiah Kubilos	Ventura
J1117	Humphrey, Katherine M.	6	Reduction of Escherichia coli and Chlorine Levels Using a Simple Water Filtration System	Mr. Raul Cantalejo	Los Angeles
J1118	Jensen, Jack B.	8	Going Undercover to Save a Precious Resource	Mr. Michael Matthews	Santa Cruz
J1119	Koutnouyan, Shant	8	Using Bioremediation as a Cost-Effective, Environmentally Safe, Alternative for Disposing Oil: A Commercial Application	Mrs. Lida Gevorkian	Los Angeles

Junior Division  
**Environmental Engineering**

Project	Name	Gd	Project Title	Advisor	County
J1120	Kubota, Danica L.	8	Biodegradable Take-Out Sauce Containers	Mr. Brad Bowden	Santa Clara
J1121	Leviant, Amelie G.	8	Petrochemical Waste Clean-up Using Polymers: A Proof of Concept	Mrs. Cathy Grimes	Ventura
J1122	Maldonado, Antonio	6	The Effect of Compost Type on Blocking Water Run-Off	Mrs. MagdaElena Martin	Kern
J1123	Manjunath, Himani	7	Natural Water Purifier: Using Banana Peels to Remove Lead from Water	Mr. Lindon Richards	Santa Clara
J1124	Morris, Alexandra Q.	7	Readily Available Materials Save Environment	Mrs. Kassi Robinson	Humboldt
J1125	Mujumdar, Rucha S. Sharma, Reva C.	6 6	Edible Membranes to Protect the Environment	Mrs. Kanchan Bhandare	Santa Clara
J1126	Pete, Milan I.	7	How to Re-purpose Plastic	Mrs. Leslie Dixon	Glenn
J1127	Pretre, Landon T.	6	The Green Zone: Plants Filtering Our Air	Mrs. Jennifer Parker	San Mateo
J1128	Rahman, Wahida	7	Using Waxworms (Galleria mellonella) to Reduce the Amount of Household Wastes in Our Landfills and Oceans	Mrs. Kavitha Satya	Los Angeles
J1129	Sahni, Kabir Sharma, Neel Siddiqui, Ashar A.	7 7 7	Improving Existing Equipment for Oil Spills in the Ocean	Mrs. Sarah Rahman	Santa Clara
J1130	Steagall, Cameron J.	8	Do Walnut or Almond Hulls Affect Water Retention Rates in Soil?	Mrs. Brianne Fidalgo	Fresno
J1131	Swamy, Sonia	7	BioDeDye: An Eco-friendly, Low-cost, Agro-waste Biosorbent for the Reduction of Dye Contaminants in Aqueous Wastes	Mrs. Swapna Mayya	Santa Clara
J1132	Torres, Alyssa I.	6	Mission Impotable	Mr. Robert Nelson	Fresno
J1133	Wang, Preston	6	The Effect of Adsorption Abilities for Dehydrated Carbon and Activated Carbon Made from Different Food Waste	Mrs. Heather Rydzski	Orange
J1134	Worman, Caroline G.	8	Eco-Friendly Filters: Effects on the Escondido Creek Water Quality	Mrs. Roxanne Hunker	San Diego
J1135	Yusuf, Ruhi	7	Effectiveness of Different Plants as Coagulants to Purify Contaminated Drinking Water	Mrs. Vimala Sampath	Alameda



Junior Division  
**Mammalian Biology**

Project	Name	Gd	Project Title	Advisor	County
J1201	Abu-Tarif, Raya A. Qureshi, Alesha Tahrawi, Jude	6 6 6	The Effect of Age on Lung Capacity	Ms. Sarah Nasr	Orange
J1202	Ackerstein, Sae H.	8	Warming Seas, Warmer Seals: How Different Seal Species Thermoregulate	Ms. Terrie Williams	Santa Cruz
J1203	Akkati, Amogha	7	Effects of Exercise: Changes in Carbon Dioxide Output	Mr. Robert Jones	Orange
J1204	Alkwadri, Ameera A. Hassan, Jasmine H., Jr.	6 7	Testing the Correlation between Hypothyroidism and Type 2 Diabetes in Down Syndrome Patients	Mrs. Rula Alshanableh	Los Angeles
J1205	Berger, Gabriel J.	8	Ears vs. Eyes	Ms. Nicole Haire	San Mateo
J1206	Bigham, Madison L.	8	Does Psyllium Affect the Amount of Sand in the Horse's Digestive System?	Mrs. Heather Bridger	Fresno
J1207	Burns, Logan J.	6	Can We Improve Sleep by 25% for Only 25 Cents?	Mrs. Maria Vincent	San Mateo
J1208	Caminiti, Jason D.	7	The Effects of Music on the Cardiovascular System	Mrs. Robin Caminiti	Placer
J1209	Day, Faith M.	7	The Effect of Tongue Type on the Ability to Taste PTC Paper	Mr. Daniel Dummett	Nevada
J1210	Dorman, Chloe E.	6	The Perfect Toy: Which Toy Do Dogs Prefer?	Mrs. Heather Rydzeski	Orange
J1211	Farber, Raya Stern, Zoe	6 6	Now You See It, Now You Don't	Ms. Liat Baranoff	Santa Clara
J1212	Glenny, James D.	6	The Vitruvian Kid: A Study of Mathematical Relationships in the Human Body	Mrs. Cherise Leonard	Riverside
J1213	Hayyeh, Serene Z. Nagy, Sumaya G.	6 7	Chili Plaster Pain Relief	Mrs. Rula Alshanableh	Los Angeles
J1214	Kautz, Kaylee M.	7	Spherical Food	Ms. Lori Bloathner	Calaveras
J1215	Kessler, Leila N.	7	Dog Aid: Chew Deterrent Wound Dressings	Mrs. Virginia Price	San Bernardino
J1216	Larson, Madeleine B.	7	Gender and Bitter Taste Perception	Mr. Daniel Dummett	Nevada
J1217	Luna, Isabelle A.	6	Effects of Various Feed Container Patterns on Dairy Goat Consumption	Ms. Stefanie Fuerte	Fresno
J1218	Macdonald, Soquel E.	7	Deer Crossing	Dr. Dusten Macdonald	Humboldt
J1219	Meksavanh, Nicholas K.	6	Virtual Reality: Fun or Harmful?	Mr. Scott Rossen	San Bernardino
J1220	Munoz, Gabriela C.	8	Effects of Background Light Intensity on Eye Fatigue	Ms. Marcia Nogueira	Ventura
J1221	Page, John C.	8	Got Juice? Analyzing Drinks for Athletes	Ms. Emily Scavarda	Monterey
J1222	Salwan, Varun	8	How Does Mindful Meditation Affect the Blood Pressure and Heart Rate?	Mr. Doug Williams	San Bernardino
J1223	Shah, Arav	6	Face Time: Do Facial Parameters Change over Time?	Dr. Tonia Symensma-Cohen	Los Angeles
J1224	Singh, Reeya	7	The Effect of Temporary Blindness on Hearing	Mr. John Briner	Orange

## Junior Division Materials Science

Project	Name	Gd	Project Title	Advisor	County
J1301	Bhardwaj, Aneesh M. Mukkamala, Abhinav	8 8	Defend Your Household Electronic Devices from Disruptive Electromagnetic Frequencies	Mrs. Sirisha Gullapalli	Sacramento
J1302	Chase, Thomas J.	8	How Does the Density of Wood Affect the Frequency of Vibrations?	Mr. James Jackson	Santa Barbara
J1303	Chaudhary, Uday Govil, Kinjal	8 8	What Is the Effect of Using Compound Wood Boards on the Overall Flammability, Durability and Strength of the Wood Board?	Mrs. Heather Mackewicz	Santa Clara
J1304	Fernald, Landon W.	7	Is It Possible to Build a Fireproof House?	Ms. Jeremae Reyes	Santa Cruz
J1305	Gong, Qianshu	8	Hydroxide-ion Batteries: The Concept and Materials Engineering for High Capacity	Ms. Denise Torrisi	Alameda
J1306	Greenwald, Romy A.	8	Testing the Decomposition of Alternatives to Plastic Drinking Straws Under Simulated Environments.	Mr. Scott Love	Santa Barbara
J1307	Henderson, Jared A.	8	The Effect of Different Materials on Particle Decay from a Radioactive Source	Mr. Michael Matthews	Santa Cruz
J1308	Hsiao, Hannah F.	8	Investigating Different Fabrics on Water Absorption, Drying Time, and Drying Cost	Dr. Robert Dubrow	San Mateo
J1309	Iftexhar, Nuha H.	7	The Effect of Different Light Sources on the Intensity of Phosphorescence	Mrs. Noor Zaweti	Orange
J1310	Kadadi, Diya K.	7	Bioplastics from Biowaste: Using Plant Cellulose and Starch to Create Affordable and Durable Plastic Solutions	Mrs. Swapna Mayya	Santa Clara
J1311	Kasparian, Keghon Kordian, Vahan	8 8	Eggshells to Save Lives: Lowering Rate of Combustion with Calcium Carbonate	Mrs. Lida Gevorkian	Los Angeles
J1312	Khan, Jemimah Z.	7	Comparing Bamboo and Plastic in Criss-Cross Patterns to Create Reinforced Concrete	Mrs. Kavitha Satya	Los Angeles
J1313	MacAvoy, Charlotte B.	7	Exploring New Alloys for Low Cost Thermoelectric Generation	Mr. Brittan Bounds	San Mateo
J1314	Macknicki, Noah A.	7	Corrosion Rates of Differentiated Metals in Hyper Saline Environments	Mrs. Greta Turney	Humboldt
J1315	Mohammed, Aziza A.	7	Investigating Kombucha Biofilm as an Alternative for Other Flexible Materials	Dr. Najia Zaman	Santa Clara
J1316	Neighbors, Gael K.	7	Which Type of Starch Makes a Stronger Bioplastic?	Mrs. Jaimee Burch	Santa Clara
J1317	Nguyen, Elysiah N.	8	How Does Chemical Lightening Affect the Structure of Human Hair?	Mrs. Ruth Gramajo	Los Angeles

Junior Division  
**Materials Science**

Project	Name	Gd	Project Title	Advisor	County
J1318	Quan, Allison S.	8	Reducing Plastic Pollution Brick by Brick: A Sustainable Brick to Combat Plastic Waste in the Water and Environment	Mrs. Jen Farrar	Contra Costa
J1319	Rajkumar, Harsha Rohan P.	8	Naturogenic Cloud	Mrs. Shama Mohamed	Santa Clara
J1320	Schultz, Julian I.	7	Can Your Sweatshirt Save You? Is Clothing an Effective Particulate Filter against Air Pollution?	Ms. Tammy Parke	Santa Clara
J1321	Short, Griffin J.	8	Densities of Fluids in Shock Absorbers	Mrs. Lynn Macy	Santa Cruz
J1322	Sullivan, Peter D.	7	Temperature Effects on the Resistivity of Metals	Mr. Andrew Rathe	Kern
J1323	Tomoff, Lilia	7	Squeaky Green: Environmentally Friendly Exfoliating Soap	Mrs. Tracy Lawrence	Riverside
J1324	VanRenselaar, Jasmine S.	7	A Heating Pad that Stays Warm	Mrs. Katherine Moreno Shavlovsky	Santa Cruz
J1325	Zhu, Anni Zhu, Sabrina H.	8 8	The Effect of Water on the Strength of Retted Fiber	Mrs. Kristen Morgensen	Santa Clara

Junior Division  
**Mathematical Sciences**

Project	Name	Gd	Project Title	Advisor	County
J1401	Barrett, Arjun J. Bhowmik, Rohan T.	8 8	Using Machine Learning and Infrared Imagery to Detect Drunk Drivers	Ms. Tina Kim	Santa Clara
J1402	Chang, Yu-Ting	8	Greedy, Yet Intelligent, Algorithms for the Game 2048 Using Python	Ms. Qin Qing Luo	Santa Clara
J1403	Chatha, Anusha K. Chatha, Arjun S.	7 7	Obstacle Avoiding Robot: A Reinforcement Learning Approach	Mrs. Roxanne Hunker	San Diego
J1404	Choey, Mason P.	7	Finding the Winning Strategy for Playing Gin Rummy: A Computer Simulation	Mr. Nathan Hutchison	San Mateo
J1405	Feldman, Eitan I.	8	Spot That Dot: Autonomous Classification of Benign and Malignant Moles	Mr. Eric Hartung	Los Angeles
J1406	Fergesen, Gabriel L.	7	Using Artificial Intelligence and Electroencephalography against Autism and Attention Deficit Disorder	Ms. Lisa LaFrance- Fergesen	Ventura
J1407	Freifeld, David E.	8	Detecting Exoplanets with Anomaly Detection and Hotelling's Theory	Mr. Andrew Lookingbill	San Mateo
J1408	Hung, Allison	6	Iterated Prisoner's Dilemma	Mrs. Sumer Dakak	Orange
J1409	Lee, Alan D.	8	Machine Learning for Distinguishing Benign from Malignant Liver Tumors	Mr. Kevin Thompson	Santa Clara
J1410	Liu, Houjun	8	Observing Behavior of Actor-Critic Driven Disturbance Agents on Cryptocurrency Exchanges	Mr. Heiko Ritter	San Mateo
J1411	Narang, Keshav	7	Generalizing a Solution to the Tower of Hanoi with Varying Number of Pegs and Rings	Ms. Jiu Chang	Santa Clara
J1412	Redkar, Neel S.	8	Using Machine Learning to Identify and Sort Waste	Mr. Sanjeev Redkar	Contra Costa
J1413	Singh, Sanskriti	7	Detection of Pneumonia on CXR Image Using Convolutional Neural Networks with an Emphasis on Minimizing False Negatives	Mr. Manish Singh	Santa Clara
J1414	Srinivas, Vibha	8	Automatic Invasive Insect Identifier with Alerts Using Artificial Intelligence	Mr. J.P. Mathot	Orange

Junior Division  
**Microbiology (General)**

Project	Name	Gd	Project Title	Advisor	County
J1501	Baghdassarian, Michael M.	8	What Isolated Substances in Manuka Honey Can Preserve Raw Unrefrigerated and Unpasteurized Milk from Spoiling?	Mrs. Lida Gevorkian	Los Angeles
J1502	Bhushan, Rithik S. Vizcaya, Jonathan	7 7	Iron: A Solution to the Negative Effects of Increased Temperature on the Photosynthesis of <i>Spirulina major</i>	Mr. Alex Hofsteen	Monterey
J1503	Bryan, Allen L.	7	Bacteria Invade Your Veggies	Ms. Melissa Bolles	San Mateo
J1504	De Guzman, Ryan A.	7	School Makes Me Sick! Which School Areas Grow the Most Bacteria?	Mrs. Mary Anne McNeil	San Diego
J1505	Delworth, Riley J. Moradzadeh, Hanna L.	8 8	Floor Food: How Long Is Too Long?	Mrs. Diane Wennberg	Merced
J1506	DiGiorgio, Madison A. Hendrix, Kyndell M.	8 8	Swimming in Fear	Mrs. Wendi Rodriguez	San Bernardino
J1507	Garrett, Jasper T.	7	The Affinity of <i>Boletus edulis</i> to Tree Species	Mr. Steven Garrett	Santa Cruz
J1508	Gorzelski, Nathan T.	8	Differences between Common Fruits and Factors that Affect Their Rate of Mold Growth	Mr. Lee Yepiz	San Diego
J1509	Henriques, Mellany H.	6	The Five Second Rule: Fact or Fiction?	Ms. Brigida Bell-Corona	Glenn
J1510	Hsieh, Annabelle E.	7	How Temperature Stressors Affect Organelle Movement during the Light to Dark Cycle of <i>Pyrocystis fusiformis</i>	Ms. Jacqueline Newman	Los Angeles
J1511	Ivan, Ella L.	7	How Mid-Winter Storms Affect Bacteria Levels in Major Waterways of Northern California	Mr. Nicholas Dedini	Humboldt
J1512	Kotla, Sai Rithvik	8	The Hardest of the Hardy: Assessing the Endurance Limit of Some Extremotolerant Microbial Life Forms	Ms. Prasanna Srinivasan	Ventura
J1513	Nelson, Jack A.	7	Does Nitrogen Affect the Oil Production Rate in Cyanobacteria?	Mrs. Diane Loflin	Fresno
J1514	Osman, Shukriya A.	8	Do Antioxidants Prevent Chemotherapy Cell Toxicity?	Ms. Najwan Nasereldin	San Diego
J1515	Pietrkowski, Pola V.	8	Increasing Amount of Proteins in Edible Plant Cells to Improve Plant-Based Food	Mrs. Afsaneh Miller	Orange
J1516	Ray, Bethany A.	6	Does the Amount of Time Food Is on a Surface Affect Its Bacterial Growth?	Mr. Mike Ray	Fresno
J1517	Ruiz, Alondra	8	Pressuring Microalgae	Mr. Ruben Romero	Los Angeles
J1518	Simerson, Tyler L.	7	Use and Reuse, But Is Your Straw Clean?	Mr. Dan Villotti	Mendocino
J1519	Swertfager, Brett E.	6	Phytoplankton Growth: Are Terrestrial Fertilizers the Answer?	Mr. Daniel Jacobsmeyer	Santa Cruz

Junior Division  
**Microbiology (Medical)**

Project	Name	Gd	Project Title	Advisor	County
J1601	Basile, Ava F.	8	"Lettuce" Discover a Solution to Inhibit E. coli Growth	Mrs. Rita Armstrong	Ventura
J1602	Bui, Courtnie	8	Honey, I've Found a Solution! The Antibacterial Properties of Manuka Honey against S. epidermidis and S. salivarius	Mr. John Briner	Orange
J1603	Fan, Kara	8	Nano Particles Liquid Bandage	Mr. Russ Bird	San Diego
J1604	Gan, Kelly Y.	8	Natural Antibiotic Effects of Honey, Garlic, Lemon, and Ginger against Escherichia coli	Ms. Lily Deveau	San Diego
J1605	Huitt, Marie G.	7	Honey, There's No More Infection! The Effects of Manuka Honey, Nature's Defense!	Mrs. Marie Bordin-Huitt	Butte
J1606	Ismail, Maryam	6	Eliminating the Zit: Finding an Effective Treatment in Exterminating Bacteria	Mrs. Zeba Haq	Santa Clara
J1607	Julio, Brianna M.	8	Where Are the Most Antibiotic Resistant Bacteria?	Dr. Steve Julio	Santa Barbara
J1608	Myers, Charlotte E.	8	Identification and Characterization of Novel Potential Antibiotics Targeting Bacterial Motility	Dr. Eric Rasmussen	Riverside
J1609	Nair, Namrata R.	8	The Effect of Different Metal Nanoparticles on the Growth of E. coli	Mrs. Shannon Deza	Santa Clara
J1610	Sharma, Rhea	8	Germ Warfare	Mrs. Awa Chalabi	Kern
J1611	Shin, Nathaniel S.	8	Using Cu, Fe, ZnO, and AgNO <sub>3</sub> Microparticles as Antibacterial Agents to Create Inhibition Zones on DH5a E. coli Cultures	Mrs. Ruth Gramajo	Los Angeles
J1612	Vaidya, Sahil	8	Comparison of the Effects of Natural and Artificial Food Coloring on Microbes	Mrs. Afsaneh Miller	Orange
J1613	Velasquez, Miguel J.	8	The Antibacterial Effects of Natural Remedies Compared to Antibiotics, Part 2	Mrs. Mary Pettitt	San Bernardino

Junior Division  
**Physics & Astronomy**

Project	Name	Gd	Project Title	Advisor	County
J1701	Ashton, Connor R.	8	Good Vibrations: The Effect of Sympathetic Vibrations on a Bass Guitar	Mr. Andrew Rathe	Kern
J1702	Bhatti, Dominique E.	8	Studying the Dynamics of Granular Materials	Dr. Ken Powell	Los Angeles
J1703	Broudy, Reuben D.	8	Modelling Minimum Voltage to Acoustically Levitate Non-spherical Objects at Near-wavelength Dimensions	Mr. Matt Bessler	San Diego
J1704	Carter, Holly E.	8	Measuring Sound Speed with Acoustic Interferometry	Mr. Robert Greene	Los Angeles
J1705	Chheng, Malia C.	8	Induction Heating	Mr. Joe Linares	Fresno
J1706	Collins, Landon M.	7	Beware: A Ghost Will Follow You Home	Mr. Jonah Olson	San Bernardino
J1707	Dong, Jason A.	7	The Speed of Sound in Varying Gas Conditions	Mr. John Briner	Orange
J1708	Gallagher, Grant J.	8	Investigating the Electrostatic Effects of Striking a Tennis Ball with a Tennis Racquet	Mr. Mark Gallagher	Orange
J1709	Gard, Conor E.	6	The Winning Position: How Changing the Center-of-Gravity in a Race Car Impacts Velocity	Ms. Gladys Vaca	San Francisco
J1710	Girdler, Noah E.	8	What Is the Buoyant Force of Helium?	Mr. James Jackson	Santa Barbara
J1711	Girish, Samanya	6	Autonomous Linear Accelerator with a Precise Measurement Technique	Mrs. Bonny Basu	Santa Clara
J1712	Jones, Piercen C.	6	Blood Spatter Matters	Mrs. Katherine Auffant	Kern
J1713	Katz, Isabelle S.	8	Characterizing Musical Instruments Using Waveform Analysis	Mr. Bruce Katz	Contra Costa
J1714	Kini, Shikha D.	7	The Effect of Viscosity of Hydraulic Machines	Ms. Emily de Moor	San Mateo
J1715	Liebe, C. Christopher Wright, Liam I.	8 8	Is Fire a Plasma?	Mrs. Emily Hoffman	Los Angeles
J1716	Lipman, Joshua A.	8	Energy Gain in the Gauss Accelerator	Ms. Nicole Haire	San Mateo
J1717	Luster, Roxy	6	Fog, Fog on the Wall: Which Color Shines the Brightest through Fog?	Mrs. Heidi Hook	Placer
J1718	Maeda, Emi	6	The Art of Skipping Stones: Favorable Angle and Shape of Stone	Mr. Arion Espinoza	San Mateo
J1719	Muhib, Arsh	8	Building a 360 Degree Periscope	Mr. Abrar Muhib	San Joaquin
J1720	Ohm, Wyndia	7	Gravitational Anomalies: (a) A Novel Multiphysics Approach with Eata from NASA, and (b) A Novel Multi-measurement Device	Mrs. Sophanie Gee	Santa Clara

Junior Division  
**Physics & Astronomy**

Project	Name	Gd	Project Title	Advisor	County
J1721	Peterson, Weston Ema.	6	Measuring Radiation	Mrs. Vicky Ramirez	Ventura
J1722	Pool, Andrew I.	8	Space Particles from Space: Altitude's Effect on the Number of Subatomic Particles Viewed in a Wilson Cloud Chamber	<none acknowledged>	Riverside
J1723	Saal, Jared M.	6	How Particle Size Affects Viscosity of Chocolate	Mrs. Liat Baranoff	Santa Clara
J1724	Shu, Hannah T.	8	Using Physics to Determine the Audio Frequencies to Evaluate the Acoustics of the Violin	Mr. Alex Hofsteen	Monterey
J1725	Soibel, Dana A.	8	The Study of Optical Properties of Artificial Colors	Mrs. Emily Hoffman	Los Angeles
J1726	Wilbur, Shane C.	6	Given the Same Stimulus, Does the Type of Liquid Placed in a Wine Glass Affect the Frequency of the Note Produced?	Mrs. Denise McNett	San Benito



## Junior Division Plant Biology

Project	Name	Gd	Project Title	Advisor	County
J1801	Ahmad, Adani	7	Understanding Light Spectrum for Optimal Germination and Growth of Bean Sprouts	<none acknowledged>	Riverside
J1802	Bang, Daniel Kim, Thomas T.	7 7	Dead Zones are Dead Jokes: Algal-Bloom Control by the Allelopathy of Aquatic Macrophytes	Mr. Ryan Lewis	Los Angeles
J1803	Chakamian, Kian S.	8	Predicting Implications of Olive Quick Decline Syndrome in San Diego County Olive Trees	Mrs. Roxanne Hunker	San Diego
J1804	Chakraverty, Maya	6	Studying Effects of Increased CO2 On Plant Biomass	Ms. Andrea Jenest	Solano
J1805	Chen, Brian	8	Validating Novel Algorithm-Generated Crop Rotations: A Second Year Study	Ms. Kathy Peng	Santa Clara
J1806	Desai, Manav Jay	7	How Does Vitamin D Affect Root Plant Growth?	Mrs. Ruth Gramajo	Los Angeles
J1807	Estrada, John Benedict A.	8	Predicting Broccoli Yield Utilizing a Remote Sensing Low Altitude Multispectral Camera: A Two-Season Trial	Ms. Kay Barrie	Fresno
J1808	Estrada, Pauline Victoria A.	6	Early Detection of Drought Stress in Bell Pepper ( <i>C. annuum</i> ) Using a Remotely Operated Vehicle with an Infrared Camera	Mrs. Ginger Byrd	Fresno
J1809	Evans, Ruby R.	6	Do Plants Absorb Microplastics?	Mr. James Evans	Santa Cruz
J1810	Filstrup, Brooklynn M.	8	Will The Direction of Gravity Affect the Way Plants Roots Grow?	Mr. David Oliver	Solano
J1811	Gulia, Bhargavi	8	Shoot, It Sprouted! Effects of Turmeric and Hydrogen Peroxide on Sprouting of Moong Beans	Mr. Shane Anderson	Monterey
J1812	Hansen, Sarah M.	8	How Much Seed Do You Need?	Dr. Robert Dubrow	San Mateo
J1813	Kampmann, Savannah E.	6	Manure and Nutrients	Ms. Brigita Bell-Corona	Glenn
J1814	Khuu, Lucia A.	6	Plant Life on Mars?	Mr. Andrew Rathe	Kern
J1815	Lassen, Kasey M.	8	The Positive Effects of Arbuscular Mycorrhizal Fungi on Sodium Stressed Plants	Mrs. Jennifer Allen	Kern
J1816	Ma, Eileen B. Zhu, Sally H.	8 8	The Impact of Different Types of Bacteria on the Water Conservation and Growth of <i>Lepidium sativum</i>	Ms. Kathy Peng Dr. Ray Engeszer	Santa Clara

## Junior Division Plant Biology

Project	Name	Gd	Project Title	Advisor	County
J1817	McCabe, Mariko S.	8	How Do the Shells and Spines of Red Sea Urchin Affect Plant Health?	Mr. Ravishan Dev Anandhan	Los Angeles
J1818	Mehta, Jai V. Wei, Nicholas	8 8	Shorter Days: The Effect of the Day/Night Cycle on the Growth of Plants	Mrs. Kristen Morgensen	Santa Clara
J1819	Monson, Cosette O.	8	Water Uptake Rate of Drought Resistant Shrubs	Mr. John Wood	Orange
J1820	Pillarisetti, Harsha	7	Effect of Intelligent Watering Systems on Plant Growth and Water Consumption	Mr. Vijay Pillarisetti	Contra Costa
J1821	Sanders, Libby S.	6	Biotechnology and the Soybean Revolution: The Effects of GMO Soybean Meal on Plant Growth and Environmental Pollution	Mr. Carey Sanders	Tulare
J1822	Scott, Mackenzie E.	6	Determining the Effect of Various Organic Solutions on Plant Growth	Ms. Stefanie Fuerte	Fresno
J1823	Shen, Aniyah X.	8	The Power of Soil Productivity	Mrs. Sandi O'Brien	Orange
J1824	Shirikchian, Gary	8	Gary's Hydroponic Garden	Mrs. Lida Gevorkian	Los Angeles
J1825	Tai, LeAnn	8	Effect of Climatic Changes on Plant Growth: A Study of Their Adaptation Patterns	Mr. Henry Nguyen	Orange
J1826	Vincent, Ashlyn P.	6	Invisible Forces: Magnetic Effects on Plant Germination and Growth	Mr. Derrick McCain	Kern
J1827	Walimbe, Pranav A.	8	More Sugar, Please!	Mr. Martin Olson	Sacramento
J1828	Walley, Christina E.	7	Nutrient Density of Plants: Aquaponics or Soil?	Mrs. Bridget Biernacki	San Diego

Junior Division  
**Product Science (Biological)**

Project	Name	Gd	Project Title	Advisor	County
J1901	Anand, Arshia	8	Antacids: Synthetic vs. Natural	Ms. Kelly Orosz	Orange
J1902	Ansari, Kamran	7	Characterizing the Dosage Profiles of PEMF Products by Evaluating Their Magnetic Field Distributions	Mrs. Afsaneh Miller	Orange
J1903	Bedrosian, Matthew P.	6	Which Type of Paper Tray Dehydrates Grapes the Fastest?	Mrs. Heather Bridger	Fresno
J1904	Biittner, Gabriella R.	8	KT Tape: Help or Hype?	Mrs. Julie Cilente	Nevada
J1905	Bishop, Ashley E. Sullivan, Charlee S.	7 7	Battling Bacteria	Mr. Alex Hofsteen	Monterey
J1906	Dang, Darina L.	7	Cutting Board Bacteria	Mrs. Elizabeth Kayee Conrad	Orange
J1907	Denis, Marc	8	How Much Glucose Is in That Drink?	Ms. Rita Armstrong	Ventura
J1908	Helms, Faith O.	6	Sugar Rush: Good to Eat a Bunch?	Mr. Greg Stackhouse	Humboldt
J1909	Henry, Sadie M.	8	Skin Care Moisturizers for Swimmers	Ms. Rita Blickenstaff	San Diego
J1910	Johnson, Ava K.	8	The Effectiveness of Different Brands of Deodorants	Mrs. Rita Armstrong	Ventura
J1911	Katriel, Levi I. Nagarajan, Krishna S.	7 7	From Caged to Free-Range: Comparing Nutritional Profiles in Hens' Eggs	Mrs. Roxanne Hunker	San Diego
J1912	Mardanian, Alice	7	Effects of Sodium Chloride, Acetic Acid, and Honey on the Contamination of Raw Meat	Mrs. Ruth Gramajo	Los Angeles
J1913	Mirza, Simra S.	7	Diffusing Rates of Nonsteroidal Anti-Inflammatory Drugs Containing Naproxen Sodium in a Stomach Acid Mimicking Solution	Mrs. Munira Amla	Los Angeles
J1914	Soe, Priyanka K.	8	Comparing the Efficacy of Backcountry Water-Treatment Methods	Mrs. Roxanne Hunker	San Diego
J1915	Tanguay, Luke R.	7	Do Environmentally Friendly Dish Soaps Clean Oil Off Feathers as Well as Dawn?	Mrs. Kyla Painter	Santa Cruz
J1916	Thompson, Carys L.	7	Trapping the Kitchen Pest	Mr. Raul Cantalejo	Los Angeles
J1917	Van Parys, John M.	7	How Long Til You Burn?	Mrs. Rodora Antonio	Sacramento
J1918	Warkentin, Aislin A.	7	What Is the Best Way to Disinfect a Toothbrush?	Ms. Paula Murphy	Kern

Junior Division  
**Product Science (Physical)**

Project	Name	Gd	Project Title	Advisor	County
J2001	Alvarez Nolasco, Yarely Ruiz Hernandez, Dulce M.	8 8	Scented vs. Unscented Candles	Mrs. Amy Brown	Monterey
J2002	Crocker, Joedina L.	8	Using Water Saturation to Affect Kernels' Popping Ability	Mr. Ernest Lewis	Kern
J2003	Do, Cameron E. Do, Christopher E.	7 8	Tackling Concussions: Testing the Effectiveness of Headgear to Reduce Displacement	Mrs. Roxanne Hunker	San Diego
J2004	Doshi, Ayush	6	Comparison of Heart Rate Measurement Accuracy across Multiple Devices	Dr. Tonia Symensma-Cohen	Los Angeles
J2005	Elliott, Brady M.	8	Fire in Your Sole: Reducing the Thermal Conductivity Found from Outdoor Sports Surfaces	Mrs. Wendi Rodriguez	San Bernardino
J2006	Ferguson, Norah T.	7	Toilet Paper Absorbency	Ms. Joni Galvan	Santa Barbara
J2007	Garcia, Karen G.	8	What Type of Salt Brands with Different Qualities Have the Presence of Microplastics?	Ms. Jerilyn Joel	Los Angeles
J2008	Goodwin, Kayla S.	6	How Do Various Types of Table Tennis Balls Differ in Bounce Height?	Mrs. Kate Sommer	Santa Cruz
J2009	Harmon, Cornelius E.	7	Oil in a Day's Work: The Power of Pistons in Heat and Lubricity	Ms. Kristi McCracken	Tulare
J2010	Heinrichs, David Sam	7	Does Limiting Direct Sunlight with Different Types of Shade Materials Make an Air Conditioner Work More Efficiently?	Mrs. Nicole Luckin	Fresno
J2011	Hickman, Brady J.	6	What Brand Is a Hit?	Mrs. Kyndra Hickman	Merced
J2012	Hirji, Hunaina B.	7	The Effects of Metal Pipes on Potable Water Quality	Mrs. Rana Alshurafa	Orange
J2013	Ito, Marea K.	8	Save the pHish	Ms. Gabriella Armenta	San Benito
J2014	Kearns, Elizabeth M.	7	Chalk Talk: Determining the Best Liquid Chalk Product	Ms. Emily de Moor	San Mateo
J2015	Kellar, Nicholas J.	8	Rammed Earth: Packing Construction's Future	Mrs. Rita Armstrong	Ventura
J2016	King, Angela C.	7	Helpful or Hurtful? Seeking the Most Effective Methods and Materials for Minimizing Electromagnetic Fields (EMF)	Ms. Debbie Culley	San Diego
J2017	Konja, Gabriel L.	7	Baseball Bat Performance Testing	Mrs. Marilyn Reed	San Diego

Junior Division  
**Product Science (Physical)**

Project	Name	Gd	Project Title	Advisor	County
J2018	Kwan, Ethan J.	8	Now That's a Lot of Damage! Which Premium Tape Has the Greatest Tensile Strength?	Mrs. Lynne Dowdy	San Francisco
J2019	Manion, Laurel A.	8	Cookie Cooking	Mrs. Elizabeth Kayee Conrad	Orange
J2020	Mozaffari, Sholeh R.	7	Same Chemical Process, Different Types of Hair	Mrs. Chelsea Humkey	San Diego
J2021	Patel, Aarohi R.	7	Medicines in Mailboxes: Melting Microorganisms	Mrs. Sharalene Dickens	Kern
J2022	Phillips, Allison M. Staker, Sophie B.	8 8	That's the Way the Cookie Crumbles: Does the Type of Fat Used in Baking Affect How Crumbly a Cookie Is?	Ms. Allison Phillips Mr. Shane Anderson	Monterey
J2023	Prevost, Mason J. Zdanowski, Jack W.	8 8	Waterproofing ECOR: Comparing Effectiveness of Low VOC Paint and Sealants	Mrs. Roxanne Hunker	San Diego
J2024	Silcott, Matthew E.	6	Cold Feet? What Type of Socks Can Keep Your Feet the Warmest in Cold Weather?	Mr. Donald Scott	Placer
J2025	Trinh, Lauren E.	7	Hands Down: The Best Moisturizer	Mr. Andrew Rathe	Kern
J2026	Walker, Malia E.	7	Heat Conductivity: A Study of Baking Sheets	Ms. Taylor Redding	Fresno

## Junior Division Toxicology

Project	Name	Gd	Project Title	Advisor	County
J2101	Addison, Eleanor C.	8	Sunscreen: Protection or Poison?	Mr. Jeffrey Nelson	Contra Costa
J2102	Aref, Sadik N.	7	Investigating the Effects of Decongestant and Coenzyme Q10 on the Heart rate of Daphnia	Dr. Najia Zaman	Santa Clara
J2103	Ayalew, Lidetu M.	8	Effects of Water Pollution on Radishes	<none acknowledged>	Santa Barbara
J2104	Bedrosian, Michael P.	8	Comparing the Effectiveness of Different Natural Repellents in Controlling the Vine Mealybug	Mrs. Heather Bridger	Fresno
J2105	Castorina, Lola S.	8	Can Sodium Bicarbonate Be Used to Kill Mosquito Larvae?	Ms. Christy Novak	Los Angeles
J2106	Dorgan, Nicholas P.	8	The Dark Side of Perfume: The Negative Effects of Perfume on Plants	Mrs. Stephanie Conklin	Orange
J2107	Elmi, Mumtaaz A.	8	Can Herbicides Have an Effect on a Planarian Nervous System?	Ms. Najwan Nasereldin	San Diego
J2108	Grewal, Jaggot S.	6	Determining Which Natural Pesticides Will Kill Pests	Mr. David Russell	Fresno
J2109	Kilby, Dylan S.	8	What Are the Effects of Various Nitrogen Percentages on Daphnia's Heart Rate?	Mrs. Diane Loflin	Fresno
J2110	Lim, Hyun S.	8	The Effects of Microwave Radiation on Life and Organic Material	Mrs. Rita Armstrong	Ventura
J2111	Macknicki, Zoe A.	8	Effects of Agricultural Pollutants on Mortality Rates of Freshwater Daphnia and Cyclops at the Arcata Marsh	Mrs. Greta Turney	Humboldt
J2112	Maheshwari, Krish	6	Effect of Wi-Fi Signals on the Growth of Pea Shoot Plants	Mrs. Juliana West	Santa Clara
J2113	Miller, Caley S.	8	Salinity Tolerance of Freshwater Green Algae at the Arcata Marsh	Mrs. Greta Turney	Humboldt
J2114	Neilsen, Crystal L.	8	Rethink Your Drink	Mrs. Nonie Randles	Glenn
J2115	Patterson, Noah J.	7	Daphnia Heart Rate: How Do the Central Valley's Most Common Water Pollutants Affect the Heart Rate of Daphnia magna?	Mrs. Reggie McLean	Fresno
J2116	Randhawa, Aisha K.	8	Essential Oils: Impact on Reproductive Timing and Health in Daphnia magna	Mrs. Renee Rosas	Riverside
J2117	Rangel, Joshua	8	Effects of Radiation on Plants	Mrs. Anu Hernandez	Kern
J2118	Rothaupt, Simone	8	The Annihilation of Nature	Ms. Rita Armstrong	Ventura
J2119	Tabb, Jonathan D.	8	Can Planaria Be Used as an Alternative Toxicology Model?	Mrs. Elizabeth Kayee Conrad	Orange
J2120	Thompson, Nora C.	8	Lights of the Sea	Ms. Rinda Wardel	Contra Costa
J2121	Todd, Lillian	7	The Effect of Sodium Chloride on Pennisetum clandestinum	Mr. Frank Novek	San Bernardino
J2122	Worley, Isabella V.	8	Are Lower Percentages of Glyphosate with Natural Herbicides as Effective as Full Strength Glyphosate?	Mrs. Diane Loflin	Fresno

**Junior Division  
Zoology**

Project	Name	Gd	Project Title	Advisor	County
J2201	Bundogji, Danna K.	8	Is Biotin the Answer? Planaria and Nervous Tissue Regeneration	Ms. Najwan Naserelddin	San Diego
J2202	Gill, Angad Santiago, John Anthony T.	7 7	The Effect of Blue Light on Planaria Regeneration	Dr. Mary Anne Tablizo	Fresno
J2203	Golden-Krasner, Sarai S. Lurvey, Maya R.	8 8	Testing the <i>Oncopeltus fasciatus</i> Neuromotor Responses to Olfactory and Visual Stimuli	Ms. Lori Snyder	Los Angeles
J2204	Gonsalves, Hercules G.	8	What Are the Effects of High Audio Frequencies on <i>Pogonomyrmex barbatus</i> ?	Mrs. Diane Loflin	Fresno
J2205	Hoffmann, Richard	8	Pheromone-Based Ant Navigation	Mrs. Rita Armstrong	Ventura
J2206	Jayaraman, Suraj Ouk, David T.	8 8	Project Planaria	Ms. Terryll Cole	Riverside
J2207	Kwok, Christopher S. Kwok, Nicholas S.	8 8	Tannins from Indian Almond Leaves that Alters Pregnancy Behaviors, Gestation Period, and Fertility Structure of Guppies	Dr. Robert Dubrow	San Mateo
J2208	Melgoza, Julia	6	Water Temperature and Mosquito Pupae	Mr. Russell Bennett	San Bernardino
J2209	Mueller, Christian E.	7	Effects of Dietary Supplements on Brown Planaria	Ms. Tammy Levy	Los Angeles
J2210	Nagra, Zaighum R.	8	The Effect of Corn Silk Extract on Neuronal Regeneration	Mrs. Ruth Gramajo	Los Angeles
J2211	Patel, Neelan R. Samy, David A.	7 7	Effects of Infrared and Visible Light Wavelengths on Planaria Regeneration	Mrs. Roxanne Hunker	San Diego
J2212	Stutsman, Sarah V.	8	Color: An Attractant to Egg-laying <i>Aedes</i> Mosquitoes or Not?	Mrs. Renee Rosas	Riverside
J2213	Vanier, Malo, Jr.	8	Natural Ant Repellents	<none acknowledged>	Santa Barbara

Senior Division  
**Applied Mechanics & Structures**

Project Name	Gd	Project Title	Advisor	County
S0301 Austin, Ansel R.	11	Clean Water for All: A Novel Filtration and Maintenance Mechanism for Improving India Mark II Water Pump Performance	Mr. George Sousa	Santa Clara
S0302 Beam, Ryan M.	11	Developing a UAV Free Fall Device for Microgravity Experiments	Mr. John Postovit	Santa Cruz
S0303 Benz, Patrick H., II Frohling, Andrew J.	11 11	Using the Venturi Effect to Optimize the Efficiency of an Air Conditioner Condenser	Dr. Patrick Benz	Santa Barbara
S0304 Billman, Tyler R. Gajaria, Anurag A. Marquez, Briana A.	10 10 11	The Optimization of the Mechanics of a Robot	Mrs. Andrea Oliveira-Taylor	Riverside
S0305 Bodenhamer, Tyler J.	9	Engineering a 3D Printer Built with Recycled Computer Parts	Mr. Daniel Gonias	San Diego
S0306 Brown, Ryan J.	9	Water Well Perforations and Their Impact on Well Efficiencies	Mr. Paul Hunt	Orange
S0307 Chung, William K.	11	Manipulating Concentrations of Plant-Based Starches to Optimize Durability for Use in Biodegradable Plastics	Dr. Jena Lee	Santa Clara
S0308 Co, Jason R.	9	The Multipurpose Prosthetic: Using 3D Printing to Create Various Attachments for Amputees	Mrs. Suzanne Miller-Moody	Santa Clara
S0309 Cunningham, Kayla M.	10	Using Winglets to Reduce Drag, Therefore Decreasing Fuel Consumption and Carbon Dioxide Emissions	Mrs. Doloumar Bergen	Riverside
S0310 Echavarria, Sofia E.	10	Better Helmets, Fewer Sports Related Concussions?	Ms. Laura Kaufman	Los Angeles
S0311 Gorin, Caitlin M.	10	A Multi-Faceted Material Strength Testing Machine for 3D Printed Plastics	Dr. Tracy Hughes	Santa Clara
S0312 Kandala, Ashutosh H.S.	9	A Novel Approach to Reducing the Amount of Headfirst Injuries on a Bicycle	Ms. Luna Bai	Orange
S0313 Krock, Spencer A.	12	Wind Tunnel Analysis of Semi-Rigid Airfoil Structures for a Collapsible Hybrid Buoyant Atmospheric Spacecraft	Dr. Daniel Clark	Riverside
S0314 Kumar, Shreya	11	Self-Stabilizing Tensegrity-Inspired Robotic Leg	Mr. Erik Jung	Alameda
S0315 Land, Andrew T.	11	Investigating String-Bow Interactions on a Novel Optoelectronic Cello	Dr. Robert Dubrow	San Mateo
S0316 Liu, Stanley C.	10	An Integrated Microfluidic System for Blood Plasma Separation and Immunoassay Detection	Ms. Neha Garg	Los Angeles
S0317 Luna, Jaden A.	9	Formulating a Superior Concrete while Utilizing a Roman Influence and Calcium Carbonate	Mr. Davin Aalto	Fresno



Senior Division  
**Applied Mechanics & Structures**

Project Name	Gd	Project Title	Advisor	County
S0318	McMorris, Brooke T.	9 Archimedean Faucet: A Miniature Hydraulic Turbine	Mr. Matthew Johnson	San Bernardino
S0319	Park, Junho	10 Exploration of Charging Cable Durability	Mr. Anthony Pham	Orange
S0320	Peluso, Brent A.	12 Electrothermally Cooling a Pitcher's Arm	Mr. Ariel Haas	San Diego
S0321	Qureshi, Firas A.	9 An Economical Microfabrication Process for the Production of a Microfluidic Device to Isolate <i>Volvox aureus</i>	Ms. Leina Rizzo	Orange
S0322	Reeb, Remy A.	11 Reducing the Incidence of Falls among the Elderly	Mrs. Jeanette Lopatka	San Diego
S0323	Robertson, Tyler E.	12 Project POWER: A Swift Water Warning System, Year Two	Mr. Eric Herzog	Fresno
S0324	Tianshi, Emily L.	10 Micro-Pattern Surface Property Design for Atmospheric Moisture Harvesting: Biomimicking Torrey Pine Needles	Mrs. Melissa Mayne	San Diego
S0325	Wisoff, Jeffrey J.	11 Assessing the Angular Dependence of Skull-to-Brain Impact Dynamics to Inform Future Bicycle Helmet Design	Mr. Jonathan Brix	Alameda
S0326	Wong, Ethan	9 Effects of Spanwise Lift Distribution on Induced Drag of a Glider Wing	<none acknowledged>	Los Angeles

Senior Division  
**Behavioral & Social Sciences**

Project	Name	Gd	Project Title	Advisor	County
S0401	Anderson, Luke T.	10	Lights, Camera, Action-Reaction: Sympathetic Nervous System Response to Action Movies across the Decades	Mrs. Victoria Acquistapace	Contra Costa
S0402	Arellano, Mayra	12	Red Pill or Blue Pill? How Age Impacts Confirmation Bias	Mr. Jeffery Adkins	Contra Costa
S0403	Bacon, Gabriel G.	11	The Effects of Demand Characteristics on a Survey	Ms. Karen Reynosa	Ventura
S0404	Bernal, Diogenes Angelo D. Hoffman, Erin C.	10 10	The Relationship between Deception and Altruism amongst Teens of Different Economic Status	Mrs. Susan Valle	Ventura
S0405	Borgsdorf, Diego Shapiro, Sarah E. Tran, Sarah S.	11 10 11	The Language of Extremism: A Socio-Linguistic Analysis of Nationalist Content in the Context of Linguistic Purism	Ms. Tripti Shah	Los Angeles
S0406	Brem, Noelle R. Onitsuka, Aika S. Reyes-Ordaz, Jocelyn	10 10 10	Which Accent Is More Appealing to Americans?	Mrs. Shahida Merchant Ms. Sarada Sinha	Monterey
S0407	Cai, Sean	10	Analyzing Stratified Ethical Behavior at Executive Levels Using Shareholder Regression Models and Firm Value	Mrs. Elaine Gillum	San Diego
S0408	Camero, Brianna M. Kaur, Bhjan	12 12	Erudition Identification: Using Computer Science to Find Literacy Levels	Mr. Mike Brasier	Kern
S0409	Chang, Anna	12	Study Jams: The Effect of Words in Music on Reading Comprehension	Ms. Kimberly Lee	Contra Costa
S0410	Chiu, Nathan W. Jain, Swasti Lin, Joe J.	9 9 9	The Design and Construction of a Patch with an Application for People that Alerts the User When They Are Slouching	Mr. Isaac Pallone	Santa Clara
S0411	Enad, Elizabeth S. Rogel, Angelheart S.	10 10	Myers Briggs and Behavior Prediction	Mr. Kevin Callaway	Ventura
S0412	Ha, Audrey Y.	9	Fostering Racial Tolerance in High Schools: Researching Correlations between Tolerance, Activities, and Demographics	Ms. Rachel Richards	San Mateo
S0413	Khan, Mahum	10	Practice Makes Permanent: How Does Repetition Affect the Human Ability to Adapt to New Forms of Writing?	Mr. Faisal Khan	Orange
S0414	Luebke, Kaelyn S.	9	Personal Comfort and Therapy System (PCATS): Wearables and Jedi Mind Tricks	Ms. Jessica Valera	San Mateo
S0415	Neervannan, Arjun R.	11	Combating Cyberbullying and Toxicity by Teaching AI to Use Linguistic Insights from Human Interactions in Social Media	Mr. David Knight	Orange

Senior Division  
**Behavioral & Social Sciences**

Project	Name	Gd	Project Title	Advisor	County
S0416	Patil, Pranav	11	Determining the Effectiveness of Video Games in Cybersecurity Education	Mr. Frank Liao	San Diego
S0417	Ravi, Harshini N. Ravi, Harshita N.	9 9	The STEM of the STEM Gap: Exploring the Gender Gap in STEM	Mr. Eddie Hammon	Kern
S0418	Reder, Gabriel P.	11	Arbitrary Altruism Actions' Effects on the Possible Downturn of Aggression on Subjects with Contrasting Spectrums	Dr. Sean Gillette	San Bernardino
S0419	Robinson, Aubrey L.	10	A Study of Connections between Synesthesia and Creativity	Mrs. Mary D'Amour	Placer
S0420	Santa Maria, Katelyn Santa Maria, Lorelei	9 9	Can We Psyche You Out? The Study of the Effect of Positive and Negative Encouragement on Physical and Mental Activities	Mr. Ryan Lewis	Los Angeles
S0421	Santoso, Sophia A.	10	What Effect Does Smartphone Usage Have on High School Students?	Mr. Matthew Schiller	Riverside
S0422	Sharma, Shay Nair	10	The Impact of a Skin Care and Skin Cancer Prevention Lesson on the Knowledge and Behaviors of High School Students	Dr. Jasdeep Sharma	Sacramento
S0423	Tieng, Vanessa D.	9	Traditional Paper and Pen Testing vs. Progressive Online Computer Testing	Mr. Paul Hunt	Orange
S0424	Young, Caneel M.	11	Is Lactobacillus rhamnosus the Solution to Anxiety Relief?	Mr. Ariel Haas	San Diego
S0425	Yuva Raju, Rhitishah R.	11	The Reduction of Stress: A Novel Digital Intervention Method Utilizing Neural Oscillation Analysis & Scanning Techniques	Mrs. Kelly Colleen	Sacramento

Senior Division  
**Biochemistry/ Molecular Biology**

Project	Name	Gd	Project Title	Advisor	County
S0501	Alam, Sabreen	9	Feel the Pressure: Effects of Mechanical Deformation on Collagen Direction and Proliferation	Dr. Michelle Digman	Orange
S0502	Athappan, Lakshman S.	9	Lowering the Risks of Stomach Cancer by Finding Methods to Decrease Nitrite Levels in Various Foods	Dr. Rajeswari Lakshmanan	Orange
S0503	Cumbelich, Thomas G.	10	Supermilk: A Plant-Based Milk Alternative	Mrs. Victoria Acquistapace	Contra Costa
S0504	Dogra, Arushi	11	Effects of Novel Dual PI3K-BRD4 Inhibitor SF2523 on Mantle Cell Lymphoma Survivorship	Mrs. Lisa Smedley	San Diego
S0505	Fang, Shirleen R.	11	RT-qPCR Development of a New Therapeutic Avenue for Curing Amyotrophic Lateral Sclerosis (ALS)	Ms. Shizuka Yamada	San Mateo
S0506	Freeman, Carissa J.	12	An Investigation of Tooth Decay Caused by Various Sodas	Mr. Riccardo Magni	Santa Barbara
S0507	Gan, Jessie L.	10	Using Bioinformatics Tools to Identify Epitopes in MMP-15: A Potential Lung Cancer Drug Target	Dr. Cheryl Eisen	San Diego
S0508	Geng, Yuqi	11	Future of Central Nervous System Sedatives and Analgesics: Common ITS Sequence among Traditional Chinese Medicine	Dr. Pamela Durkee	Monterey
S0509	Gokal, Tejus A.N.	9	Vitamin C Content and Acidity of Tangerines	Mr. Eric Herzog	Fresno
S0510	Guh-Siesel, Alexander	11	A Method for Treating Celiac Disease: Synthesis of Small Molecule Inhibitors of the HLA-DQ2 Receptor	Mr. Darren Dressen	Santa Clara
S0511	He, Charlotte	10	Gli Activation Is a Key Mechanism of Resistance to EGFR-TKI in Lung Cancer	Dr. Vivianne Ding	San Mateo
S0512	Kademani, Maanasi R.	11	Anacardic Acid Analogs for the Inhibition of Matrix Metalloproteinase-2	Mrs. Michele Hampton	Riverside
S0513	Kamra, Shreya K.	12	Epigenetic Therapy for Liver Cancer: The Effect of 5-Azacytidine on the Expression of Tumor Suppressor Genes	Dr. Jennifer Sanders	Monterey
S0514	Lakkaraju, Shreya	9	Oxygen Saturation in Hemoglobin	Mr. Ramana Rao	Contra Costa
S0515	Lee, Heather Y. Patel, Dilan	11 11	Supporting the Notion that Nanopipette Injection Is an Accurate and Reliable Method for Multiplexed Genetic Editing	Mr. James Maas-Baldwin	Santa Cruz
S0516	Liu, Andrea Z.	12	The Role of CD114 (a G-CSF Receptor) in Medulloblastoma Cancer Stem Cells and Pathogenesis	Mr. Ariel Haas	San Diego

Senior Division  
**Biochemistry/ Molecular Biology**

Project	Name	Gd	Project Title	Advisor	County
S0517	Nazareth, Michelle M.	10	RNA Regulation: Identifying and Preventing AMP Depurination in Early Life RNA Polymerization	Ms. Cristie Kirlin	Santa Cruz
S0518	Pullela, Laya S.	10	The Effect of Light Exposure on Chaperone Protein Alpha B Crystallin: Modeling Cataract Formation in the Lens	Mr. Donald Buckley	Orange
S0519	Sandhu, Avneet	11	RNA Interference of Genes Involved in Coenzyme 4 and Its Effect on <i>C. elegans</i>	Mr. Kyle Webster	Kern
S0520	Schaefer-Whittall, Emma R.	12	Something's Fishy: Using DNA Barcoding to Identify Mislabeled Fish	Mr. Eric Byrd	Santa Cruz
S0521	Song, Gary J.	10	Single-Molecule Transcriptome: Wide Dynamics of Translation	Dr. Sean O'Leary	Riverside
S0522	Sovich, Taylor M.	10	Quantitative Analysis of Iron in Food	Ms. Karen Sovich	Ventura
S0523	Tabassum, Asna	11	In-Silico Analysis of Angiotensin Receptor Blocker Affinity to Polymorphic Angiotensin T1 Receptor to Customize Therapy	Dr. Bradley Andresen	San Bernardino
S0524	Wang, Kaitlyn M.	11	shRNA-Mediation of UGGT1 to Modulate Excessive Procollagen Secretion in Cardiac Fibrosis	Mr. Ariel Haas	San Diego
S0525	Wedekind, Katherine A.	11	Generation of MPS IIIA Induced Pluripotent Stem Cells and Correction Using CRISPR Cas9	Ms. Melissa Klose	Los Angeles
S0526	Yeung, Andre Y.	11	Induction of Endosymbiotic Gene Transfer from Chloroplast to Nuclear Genome in the Green Alga <i>Chlamydomonas reinhardtii</i>	Dr. Robert Jinkerson	Los Angeles

Senior Division  
Chemistry

Project	Name	Gd	Project Title	Advisor	County
S0601	Almaraz, Leslie A. Arya, Aliza D. Vargas, Mckayla M.	12 12 12	Sustaining a Biodegradable Environment through the Use of Polylactic Acid and Compost	Mr. Christopher Tavares	Los Angeles
S0602	An, Christina	12	Building and Testing a Magnetic Multilayered Hydrogel Microsphere Crosslinked by Genipin for Targeted Delivery of Drugs	Ms. Melissa Klose	Los Angeles
S0603	Bright, Jacob J. Liu, Jeff K.	10 10	Observing the Photoswitching Mechanism of Donor-Accepting Stenhouse Adduct (DASA) Molecules	Mrs. Michele Hampton	Riverside
S0604	Cantu-Cervini, Emilio	12	Mars Likes It Hot: The Effect of Temperature and Dust Storms on the Clay-Bicarbonate Reaction	Ms. Jennifer Claudio	Santa Clara
S0605	Chaudhuri, Anushree	11	A Porous Silicon Optical Nanosensor for the Detection of Volatile Organic Compounds	Ms. Diana Loo	San Diego
S0606	Chen, Alan P.	10	Colorimetric Detection of Toxic Heavy Metal Ions by Metal Nanoparticles	Dr. Bingzhang Lu	Santa Cruz
S0607	Daun-Widner, Willow M.	9	Lipids and Latex: How Common Lipids Affect the Elasticity of Medical Grade Latex	Ms. Erin Vaccaro	Mendocino
S0608	Ganguli, Rushil	10	A Smartphone-based Low Cost, Portable, and Accurate Optical Tensiometer to Determine Cleaning Power of Soap	Dr. Rahul Ganguli	Ventura
S0609	Ghalsasi, Aditi A.	11	Development of Functionalized PCL-2000 to Create Ideal 3D Printable Polymers	Dr. Smriti Koodanjeri	Santa Clara
S0610	Kenderski, Cathy S.	9	Using Hydrolysis to Facilitate the Chemical Degradation of PET Plastic	Mrs. Roxanna Jackman	Contra Costa
S0611	Lai, Kellen	9	Observing the Double Diffusion of Salt and Sucrose	Mr. Paul Hunt	Orange
S0612	Leeman, Jacob	11	Trends in Catalytic Properties of Tetra-Ammonium-Based Post-Transitional Metal Chloride Deep Eutectic Solvents	Ms. Francine Farouz	San Mateo
S0613	Liu, Benjamin C.	12	A Novel Printing Methodology of 3D Inverse Opals from Free-Standing Crystalline Structures for Next-Gen Optical Sensing	Mr. Alvin Tan	Los Angeles
S0614	Morales-Zapien, David	12	Are Expiration Dates Real?	Dr. Rano Sidhu	Ventura
S0615	Narain, Anshul	12	Developing Metal Electrodes to Replace ITO in Organic Thin Film Solar Photovoltaics	Mr. Matthew Carter	Fresno
S0616	Noronha, Laura M.	11	Z-Scheme Photocatalysis: A More Systematic Approach with $\alpha\text{-Fe}_2\text{O}_3@Au@P\text{-SiO}_2@Cu_2O$ Nanostructure	Mr. Rashed Aleisa	San Bernardino

Senior Division  
**Chemistry**

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Project	Name	Gd	Project Title	Advisor	County
S0617	Perez, Nicholas A.	11	Facilitating Emergency Thermal Protection via an Integration of Materials Augmented by an Endothermic Process	Mrs. Julie Beckius	Riverside
S0618	Pham, Kelly Q.	10	The Effect of pH on the Adsorption Capacity of Wool	Mr. Paul Hunt	Orange
S0619	Porayouw, William F.	10	Constructing Earth-Abundant Core Shell Plasmonic Photocatalysts for Hydrogen Production via Water Splitting	Mrs. Yubo Tan	San Bernardino
S0620	Rodrigo, Mia Isabel M.	12	Determining the Relationship between Oxidation Time for Wine and the Amount of Sulfite Remaining	Dr. Rano Sidhu	Ventura
S0621	Schneider, Zachary	11	Phi of Black Tea and Green Tea	Dr. Rano Sidhu	Ventura
S0622	Shah, Rishi	11	Analysis of UV Photodegradation of Moxifloxacin in Water Samples	Mr. Eddie Hammon	Kern
S0623	Subramanian, Harishankar G.	11	Synthesis of Luteolin as the Flavonoid Backbone of Hydnocarpins: A Potential Anti-Cancer Agent	Dr. Qiao-Hong Chen	Fresno

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Senior Division  
**Computational Systems & Analysis**

Project	Name	Gd	Project Title	Advisor	County
S0801	Agarwal, Sandhini	12	Tracking Parkinsonian Tremors: A Wearable Device Application Utilizing Smart Sensing for Real-Time Monitoring & Analysis	Mr. William Dunbar	Santa Clara
S0802	Ahmad, Rehaan Yang, Brian B.	11 11	Constructing Vegetation-Health-Map Image Forecasts Using a Novel Variable Length Attention ConvLSTM Network	Mr. Daniel Stavis	Santa Clara
S0803	Alag, Ayush	12	Computational DNA Methylation Analysis of Food Allergy Yields Novel 13-gene Signature to Diagnose Clinical Reactivity	<none acknowledged>	Santa Clara
S0804	Alber, Samuel A.	11	Developing and Applying a Novel Stochastic Model to Increase Production of Functional Cardiomyocytes via DNA Methylation	Mr. Tim Smay	Orange
S0805	Anand, Suraj K.	11	Machine Learning Ensemble Model for Improved Personalized Lung Cancer Risk Assessment and Malignant Nodule Detection	Ms. Melissa Klose	Los Angeles
S0806	Chan, Dennis	10	Implementation and Validation of a Machine Learning Model for the Early Detection of Alzheimer's Disease	Mr. Leon Chan	Contra Costa
S0807	Chen, Cynthia	11	Decoding Neural Networks: Novel Computational Methods to Discover Anti-Tumor B Cell Receptor Binding Motifs	Mr. Chris	Santa Clara
S0808	Chowdhuri, Sauhaarda	11	PhonoNet: Deep Learning for Raga Identification in Indian Classical Music	Mr. Dom David	San Diego
S0809	Chu, Andrew K.	9	A Novel Model to Optimize the Efficient Use of Lithium-Ion Batteries in Renewable Energy Storage Systems	Ms. Rachel Dragos	San Mateo
S0810	Chung, Karen	11	Integrating Mathematical Modeling with Machine Learning for Cancer Driver Gene Identification	Dr. Qing Nie	Orange
S0811	Cui, Patrick Zhang, Stephanie	11 11	PocketOnco: An App for Diagnosis-Prognosis of Colorectal, Breast, and Skin Cancer Using Convolutional Neural Networks	Mr. Michael Tang	Orange
S0812	Elarabawy, Adham	11	Predicting Optimal Farming Regions via Machine Learning Trained on Novel Vegetation Index	Mr. Ariel Haas	San Diego
S0813	Ganesh, Raghav	11	Developing a Novel, Accurate, and Rapid Machine Learning Based Skin Disease Diagnosis Algorithm and Mobile Application	Mr. Lester Leung	Santa Clara
S0814	Ghosh, Anusha	11	A Novel Program for the Detection and Translation of the ASL Alphabet through the Use of Deep Learning	Dr. Tracy Hughes	Santa Clara
S0815	Kakhandiki, Pranav	11	Automated Diagnosis of Aortitis Using Machine Learning	Mr. Kenneth Iams	Santa Clara
S0816	Kalavacherla, Sruthi	11	Controlling the Chikungunya Virus in Dengue Endemic Areas through the Development of a Peptide Vaccine	Mrs. Renee Ogle	Alameda
S0817	Kallingal, Shreyas G.	11	Waterborne Parasite Infection Risk Mitigation via Microscopy-based Assays and Parasiticide Proteases	Mr. Jonathan Brix	Alameda



Senior Division  
**Computational Systems & Analysis**

Project	Name	Gd	Project Title	Advisor	County
S0818	Kim, Anthony J. Ranparia, Valmik D. Shia, Sky	11 11 9	Sound Localization and Noise Cancellation to Assist the Hearing Impaired	Dr. Young Kim	Los Angeles
S0819	Lipman, Benjamin J.L.	11	Accurate Identification of Cardiac Anomalies through Deep Learning	Mr. Daniel Kelley	Santa Clara
S0820	Liu, Jiaju	11	A Novel Approach for Understanding Early-Stage Epileptogenesis via Nonlinear Manifold Learning	Ms. Melissa Klose	Los Angeles
S0821	Maniar, Natasha M.	12	MapAF: Deep Learning to Improve Therapy for Complex Human Heart Rhythm Abnormalities	Dr. Sanjiv Narayan	Santa Clara
S0822	Nazareth, Andrew B.	11	Predicting the Presence of Pneumonia in Chest X- rays Using Deep Learning with Convolutional Neural Networks	Mr. Erik Perkins	Santa Cruz
S0823	Oh, Nathan Y.	10	Modeling Intersections as an Asymmetric Non-Zero- Sum Game for Maximin Decision Theory and Traffic Flow Optimization	Mrs. Jeralyn Newton	Orange
S0824	Pagdanganan, Anjo B.	10	A Deep Learning Approach to E. coli Epidemic Prediction	Mrs. Shahida Merchant	Monterey
S0825	Parthasarathy, Rishab X. Zhao, William	9 9	SkinSight: A Novel Implementation of a Convolutional Neural Network to Recognize Skin Diseases	Dr. Eric Nelson	Santa Clara
S0826	Pasha, Deepro F.	10	Developing an Artificial Intelligence-Based Assistive Robot: A Novel Approach to Prevent Falling in Elderly People	Mr. Matthew Carter	Fresno
S0827	Pimpale, Govind Mand Pinto, Marek D. Reuben, Nitish	11 9 12	A Modular and Dynamic GPU-Based Maize Simulation Using L-Systems	Mrs. Channy Cornejo	Santa Clara
S0828	Singh, Amol P.	12	STAC-STIC: Novel Computational Pipeline to Generate Digital Super-Resolution Static Representations of Pathology Slides	Dr. Robert Ohgami	Santa Clara
S0829	Singhani, Anish	11	Real-Time Freespace Segmentation Using Deep Learning on Autonomous Robots for Detection of Negative Obstacles	Mr. Sharad Singhani	Contra Costa
S0830	Surti, Samyak P.	11	Cellular Automata-Based Mathematical Model for the Spread of Forest Fires	Mrs. Daria Muller	Sacramento
S0831	Surti, Tirth D.	11	Galaxy Morphological Classification through Convolutional Neural Networks	Mrs. Darshana Surti	Placer
S0832	Wang, Yuansong	11	Analysis of ADHD among Students	<none acknowledged>	Monterey
S0833	Wu, Dustin H.	11	A Novel Fuzzy Clustering-Based Convolutional Neural Network Ensemble for Histopathologic Cancer Metastasis Detection	Mrs. Rajshree Mudaliar	San Diego

Senior Division  
**Earth & Environmental Sciences**

Project	Name	Gd	Project Title	Advisor	County
S0901	Adibnia, Sahand	9	The Effect of Rainfall on the Water Quality of South San Ramon Creek	Ms. Patti Carothers	Alameda
S0902	Barwegen, Sophia A.F.	12	The Effect of Light Pollution on Dark Sky Brightness and the Calvin Cycle of Wildflowers in Yosemite National Park	Dr. Christine Koltermann	Santa Clara
S0903	Bechler, Amaya M.	11	How Is Bird Abundance and Diversity Affected by Invasive Dense-flowered Cordgrass in Humboldt Bay Marshes?	Mr. Greg Gray	Humboldt
S0904	Cai, Justin H. Xia, Iris X.	11 11	Implications of Climate Change on Marine Ecosystems: Using Big Data Mining to Analyze Bioturbation and Mass Extinctions	Mrs. Katie Collins	Santa Clara
S0905	Cambron, Trevor W. Owens, Natalie T.	12 12	Trails, Soil, and SOD	Ms. Stephanie Beck	Santa Cruz
S0906	Chen, James Y.	11	Study of Atmospherically-Relevant Reactions between Dinitrogen Pentoxide with Organic Acids and Chlorine Ions in Water	Mr. Tim Smay	Orange
S0907	Cox, Mariah G.	12	The Effects of Wildfire Ash on Soil Nutrient Levels	Mrs. Norma Cox	Mendocino
S0908	Galinato, Heather L.	9	Tsunami Simulation: Slope vs. Inland Travel	Ms. Jeanette Favaloro	Monterey
S0909	Gerstein, Vivian S.	10	The Effect of Wildfire Smoke on Fermented Grape Products	Mr. Earl Peters	Humboldt
S0910	Gonzalez, Dillon T.	10	The Effect of Rheology on Reverse Faults Using a Fault Deformation Machine.	Mrs. Michele Hampton	Riverside
S0911	Howard, Ruby A. McCormick, Katherine R. Schafer-Dews, Helen Leslie D.	12 11 11	Soil Water Content Relative to French Broom Removal in the San Lorenzo Valley Watershed	Ms. Stephanie Beck Dr. Michael Loik	Santa Cruz
S0912	Ith, Brian L. Rodriguez, Marcus A.	12 12	Examining Invasive Boars' Impact on Water Quality in Tejon Ranch Conservancy in Comparison to Wind Wolves Preserve	Mr. Mike Brasier	Kern
S0913	Jimenez, Mateo Lucero, Marcos	12 12	Comprehension of Slope Stability with an AR Sandbox	Mr. Mike Brasier	Kern
S0914	Kim, Patrick J.	11	Developing Coupled Physical-Biogeochemical Models of Mesozooplankton Dynamics in the California Current System	Dr. Jaime Guiet	Los Angeles
S0915	Kwon, Yoonji A.	11	No Smoke Without Fire: The Impact of Wildfires on Exposure to Particulate Pollutants	Mr. Matthew Carter	Fresno
S0916	Marks, Tessa L. Swenson-Thole, Mackenzie A.	12 11	An Analysis of the Relationship between Climate Change and Lyme Disease	Dr. Gregory Gilbert	Santa Cruz

Senior Division  
**Earth & Environmental Sciences**

Project	Name	Gd	Project Title	Advisor	County
S0917	McQuilkin, Ellery B.	9	Sierra Streams: The Effect of Glacial Melt on Fall Flow	Dr. Constance Millar	Mono
S0918	Michaels, Tai L.	12	Streamflow Measurement and Prediction in Southern California: An Observational and Citizen Science Project	Mr. Tai Michaels	Los Angeles
S0919	Peters, Gavin A.	10	Phytoplankton Assemblage Composition at White Point Hydrothermal Vent	Mrs. Julie Munoz	Los Angeles
S0920	Placencia, Mia A.	12	A Study of Particulates Emitted from Printers	Mr. Riccardo Magni	Santa Barbara
S0921	Sivakumar, Ashwin	9	Studying Avian Biodiversity Changes after Wetland Restoration: A Novel Approach via Remote Sensing and Citizen Science	Dr. David Herman	Los Angeles
S0922	Stark, Brayden C.	11	A Systematic Method to Reduce the Biomass of a Harmful Algal Bloom (HAB)	Dr. Aidyl Gonzalez-Serricchio	Los Angeles
S0923	Sung, Joyce Hee	12	Earth Has a High Fever That Makes It Sour: The Impact of Global Warming on the Concentration of Carbon Dioxide Produced	Dr. Rano Sidhu	Ventura

Senior Division  
**Electronics & Electromagnetics**

Project	Name	Gd	Project Title	Advisor	County
S1001	Ahmad, Jamil S. Akbar, Moaaz	11 11	Frontiers of 5G: Sparse Adaptive Battery-less Ambient Backscatter Communication Networks	Mr. Matthew Carter	Fresno
S1002	Anand, Akash K.	9	Optimal Phased Array Antenna Systems for Radio Astronomy	Ms. Melissa Klose	Los Angeles
S1003	Anavekar, Om Chichili, Tarun R. Gupta, Arnav	11 11 11	An Intelligent Glove that Converts Hand Gestures and Sign Language Into Spoken Text	Dr. Eugene Mizusawa	Contra Costa
S1004	Balasingam, Akhilesh V.	10	Brain-Inspired Circuitry for the Future of AI: Optimizing the Analog Response of RRAMs Under Pulsing for Synaptic Use	Dr. Dipu Pramanik	Santa Clara
S1005	Caligiuri, Christopher R.	10	BrainBot: Multielectrode Data Modeling and Stem- Cell Derived Brain Stimulation through a Real Time Robotics Platform	Mr. Ariel Haas	San Diego
S1006	Chae, Rachel H.	12	FMCW Radar Driver Head Motion Monitoring Based on Doppler Spectrogram and Range- Doppler Evolution	Dr. Changzhi Li	Orange
S1007	Cheng, Jiahan Rife, Thomas H. Wetterau, August Z.	9 9 9	Seeing Reality	Dr. Kim Lawe	Riverside
S1008	Dattamajumdar, Aryia	11	An Early Warning AI-powered Portable System to Reduce Workload and Inspect Environmental Damage after Natural Disasters	Ms. Anita Wu	Santa Clara
S1009	Gali, Yahvin	9	Rethinking Braille with Pi Reader: Raspberry Pi Based Optical Reader for the Blind and Visually Impaired Using OCR & TTS	Mrs. Anita Gali	San Joaquin
S1010	Gandhi, Saurav S.	9	A Hand Dynamometer Controlled Computer Vision Based AI Robotic Navigation System for the Visually Impaired and Elderly	Mrs. Suzanne Miller-Moody	Santa Clara
S1011	Ghodsi, Melina S.	10	Monitoring Respiration Utilizing a Low-cost Accelerometer Sensor to Prevent Sudden Infant Death Syndrome (SIDS)	Dr. Majid Sarrafzadeh	Orange
S1012	Harris, Lauren Y.Z.	12	Piezoelectric Energy Generation from Roadways and Pedestrian Walkways: A Practical Field Test of a Piezoelectric Speed B	Mr. John Ingrum	Los Angeles
S1013	Joshi, Arya P.	12	Energy Generation from Motor Vehicle Drag through Piezoelectric Processes	Mr. Clay Elliott	Orange
S1014	Kapoor, Andy	9	SensorSafe Baby Car Seat	Mrs. Tami Engel	Orange
S1015	Khare, Rohil	9	Vacuumed Linear Accelerator Launchers: The Future of Space Launches	Mr. Subodh Khare	Alameda

Senior Division  
**Electronics & Electromagnetics**

Project	Name	Gd	Project Title	Advisor	County
S1016	Limon, Patricia N. Monterroso, Elissa E. Romer, Lizbeth M.	12 12 12	Expanding the Lifespan of a Plant through a Self Watering Flower Pot	Mr. Joshua Gagnier	Orange
S1017	Manshahi, Farid A.	11	Designing an Affordable Advanced Mind-Controlled Robotic Arm	Mr. Trevor Morris	San Bernardino
S1018	Roy, Sohom K.	10	Camera & Stabilization System to Provide Object Detection/Tracking in Real Time for Assistance of the Visually Impaired	Mr. Daniel Stavis	Santa Clara
S1019	Sharma, Suhina	10	Cost-Effective Device that Analyzes Gas and VOC Concentrations in Exhaled Breath for Prevention of Chronic Lung Diseases	Ms. Rita Kolenic	Orange
S1020	Sperandio, Isabel	11	Harnessing the Power of the Ocean: Designing an Efficient and Portable Wave Energy Converter Prototype	Ms. Tarn Wilson	Santa Clara
S1021	Wang, Xin (Anna)	10	Analysis of Energy Efficiency in a Linear Induction Motor	Mr. David Kim	Los Angeles

Senior Division  
**Environmental Engineering**

Project	Name	Gd	Project Title	Advisor	County
S1101	Amarante, Trevor J.	12	Bioreactors: Promoting Methanogenic Reproduction through the Recirculation of Leachate	Mrs. Stephanie Salas	Fresno
S1102	Balagopal, Danya S.	9	The Effect of Bio-coagulants on the Adsorption of Waste Oil and the Reduction of Turbidity from Oil-Produced Waters	Dr. Sean Wilmot	Santa Clara
S1103	Catanzaro, Francisco C. Catanzaro, Isabella J.	10 12	Measuring Chlorophyll Fluorescence and Spectral Reflectance for the Remote Sensing of Agriculture	Dr. Tracey Milani	San Diego
S1104	Chaudhuri, Shreya	10	The Effect of Growth Media on Algae's Ability for CO2 Biofixation	Ms. Kara Pezzi	Alameda
S1105	Diep, Abida T. Thirumalai, Vittal	12 11	Keeping the Ocean Clean: A Novel Self-Sustaining Boat that Uses Vision Tracking to Collect and Sort Trash in the Ocean	Mr. George Sousa	Santa Clara
S1106	Fairlie, Jessica S. Feldheim, Vivian S.	11 11	Sweet Erosion: Analyzing Coastal Erosion Prevention Methods	Dr. Rebecca London	Santa Cruz
S1107	Garcia, Julianna G. Lum, Siena M.	11 11	Used Coffee Grounds: A New Source of Fuel	Mrs. Schatzi Sovich	Ventura
S1108	Garudapuri, Dimple Amitha	9	Na/Ca/K Pollution Scrub: A Domestic Approach to Chemical Carbon Capture	Mrs. Jeanette Bowles	Riverside
S1109	Hong, Jonghyun Soucar, Jad	12 11	Producing a Corrosion Resistant and Environmentally Friendly Concrete by Using the Salt Water Carbonate Buffer System	Ms. Orenda Tuason	Los Angeles
S1110	Janapaty, Shloka V.	11	A Novel, Fast, Low-Cost Approach to Achieve Near 100% LDPE Degradation: Bioremediation Landfill Implementation	Dr. Tracy Hughes	Santa Clara
S1111	Jha, Eshani	10	A Novel and Affordable Water Filtration System for Complete Removal of Heavy Metals	Mr. Lester Leung	Santa Clara
S1112	Krockenberger, Nicole	10	Creating a Renewable and Biodegradable Bioplastic from Bambusa multiplex	Mrs. Catherine Messenger	Santa Clara
S1113	Moudgalya, Pranav S.	9	Assessment of Organic Waste Materials in Nitrate Filtration of Southern California Waters	Mr. Joseph Huber	Orange
S1114	Muthukumar, Aarthi	11	Interdisciplinary Approach to Deforestation and Lung Disease: Using Photovoltaic Systems to Build Low-Cost Solar Cookers	Ms. Megan Slinger	Alameda
S1115	Park, Charlotte	11	Conductive Materials Based Reusable Electrostatic Particulate Matter 2.5 Filters	Dr. Richard Kaner	Los Angeles

Senior Division  
**Environmental Engineering**

Project	Name	Gd	Project Title	Advisor	County
S1116	Prawira, Jacqueline	9	Ocean.Bioplas: The Plasticity of Marine Exoskeleton-Inspired Materials and their Degradability in the Environment.	Ms. Aily Salikin	San Joaquin
S1117	Quan, Melanie E.	10	Developing Compostable and Water-Soluble Algal Bioplastics by Repurposing Waste Products of Algal Biofuel Production	Mrs. Denise Quan	Contra Costa
S1118	Roh, Jiyoun	11	Preventing Eutrophication with an Organic Fertilizer Made of Dark Chocolate, Coffee Grounds, and Banana Peels	Ms. Orenda Tuason	Los Angeles
S1119	Roice, Alicia E. Roice, Ashlyn M.	9 9	Trash to Treasure: Biofuel from Agricultural Waste by Saccharification and Fermentation Using an Arduino Ethanol Sensor	Mrs. Sini Joseph	San Joaquin
S1120	Ryan, Brantley R.	9	The Effects of Simulated Rain on Varying Types of Erosion Control Methods	Mrs. Kristine Jennings	Riverside
S1121	Smith, Mirabella M.	11	Desalinating Water Using a Centrifuge and Varying Layers of Filtration	Mrs. Julie Beckius	Riverside
S1122	Smith, Nathan A.	10	Aqua Drone: A Novel Approach to Water Testing. An Autonomous Drone Used to Measure the Quality of Water	Miss Nicole Brousseau	Sacramento
S1123	Srivastava, Ayushi	11	The Milkweed Mesh: Cleaning Up Oil Spills in Aquatic Environments Using an Eco-Friendly Component	Mrs. Abigail Noche	San Francisco
S1124	Tadimeti, Aditya	10	The Effects of Different Aquatic Environments on the Rate of Polyethylene Biodegradation by Bacillus subtilis	Mr. Jeff Sutton	Santa Clara
S1125	Tallavarjula, Visala R.	12	Desertification Mitigation: To Grow Plants in Sand with Suppression of Percolation Water Loss Using Sequestered Carbon	Dr. Fred Barez	Santa Clara
S1126	Wang, Jiaheng	12	Contactless Buoyant Solar Desalination/Sterilization	Mrs. Julie Munoz	Los Angeles

Senior Division  
**Mammalian Biology**

Project	Name	Gd	Project Title	Advisor	County
S1201	Agashe, Ruchi P.	11	Identification of Treatments for Hemophilic Joint Disease through Evaluation of Vascular Defects	Mr. Ariel Haas	San Diego
S1202	Balusu, Chinmayi	12	Can the Longevity Compound Rapamycin Rescue Brain Tissue in Age-Related Diseases in Old Mice?	Ms. Sue Baker	Sacramento
S1203	Beshimova, Adolat	12	Calpains 8 and 9 are Expressed in the Murine Intestines and Regulated by wnt3a in Colon Cancer Cells	Dr. Ling Shao	Los Angeles
S1204	Branche, Corynn M.	10	Novel Insights into Human Obesity through Identification of Genetic Polymorphisms in Lean vs. Obese Labrador Retrievers	Dr. Barbara Natterson-Horowitz	Los Angeles
S1205	Brar, Ishaan S.	10	A Novel Multi-Lumen Urinary Catheter with Sustained Unidirectional Biocide Flow	Dr. Harjeet Brar	Kern
S1206	Burrus, Ashlyn H.	9	Acne Treatments: Proactiv vs. Home Remedy	Mrs. Katayoon Setodehnia	Orange
S1207	Close, Iliana R. Swei, Keira	9 9	Correlating Inflammatory Markers and the Development of Neurodegenerative Lesions Using Machine Learning	Dr. Robert Dubrow	San Mateo
S1208	Hepfer, Jason I.	10	Variations in Behavior Tendencies of House Mice as a Result of Gravitational Manipulation	Ms. Karen Reynosa	Ventura
S1209	Jia, Allison S.	11	Modeling Neurodegeneration in vitro: A Dynamic Study of Tau in a Microfluidic Chamber System via Quantum Dot Labeling	Mr. Chris Spenner	Santa Clara
S1210	Jo, Hara	11	The Effect of 3T3/NIH Fibroblast Co-Culture on the Growth and Survival of HMEC	Mrs. Michele Hampton	Riverside
S1211	Johnston, Elisha D.	10	Developing a Novel Physiologically Relevant Model to Study Cartilage Regeneration	Dr. Lin Chen	Los Angeles
S1212	Joven, Zuriel Erikson V.	10	Development and in Vitro Evaluation of Dextrose Transdermal Patches as a Low-Cost Alternative to Intravenous Delivery	Ms. Corinne Rushing	Sacramento
S1213	Khurana, Maya S.	11	Occult Breast Cancer: Does Molecular Profile Matter in Treatment?	Ms. Laura Kaufman	Los Angeles
S1214	Kim, Susanna S.	11	Identification of Novel Biomarkers for the Early Diagnosis of Acute Myocardial Infarction	Mr. Eric Lee	Los Angeles
S1215	Moon, Katie G. Morrissey, Kyle M.	10 10	Measuring Stress on the Patellar Tendon at Various Bend Angles	Ms. Karen Reynosa	Ventura
S1216	Moshfeghi, Sina	12	Transdermal Lactate Collection with Agarose Gels for Noninvasive and Painless Monitoring of Patients	Ms. Melissa Klose	Los Angeles



Senior Division  
**Mammalian Biology**

Project	Name	Gd	Project Title	Advisor	County
S1217	Nguyen, Kenny N.	9	Fractals and the Chaos Theory in Oncology and the Analyzation of Tumors	Dr. Rachell Auld	Riverside
S1218	Patel, Seeta R. Rheem, Hyunjin	10 10	Surface-Modified Loaded Human Red Blood Cells for Targeting and Delivery of Drugs	Dr. Bahman Anvari	Riverside
S1219	Randhawa, Omer W.	11	Impact of APOE Gene on Alzheimer's Gender Discrepancy	Mrs. Elaine Gillum	San Diego
S1220	Rivera, Jesus A.	10	Formula Milk vs. Mother's Milk	Mr. Roberto Castro	Riverside
S1221	Robinson, Dalton	11	Parasite Susceptibility in Icelandic Sheep: A Comparison of Offspring of Iceland-born Rams vs. American-born Rams	Dr. Susan Engwall	Mendocino
S1222	Vargas, Julia	11	Superiority In Grip Strength: Athletes or Non-athletes?	Mr. Riccardo Magni	Santa Barbara

Senior Division  
**Mathematical Sciences**

Project	Name	Gd	Project Title	Advisor	County
S1401	Atreya, Pranav D.	12	A Novel Analytical Approach to Determining Parameter Derivatives of an Object under Motion Constraints	Mrs. Stella Demetriou	Santa Clara
S1402	Basu, Maya A.	9	Creating a Neural Network to Play the Game of Connect Four Using a Genetic Algorithm	Dr. Samit Basu	Alameda
S1403	Cooper, Jack C. Reyes, Eric S.	11 11	Pythagorean Triples Found in the Quadratic Equation	Mrs. Susan Valle	Ventura
S1404	Gilbert, Elias B.	11	Defining the Function of a Curve in an Image with Graphical Analysis and Model Selection	<none acknowledged>	Santa Cruz
S1405	Holst, Mason V.	10	An Optimized Multigrid Algorithm for Enabling Efficient Physical Simulations on Realistic Geometries	Mr. Ariel Haas	San Diego
S1406	Levine, Alex S.	12	Efficiently Identifying High-Centrality Nodes in Modular Networks	Mrs. Holly Eaton	San Diego
S1407	Liu, Daniel	11	Extending Adversarial Attacks and Defenses to Deep 3D Point Cloud Classifiers	Mr. Brinn Belyea	San Diego
S1408	Mandelstam, Andrei	10	Dynamics of the Tangent Map	<none acknowledged>	Orange
S1409	Narayanan, Tejas Rao, Ashish P. Sarkar, Bidipta	11 11 11	Novel Reinforcement Learning Methods in Collaborative Environments	Mr. Eric Ferrante	Santa Clara
S1410	Palleti, Raj S. Prasad, Suhas	11 11	Dimensional Isomorphisms of the Eulerian Sequence: A Computer Inspired Analysis	Mr. Jim Birdsong	Santa Clara
S1411	Park, Jian	10	DT-DBSCAN: Density-Based Spatial Clustering in Linear Expected Time Using Delaunay Triangulation	Mrs. Rena Dear	Orange

Senior Division  
**Microbiology (General)**

Project	Name	Gd	Project Title	Advisor	County
S1501	Aitken, Catherine P.	11	Effects of Glycerol Solution on Freeze Tolerance and Photosynthetic Efficiency of Cyanobacteria for Use in Terraforming	Ms. Kristina Koster	Contra Costa
S1502	Anderson, Christopher S. Lozier, Katelyn A. Robinson, Celeste R.	12 12 12	What the Fungus Is Killing the Sea Stars?	Ms. Stephanie Beck	Santa Cruz
S1503	Bernstein, June T. Kadaba, Samarth E. Leong, Vincent S.	10 10 12	The Effects of a Neurotoxin on the Gut Microbiome of <i>Eisenia feita</i>	Ms. Baoqing Zhou	Ventura  Los Angeles
S1504	Chen, Curtis C.	10	Exploring Plant Natural Products for Novel Antimicrobial Activities	Mrs. Michele Hampton	Riverside
S1505	Durant, Phoebe S.	12	Sensitivity of Gram (+) and Gram (-) Bacteria to Essential Oils Based on the Sensitivity Disc Diffusion Method	Mrs. Greta Turney	Humboldt
S1506	Feng, Daniel	10	Discovering Antibacterial Molecules in a Previously Uninvestigated Native American Medicinal Herb	Ms. Lynette Burnside	Orange
S1507	Filler, Chen E.	11	The Role of Tetraspanins in the Uptake of <i>Candida albicans</i> by Host Cells: Year 2	Dr. Hong Liu	Los Angeles
S1508	Garg, Shreya	11	Determining the Roles of CuSB, Flagellin, and AcrAB-TolC in Bacterial Responses to Nonlethal Nanosilver Concentrations	Dr. Christine Koltermann	Santa Clara
S1509	Gupta, Saira S.	9	A Preliminary Assessment of Surgical Site Infection Prophylaxis with Topical Micronutrients	Dr. Gail Hill	Riverside
S1510	Harvell, Kelly A.	11	Effects of Ocean Acidification on <i>Chaetoceros gracilis</i> in the Monterey Bay	Mr. Jason Nicholson	Monterey
S1511	Hernandez, Dolores N., II Montes, Natalie	11 11	The Highlight of UV and Makeup	Ms. Guadalupe Valero	San Bernardino
S1512	Jakpor, Jibiana Z.	9	Comparison of Gene Expression in Pancreatic Cancer with and without Perineural Invasion	Mrs. Julie Sullivan	Riverside
S1513	Kamarshi, Vivek V.	12	Cellular Pathways for Increasing Fusion and Decreasing Replication of Varicella Zoster Virus	Ms. Renee Fallon	Santa Clara
S1514	Kang, Emily K.	10	Turning Over a New Phage: A Novel Approach to Phage Therapy	Mr. Ariel Haas	San Diego
S1515	Kuan, Raymond Tan, Derek	11 11	Effectiveness of Phycocyanin, Isolated from <i>Spirulina platensis</i> , on the Inhibition of Neoblast Tumor Growth	Mr. Scott Vander Veen	Santa Clara

Senior Division  
**Microbiology (General)**

Project	Name	Gd	Project Title	Advisor	County
S1516	Labador, Jillian M.	11	Engineering Pseudomonas putida KT2440 for Biodegradation of Ethylene Glycol	Dr. Kim Lawe	Riverside
S1517	Lim, Lana C. Tang, Wenxuan	10	Methylglyoxal, Antibacterial Agent in Manuka Honey, and Its Efficacy in Treating S. aureus Related Nosocomial Infections	Dr. Rachell Auld	Riverside
S1518	Maemoto, Abbie K.	10	Nutrient Removal Efficiency of Nitrates and Phosphates by N. oculata through Increased Infusion of Carbon Dioxide	Mrs. Julie Munoz	Los Angeles
S1519	Markarian, Eric	9	Targeting Enterococcus faecalis with Phage Therapy	Ms. Orenda Tuason	Los Angeles
S1520	Nguyen, Helen Ponce, Ezequiel Tran, Sophia	12	Targeting Susceptibility to Mutations in the Cell Cycle: Disruption of the Ade2 Gene in Yeast Using CRISPR/CAS9	Mr. Patrick Allamandola	Santa Clara
S1521	Noh, Elaine J. Shimizu, Amy S.	10	The Effect of Public Restroom Stall Location on the Bacterial Growth on Toilet Seats in Each Stall	Ms. Jennifer Blackie	Orange
S1522	Patel, Jayna T.	10	The Effect of Using Alcohol-Based Hand Sanitizer vs. Alcohol Hand Wipes on the Percent of Bacterial Reduction from Hands	Ms. Crystal Cooper	Orange
S1523	Ronaghi, Sasha L.	11	Using Machine Learning and Surface Enhanced Raman Spectroscopy to Analyze the Effects of Antibiotics on P. aeruginosa	Ms. Tanya Lerch	Orange
S1524	Rumbaugh, Phoenix T.	11	Mitigating Effect of Yucca Root Powder on Microcystis aeruginosa	Mrs. Anne Rumbaugh	Santa Cruz
S1525	Schletewitz, Ashley C.	9	Evaluation of Equisetum hyemale Extract as an Alternative Chemical for the Control of Penicillium italicum on Citrus	Dr. Themis Michailides	Fresno
S1526	Zhang, Elizabeth Y.	11	The Effect of Metal Ions on Lactobacillus acidophilus Growth and Beta-galactosidase Activity	Ms. Melissa Klose	Los Angeles

Senior Division  
**Physics & Astronomy**

Project	Name	Gd	Project Title	Advisor	County
S1701	Anchanattu, Isaac J.	10	Measuring Road Quality Using Vibration Analysis	Mr. Bobby Anchanattu	San Joaquin
S1702	Annison, Caden	9	Changing the Rate of Electronically Detected Muon Occurrences by Modifying External Variables	<none acknowledged>	San Mateo
S1703	Barrett, Hayden A. Gonzales, Andrew J. Ryan, Logan J.	9 9 9	How Do Different Wavelengths of Light Affect the Energy Production Efficiency of a Solar Panel?	Ms. Morgan Olko	Fresno
S1704	Bhatti, Maximillian A.	10	High-Stratospheric Testing of Novel Cosmic Ray Shielding Composites	Dr. AnnMarie Hwang	Los Angeles
S1705	Broudy, Isaac A.	11	Developing and Calibrating a Linear Polarimeter for Astrophysical Tests of Beyond Standard Model Physics	Dr. Michelle Mardhal	San Diego
S1706	Castro, Rebeca	11	Biomechanics of the Golpe	Mr. Andrew Hamilton	Los Angeles
S1707	Inouye, Jonathan K.H.	12	Improving Solar Panel Efficiency with Thermoelectric Generator Units Using the Seebeck and Peltier Effects	Mrs. Brenda Royce	Fresno
S1708	Inverary, Faith F.	10	Solar Controller: How Varying Weather Patterns Affect Light to Heat Conversion within Solar Ovens	Dr. Kim Lawe	Riverside
S1709	Kabranov, Philip	12	Accretion Analysis through Profile Decomposition of T-Tauri Stellar Spectra Using Nonlinear Least Square Minimization	Mr. Narquiz Cervantes	Santa Clara
S1710	Ko, Wonjin	10	A Novel Method of Dielectric Nanopores for Electrophoresis Measurements of Nanoparticles	Mr. Eric Lee	Ventura
S1711	Koodli, Krithi V.	9	A Novel Method of Distinguishing Rocky Planets from Uninhabitable Gas Giants Using Unsupervised Clustering	Mr. Shahram Mostarshed	Santa Clara
S1712	Kwon, Alexander S.	11	Synthesis and Analysis of Strontium Titanate (STO): Can It Replace Silicon for Power Electronic Applications?	Mrs. Anie Robinson	Orange
S1713	Rim, Patrick	11	How Far to the Stars?	Mr. Kurt Wahl	Orange
S1714	Salunke, Nikita N.	11	Effect of Epitaxial Compression on Structural & Electrical Transport Properties of 3D Topological Dirac Semimetal Cd <sub>3</sub> As <sub>2</sub>	Mr. David Walz	Santa Clara
S1715	Scaletta, Kayenne R.	11	Designing the Perfect Coaster	Mrs. Patricia Ehart	San Bernardino
S1716	Shi, Jimmy	11	Magnetic Damping Study by Broadband Ferromagnetic Resonance	Dr. Igor Barsukov	Riverside
S1717	Vijayakumar, Vivek	10	Analysis of Molecular Spectra in Asymptotic Giant Branch Carbon Stars	Mr. Robert Terrill	San Diego
S1718	Wang, Andrew E.	12	Dusty Spacesuit Charging and Arcing: Implications for Human Exploration of the Lunar Terminator and Far-Side	Mrs. Julie Munoz	Los Angeles
S1719	Weiss, Ian G.	9	Our Roads: A Large Thermoelectric Generator	Mr. Greg Gardiner	Orange

Senior Division  
**Plant Biology**

Project	Name	Gd	Project Title	Advisor	County
S1801	Chan, Yee Kit Yu, Jaimie	9 9	MSG and Cell Growth	Ms. Heng Yuan Shr	Mendocino
S1802	Do, Isabelle	11	The Effect of Nuclear-Cytoplasmic Partitioning of AAR2 and HYL1 on microRNA Biogenesis and Plant Development	Mrs. Michele Hampton	Riverside
S1803	Elliott, Olivia W. Palmer, Camryn N.	9 9	Does Gibberellic Acid Affect Pea Plant Growth?	Ms. Morgan Olko	Fresno
S1804	He, David L.	10	Effect of Genetic Modification of DMR6 in <i>Solanum lycopersicum</i>	Mr. Ariel Haas	San Diego
S1805	Huey, Royal J., III	11	The Effects of Simulated Microgravity on the Root Development of Seedlings	Ms. Jennifer Claudio	Santa Clara
S1806	Huitt, Emily M.	9	California Avocados Harvested in the Golden State: Investigating Root Rot and Combating <i>Phytophthora cinnamomi</i>	Mrs. Marie Bordin-Huitt	Butte
S1807	Iyer, Siya R.	9	Improving Algal Biofuel Production with Nanotechnology	Mrs. Sarika Iyer	Contra Costa
S1808	Moes, Jorja M. Slyker, Anjali N.	10 10	Silver Nanoparticles on Freshwater Aquatic Java Plant Growth	Mrs. Susan Valle	Ventura
S1809	Phaychanpheng, Wynn Sogata, Audrey T.	10 10	Jasmonic Acid Regulation of Abiotic Stresses in <i>Brassica rapa</i> and <i>Arabidopsis thaliana</i>	Ms. Chirichan Tasanont	San Bernardino
S1810	Pollner, Alina V.	11	Bioengineering Plant Genomes to Increase Crop Production via CRISPR-Cas9	Mr. Ariel Haas	San Diego
S1811	Salahifar, Aylin G.	9	Comparing the Physiological Responses of C3, C4, and CAM Plants in Changeable Climates Using a Smart Plant Tracker	Mr. Tulug Salahifar	San Mateo

## Senior Division Toxicology

Project	Name	Gd	Project Title	Advisor	County
S2101	Adcook, Sydney C.	10	Silver Nanoparticle Exposure Effect on the Growth of 13 Common Strains of the Human Gut Microbiota	Mr. Donald Buckley	Orange
S2102	Chang, Benjamin	12	Analyzing Dental Pulp Stem Cell Response to TiO <sub>2</sub> ALD and Fused Deposition Modeling on PLA Bioscaffolds	Ms. Crystal Cooper	Orange
S2103	Choi, Sydney S.	9	Don't Be Salty! Testing the Reaction of Plants to Four Chloride Based Chemicals	Ms. Kim Kiest	Monterey
S2104	Dara, Suchitra S. Sahoo, Alor	11 9	Biorational Solutions of a Re-emerging Pest, the Western Grapeleaf Skeletonizer	Dr. Surendra Dara	Kern
S2105	Ghadia, Krina A.	9	Running a Bioessay: Sodium Toxicity's Effect on Lactuca sativa Germination	Mr. Eddie Hammon	Kern
S2106	Golden, Adriana	11	Effects of E-Cigarette Flavor and Nicotine Concentration on Human Alveolar Epithelial Cell Viability	Mr. Carl Ma	Marin
S2107	Gurram, Sumanth Wu, David H.	12 12	Electromagnetic Fields Inhibit Cancer Proliferation: An Interdisciplinary Approach to Improve Treatment	Mr. Scott Halander	San Diego
S2108	Huitt, Joseph A.	12	Honey! Why Can't My Bees Fly? Investigating the Accuracy of Varroa Mite Treatments	Mrs. Marie Bordin-Huitt	Butte
S2109	Meinhold, Li F.	10	The Effects of UV Radiation on C. elegans Growth Rate as a Model for the Impacts of Interstellar Travel	Dr. Pradeep Joshi	Santa Barbara
S2110	Mihalache, Beatrice M.	10	Effects of Polyethylene Microbeads on Lactuca sativa var. longifolia	Mrs. Catherine Messenger	Santa Clara
S2111	More, Annalisa J.	10	Detection and Removal of Pesticides Residues from Organic and Non-Organic Produce of the Salinas Valley	Ms. Ying Chu	Monterey
S2112	Mukherjee, Atreyi L.	10	The Effect of Nicotine Strength and Inactive Material in E-Cigarette Liquid on the Pulse Rate of Lumbriculus variegatus	Dr. Christine Koltermann	Santa Clara
S2113	Swamy, Samika	9	CogniGuard: A Novel, Herb-based Treatment for Protection against Neurotoxicity from Lead Pollution	Ms. Renee Fallon	Santa Clara
S2114	Turney, Korbyn M.J.	9	Effects of Silver Nanoparticles on Mortality Rates of Freshwater Microorganisms at the Arcata Marsh	Mrs. Greta Turney	Humboldt

## Senior Division

### **Zoology**

Project	Name	Gd	Project Title	Advisor	County
S2201	Ansari, Nadia	9	Use of Pulsed Photobiomodulation in Nerve Regeneration after Injury-Induced Peripheral Neuropathy in <i>Danio rerio</i>	Mr. Dan Thomassen	Orange
S2202	Christopher, Madeline A.	9	Honeybee Food Transfer and Foraging Activity	Mr. Paul Hunt	Orange
S2203	Kim, Changhyun	12	Observing Mutualism of <i>Vermivora cyanoptera</i> and <i>Psaltiriparus minimus</i>	Mrs. Julie Munoz	Los Angeles
S2204	Lee, Junhee	11	Effect of Temperature on Embryonic to Larval Development of Sand Dollars, <i>Dendraster excentricus</i>	Dr. Andres Carrillo	Los Angeles
S2205	Lindholm, Elizabeth M.B.	9	The Witching Hour: Diel Variations among Kelp Forest Fishes at Monastery Beach, CA	Ms. Kim Kiest	Monterey
S2206	Mungaray, Roberto E.	10	How Does the Composition of Pigeon Milk Affect the Growth Process of Domestic Animals?	Ms. Karen Reynosa	Ventura
S2207	Pamidimukkala, Sanjita	10	Prevention of Oxidative Stress Induced Diseases through the Effects of Curcumin on Planarial Stem Cells and Regeneration	Ms. Tiffany Wu	Contra Costa
S2208	Roy, Triya	11	The Effect of a High-Sugar Diet on <i>Drosophila melanogaster</i>	Dr. Inez Yuwanita	Santa Clara
S2209	Sutton, Simone S.K. Triulzi, Isabelle Ming M.	11 11	Abundance of Sand Crabs in Relation to Core Samples	Ms. Stephanie Beck	Santa Cruz
S2210	Washburn, Haidyn	11	Assessing the Effect of Light Pollution on Courtship Behavior of <i>Drosophila melanogaster</i>	Mr. Davin Aalto	Fresno



**California Science Center**  
**CALIFORNIA SCIENCE & ENGINEERING FAIR**  
**2019 Judges**

The California Science & Engineering Fair would not be possible without the voluntary efforts of hundreds of professional scientists and engineers from throughout the State who have volunteered this day for the purpose of meeting with the participants and discussing their projects. We especially recognize the Directors of Judging, Dr. Philip M. Fine, Dr. Thomas R. LeBon, and Dr. Geraldine J. Peters who have coordinated all of the judges for the 2019 Fair.

We also want to recognize the extra efforts by the following people who read every Project Summary and collaboratively assigned each project to the panels in this *Program*: Mr. Robert V. Anderson, Dr. John J. Ermer, Mr. Harry J. Evry, Dr. Robert A. Gelfand, Prof. Fred Gross, Dr. Mark Hanning-Lee, Dr. Cymra Haskell, Ms. Kathryn J. Hoxsie, Mrs. Ani M. Issaian, Dr. Michael F. Johnston, Dr. Raj P. Kandpal, Dr. Zachary T. Kier, Dr. Shalini Kumar, Dr. David E. Lee, Dr. Florence J. Lin, Mr. Tom Melatis, Dr. Vasileios Papapostolou, Dr. Jessica Anne Parr, Dr. Zoe Pettway Unno, Mr. Ahmed Rafi, Dr. Robert E. Salfi, and Ms. Margery Weitkamp, in addition to the Directors of Judging above.

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Finally, we recognize all of the judges who had confirmed their participation by the time this *Program* was produced on April 18.

Dr. Kim Aaron	Dr. Ethan A. Barbour	Mr. Chris Ching
Ms. Serena Abdullah	Dr. Rania Bassiouni	Mr. Anthony K. Choi
Prof. Ravinder Abrol	Dr. Gregory Becker	Dr. Henry A. Choy
Mr. Kent D. Adams	Mr. William Borges, III	Mr. Gino Cochella
Mr. Syed Z. Ahmed	Mr. Gary L. Bostrup	Mr. Robert Cohen
Prof. Mark Alber	Mr. Nelson Bravo	Mr. Bob F. Colella
Dr. Rizaldo E. Aldas	Mr. Richard J. Bravo, Sr.	Dr. Ashley M. Collier-Oxandale
Dr. Glenn Alers	Dr. Elizabeth Crabb Breen	Dr. Cathleen Collins
Mr. Albert C. Alfaro	Mr. Chris S. Brown	Mr. Carl M. Conliffe
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