

**2021 Contra Costa County Science & Engineering Fair  
PROJECT PLACEMENTS & SPECIAL AWARDS**

**SENIOR DIVISION GRAND SWEEPSTAKES WINNERS (9th - 12th Grades)  
and INTERNATIONAL SCIENCE & ENGINEERING FAIR FINALISTS**

These projects will represent CCCSEF at the Regeneron International Science & Engineering Fair (ISEF)  
scheduled to be held virtually May 3-6, 2021.

CATEGORY	GRADE	TITLE	STUDENT	SCHOOL	SPECIAL AWARD
Biology	11	CarC Spy: Early Cancer Detection Using AI-Based Electrochemical Biosensor	Jyothikaa Ramann	Dougherty Valley High	International Science & Engineering Fair; California Science & Engineering Fair; Naval Science Award (\$50)
Engineering	9	Accessible Correlative Diagnostic Solution for Multi Organ Dysfunction Caused by SARS-CoV-2	Gatik Trivedi	Dougherty Valley High	International Science & Engineering Fair; California Science & Engineering Fair; The Tremsin Award of Innovation in Engineering (\$100)
Engineering	12	Interpretable Automation of Pulmonary Embolism Diagnosis	Nisha Balaji	Dougherty Valley High	International Science & Engineering Fair; California Science & Engineering Fair
Environmental	12	Analysis of Plastic Pellet Distribution Using Citizen Science Nurdle Patrol Data and Batch Identification to Differentiate Spills Within Samples	Melanie Quan	Las Lomas	International Science & Engineering Fair; California Science & Engineering Fair; Chevron (\$500); Contra Costa Water/Waste Water Agencies (\$800); American Meteorological Society
Math/Computer Science	11	A Novel Hybrid Deep Learning Model to Predict Acute Kidney Injury Using Patient Record Data and Ultrasound Kidney Images	Sophia Shi	Dougherty Valley High	International Science & Engineering Fair; California Science & Engineering Fair; Chevron (\$500); Yale Science & Engineering Award

**JUNIOR DIVISION GRAND SWEEPSTAKES WINNERS (7th-8th Grades)**

These students are eligible to compete for a place at the  
**Broadcom MASTERS Middle School National Science Fair Oct. 22-27, 2021.**

CATEGORY	GRADE	TITLE	STUDENT	SCHOOL	SPECIAL AWARD
Engineering	7	Underwater Wireless Transmission of Data and Energy Using Artificial Light for Unmanned Underwater Vehicles and Floats	Lucas Katz	Joaquin Moraga Intermediate	California Science & Engineering Fair; Broadcom Masters; Mt. Diablo Amateur Radio Club (\$200)
Math/Computer Science	8	SpatialX: Training Tool to Improve Spatial Abilities	Sania Bidurukontam	Gale Ranch Middle	California Science & Engineering Fair; Broadcom Masters; Lemelson Early Inventor Award (\$100); Naval Science Award (certificate & medallion)

**California Science & Engineering Fair Finalists  
(Only 18 are selected for this honor.)**

**The California Science & Engineering Fair will be held virtually April 12-13, 2021.**

CATEGORY	GRADE	TITLE	STUDENT	SCHOOL	SPECIAL AWARD
Behavioral	10	How the Pandemic Has Affected Teen Nutrition	Daniel Berkes	De La Salle High	California Science & Engineering Fair; US Agency for International Development
Biological	9	The Effects of E-cigarette Juice on the Lifespan on Drosophila Melanogaster	Akshaj Molukutla	San Ramon Valley High	California Science & Engineering Fair
Biological	10	Radiotrophic Fungi: Benefiting from Exposure to Ionizing Radiation	David Wright	De La Salle High	California Science & Engineering Fair; US Department of the Air Force (certificate & backpack)
Biological	11	CarC Spy: Early Cancer Detection Using AI-Based Electrochemical Biosensor	Jyothikaa Ramann	Dougherty Valley High	International Science & Engineering Fair; California Science & Engineering Fair; Naval Science Award (\$50)
Biological	12	Prediction of Phenotypic Cancer Drug Response with an Image-Based Dual Convolutional Neural Network	Bala Vinaithirthan	San Ramon Valley High	California Science & Engineering Fair
Engineering	7	Underwater Wireless Transmission of Data and Energy Using Artificial Light for Unmanned Underwater Vehicles and Floats	Lucas Katz	Joaquin Moraga Intermediate	California Science & Engineering Fair; Broadcom Masters; Mt. Diablo Amateur Radio Club (\$200)
Engineering	9	Accessible Correlative Diagnostic Solution for Multi Organ Dysfunction Caused by SARS-CoV-2	Gatik Trivedi	Dougherty Valley High	International Science & Engineering Fair; California Science & Engineering Fair; The Trensins Award of Innovation in Engineering (\$100)
Engineering	10	Artificial Pancreas	Riya Chhabra	Dougherty Valley High	California Science & Engineering Fair
Engineering	11	Just Breathe: Redesigning the Inhaler for Efficient Drug Dispersal and User Interaction	Daylin Atwood	Campolindo High	California Science & Engineering Fair; The Trensins Award of Innovation in Engineering (\$100)
Engineering	12	Interpretable Automation of Pulmonary Embolism Diagnosis	Nisha Balaji	Dougherty Valley High	International Science & Engineering Fair; California Science & Engineering Fair
Environmental	10	The Effects of Microplastics on Forward Rate of Spread (FROS) and Emission Toxicity of Forest Fires	Isaac De Rosas, Rolando Sanchez	De La Salle High	California Science & Engineering Fair
Environmental	12	Analysis of Plastic Pellet Distribution Using Citizen Science Nurdle Patrol Data and Batch Identification to Differentiate Spills Within Samples	Melanie Quan	Las Lomas High	International Science & Engineering Fair; California Science & Engineering Fair; Chevron (\$500); Contra Costa Water/Waste Water Agencies (\$800); American Meteorological Society

Math/Computer Science	8	SpatialX: Training Tool to Improve Spatial Abilities	Sania Bidurukontam	Gale Ranch Middle	California Science & Engineering Fair; Broadcom Masters; Lemelson Early Inventor Award (\$100); Naval Science Award (certificate & medallion)
Math/Computer Science	11	A Novel Hybrid Deep Learning Model to Predict Acute Kidney Injury Using Patient Record Data and Ultrasound Kidney Images	Sophia Shi	Dougherty Valley High	International Science & Engineering Fair; California Science & Engineering Fair; Chevron (\$500); Yale Science & Engineering Award
Math/Computer Science	12	Constructing Segmented Differentiable Quadratics to Determine Algorithmic Run Times and Model Non-Polynomial Functions	Ananth Goyal	Dougherty Valley High	California Science & Engineering Fair; Chevron (\$500); The Promoting Innovation in STEM Pina Award (\$500); US Department of the Air Force (certificate & backpack)
Physical	10	Where Have You Been?: Analyzing Micrometeorites from the Solar System	James Christensen	De La Salle High	California Science & Engineering Fair; NASA Earth System Science Award
Physical	11	A Novel Solution to Plastic Pollution: Developing a Low-Cost Test For Plastic Pollutants at Sea and in Drinking Water	Cathy Kenderski, Sarah Wu	Campolindo High	California Science & Engineering Fair; American Meteorological Society; Association for Women Geoscientists; AWG SFBA Chapter (\$40); Contra Costa Water/Waste Water Agencies (\$500); Martinez Refining Company Science for Safety Award (\$250)
Physical	11	Computing Personalized HRTFs through Finite Numerical Methods	Shubham Kumar	Dougherty Valley High	California Science & Engineering Fair; US Metric Association Award

### BROADCOM MASTERS FINALISTS

These students are eligible to compete for a place at the  
Broadcom Masters Middle School National Science Fair Oct. 16-21, 2020, in Washington DC.

CATEGORY	GRADE	TITLE	STUDENT	SCHOOL	SPECIAL AWARD
Engineering	7	Underwater Wireless Transmission of Data and Energy Using Artificial Light for Unmanned Underwater Vehicles and Floats	Lucas Katz	Joaquin Moraga Intermediate	California Science & Engineering Fair; Broadcom Masters; Mt. Diablo Amateur Radio Club (\$200)
Math/Computer Science	8	SpatialX: Training Tool to Improve Spatial Abilities	Sania Bidurukontam	Gale Ranch Middle	California Science & Engineering Fair; Broadcom Masters; Lemelson Early Inventor Award (\$100); Naval Science Award (certificate & medallion)

**FIRST PLACE AWARDS**

CATEGORY	GRADE	TITLE	STUDENT	SCHOOL	SPECIAL AWARD
Behavioral	10	How the Pandemic Has Affected Teen Nutrition	Daniel Berkes	De La Salle High	California Science & Engineering Fair; US Agency for International Development
Biological	7	Battling Bacteria: Do Natural Ingredients Even Stand a Chance	Anirudh Ayyadevara	Windemere Ranch Middle	Bio-Rad Laboratories (\$200)
Biological	8	Organ Donation of the Future	Angello Ledesma	Pine Hollow Middle	Naval Science Award (certificate & medallion)
Biological	9	The Effects of E-cigarette Juice on the Lifespan on Drosophila Melanogaster	Akshaj Molukutla	San Ramon Valley High	California Science & Engineering Fair
Biological	10	Radiotrophic Fungi: Benefiting from Exposure to Ionizing Radiation	David Wright	De La Salle High	California Science & Engineering Fair; US Department of the Air Force (certificate & backpack)
Biological	11	CarC Spy: Early Cancer Detection Using AI-Based Electrochemical Biosensor	Jyothikaa Ramann	Dougherty Valley High	International Science & Engineering Fair; California Science & Engineering Fair; Naval Science Award (\$50)
Biological	12	Prediction of Phenotypic Cancer Drug Response with an Image-Based Dual Convolutional Neural Network	Bala Vinaithirthan	San Ramon Valley High	California Science & Engineering Fair
Engineering	7	Underwater Wireless Transmission of Data and Energy Using Artificial Light for Unmanned Underwater Vehicles and Floats	Lucas Katz	Joaquin Moraga Middle	California Science & Engineering Fair; Broadcom Masters; Mt. Diablo Amateur Radio Club (\$200)
Engineering	9	Accessible Correlative Diagnostic Solution for Multi Organ Dysfunction Caused by SARS-CoV-2	Gatik Trivedi	Dougherty Valley High	International Science & Engineering Fair; California Science & Engineering Fair; The Tremsin Award of Innovation in Engineering (\$100)
Engineering	10	Artificial Pancreas	Riya Chhabra	Dougherty Valley High	California Science & Engineering Fair
Engineering	11	Just Breathe: Redesigning the Inhaler for Efficient Drug Dispersal and User Interaction	Daylin Atwood	Campolindo High	California Science & Engineering Fair; The Tremsin Award of Innovation in Engineering (\$100)
Engineering	12	Interpretable Automation of Pulmonary Embolism Diagnosis	Nisha Balaji	Dougherty Valley High	International Science & Engineering Fair; California Science & Engineering Fair
Environmental	10	The Effects of Microplastics on Forward Rate of Spread (FROS) and Emission Toxicity of Forest Fires	Isaac De Rosas, Rolando Sanchez	De La Salle High	California Science & Engineering Fair

Environmental	12	Analysis of Plastic Pellet Distribution Using Citizen Science Nurdle Patrol Data and Batch Identification to Differentiate Spills Within Samples	Melanie Quan	Las Lomas High	International Science & Engineering Fair; California Science & Engineering Fair; Chevron (\$500); Contra Costa Water/Waste Water Agencies (\$800); American Meteorological Society
Math/Computer Science	8	SpatialX: Training Tool to Improve Spatial Abilities	Sania Bidurukontam	Gale Ranch Middle	California Science & Engineering Fair; Broadcom Masters; Lemelson Early Inventor Award (\$100); Naval Science Award (certificate & medallion)
Math/Computer Science	11	A Novel Hybrid Deep Learning Model to Predict Acute Kidney Injury Using Patient Record Data and Ultrasound Kidney Images	Sophia Shi	Dougherty Valley High	International Science & Engineering Fair; California Science & Engineering Fair; Chevron (\$500); Yale Science & Engineering Award
Math/Computer Science	12	Constructing Segmented Differentiable Quadratics to Determine Algorithmic Run Times and Model Non-Polynomial Functions	Ananth Goyal	Dougherty Valley High	California Science & Engineering Fair; Chevron (\$500); The Promoting Innovation in STEM Pina Award (\$500); US Department of the Air Force (certificate & backpack)
Physical	10	Where Have You Been?: Analyzing Micrometeorites from the Solar System	James Christensen	De La Salle High	California Science & Engineering Fair; NASA Earth System Science Award
Physical	11	A Novel Solution to Plastic Pollution: Developing a Low-Cost Test For Plastic Pollutants at Sea and in Drinking Water	Cathy Kenderski, Sarah Wu	Campolindo High	California Science & Engineering Fair; American Meteorological Society; Association for Women Geoscientists; AWG SFBA Chapter (\$40); Contra Costa Water/Waste Water Agencies (\$500); Martinez Refining Company Science for Safety Award (\$250)

**SECOND PLACE AWARDS**

CATEGORY	GRADE	TITLE	STUDENT	SCHOOL	SPECIAL AWARD
Behavioral	8	Cognitive Bias, 75 Years Later	Ajay Reddy	Tice Creek School	
Behavioral	8	The Influence of Words on Memory	Isabella Miller	Northcreek Academy	
Behavioral	8	Boom, Zoom, or In a Room; Comparing the different learning styles of audio, virtual and in person	Jordan Gamoras	Northcreek Academy	
Behavioral	10	The Psychology of Music During Historical Pandemics	Peter Heiskell	De La Salle High	American Psychological Association
Biological	8	Yeast DNA: Detrimental Aftermaths of UV Ray Exposure	Brooke Koller	Northcreek Academy	
Biological	10	A Comparison and Interpretation of Convolutional Neural Networks to Diagnose Schizophrenia from Structural Brain MRI	Grace Yang	Dougherty Valley High	

Biological	10	Effects of Nicotine with the CRISPR cas9 Gene Editing System	Nick Johnson	De La Salle High	
Biological	10	Comparison of Scoby in Kombucha to a Daily Probiotic	Drew Miller	De La Salle High	
Biological	10	Do You Hear What I Hear? Deleterious Effects of AirPods on Hearing Acuity and Concentration	Michael Giorgi	De La Salle High	
Biological	10	Cat Conditioning - Teaching Cats a Communication Mechanism	David Green	De La Salle High	
Biological	11	Optimal Locations for Detecting Cardiac Sinus Rhythm Using Low-Cost ECG Sensors	Shreya Lakkaraju	Dougherty Valley High	
Biological	11	Automated Docking of Ligands to Cancerous Proteins	Harshita Krupadanam	Quarry Lane School	Bio-Rad Laboratories (\$300)
Biological	11	The effect of Hydroxychavicol, a betel leaf component, on A549, K562, and MCF7 cancer cell lines.	Ashwin Chandra	Dougherty Valley High	
Biological	11	Identification of SARS-CoV-2 Main Protease Inhibitors Utilizing Michael Acceptor Warheads	Andrew Liang	The College Preparatory School	
Engineering	8	The Self-Sustainable Home	Shivam Mohapatra	Windemere Ranch Middle	
Engineering	9	How to Mute a Horn	Siddarth Nagapudi	Dougherty Valley High	
Engineering	11	Designing a Solar Powered Aircraft Using 3D Modeling for use on Mars	Jonathan Yu	Northgate High	
Engineering	11	TempTracker	Aarya Kalisetti	California High	
Engineering	11	Using Stem Cells to Bioengineer a Kidney: Crafting the Ideal Microenvironment	Nidhi Thati	Dougherty Valley High	Society for In Vitro Biology
Engineering	11	Utilizing Compounded and Surface Synthesized Copper Nanoparticles to Render PLA Polymers Antibacterial	Serena Yang	Dougherty Valley High	Chevron (\$500)
Engineering	11	Compact Shaft-Rotating Swerve Drive With Prong Structure for Highly-Maneuverable and Agile Robots	Miles Vranas	Monte Vista High	John Henry Award of Technology Innovation (\$100)
Engineering	12	This ... is a Sneeze	Dakota Spencer, Allison Lee, Lauren Sirmons	Deer Valley High	
Engineering	12	Simulation of Mars' Gravity	Cynthia Donjuan-Fernandez, Joshua Cordero Canales	Deer Valley High	
Environmental	8	Using Infrared Cameras to Detect Wildfires Before They Spread!	Rishav Saravanan	Windemere Ranch Middle	
Environmental	8	Can We Exploit Carbon Dioxide from the Environment?	Pranav Saravanan	Windemere Ranch Middle	Vulcan Materials Company (\$500)
Environmental	10	Combating Effects of Coral Bleaching from Ocean Acidification Through Implementation of Bryophyta into a Marine Environment	Rhea Master, Niya Suravarapu	Dougherty Valley High	US Stockholm International Water Institute Junior Water Prize

Environmental	11	Multi-Tiered Water Purifier	Pranav Mulakala, Shaurya Srivastav	California High	
Environmental	11	Conserving Wasted Water: Carbon Filtration and Water Analysis with Arduino	Vinay Reddy	Las Lomas High	National Oceanic & Atmospheric Administration (NOAA)
Environmental	11	An Organic Method for Efficient Carbon Capture for Reducing Effects of Global Warming	Aadity Sharma	Dougherty Valley High	US Department of the Air Force (certificate & backpack); Naval Science Award (\$50); US Stockholm International Water Institute Junior Water Prize
Math/Computer Science	8	#TheSilentStruggle: An intelligent machine learning based platform to empower teens to stand up to the social struggle	Krishna Singhani	Diablo Vista Middle	The Katherine Johnson Award (\$100)
Math/Computer Science	9	Florence - Power to Our Nurses	Aayush Asthana	Dougherty Valley High	
Math/Computer Science	9	Predicting Population Growth with Mathematical Models	Siddharth Chander	Dougherty Valley High	
Math/Computer Science	10	BetweenTheLines: Mental Health Detection Using Neural Networks and Sentiment Analysis	Riyanka Narasimhan, Harrison Xu	Dougherty Valley High	
Math/Computer Science	11	How Various Activation Functions Affect the Loss and Output of a Neural Network	John Lins	Northgate High	
Math/Computer Science	11	Infinite Function-Compositions	Siying Chen	Deer Valley High	Mu Alpha Theta
Math/Computer Science	11	Saving The Environment with Early Detection of Wildfires Utilizing Artificial Intelligence	Samarth Shah, Kaival Shah	The Quarry Lane School	
Math/Computer Science	12	Analyzing the Historical Patterns in Lunar Crater Naming	Dennis Gavrilenko	Deer Valley High	
Math/Computer Science	12	On Group-Theoretic Extensions of Penney's Game	Sean Li	Monte Vista High	
Math/Computer Science	12	Quantifying Atmospheric Reduction in CO Emissions During COVID Lockdowns	Franklin Ho	Home School	
Physical	8	Is Plywood Bulletproof?	Samantha Dale	Northcreek Academy	US Department of the Air Force (certificate & backpack)
Physical	8	Let's Blow This Popsicle Stand!	Vivian Gallaway	Northcreek Academy	Henkel Aerospace Highflyer Science Award (\$250)
Physical	9	Affect of Materials on Wifi Signals	Rishi Gopalasetty	Dougherty Valley High	
Physical	10	The Glow of Luminol	Erin Weber	Northgate High	
Physical	11	A Machine Learning Model for Predicting the Carbon Dioxide Adsorption Capacity of Metal-organic Frameworks (MOFs)	Venkat Ranjan	Dougherty Valley High	ASM Material Education Foundation; Ricoh USA, Inc.
Physical	11	Computing Personalized HRTFs through Finite Numerical Methods	Shubham Kumar	Dougherty Valley High	California Science & Engineering Fair; US Metric Association Award



**THIRD PLACE AWARDS**

CATEGORY	GRADE	TITLE	STUDENT	SCHOOL	SPECIAL AWARD
Behavioral	10	The Influence of Major Political Events on Teen Usage of Social Media	Will McNamara, Alexander Favorito	De La Salle High	
Biological	7	Avian Biodiversity in Pleasant Hill, CA: An Analysis of Survey Data	Andrea Rosmarin	Pleasant Hill Middle	Vulcan Materials Company (\$500)
Biological	7	Tooth Decay	Pranathi Suserla	Gale Ranch Middle	
Biological	10	Nutrient Pollution Levels and Freshwater Invertebrate Biodiversity in Local Waterways	Elyse Contreras	Northgate High	
Biological	10	Testing the Longevity of Mitochondria	Anton van Oppen	De La Salle High	
Biological	10	A Review: Efficacy of Dietary Treatments Targeting the Gut Microbiome for Autoimmune IBD	Ridhi Goyal	California High	
Biological	11	Potential Treatment for RAG1/2 SCID and IL7Ra SCID through CRISPR Gene Editing	Saee Patil	California High	
Biological	11	BLASTing Flu Viruses	Srinitya Sriram	Dougherty Valley High	
Biological	11	The Fault in Our Sanitizer: The Effect of Heat on Hand Sanitizer Effectiveness	Ellie Yin	Deer Valley High	
Biological	11	Supplemental Treatment for Angioimmunoblastic T-cell Lymphoma to Prevent Early Relapse	Siya Iyer	Dougherty Valley High	
Engineering	9	Filtering Greywater for Gardening	Ethan Li	Monte Vista High	Contra Costa Water/Waste Water Agencies (\$200)
Engineering	9	RoboPen: Intelligent Portable Precision 3D Writing Tool	Aashita Krupadanam	The Quarry Lane School	Naval Science Award (\$50)
Engineering	11	Providing Aid to Smokey: Designing an Outdoor Fire Detector	Caitlin Todd, Michael Todd, Indi Fulgham-Raju	Deer Valley High	
Engineering	11	Wi-Fi Reflectors	Colby Ye, Yen Wong	Deer Valley High	
Engineering	11	Biofuel for a Greener Future - How Used Vegetable Oil Can Reduce the Diesel Footprint	Shriya Beedu	Dougherty Valley High	
Engineering	12	Giving New Life to 3D Printer Waste as Coasters	Brandon Gee, Fatima Fazli, Tyler Lam	Deer Valley High	
Environmental	10	The Effect of Plants on Radiation	Sriram Kudamala	Dougherty Valley High	
Math/Computer Science	7	Keeping your heart healthy: What's Important?	Ananya Raghu, Anisha Raghu	Windemere Ranch Middle	



Math/Computer Science	9	Earth Buddy App	Akash Danda, Sayam De	Dougherty Valley High	
Math/Computer Science	10	Creating a Safer World: Designing Nanomedicine to Remedy the Effects of Chemical Weapons	Faris Khandaqji, Krishna Marichetty	De La Salle High	
Math/Computer Science	10	Utilization of Generative Neural Networks to Develop Novel Molecules to Target Leishmaniasis	Neel Redkar	Dougherty Valley High	
Math/Computer Science	11	Converting Handwritten Medical Records into Electronic Records with Deep Learning	Arjun Chandra	Dougherty Valley High	Chevron (\$500)
Math/Computer Science	11	Blocking RFID Readers from Reading your ID Card	Akshay Kamath	California High	
Math/Computer Science	11	Fake News and Hate Speech Detection Using Deep Neural Network	Yuyang Chen	Athenian School	
Math/Computer Science	11	Implementing a machine learning model for early diagnosis of heart disease	Megan Jacob	Dougherty Valley High	The Dorothy Vaughan Award (\$100); The Promoting Innovation in STEM Pina Award (\$500)
Math/Computer Science	11	Algorithmic Analysis of Mental Health upon Individual and Locational Factors to Predict Mental Health State	Bill Li	Dougherty Valley High	
Math/Computer Science	11	Using Data Sketches to Detect SARS-CoV-2	Divyanshi Singh	Dougherty Valley High	Mary W. Jackson Award (\$100)
Physical	10	Effect of Flash Freezing on Micro and Macro Nutrients in Food	Aiden Yakas	De La Salle High	

**FOURTH PLACE AWARDS**

<b>CATEGORY</b>	<b>GRADE</b>	<b>TITLE</b>	<b>STUDENT</b>	<b>SCHOOL</b>	<b>SPECIAL AWARD</b>
Math/Computer Science	10	Recycling Website Project	Ananyashree Seetharaman	Quarry Lane School	
Math/Computer Science	10	Simulation and Mitigation of COVID 19 Particle Dispersion	Isaac Liu	Dougherty Valley High	
Physical	11	Pushing the Boundaries of Classical Computers	Siddharth Shastry	Dougherty Valley High	
Physical	12	The Sugar Secret	Justice Martinez	Deer Valley High	



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