

Welcome from Gary Robinson

President, Synopsys Outreach Foundation

Welcome to the 2017 Synopsys Championship, one of the most highly regarded regional science fairs in California. Some of the best young minds in Silicon Valley are here with us today.

Some Synopsys Championship participants will advance to the state and international competitions. But that's secondary. What's important is that you did the hard work, overcame the inevitable obstacles in your research, and made it here to compete. We promise you this will be an experience you'll remember and treasure.

Science projects are not just for future scientists. Research shows that project-based science fair activities increase student learning in science and in a wide range of 21st century skills such as critical thinking, communication and collaboration.

In addition to annually enabling students and teachers developing science projects at more than 925 schools across California and Oregon, the nonprofit Synopsys Outreach Foundation considers it a great honor to have served as the major sponsor of The Synopsys Championship since 2000. This event, run mostly by volunteers, sets a standard for other science fairs across the state and country.

A science fair is one of life's more memorable experiences. We hope you'll enjoy the day.



Welcome from Veena Jain

President, SCVSEFA

On behalf of the Santa Clara Valley Science and Engineering Fair Association, I welcome you to the 2017 Synopsys Championship. This year, we celebrate the 57th consecutive annual event, and the 17th year with the Synopsys



Outreach Foundation, our major sponsor.

The mission of SCVSEFA is to awaken more students to the wonders and power of science, technology, engineering, and mathematics. This event benefits students in a myriad of ways but, most importantly, it teaches them to innovate and learn on their own. The traditional classic model of education and learning has given way to continuous and lifelong learning. Today's students will need to self-motivate, and be ready to learn anywhere, anytime, and at any age. Testimonials from past students over the years are proof that participation in the Championship equipped them with critical skills of initiative, and research, perseverance, self-regulated learning to succeed in their adult lives.

I would like to sincerely thank the Synopsys Outreach Foundation and all our other donors who continue to support this event through generous cash and "in kind" donations. I especially want to thank the many volunteers - mentors, judges and so many others who are involved in producing this event. Some have worked tirelessly for years as SCVSEFA board members. I also wish to thank the teachers, school administrators and staff for supporting the students who are participating. The science fair cannot happen without all of you!

Importantly, I welcome and celebrate the students. The Championship is a culmination of all your hard work over the past months. Be confident and showcase your skills and knowledge to the judges. They are eager to hear you. I promise this will be an experience you will cherish for years to come.

Intel International Science and Engineering Fair

What happens when you have the students who won first place in Astronomy the previous year in your group traveling to Intel ISEF during the Solar Transit of Mercury? You take your solar telescope with you and share the event on the spot, of course!

That's how Intel ISEF 2016 started for our group of twelve finalists from Silicon Valley, and the rest of the week would not disappoint. Check-in went smoothly (thank you SCVSEFA SRC). Opening ceremonies included a performer dancing with some titanic Tesla coils and we had a great place for doughnuts and waffles across the street. We did have a bit of a walk to the hotel, and it was hot, hot, hot in Phoenix. But most everyone remembered to wear comfortable shoes. Awards went to 9 of our 10 projects, compared to a 30% overall fair average!

Swetha Revanur, Evergreen Valley HS, won the highest prize our county received, the Dudley R. Herschbach SIYSS Award, which includes a trip to the Nobel Prize Ceremony!

Congratulations to all of our exceptional students. - Heidi Black

Love Science ? Check out https://www.sciencepeepz.com



What's Next ?

If your project was judged as a First, Second, Honorable Mention or a Special Award winner, you will be invited to attend the Awards Ceremony on Sunday, April 9th, 2017. Check out www.science-fair.org after March 31st to see if you are a winner and to find out the details for this event. There will be two ceremonies; one for the middle school winners and one for high school winners. You'll receive your ribbon or medal and you may also get a Special Award -- or more than one! Or ... a spot at the California State Science Fair! Or ... an all-expense-paid trip to the Intel International Science and Engineering Fair - the Grand Prize!

Volunteers make it happen for our students. You can join our wonderful team of volunteers. Sign up at www.science-fair.org and click on VOLUNTEERS. Volunteers make it possible for students' dreams to come true.

THANK YOU !

Non-affiliated 2016 Volunteers returning for 2017 Scientific Review Committee Volunteers SCVSEFA Staff and Board Members at the Championship

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Synopsys Championship Projects Continue CSSF Success

We tell our potential participants that doing a successful science fair project requires "passion." Sometimes we forget that it also requires perseverance - especially, if you plan to participate in the California State Science Fair. On his website, Robert N. Jones says, "In a nutshell, perseverance is the act of persisting to do something in spite of challenges, obstacles and disappointments." We had plenty of obstacles on this trip, but came away as successful as ever!

For a 2-day trip, it was crazy how many things almost went wrong for our sponsored group. We arrived at the airport in L.A. and loaded ourselves onto the waiting bus. But where was the box containing our 15 boards? The longest 20 minutes this chaperone has ever spent was waiting to see if that box would show up on the next arriving flight. (Science fair project idea - a fast way for airlines to know which plane a piece of luggage is on. That barcode they stick on is only for identifying to whom the piece belongs if it ends up at the wrong location!) Then, as students set up their boards, we tried to check in at the hotel. By 6:30 PM some still didn't have rooms, and luggage was stored in the one room we had. Evening activities were fun, we built 3-D optical illusions and discussed the schedules. Everyone was on time, and we wowed the judges again, taking all 4 places in some categories! Nearly 48% of our

projects returned with recognition, as opposed to 30% fair wide. We continued capturing the top prizes in at least one of the two divisions. Andrew C. Chiang was awarded the Junior Division Project of the Year. Then you happily get on the plane and go home, right? It's finals week for some of these illustrious students. We're notified that the flight is delayed, tried to negotiate flights for kids who have finals, then the flight was cancelled. But, there was room on another flight. Being kids that persevere, they nestled down on those airport chairs, plugged in those devices, and started working away on homework and reviewing for finals.

Big thanks to the parents, chaperones, and participants who helped make this trip as memorable as it was challenging! CSSF will be held in April this year, providing us with a new set of challenges to overcome! - Heidi Black

2016 California State Science Fair Major Fair Award

Project of the Year Award - Junior Division



Andrew C. Chiang, Grade 7 **Force Sensing Techniques** for Robotic Arms Advisor: Mr. Kevyn Adams School: BASIS Independent Silicon Valley, San Jose, Santa Clara County







Value of traditional feminine knowledge in science

Holly Jackson, 2014 Broadcom MASTERS Grand Prize, ISEF Finalist. Synopsys Grand Prize, sixth year participant

Our world is becoming more open. Boys pursue traditionally girly things, and girls pursue traditionally boyish things. However, a bias towards boyish pursuits still exists. Many parents and educators encourage children interested in science to play with building blocks, video games, trains, and cars because they believe these traditionally masculine games increase kids' spatial awareness and understanding of mechanics. But, have you ever heard someone encourage a budding engineer to learn to sew? Unbeknownst to most, traditional feminine pursuits such as sewing,

crocheting, and storytelling can have similar benefits. Sewing, for example, can boost children's understanding of materials science - since they must differentiate between the strength of different stitches and threads - and geometry - as they have to convert two-dimensional patterns to three-dimensional objects. Crocheting and knitting can help kids learn pattern recognition and increase their fine motor skills, giving them skills professional scientists like surgeons and mechanical engineers need. Even storytelling with fairies and dolls helps children track complex, interconnecting ideas and relationships, a skill set needed when coding. Playing with building blocks, video games, and other traditionally boyish toys definitely provides useful scientific skills. However, it is vital for us to recognize that you can learn science from many types of play.

Congratulations to our 2016 First-place Category Award Winners

Biological Science and Engineering

Ahmad Ismail Nithika Karthikeyan Avlin Salahifar Cole Bregman Eden Cohen Aditi Bharti Jenna Houle Khushi Parikh **Tejal Patel** Aalok Patwa Prathik Kakarlamudi Aditya Udgaonkar Cynthia Chen Anusha Ghosh Shloka Janapatv Kamryn (Kami) Richardson Vibha Arramreddy Aarzu Gupta Allison Jia Sejal Krishnan Maya Shukla Jasmine Wiese Charlie Huang Vivek Kamarshi Kamya Krishnan Shirley Qi Rujuta Sathe Mythri Ambatipudi Shrevas Chandrashekaran Emilv Chen Gina Yang Claire Zhang Aditi Gnanasekar Isha Mehrotra Rohan Mehrotra Sydney Ty Vardhaan Ambati Ankita Chatteriee Tanisha Joshi Pravin Ravishanker Anish Seshadri Elina Yon Natalie Chau Kylie Huch Barah Aljewad Jennifer Mosch

Physical Science and Engineering

Adarsh Sairam Ambati Anousha A. Athreya Shrevas Basu Saniana S. Jilla Tavleen Kaur Krishna S. Mani Arya Rajesh Surya C. Tallavarjula Nimai Talur Pujita Srilalitha Tangirala Anna Rose White Iris Zhou Zahra Abdul Aziz Akhilesh Varadan Balasingam Andrew Chiang Kate E. Jackson Masha Korolik Arvind Ramachandran Shruthi Sriram Kaushik Sai Tota Johan D.S. Vonk Gisele M. Inaba Diana B. Labonville Athena Fung Milan Ganai Adishree Ghatare Nina N. Isaka Suhas Prasad Vedha Santhosh Kirtan Shah Shruti Sridhar **Rushil Srivastava** Dan Tran Marc Gong Bacvanski Ravi Nikhil Bhatt Krishnakumar Bhattaram Cameron Cole Jones Saniana Viral Shah Cindy Xindi Wang Katherine Zhang Vivian Chiang Kyle John Ettinger

Shomil Jain Anushka Jogalekar Shadaj Laddad Labanya Mukhopadhyay Atul Raghunathan Adiyan Kaul Andrew Tong Li Sohan Vichare Robert Yang Matthew Zhou Aditya Dhar Matthew Hase-Liu Sophia Lau Sritam Mishra Shaunak Modak Bennett Ngan **Reid Barton** Sanjay Mohan Maya Varma **RRI Biological Science** and Engineering Krish Kapadia Anjay Saklecha Utkarsh Tandon Jerry Chen Amy Jin Pranav Lalgudi Scott Song Durga Ganesh Jonathan Ma Sadhika S. Malladi Swetha Revanur Anin Sayana **RRI Physical Science** and Engineering

Amy C. Dunphy Holly Marie Jackson Shashank Dholakia Shishir Dholakia Rishab Gargeya Manan Shah Anjini Karthik

Why it is important to record your science fair experience By Dennis Bua, Ph.D.

Planning and executing an independent research project demonstrates that you have the ability to think critically about a problem or subject, the skills to solve complex problems, and the *guts* to present your findings. You want to document your science fair experience in your resume because it will be helpful when you apply for scholarships, employment, and college.

When you write your resume entry, be specific and remember to include:

- 1: The scope of the competition: school, school district (e.g. Sciencepalooza!), region (e.g. Synopsys Science & Technology Championship), or international (e.g. Intel International Science and Engineering Fair (ISEF)).
- 2: The amount of time you dedicated to the project. Keep track of approximately how many weeks and hours you spent on the project.
- 3: List any honors/awards received if applicable.
- 4: Write a one or two sentence summary of your project and your findings.

" The important thing is to never stop questioning. "



The Road Less Traveled

Kami Richardson, 2015 Isabelle Stone Biology Award, First Place Biological Sciences, two year CSSF ecology finalist, fourth year Synopsys participant

Einstein said "No problem can be solved from the same level of consciousness that created it." He's right. You have to look at a problem in a different way if you want to solve it. I'm always amazed at the different solutions that researchers come up with to try and solve a problem, so when I work on my project, I try to find that one

unique way that no one else has tried. I like to use low cost and organic methods in the environment instead of using chemicals to do the same thing. Some of my ideas might seem wonky or different, but sometimes those are the best solutions without long-term consequences. Several man-made inventions were inspired from nature, like how the seed-sac burr of a burdock plant inspired Velcro. So, if you're looking for inspiration on a project, look no farther than your own backyard and think -- really think -- about maybe why nature does things in a certain way, and maybe you'll be able to apply that thinking to solve other problems as well.



Curiosity Leads to Bee Projects

Gina Yang - Synopsys Outreach Foundation n+1 Finalist, Outstanding Young Scientist Finalist (CAPS), First Place Biological Sciences, 2-time CSSF Category Award Winner, third year Synopsys participant

My love affair with insects began when I was just seven. There was something so enchanting about the tiny creatures-they came in a mind-boggling variety of colors, shapes, and sizes. Crouching in the front yard on sunny days, I would observe them: bees flitting around the rosemary flowers, a seemingly endless trail of ants crawling to nowhere, a colony of roly-polies walking up the terraces.

Many years later, when I was on my middle school's Science Olympiad team studying entomology, one significant question caught my attention: "What is the most serious problem affecting beekeepers today?" The answer to this question would turn out to be the catalyst for my curiosity and the basis for my high school research: a recent spate of mysterious bee disappearances known as Colony Collapse Disorder. As pollinators, bees are unsung heroes; the agricultural industry would be virtually nonexistent should these insects totally disappear. From the beginning, the bee disappearance fascinated and intrigued me. My commitment to the honeybee issue has led me to complete two individual research projects investigating alternate causes of bee disappearances to help uncover the solution behind this mysterious problem.



find time to enjoy the Expo Center in Los Angeles.

www.science-fair.org

Special Awards and Sponsors of Special Awards

Al Foster Award

American Association for Laboratory Animal Science, Northern California Branch American Chemical Society, Santa **Clara Valley Local Section** American Institute of Aeronautics and Astronautics (AIAA) Intelligent Systems Award American Meteorological Society American Psychological Association American Society of Civil Engineers Arizona State University Walton Sustainability Solutions Initiative **ASEI** American Society of Engineers of Indian Origin ASM International, A Society for Materials, Santa Clara Valley ACM San Francisco Bay Area Professional Chapter Association of Women Geoscientists, SF Bay Area Chapter Association for Women in Science. Palo Alto Chapter Broadcom MASTERS California Association of Professional **Scientists** "Have the courage

"Have the courage to follow your heart and intuition. They somehow know what you truly want to become."

- Steve Jobs

California Society for Biomedical Research - Ron Orta Excellence in Biomedical Research Fair Manager's Graphic Design Award Hegland Award Hernandez Spirit Award for **Environmental Sustainability IBM** Award **I-SWEEEP** Inez M. Lechner Award Institute of Electrical and Electronics Engineers (IEEE) Intel Excellence in Computer Science Award Morgan Lewis Mu Alpha Theta Muddu Family Entrepreneurial and Startup Award NASA Earth Systems Science Award National Oceanic and Atmospheric Administration (NOAA) Northern California Institute of Food Technologists (NCIFT) Resource Area for Teaching (RAFT) Teacher Award Ricoh Corporation SAMPE- Society for the Advancement of Material and Process Engineering San Jose State University College of Engineering Santa Clara County Biotechnology **Education Partnership**

Santa Clara Valley Science & **Engineering Fair Association** - Board of Directors Awards -High School Santa Clara Valley Science & Engineering Fair Association - Board of Directors Awards -Middle School Schonert Award Society for In Vitro Biology Society of Vacuum Coaters (SVC) Society of Women Engineers Stanford University Chemistry Dept. * Stockholm Junior Water Prize System Safety Society TechLab Education The Ann Burrell Award The Bruce Kawanami Engineering Award The Kerry Veenstra Awards The Synopsys Outreach Foundation n+1 Prize **Trimble Navigation Awards** United States Air Force United States Coast Guard Auxiliary United States Metric Association United States Navy and Marine Corps U.S. Public Health Services Award University of Toronto Award Varian Medical Systems Wireless Communications Alliance Yale Science and Engineering Association Award Zeidman Award * New Award

Look around the hall today and consider that each of these projects (plus the ones that were withdrawn or 'failed to qualify') came with a lot of paperwork. Have you ever considered what happens to all that paperwork? Nearly eleven hundred applications are mailed or handed off by teachers, then arrive at a house in Palo Alto with a big "Science Fair" sign on the door. For the past 12 years, those applications have lined the floors and tabletops in Ruthie Waters and Craig Laughton's house from September until the end of March.

Ruthie is the keeper, sorter, and organizer of applications, but also web master, state science fair board transporter, large sign maker for fairs, clinics, and Winners Circle, SRC contributor, and lent her

keen mind and scientific expertise to the pursuit of improving all aspects of the science fair. She has a handle on each moving part, and how changes to one part impacts the others, or more importantly, our participants. Ruthie has had a significant role in helping to mold and shape the Championship as it grew into the premier event it is today. Her contributions such as to our web site and the graphics serve as an excellent advertisement for the Synopsys Championship achievements.



Thank You Ruthie!



Remembering Isabelle Stone - by Pat Castro

When I joined the Science Fair board back in the 1970's Isabelle Stone was part of the support staff who really did much of the work in planning, getting applications approved, setting up the hall we would be using and organizing the students' table locations. The Fair was more like 100 projects in those days, but it was still a big job. 'Is', as we all knew her, was very willing to do whatever was needed and was great with the students as well as the Board. My son, Peter, a high school student, was involved in creating a software program for eventually managing the fair and he fell in love with 'Is' as did many of the student participants. She could handle any problem and was willing to help in many ways . She was hired at HP and had to phase out her work with the Science Fair. The Board realized they needed paid staff and this was feasible when Synopsys became our major sponsor. She continued to be available during the fair for many years, until she moved out of the area. We kept in contact with her over the years. Isabelle passed away April 12, 2016, at the age of 94, leaving a large family and Richard, her husband of 73 years. She is missed by many in the Science Fair family who remember a gracious and generous lady.





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No man stands so tall as when he stoops to help a child. - James Dobson



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The **Santa Clara Valley Science and Engineering Fair Association needs your support** to continue putting on the Championship. Although the majority of our funding is from the Synopsys Outreach Foundation and the major donors listed, IRS regulations require that at least one third of our funding comes from small donors (project registration fees and t-shirt sales do not count). Here is where you can help - either directly and/or indirectly through matching.

If you think the Synopsys Championship is a worthwhile event, please consider donating. We prefer checks written directly to SCVSEFA because we receive 100% of the donation. You can also donate electronically via CommitChange on our website. Donations are tax deductible as a 501(c)(3) non-profit. Please send checks to: SCVSEFA, Treasurer, PO Box 307, Los Altos, CA 94023-0307. If you are a volunteer or donor and work for a company that provides matching to qualified charitable organizations, please take a minute to fill out the company form for the matching donation to come to us. If SCVSEFA is not already in your company's list of qualified organizations, please contact me at treasurer@science-fair.org. -Larke Reeber