March 16-17, 2016

Synopsys Championship Newsletter 2016

Welcome from Gary Robinson, President, Synopsys Outreach Foundation

Welcome to the 2016 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 for years to come.

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

In addition to annually supporting students and teachers developing science projects at more than 700 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 John Turner, President, SCVSEFA

It is a great privilege for all of us to be part of this event, for it is the 56th year that the Santa Clara Valley Science and Engineering Fair Association has organized and run this fair. It is also the 17th year that the Synopsys Outreach Foundation has been the major sponsor of our Fair, and we are extremely proud and thankful for their generous and continued support.

The Synopsys Championship has continued to grow and flourish throughout all these years. This is due in no small measure to the fact that our teachers bring their support for science fairs to their students and their respective classrooms. Record numbers of Synopsys Championship students are being selected as winners in national science competitions; whenever and wherever our students participate, they compete with skill and enthusiasm and they win.

The success of the Synopsys Championship would not be possible without the hundreds of volunteers who are willing to invest their time and resources in the future of our students. The SCVSEFA Board of Directors, our judges, teachers, and a cadre of general volunteers who return year after year to help run the Fair and support the students, plus many sponsors, make the Synopsys Championship one of the best—if not ***the*** best—regional fairs in the United States. The Board of Directors especially wants to thank all of the volunteers, teachers, and administrators for their hard work and dedication.

Many of our students have participated in the Synopsys Championship numerous times. When asked, "What do you like most about our Fair?" many have responded, "I especially like the opportunity to speak to the judges." And many judges return year after year to share their experiences, expertise, and knowledge with the students. This interaction is a wonderful way for students to learn about research, to share what they have learned in making and supporting their projects, and to show what they have accomplished. Our judges invariably enjoy interacting and providing a memorable experience for the students.

We, The SCVSEFA Board of Directors, will continue to strive to engage and adhere to our mission to awaken more students to the wonders and power of Science, Technology, Engineering, and Mathematics (STEM). When our students interact with the judges and scientists, as well as with each other, we see them grow and broaden their horizons. I am greatly rewarded to see this growth. We thank all of our sponsors, volunteers, and donors both large and small. We especially thank the teachers and administrators who make this fair possible for the students of Santa Clara County. Let this 56th Annual Fair be a special tribute to all the volunteers who toil tirelessly throughout the year to bring us the Santa Clara Valley Science and Engineering Fair Championship sponsored by The Synopsys Outreach Foundation.

OUR MISSION IS TO AWAKEN MORE STUDENTS TO THE WONDER AND POWER OF SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS (STEM)

Intel International Science and Engineering Fair, May, 2015, Los Angeles, CA

The Intel International Science Fair is a week of activity and adrenaline, bonding and boards.

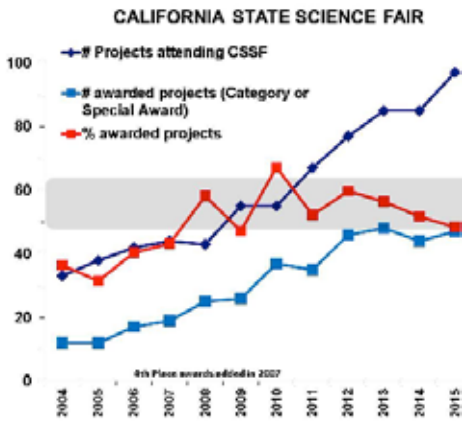
Even before the week, our finalists meet one another at mentor night, when they gather for pizza, turn in paperwork, and meet a PhD who will listen to their talk, read their board, and guide them through improvements.

The first group event is stuffing the box with 10 boards at the airport, and from then it's a blur of badges and schedules. Intel ISEF includes 4 official ceremonies, 2 for opening and 2 for awards, 2 party nights, and 7 grueling hours of judging. In between we have to register, get Display and Safety approval for all 10 projects, and trade pins with as many participants from 72 other countries as possible. Finding food for our bunch that may be half vegetarians within a short distance to the convention center can add challenge depending on the city, as can be corralling 10+ highly intelligent and motivated teens. AP exams and media interviews steal members away from the group, making it a feat just to get all the participants in one place for the requisite group photo with a worthy backdrop.

Inevitably there are problems that all seem to be new: nerves have someone vomiting into a garbage can, a form needs to be notarized at 10 PM on a Sunday evening, the head chaperone spills an entire bottle of water into the pocket of the bag that holds her cell phone. And yet each year, this group that may speak 5 or so different languages and attend as many as 10 different high schools east and west, public and private, returns with new lifelong friends, and more than our fair share of ribbons.

—Heidi Black

Synopsys Championship Projects Continue CSSF Success



The California State Science Fair has many similarities to the Synopsys Championship, save one important difference. On the first day you check in, get your badge, set up your board, and on the second day there is judging—and then there is the award ceremony right then and there!

We try to include all of our participants in two activities during our time in Southern California—activity night and the group photo. On Monday everyone is welcome to gather in the Radisson for some science fun and a short overview of judging day, and on Tuesday, just after judging, we gather at the fountain for the group shot.

Last year Santa Clara County was awarded 97 slots at the California State Science Fair, which means nearly 10 percent of you standing in the hall today will be invited to participate! Take note that the date this year may be a little challenging for some, but it can be well worth the effort! For the last six years, our students have won Project of the Year, last year in both the middle and high school categories! Will you be next?

—Heidi Black

Synopsys Championship Winners won the Top Project Awards at the 2015 California State Science Fair

Raghav Ganesh, Grade 7. Miller (Joaquin) Middle School, San Jose.

Jr High Project of the Year

Shishir Dholakia and Shashank Dholakia, Grade 10. Wilcox (Adrian C.) High School, Santa Clara.

Senior High Project of the Year

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 3, 2016. Check out www.Science-fair.org after March 24 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 volunteer corps when they return next year: click on "VOLUNTEERS" at www.science-fair.org. Always much needed and appreciated, volunteers make it possible for students' dreams to come true.

Non-affiliated 2015 Volunteers returning for 2016	69
Scientific Review Committee Volunteers	17
SCVSEFA Staff and Board Members volunteering at the Championship	32

How We've Grown

The Santa Clara Science Fair, now 56 years in the making, has some legendary supporters who helped get it started and are still participating in it. Among these is Bob Billner, who is still an associate on the SCVSEFA Board. The fair was originally organized for a year or two by the YMCA; Bob was involved even then before it was incorporated as the Santa Clara Valley Science Fair in July 1964.

Another one of these venerable members is Pat Castro, who participated in two of the earliest national science fairs in Oak Ridge, Tennessee, and Lafayette, Indiana in 1953 and 1954. Pat majored in electrical engineering at Northwestern University and went to work for Hewlett-Packard, rising through the ranks to the position of Director of one of the HP Labs (the first female director there and the only one for a long time, she already had this position in 1978).

Pat reminisces: "When HP received a letter in the 1970's asking for a manager from HP to join the science fair board, this was directed to me, a manager in HP Labs. I knew what a science fair was from my high school days and was happy to volunteer. Bob Billner was one of the early board members. I helped bring in money from HP, and I was able to bring my Pinto filled with donuts from HP for the judges on judging day—the car smelled like donuts for weeks afterwards. We had grades 6-12 projects and 10 categories. In addition to middle and high school, we also included elementary school grades.

"As a new member of the Science Fair Board, I remember there was Isabelle Stone and Lillian Severin who helped organize the fair when it started at the Exposition Hall at the San Jose Fairgrounds, and the fair lasted a week. Table setup was Monday evening, students brought in their projects on Tuesday, Judging was Wednesday (students had to be arrive one hour early to verify if they passed compliance and had 30 minutes to fix any problems we had found), Thursday-Friday was open house, and Saturday afternoon was the awards ceremony. The set-up day started early. Stacks of wooden tables were in the hall and the board had to set them up and arrange them for the students. Chairs also had to be set up. After the fair, these tables had to be knocked down and stacked. Project cards for the students' locations were done by hand. Judges lists were also manually created. It involved lots of work.

"No computers to help in those days. (Thank goodness for my Selectric II.) My son, Peter, was a high school student just as computers were being developed. He was interested in database software and wrote the software we used to manage the growing number of projects each year for four years. I entered projects on the computer as they arrived in the mail. This allowed us to print out project cards and judges lists, and other documents needed. Peter and I would stay on in the wee hours of the morning entering the results on his computer before heading home around 4:00-5:00 AM. When he went to college, Kathy Gannon, who worked in my lab at HP, took over this task until Peter graduated and returned home and continued with upgrading the software. As we grew in size it became necessary to hire someone to take over the operational duties, which Ruth and Craig do now, while Kerry Veenstra continuously upgrades the database.

"We eventually needed larger facilities than the Fairgrounds. Synopsys wanted to help, and after negotiating we agreed to their donating $75,000 each year and having naming rights, but no involvement in running the fair. When Synopsys first sponsored us, we upgraded to Parkside Hall (sharing space at least one year with the Robotic competition because we could not fill the room). When the Tech Museum took over the adjacent rooms (to build their Museum) and we grew, we moved to the San Jose Convention center, using one of the main halls and two adjacent rooms. When we grew some more and needed still more space, we moved to the current location of The South Hall, the blue tent at the back of the San Jose Convention Center. This allowed us to continue to grow until now we are at ~1000 students who completely fill South Hall each year. Space and money are the major limiting factors on our fair's future."

All About Judging

Categories and Fields of Study Updated

Category Judging assures that every student's project is evaluated by at least two judges. June Andersen, Chair of Category Judging writes, "This year we re-designed the fields of study to more closely match those used by the Intel International Science and Engineering Fair. Some top winners from our fair are selected to compete at the Intel Fair. Last year, the Intel Fair completed an in depth review of its fields of study to better match judges to projects. We adapted Intel's approach to the needs of our fair to improve judge matching. In the past, all engineering projects were grouped together at our fair. This year we divided engineering projects into six fields of study, which now include new engineering subjects such as biomedical engineering. Examples of types of projects included in each field were updated to suggest exciting new fields of research for students."

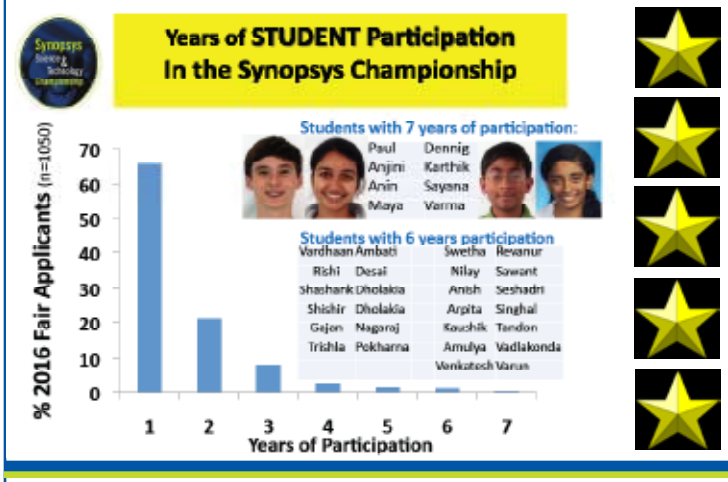
Students need to distinguish between science and engineering projects when they register for the fair. A science project involves using the scientific method to validate a hypothesis. An engineering project has an engineering goal and involves design and construction of a novel device, process, or application.

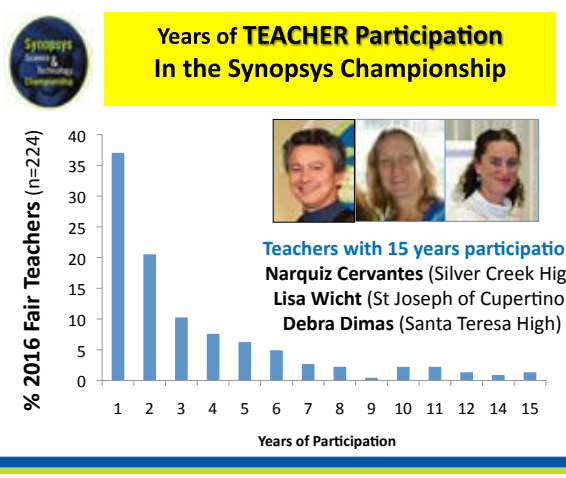
In past years, the Synopsys Championship used 12 Categories. These have now been consolidated into four categories based on: (1) whether the students received research mentoring and access to non-school laboratories and (2) the subject matter of the project (Biological vs. Physical science). Students in grades 9 to 12 whose projects were conducted under the supervision of professional research staff are assigned to the two "RRI" categories, RRI Physical Science or RRI Biological Science, and judged with other RRI projects. All other projects are assigned to either non-RRI Physical Science or non-RRI Biological Science and are judged with projects done by students from the same grade. Judging is done in groups of approximately 10 to 12 projects. Although the categories have been consolidated, the percent of projects that receive a Category Award remains the same, about 30 percent. Projects are assigned to the appropriate category based on the student's registration form.

When students register, they chose one of 15 fields of study for their research. These fields of study are used to assign judges to teams which best match each student's project. This additional information has also been used to better recruit Category Judges with the appropriate experience to understand and appreciate the students' projects. About 450 volunteers are recruited as Category judges each year. Qualified parents are also encouraged to volunteer as judges, but are not allowed to judge their children or friend's children under the SCVSEFA's strict conflict of interest policy. Judges in bioscience fields are usually in short supply.

For more information on categories and fields of study visit the Project Categories page on our website at https://science-fair.org/rules-and-registration/project-categories/.

—June Andersen





Full Circle.

I've been involved with the Santa Clara County Science and Engineering Fair (now known as the Synopsys Championship) for eighteen years. Over time we've come to know some of the students really well, especially the ones who participated through grades 6-12 and who went on to the state or international fairs. Our relationship with some families went deeper yet when younger siblings were finally old enough to participate for themselves.

The 2015 Synopsys Championship was a special fair. Two long-term student participants returned to the Championship, not as participants but as judges. They had completed their undergraduate training and probably a master's degree too and here they were – giving back having gone full circle. One student worked on the east coast but his company had a location in the area. He arranged to be in the west coast office the week of the Synopsys Championship so that

he could take a day off and judge. The other student participant worked locally so it was a little easier to make arrangements.

The very special part was that after the fair was over they found us in the "office area" asking if their past teachers (Francis Lee from Miller Middle and Bruce Kawanami from Monta Vista) were available. So teachers, if you give of your time and make a difference in a student's life you will be remembered years and years later. And students – you can make a teacher's day by sending a thank you letter or paying them a visit.

This experience made me realize that we have a source of young, talented judges with the latest training right on our doorstep. If you have graduated, are still in the area and find yourself reading this article, know that we would welcome you as "full circle" judges.

—Ann Burrell

The White House Science Fair

Three of our past or present students attended The White House Science Fair on March 23, 2015. This fair featured exhibits from students from all across the country. Holly Jackson (2014's winner of the top Broadcom MASTERS award and an award winner in 2015); Natalie Ng (long-time previous participant and major winner, now in college); and Ruchi Pandya, also multi-year participant and major winner and now a senior were among those invited to participate.

San Jose resident Ruchi Pandya, is pictured here with President Obama at the White House Science Fair where she showed off her research. The test Ruchi developed can identify key warning signs of cardiac arrest with just a single drop of blood. The Lynbrook High School student hopes that one day the test will be available at every pharmacy.

"Something like this could take the form of a insulin-based test, so you can go to CVS, pick it up, use it, and throw it away. This would be extremely cheap, very economical, and really revolutionize the in-home patient care," Pandya said.

Winners' Circle

Our annual Winners' Circle event was held on Thursday November 5, 2015, from 6:00 to 8:00 PM at the Santa Clara County Office of Education, San Jose

Every City in Santa Clara County that had Synopsys Championship winners agreed to recognize their Winners at a scheduled City Council meeting. A total of 120 students were recognized in Campbell, Cupertino, Sunnyvale, and San Jose. It was a rewarding experience for the City officials and for the students who were thrilled that the government of the city in which they live recognizes their accomplishments.

Cupertino's Mayor, Rod Sinks, Science Fair Winners and their families in at a reception held on November 3, 2015.

San Jose Mayor, Sam Liccardo, and the San Jose City Council recognized the Science Fair Winners and their families at a Council Meeting on December 8, 2016

Regulated Research Institution (RRI) Projects

We have always permitted students who have done research at RRI research facilities to compete in the Synopsys Championship. As you might imagine, it is difficult to compare projects done in a research facility (with access to sophisticated cell lines and bacterial strains, expensive and sophisticated equipment, and Ph.D.-level mentors with research experience) with those projects done at home or school. Judges found it difficult to evaluate the projects when they were mixed together, even with the presence of a Form 1C, where the senior scientist in the laboratory evaluates the contribution of the student to the research project performed. Even within the RRI category there is an enormous diversity of quality. Some students learn valuable lab techniques and apply them to a simple project of the professor's choosing. At the other end of the spectrum, students find a lab where a researcher/educator is willing to allow them to do the research project that the student has formulated, learning much along the way.

In 2015 we tried an experiment where we grouped students with these more sophisticated projects together and judged them against each other. As you might imagine, fewer students with RRI projects and slightly more students with really good school-based projects won category awards. Judges were much happier that they had a more even field of projects to assess and judge.

One concern was that students with RRI projects had to compete against each other and that fewer of these more sophisticated projects would represent the Synopsys Championship at CSSF (projects progressing to CSSF typically are selected from first-place winners). Surprisingly, our percentage of winning projects at CSSF (in the 50-60%) barely changed in 2015.

Another concern was that comparing RRI projects to each other would change the selection of students going to Intel ISEF and the California State Science Fair. In fact, Grand Prize winner selection at both middle and high school is done independently, and category awards have no bearing on these results. All Grand Prize winners have automatic slots at CSSF and high school Grand Prize alternates win a paid trip to the CSSF as well. In addition, grouping RRI projects together has no effect on Special Awards judging, since they are also judged independently and Category Awards have no effect on Special Awards.

This year it came to our attention that there were students doing computer science, bioinformatics, or similar research at home, but who were meeting with university/professional mentors on a regular basis. We have asked these students who are receiving professional mentoring to compete in the RRI categories also.

While grouping RRI projects together may make it more difficult for top projects to win Category Awards, it seems more appropriate to judge projects with similar levels of assistance together. Our primary goal is for students to be able to have the experience of doing research or engineering projects, to provide them a venue to talk to other professionals (judges) about what they have done, and to receive validation and encouragement to continue in STEM as careers.

—Ann Burrell

AWIS Special Awards – Why We Sponsor

The Palo Alto Chapter of the Association for Women in Science (AWIS) has been dedicated to science education community outreach for over 20 years. In 2005, the chapter board unanimously voted to sponsor a special award in the Championship for best high school project by a female scientist to bring focus on the wonderful research that young ladies in STEM can do. This continued support is to build recognition and confidence in a field still rife with gender bias, conscious or unconscious.

A wide range of female scientists from industry professionals to academic postdoctoral fellows volunteer their time and expertise to select and interview the students at the Championship. They interview, debate, interview some more and finally settle on the winners and honorable mentions. First place winners receive a $100 cash prize, usually include something fun like DNA earrings, a certificate and a book about inspirational women in science. The awardees have come from public and private schools with projects ranging from physics, life sciences and bioinformatics. There has been a good mix between projects done at school and those with research institute mentors. Over these past 10 years, 30 young ladies have been recognized by AWIS at the Championship.

Other than the recognition for students, our volunteers also receive a tremendous amount of satisfaction. We get to see young ladies passionate and excited about their project. They show a depth of understanding and maturity well beyond their age. Many of the scientists have volunteered for multiple years and look forward to this opportunity to give back to the community and inspire young women in STEM. Please consider how your organization or company can support a special award. Even a modest one like the AWIS award can have a lasting impact on the students.

—Dr. Katy Korsmeyer

AWIS
ASSOCIATION FOR WOMEN IN SCIENCE
Palo Alto

AWIS scientists volunteer to interview students for special awards and category awards at the Championship

Support Needed

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 giving a donation. We prefer checks written directly to SCVSEFA because 100 percent of the donation comes to us, but you can also donate electronically via CommitChange on our website. Donations are tax deductible because we are 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 one of the many companies that provide matching donations to qualified charitable organizations, please take a few minutes to fill out the form your company requires 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

New North of the Border Special Award

The Board of Directors is excited to introduce a new Special Award sponsored by the University of Toronto in Toronto, Canada. They are offering a week-long scholarship to their summer engineering camp, DEEP, along with room and board and a travel stipend for a top engineering project. Their response as to why they chose our fair was, "We are looking for the best and brightest young minds around the world. The students that participate in your fair have an innate passion, curiosity and dedication to STEM which we share." We say, "University of Toronto, welcome to the Synopsys Championship!!"

—Bruce Kawanami

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
American Vacuum Society, Northern CA Chapter
ASEI American Society of Engineers of Indian Origin
ASM International, A Society for Materials, Santa Clara Valley Chapter
ACM San Francisco Bay Area Professional Chapter
Association of Women Geoscientists, San Francisco Bay Area Chapter
Association for Women in Science, Palo Alto Chapter
Arizona State University Walton Sustainability Solutions Initiative
Broadcom MASTERS
California Association of Professional Scientists
Dr. Paul X. Callahan in Memoriam
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
NASA Earth Systems Science Award
National Oceanic and Atmospheric Administration (NOAA)
Northern California Institute of Food Technologists (NCIFT)
Promethium Chapter of Iota Sigma Pi
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 Biotech Education Partnership (SCCBEP)
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
Stockholm Junior Water Prize
System Safety Society
TechLab Education
The Ann Burrell Award
The Bruce Kawanami Engineering Award
The Kerry Veenstra Awards
The ROD Women in Science Award
The Synopsys Outreach Foundation n+1 Prize
Trimble NavigationAward
United States Air Force
United States Coast Guard Auxiliary
United States Metric Association
United States Navy and Marine Corps
University of Toronto Award
U.S. Public Health Services Award
Varian Medical Systems
Wireless Communications Alliance
Yale Science and Engineering Association Award
Zeidman Award

*We gratefully acknowledge those who support the Synopsys Championship and thank those companies who support science education by allowing their employees time away from work to judge and volunteer at the Championship. And once again we would like to thank the Rambus Foundation for their very generous donation for the printing of this newsletter and Hassan Lashgari and his staff at Pine Press Inc., who have helped the SCVSEFA Board meet publishing deadlines since 1990. We also extend our sincere appreciation to Alpine Awards in Sunnyvale, who since 1988 have produced our ribbons and plaques. We also thank the participants, their parents, teachers, mentors, schools, and the Synopsys Championship's major sponsor, The **Synopsys Outreach Foundation**, for making the Synopsys Silicon Valley Science and Technology Championship the exceptional event that it is!*

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