March 12-13, 2013



Synopsys Championship





Welcome from Gary Robinson, President, Synopsys Outreach Foundation

Welcome to the 2013 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. Many Synopsys Championship contestants will advance to the state, national and international competitions...but what's most important is that all of you did the hard work, overcame the inevitable obstacles in your research, and made it here to compete.

Based on our research, the time and effort you've poured into your projects has helped you develop the skill set you'll need to compete in the 21st Century workforce. By learning to manage a project and meet deadlines, analyze data, and present your results both orally and in writing, you've significantly improved your critical thinking, communication, and other skills you'll need to succeed in the years ahead.

In addition to annually supporting more than 140,000 students and

teachers developing science projects at 660 schools across California and Oregon, the nonprofit Synopsys Outreach Foundation considers it a great honor to serve as the major sponsor of The Synopsys Championship, something we've been doing for more than a decade. This event, run mostly by volunteers, has set a standard for other science fairs across the state and country.

We promise you will treasure today's experience for years to come. Have fun!

Welcome from Forrest Williams, President, SCVSEFA

On behalf of the Santa Clara Valley Science and Engineering Fair Association and our treasured and deeply appreciated sponsors and supporters, I extend my heartiest welcome to you on this special occasion of the 2013 Synopsys Science and Technology Championship. Join with us as we witness the excitement of the students as they overwhelm judges with their projects. You don't want to miss this opportunity.

Volunteers are the key ingredients for a successful and rewarding fair and the Santa Clara Valley Science and Engineering Fair Association has a long history of successful and rewarding fairs because of its volunteers. This will be our 53rd year. First, I want to welcome and thank the judges for volunteering their time and experience to judge

projects. I also want to thank the mentors who work with our students and have answered so many student questions. I want to welcome and thank teachers and parents for their selfless dedication to the students and projects, making sure that each student and project were ready for the dance. To those volunteers who have worked tirelessly for the entire year preparing for this fair—this day—I extend my genuine thanks and appreciation. Thank you all for your dedication and support of our students.

The Synopsys Outreach Foundation has been our major sponsor for 14 years. The Santa Clara Valley Science and Engineering Fair Association Board of Directors are deeply appreciative of this support and are looking forward to continued sponsorship in the future. And

I also want to thank all of the other sponsors for their generous contributions that make this championship the great success that it is.

Lastly, I want to welcome the students. You have met all of the requirements to compete in the Synopsys Science and Technology Championship, so this is your time to shine. It is our desire to make this an exciting and rewarding experience for each of you. Many of you are new to the Championship, but many of you are returning students. I am very pleased that you were interested enough in science and engineering that you wanted to explore their wonders and excitement by taking on a project that led you here. Many of you will move on to the State Science Fair and International Fairs. I wish the very best to each of you. (continued next page)

OUR MISSION IS TO AWAKEN MORE STUDENTS TO THE WONDERS AND POWER OF SCIENCE AND ENGINEERING

Synopsys Championship Winners compete well at other Science Fairs. At the California State Science Fair, 44 of the 77 projects (57%) won awards. In addition, one of our students won "Project of the Year" for the Junior Division. Of the six largest regional fairs, Santa Clara Valley Science and Engineering Fair Association is the affiliate that has the greatest percentage of awarded projects. At the INTEL International Science and Engineering, 7 of the 9 projects (78%) received awards. Winners have also won awards in the Broadcom Masters 2012 Science Fair and the Google Science Fair 2012.

The Brookings Institution Report of February 1, 2013 article, "Patenting Prosperity: Invention

and Economic Performance in the United States and its Metropolitan Areas," identified the San Jose Metro Area (San Jose-Sunnyvale-Santa Clara, CA) as the highest producer of patents in the nation. Silicon Vallev is still the center of creativity. innovation and entrepreneurship; more patents are produced per employee in Silicon Valley than any other city in the Country. The world looks to Silicon Valley for answers. The future is bright and full of challenges; students must be encouraged to explore the wonders of science and engineering to meet those challenges. The current generations are the ones who will solve the problems for the future. After all, Silicon Valley has set the standard for creativity, innovation,

entrepreneurship and patents for decades. Our students must meet these challenges—with our help. We have a reputation to defend!

Science and Engineering are my passions. They have served me well as a career. I am dedicated to our mission to encourage students to explore the excitement, challenges and rewards of science and engineering and to consider this as a lifelong pursuit. Everyone participating in the 2013 Synopsys Science and Technology Championship today—sponsors, students, teachers, parents, judges, Board members, staff and volunteersthis is the culmination of your hard work. Let's get to work celebrating your achievements.

-Forrest Williams

Intel International Science and Engineering Fair 2012



The 2012 Intel International Science and Engineering Fair was held in Pittsburg, PA. Silicon Valley's ten

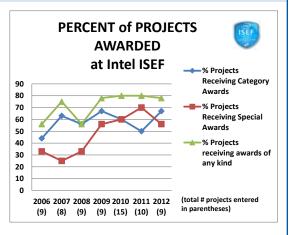
students and three chaperones headed out early on Sunday after arriving in Pittsburgh to search for covered bridges and Pennsylvania Dutch. Once these were found, we headed to the Ohio border just to check off another state and then sprinted back for the pin trading. We spent Monday practicing presentations and enjoying the opening ceremonies. Tuesday we went to see the Andy Warhol Museum and Carnegie Mellon campus and then headed back for the California delegation gathering, Nobel Laureate talks, and the host city celebration. The contestants spent all day Wednesday on their feet talking to a never-ending procession of judges and then off to the Steelers Stadium for the "After Party." By Thursday the head chaperone

was rendered useless by laryngitis, though all our finalists made it through the public viewing. Afterwards we headed up the Duquesne Incline to eat a celebratory dinner while overlooking the Three Rivers. We picked up some special awards Thursday night, highlighted by a \$60,000 scholarship offer. Friday morning we attended the Grand Award

Ceremony and cheered each other on as Silicon Valley students once

again garnered more than their fair share of prizes. These trips are measured, however, not in the ribbons carried home, but in the bonds established between one another, with those from other US cities, and with new friends from abroad.

-Heidi Black





Synopsys Championship Projects Continue CSSF Success



record 77 Synopsys Championship Aprojects were invited to the 2012 California State Science Fair (CSSF) in Los Angeles. Every year we earn a larger allocation of invited projects due to our fair's high quantity of high quality projects. Our top 77 projects went on to win 44 CSSF category and special awards. The attached graph shows the nice trend! And the topper was the Junior Division Project of the Year award won by Maya Varma's project, "Arduino-Based Foot Neuropathy Analyzer" mentored by Dr. Anujan Varma. This was the fourth consecutive Project of the Year award won by our delegation, quite an achievement.

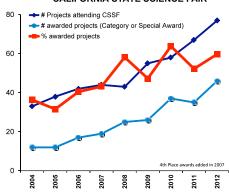
So how do we handle such a large delegation of students, chaperones,

and parents?
Super organized
planning, plenty of
information, and
a lot of flexibility
are required make
all things happen.
We are so very
fortunate to have

Craig Laughton and Ruthie Waters on our side with their incredible gifts of attention to details and precise execution. For example, we successfully coordinated the synchronization of one super humungous bus filled with passengers from various flights with two vans full of project display boards at the Science Center and all boards were setup on-time with no errors. (That alone is its own mini-miracle!) A relaxed afternoon followed by fun, brain-exercising ice-breakers get the student's ready for the Tuesday morning judging. After judging and lunch we take our annual water fountain photo to commemorate the event in the wonderful Southern California sun. Then after the awards ceremony, everyone winds down the day as we fly back home to SJC. Tired but extremely satisfied, our students proudly met their parents and guardians for their ride home. Just in time for late night homework and then going back to school to make up two days of work. But it was worth every minute because of the immersion in so much exciting science and engineering in such a short time. In fact, it was so memorable, I say, 'Let's do it again next year!'

-Bruce Kawanami

CALIFORNIA STATE SCIENCE FAIR



A student perspective on the I-SWEEP Olympiad (International Sustainable World Energy Engineering Environment Project)

Winners of the top projects in the theme of environmental sustainability and innovation from the categories of Environmental Science, Energy, and Engineering spent five days in Houston, Texas, where Gold medals were awarded to both Synopsys Championship sponsored projects.

The Indian saris floated around; Jewish kippas bobbed up and down; formal suits mingled in the crowd. Looking around, I realized that this was more than just a fair for people to display their scientific discoveries. It was a convergence of cultures—a place where people from all backgrounds mingled and shared their experiences with one another.

In May 2012, my research partner, Paulomi Bhattacharya, and I had the opportunity to compete at the International Sustainable World Energy, Engineering and Environment Project Olympiad (ISWEEEP) held in Houston, Texas. This science fair provided me an unprecedented platform to present my scientific research on energy sustainability. However, after I came back home and looked back upon my experiences, I realized that the fair not

only deepened my love for science and communication, but also exposed me to different world cultures and taught me about diversity.

When I spent time with my competitors, I learned about their daily experiences, which were quite different from what I had read in the news and textbooks about their country. I met people from Tunisia who had worked on their engineering project despite the unrest during the Arab Spring. Their commitment to their project amidst the social conflict and yet their enduring love for their country showed me what a truly passionate and forgiving nature looked like. They proudly informed me of their country's progressiveness and how they had taken part in the revolutionary efforts in small ways. These people in front of me, whose faces I could read and

voices I could hear, were so much more real than anything I had read about in the papers, and for the first time I realized that behind the facts and evidence, people's lives were at stake.

Later, I spoke in Spanish with a student from Mexico. While we were discussing our common love for Shakira's



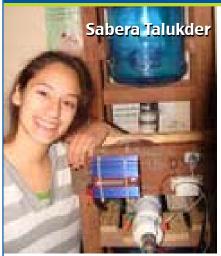
Waka Waka en Español, I learned that this student was conducting biochemistry research similar to what I had experimented with the previous year. In broken Spanish, we discussed our individual projects, different scientific techniques and lab research we had done to each make our small contributions to the environmental applications of biochemistry.

ISWEEEP also featured a social and after we each received our ISWEEEP passports, we set out on a journey to meet people from as many different

states and countries as we could. As I pranced along the hall exchanging my Golden Gate key chains, my new friends offered me a Kyrgz bird house, a Thai booklet and Minnesotan pen. I even learned traditional Texan square dancing, in the process taking a different part of America back to the Bay Area with me. The International science fair was so much more than an opportunity to present my research; it was an opportunity to interact with and learn from so many different types of people who all love science as much as I do.

To me, science is not just numbers, engineering, math, and technology, but rather science is people. With our love for science as a common bond, I was able to take back many lessons from exchanges with my competitors-cum-friends. Not only did I become more open-minded and make precious friendships, I realized I want to inspire and be inspired by other people as I conduct my research, connecting with others and sharing my discoveries.

—Eesha Khare Gold Medallíst, I-SWEEEP 2012



My intention with my research and my science fair project was never to compete in a science fair, it was to help people who didn't have the capability to help themselves. I truly believe that the best science is the science that can advance the world and help people while doing it.

My Pani Purification project was my first real science fair project and the Synopsys Science Fair was my first real science fair. The title truly explains my project: "pani" in Bengali and Hindi means water, and purification is rather self explanatory. How could I make a cheap, portable, easily understood, and solar-based water purification systems to purify water in third world and developing countries?

The first time I went to Bangladesh was when I started my project. Seeing the people and the condition that everyone was in disheartened me. I felt that everyone should be able to have access to the clean drinking water that my sister and I had access to in the U.S., so I decided to do something about it. Before I could do anything I had to know what the current water

situation in the country. So, I awoke at 5:00 a.m. three days in a row and went to 28 different locations around Dhaka to collect water samples. I then tested the samples at Incepta Pharmaceuticals and at the ICDDR,b (the world's largest cholera research institute). The water was disgusting, but people were drinking it. One of the most vivid imprints on my mind is when I went to collect water from a school, a father came up to me and begged me to come to his house and sample his water. I had to explain to him that I couldn't test everyone's water; he was distraught because I wasn't going with him, but happy because I was doing something about the problem. This moment showed me that there was a huge need.

Back to the U.S., after extensive trial and error, I set up a prototype, and to practice for the Synopsys Science Fair I attended the Science Palooza. Science Palooza was a great prep for me since it helped me learn what being judged would be like. At Palooza I met Zoe Lofgren, and got an Einstein Award. My next hurdle was the Synopsys Science Fair which was truly superb. I learned so much about thinking on my toes and how to be confident even when my baby (project) was being attacked! At the fair I won a 1st Place Award in the Engineering Category and three additional awards: a \$100 First Prize, Morgan Lewis Award; \$100 check and certificate from Wireless Communications Alliance; and a Third place \$100 and certificate for the Pauchon Foundation Award. I used the money to build the prototypes that I deployed in Bangladesh. My project was also awarded \$100 for my school (Los Gatos High School). This recognition was really great because without

the tremendous support of my teachers, mentors, and school none of this would have been possible.

However, I did not qualify to go onto the CSSF, which to me disheartening since I had gotten so much recognition at Synopsys. I persevered and applied to the Google Science Fair just for fun and was shocked when I found out that I was a regional finalist (1 of 30), even more surprised when I became a finalist (1 of 5), and even more shocked when I found out I was a finalist (1 of 13) for the Science in Action award. The Google Science Fair was extraordinary and I got so much helpful publicity from it, like being interviewed by Ira Flatow on NPR's Science Friday or having a PBS News-Hour extra about my project. Meeting all of the 15 amazing judges at the Google Science Fair was a breathtaking experience.

Although all of the science fairs taught me so much, they were never the main objective of my project. I did the project to help people, and thankfully during winter break 2012 I went back to Bangladesh to set up my prototypes in Sajida Foundation's daycare for street children. During the seventeen days I was in Bangladesh I had to build, deploy and test my prototypes which was very stressful and difficult. There was so much bacteria in the water that they overwhelmed the physical and final filtrations, so I had to remove those two steps and test the system with just the UVC light. This was the most successful of all of the tests, and made the water significantly more drinkable.

Following my project through has been such an amazing experience, and now looking back it is such a significant part of my life. I am so grateful that science helped me help others.

- Sabera Talukder



y science fair journey started rather unceremoniously. Neither my parents nor my school pushed it. It was not among my life-long dreams. I would never have imagined this journey would be mine. It all started my freshman year. I had just switched from one biology class to another, and the first thing I found out from my new teacher was that I was required to do a project for the district science fair. I was pressed for time and had no interest in getting too involved, so another girl and I did a group project on what type of sugar made the most rock candy. We won second place. I thought I would be done forever with science projects, fairs, and judges

Apparently, I thought wrong. My sophomore year, my chemistry teacher

also required that we participate in the district science fair. It was extra credit to participate in the Synopsys Championship. This year I wanted my project to be more original; and I figured that, if I was going to do all the work for the district science fair, I may as well enter in the Championship as well. My project ended up being "Ecotreds, one hundred percent recycled shoes made from plastics bags, tires, and styrofoam." I won first at the district science fair before going on to Synopsys and winning a special award for using recycled materials.

By my junior year I was hooked. I joined my school's research class and chose an extremely challenging project, "The Synthesis of Quantum Dots for Application in Solar Cell Efficiency." It was a really challenging and advanced project for me, but over the months of working on it I had fun and learned a lot. For my junior year my goal was to make it to the CSSF. Not only did I make it to the CSSF, where I won third, but I also made it to the Intel ISEF, where I won fourth place and a sixty-thousand-dollar scholarship

to the Florida Institute of Technology.

One might think that was enough, but I am still trying to manage marching band, college applications, and lab work in my senior year. I have decided to continue my work with nanoparticles in my project, "Berzeliopaper: The Novel Arrangement of Silicon Nanoparticles in a Macroscopic Aggregate Sheet and its Comparison to Buckypaper." I really didn't intend for that long of a title, but I guess it fits considering the amount of time I am spending on this project. I am excited to see how far it will take me.

Four years later, my perception of science fair and the fields of science and engineering is completely changed. I've made a lot of cool friends along the way to keep in touch with through the college years as we continue our paths in science, math, and engineering. Good luck to everyone. Enjoy this experience. It can take you places you never imagined you would go. And if this year doesn't go as great as you want, remember Walt Disney's saying, "keep moving forward."

-McKenna Duzac

The Winners' Circle

The annual SCVSEFA Winners' Circle Event was held at the Santa Clara County Office of Education on September 20, 2012. It is our way to thank and congratulate those students who have represented us so well at the State, National and International science fair levels—and a chance for us to meet and greet their parents and hear the participants' inspiring stories.



What's Next?

If you are one of the participants whose project was judged as a First, Second, Honorable Mention, or a Special Award winner, you will be invited to attend the appropriate ceremony at California's Great America on Sunday April 7th, 1:15 for middle school winners and 3:15 for high school. Entrance to California's Great America for the day is the gift California's Great America gives to each of our winners. A very nice reward for a job well done!

You can find out on our website if you are eligible to attend the Awards Ceremony: check out www.Science-fair.org after March 16th to see if you are a winner. Be ready to wend your way to the stage for your moment of glory as your name is called. You'll shake hands with the presenter and receive your ribbon or medal. Congratulations! 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! If you don't "win" a spot at the Awards this year, you are still a cool young scientist, with more experience now and a better chance when we see you at the Championship next year!

Why are Projects Marked "Fail to Qualify"?

f you are reading this, your project was listed as "accepted" in the database. One of the alternate statuses is "not qualified" or "fail to qualify," and several people have asked what causes a project to be given this status.

All projects are reviewed before acceptance so an "FTQ" listing is actually assigned to a project by either the SRC or the IRB. The IRB reviews human subject projects; the SRC reviews all other projects, but specifically those that use vertebrate animals, potentially hazardous biological materials (bacteria and fungi, rDNA, etc), chemicals, and hazardous devices and activities.

Most of these categories require pre-approval so if the project was done without that pre-approval it is automatically "FTQ." Additionally, no bacterial or fungal or rDNA projects can be done at home - another automatic "FTQ."

The IRB has "FTQ'd" projects that involved sleep deprivation, diets involving excessive amounts of highly caffeinated drinks, reduced calorie diets, and surveys that asked highly personal and intrusive questions.

The rules involving vertebrate animals are very strict. Projects that will cause stress to the animals, inflict pain

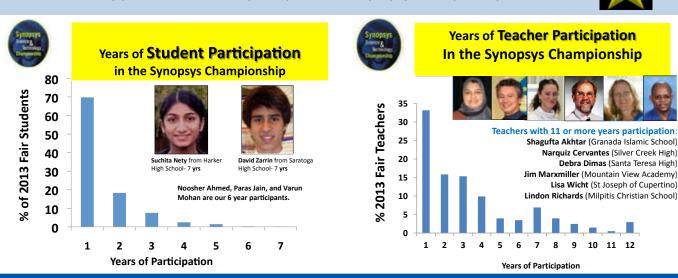
or cause even minimal weight loss will also be "FTQ." And these are just a few!

Chemical projects sometimes generate the most dangerous proposals. Extracting toxins from Amanita (death cap) mushrooms in the kitchen with a garlic press had the most potential for death to the family. This was moved to a school lab with direct supervision. The same was true for heating sodium hydroxide to 700°C – a chemical hood was an absolute requirement. Students who apply for pre-approval and whose project is "FTQ" are always given an option for modifying a proposal so that it is acceptable, or they may send in a replacement project that is acceptable.

—The SRC/IRB Committee

he gold star in the lower right corner of the teacher and student name badges indicates how many years the wearer has participated in the Synopsys Championship.





How Judging Teams are Organized

Most of the regular judging in our science fair is done in Category Judging. Those judges go out in Teams and here is how that's done. Hand sorting!

Last year I was handed the reins of this task by our late Board Member, Dr. Steven Wang. He left a great bunch of process examples and several detailed write-ups. And he personally came over to help me, in the thickest part of the process, the evening before going in for a medical procedure. We have some extremely dedicated Board Members.

We divide the projects into their different categories. Biology, computer science etc.. Then we sort the hundreds of judge sheets into piles of

"first choice" sorted by science fair judging experience. The longer you judge, the more likely you are to get your first choice! Here is the level of our judge-pool experience: last year a NASA manager of a major scientific satellite finally got to be 'team leader' of a middle-school space science team! It's been fun 'managing' this pool of extremely smart, dedicated, and nice people. And very many of them are parents with kids of their own who want to also help other kids in this community.

After we distribute the experienced judges into the type and number of teams we need, we start distributing the new judges. We almost always have two experienced judges

in a team. We always have at least two judges, and our standard is to have three judges. The new judges get filled-in and will be more likely to get a "second choice" for category. The joke is if it's your first year and you know a leaf from a stem, you may get middle school botany! These projects are not "rocket science," even a NASA project manager can do a good job talking to these junior scientists.

9

10 11 12

These students really have a lot of fun talking to real scientists, doctors, nurses, technicians, and engineers. Our judges are highly appreciated by all.

> -Steven Nelson SCVSEFA Board Member

Special Awards, Sponsors

Agilent Technologies 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) American Meteorological Society American Psychological Association American Society of Civil Engineers American Society of Heating, Refrigeration and Air **Conditioning Engineers** American Vacuum Society, Northern **CA Chapter** Apatite to Zircon, Inc. Award ASM International A Society for Materials

Materials
Association for Computing
Machinery, San Francisco Bay
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Palo Alto Chapter

Brownlee - Shaeffer - Schmahl Science Award California Association of Professional Scientists California Society for Biomedical

Research - Ron Orta Excellence in Biomedical Research Award Common Ground Organic Garden
Supply & Education Center
Dr. Paul X. Callahan in Memorium
DuPont Industrial Biosciences
Fair Manager's Graphic Design Award
Hegland Award
Hewlett-Packard Laboratories
I-SWEEEP
Inez M. Lechner Award
Institute of Electrical and Electronics
Engineers

Labcoat Award for Lab Bench Finesse MedImmune Morgan Lewis

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Resource Area for Teaching (RAFT)
Teacher Award

Ricoh Corporation

SAMPE

San Jose State University College of Engineering

San Jose State University Student
Affiliates of the American Chemical
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Santa Clara County Biotech Education Partnership (SCCBEP)

Santa Clara County Integrated Waste Management Program

Santa Clara Valley Science & Engineering Fair Assn - Board of

Engineering Fair Assn - Board of Directors Awards - High School

Santa Clara Valley Science & Engineering Fair Assn - 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

The ROD Women in Science Award The Synopsys Outreach Foundation n+1 Prize

The Tech Museum of Innovation
The Tech Summer Camps
Trimble Navigation, Ltd.

UCSF Center for Systems and Synthetic Biology Award

United States Army
United States Coast Guard Auxiliary
United States Metric Association
United States Navy and Marine Corps
U.S. Public Health Service Award
Varian Medical Systems
Whitney Education Foundation
Wireless Communications Alliance

Yale Science and Engineering
Association Award

Special Award Spotlight 2013, The Hegland Award

My late husband Phil and I became acquainted with the Santa Clara County Science Fair in 1983 when our oldest son, Mark, a sixth grader, entered a physical science project and won a prize. We were impressed with the fair, its exciting atmosphere, wonderful learning environment, and the positive impact it had on all the participants. We made sure our younger son, Greg, started science experiments as soon as he entered school. He received several prizes including the Lil Severin Award in 1989.

Phil, who worked as a physicist for Measurex Corporation in Cupertino, organized a judging team and presented awards financed by Measurex until 1989 when the company changed hands and the award was discontinued. This is when the Hegland Award began. Phil wanted to continue fostering the children's love of science and creative efforts. Taking a day off work, he continued judging, usually convincing some his co-workers to accompany him to the fair. We provided the funds for the Hegland award.

Phil's criteria for the award are still in place today. He enthusiastically loved physics, creativity and ingenuity. He loved the experiments that showed such qualities and rewarded those students who showed them as well as a keen desire to understand the world around them. He enjoyed talking to the children about their projects. He granted the award to the middle school grades, a crucial time in life. Being a middle school teacher I heartily agree. I am happy and honored to be able to continue the Hegland Award in his name.

—Mercy Hegland

We gratefully acknowledge those who support the Synopsys Championship and thank those companies who support science education by allowing their employees to take 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 sponsors, The Synopsys Outreach Foundation, and California's Great America for making the Synopsys Silicon Valley Science and Technology Championship the exceptional event that it is!



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