

March 11-12, 2014



Synopsys Championship

Newsletter 2014



Welcome from Gary Robinson, President, Synopsys Outreach Foundation

Welcome to the 2014 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 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 as a bit of an expert. 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 science projects can help students hone not only science-related skills such as scientific investigation and analysis, but also critical thinking, communication, collaboration and other, non-science-specific skills critical to success in any 21st-century career you may choose.

In addition to annually supporting more than 150,000

students and teachers developing science projects at 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 Forrest Williams, President, SCVSEFA

On behalf of the Santa Clara Valley Science and Engineering Fair Association (SCVSEFA) and our esteemed sponsors and supporters, I extend my welcome and appreciation to you for joining and participating in the 2014 Synopsys Science and Technology Championship. We all are excited about this great opportunity for students to present their work to judges and the community. Join us in our 54th year, as students demonstrate to you the wonders of science, technology, engineering, and mathematics. You will be WOWED!!!

A volunteer is one that freely gives of their time and energy in the service to others. Volunteers are the backbone of this country. While some volunteers save lives in natural disasters, others may

respond to community needs that improve the quality of life locally. Volunteers find their work to be a rewarding and fulfilling experience—they recommend it to everyone. The SCVSEFA is an organization that is successfully run by volunteers. To those volunteers who have worked tirelessly for the entire year making preparation for **this special day**, I extend my warm and genuine thanks and appreciation.

I also want to extend a warm and sincere welcome and thanks to those who are volunteering their time and expertise to judge the projects, a critical element of the fair, and to the mentors who responded to student questions regarding their projects. To teachers and parents, a sincere welcome

and appreciation for your selfless dedication to the student and projects, making sure that all is ready for this **special day**.

The Synopsys Outreach Foundation has been our major sponsor for **15 years**, which represents a long-term commitment to the mission of SCVSEFA and the students of Santa Clara Valley. The SCVSEFA Directors are very grateful for this sustaining support and are looking forward to continued sponsorships in the future. To all of the other sponsors and supporters, thank you for your generous contributions of time and resources that help to make the Synopsys Championship a successful and rewarding experience for the teachers, students, parents, and the Santa Clara County community.

(continued next page)

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

Students, **WELCOME!** This is **your day!** This is **your time to shine!** For returning students, we hope to continue the excitement and rewards of your science fair experiences. To the students who are new to the Championship, thanks for participating. I am excited that your interest in science and engineering motivated you to explore their wonders by taking on the project that led you **here.** We strive to make this a rewarding and enriching experience for you. We look forward to your continued participation. Whether or not your project moves on to the California State Science Fair or one of the many other opportunities achieved

through participation, SCVSEFA will continue to support your efforts, and we wish each of you the very best as you endeavor to build upon your science and technology skills.

Silicon Valley is the center of ingenuity and entrepreneurship. More patents are produced per employee here than any other region in the Country. The world looks to us for answers. The future is full of global challenges, but there is a shortage of science and engineering talent. To fill this gap, we must continue to encourage students to explore the wonders of science and engineering. They are the problems solvers of the future. Silicon Valley has set the standard

for innovation. All of us must do our part to prepare our students to fill the need. We have a reputation to defend.

For each of you contributing to the 2014 Synopsys Science and Technology Championship today, this is the culmination of your hard work. Let's celebrate!!

—Forrest Williams



Forrest Williams celebrates with St. Christopher School science-fair winners.

Intel International Science and Engineering Fair 2013



The 2013 Intel International Science and Engineering Fair was held in Phoenix, AZ from May 12th through

17th. We ate most our lunches under a misty spray provided by the café across from the convention center. Our 10 finalists, evenly split between female and male, bonded even before we took to the air. The busy week included sessions on improving our public and media speaking, meeting with all the California finalists, pin trading with finalists from over 60 countries, an entire day of talking to judge after judge, and figuring out how many highly intelligent science fair winners it takes to find a place to eat dinner on the evening before the awards ceremony. Each year in the last 15 I have chaperoned students to Intel ISEF, the delegation from Silicon Valley is called to the stage time and time again and this year would be no different. But this year there would be extra cause for celebration! This year one of our young



Eesha Khare

women would grace the stage when the top 3 award winners, top 3 of the entire fair representing 1600 projects from all over the world,

was announced. Eesha Khare, 18, from Lynbrook High School, won project of the year at both CSSF and ISEF (The Young Scientist Award of \$50,000) for "Design and Synthesis of Hydrogenated TiO₂-Polyaniline Nanorods for Flexible High-Performance Supercapacitors." Eesha Kahre and her nanoparticle supercapacitor prototype wowed the judges and ended up making media news from India to *The Today Show.*

I can't wait to see what we bring home this year from Los Angeles! Will you be standing on the stage during the grand awards?

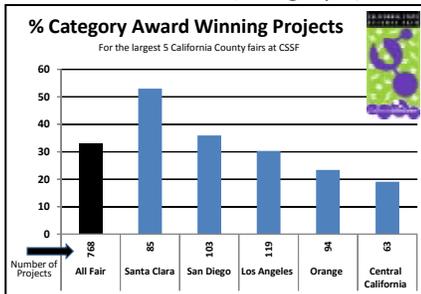
—Heidi Black



Synopsys Championship Projects Continue CSSF Success



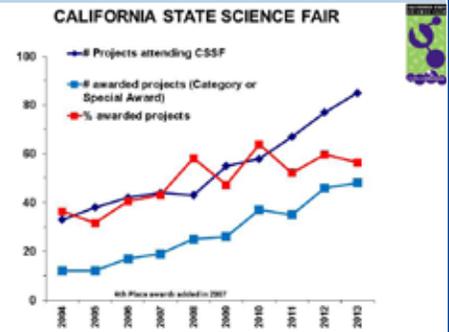
Our Synopsys Championship sent 85 amazing projects that were awarded 45 Category Awards (53%!!!) at the 2013 California State Science Fair (CSSF) in Los Angeles. Our projects also brought home 14 Special Awards. And the top 'Gotta Call Mom Now' moment belonged to Eesha Khare as she was awarded the Senior Division's Project of the Year! Congratulations, Eesha! Our delegation's overall performance continues to outperform the rest of the highest project represented California counties (see graph).



These positive-trending data reflect the high quality of our fair's projects.

Besides the number of awards, this trip set all kinds of administrative records, the background support that isn't often mentioned. The display boards completely filled two vans to their roofs. Our large delegation required two large busses to take all the students and their families. And we needed a record nine chaperones. This large a delegation requires a HUGE amount of excellent planning and clear communications.

We overcame one unforeseen hurdle: the rooms we had reserved didn't include a continental breakfast. So during our rowdy icebreaker games, our creative chaperones and parents settled on finding a late-night supermarket to purchase breakfast food for our student delegation. The hotel found us a large vacant room, and we got all our students fed be-



fore their big day. It was a great rescue for what would have been many growling stomachs.

At the end of the day, we once again we had to depart after the Middle School Awards Ceremony, and prior to the High School Awards Ceremony. We did our standard airport run, including eating at the fine dining establishments in the LAX terminal. There were many happy faces and shouts when the high school awards were posted on the web. It was another wildly successful trip for all of our Synopsys champions.

—Bruce Kawanami

Note for the 2014 CSSF There will be major logistical changes to the way the 2014 fair will be administered. If your project is honored as a CSSF selection, please be aware that there will be significant differences from years past. Check our website (after the Awards Ceremony) to learn about the changes.

Enlightening, Entertaining, and Enthralling Experiences



My journey into science research and science fairs started off close to home. Both my grandfathers are victims of diabetes and the myriad complications that accompany it. I humbly admit that it wasn't inspiration from great scientists that got me interested in this field. Instead the trials and tribulations of my grandfathers, including their daily struggles with blood glucose, diet and expensive medications, built my curiosity. I observed their

problems, researched the science behind them, and designed my science fair project around the questions that arose during the process. Like any middle schooler, I need timely guidance and encouragement throughout the journey. My teacher, Mrs. Makhijani, provided all that.

As the academic year 2012/13 began, I realized that I had barely scratched the surface of diabetes. All the research pointed to the fact that obesity, diabetes, and cardiovascular disease are all closely related. Diet is a critical aspect of all three diseases. Kill three birds with

one stone! This was my motivation for my seventh grade science fair project. Diet Induced Thermogenesis (DIT) is the number of calories the body spends from its internally stored reserves to process the consumed food and absorb nutrients. If the calories expended to process and absorb the consumed food are more than the caloric value of the consumed food, the body experiences a net loss of calories, thereby resulting in reducing obesity. My project was testing the ability of various additives to increase the DIT values of the diet. I delved head on into this research.

For my sixth grade science fair project, I had to overcome the ordeals of having to coordinate twenty human test subjects, their diets, and their blood glucose levels. For my seventh grade project, I wanted to avoid this problem. Trying to design *in vitro* experiments to simulate conditions inside the body was the biggest challenge I faced. However, it also gave me an opportunity to dive deep into the workings of the biochemical reactions that control our body. At the Synopsys Science Fair, while awaiting the judges, I enjoyed talking to my neighbors and made about twenty new friends. Finally, when the judges arrived, I spoke about the innovative techniques I used to simulate the conditions inside the body, my project research and inexpensive alternate remedy my project offered. Getting selected to

participate at CSSF after a victory at Synopsys was icing on the cake!

I thoroughly enjoyed the L.A. experience, especially eating at the brand new restaurants that had sprung up near USC since my visit last year. However, at the end of the day when the fun ended, I realized the gravity of the situation: The next morning, I had to face a whole lot of judges. Fortunately for me, not only were the judges very pleasant, but they listened to me patiently as I answered their questions. I was anxious because the judges were so qualified and I was just a middle schooler. When the morning session ended, I was somewhat relieved. I spent the afternoon, enjoying lunch in the company of my dad and my friends from my middle school. A visit to the space shuttle Endeavour took me to an entire new world and

I forgot all about the impending results. Back at the auditorium, everyone waited for the awards ceremony to commence. The fourth place winner for my category was announced. Then the third place. Next second place. By this time, I was getting worried. Was I even going to win anything? Suddenly, I heard my name, pronounced correctly for one of the first times. I sat up alert and realized that I had won first place! The rest of the day went by in a blur, and all I remember is receiving huge hugs from my dad, my friends, and my teacher. The plane ride back was much more relaxed. I was excited to go to school the next day and was looking forward to sharing the good news with my principal, teachers, and friends. What an experience!

—Mythri Ambatipudi

A Teacher's Perspective and More... Advanced Science Research at Los Gatos High School by Cathy Messenger

As a science teacher in a public school, mentoring individual research projects takes creativity, resourcefulness, perseverance and time. Creativity in helping students choose engaging projects that can be carried out in a high school laboratory. Resourcefulness in procuring materials and finding expert advice for students—while ensuring that the students are doing the work. Perseverance in working with adolescent researchers—teaching them skills and encouraging them to take risks while holding them accountable to deadlines so that they can earn a grade for this science elective course. And finally, time to stay after school and come in on weekends and holidays to give students the time they need to complete their research.

In recruiting students for this class, emphasis is placed on “you get out of this class what you put into it.” Students who are unable to put the time into their projects

(or seek advice in a timely manner) find themselves explaining an incomplete project to the judges. Those that are able to devote the time find that they have accomplished something truly amazing and can approach “judgment day” with confidence.

But that’s the teacher’s perspective. To see what students get out of this class, keep reading. The quotes from current Advanced Science Research (ASR) students at Los Gatos High School are more than enough motivation for this teacher to continue teaching this rewarding yet very time consuming course!

● “This class has improved my organizational skills, tested my dedication and commitment, made me a better time manager, and taught me how to think individually and solve problems by myself. Although research has its ups and downs, I know that I get out what I put in,

and there is nothing more rewarding than getting results from my experiment.” **Shomik, sophomore, 1st year ASR**

● “I learned how to work effectively in a group on a long term project. Rather than following directions, I have learned how to write a completely unique procedure and follow through with it. Finally, I have learned to keep an organized research notebook and plan short term and long term goals.” **Max, senior, 1st year ASR**

● “Advanced Science Research is a great class because you get to learn about what you are interested in, and it can be as challenging as you want it to be.” **Marina, junior, 1st year ASR**

● “Research is 90% failure and 9% confusion. I do research for the remaining 1%. Although the class is hard and my responsibility and scientific discipline are tested, I know “the road to success is paved with failure,” so I keep working. Each time

I fail, I learn something new and can then gauge where my next steps will fall." **James, senior, 2nd year ASR**

● "ASR is a class which I would describe as bipolar. On one hand you have a lot of work that needs to be done but on the other hand it can be a fun, enjoyable class. The students that enroll in the class are all very kind and open to questions." **Mason, sophomore, 1st year ASR**

● "I think signing up for this class was one of the best decisions I made in high school. After doing my own research as a part of the class

for 3 years, I have come to learn a lot about how science research can help promote my own curiosity and develop my reasoning, reading, writing, and critical thinking skills."

Brooke, senior, 3rd year ASR

● "I am incredibly thankful that LGHS offers this class. Participating in it allows me to pursue scientific inquiry in a meaningful way. Over the past two years I have gotten the chance to send an experiment to the ISS, as well as work on constructing a biologically inspired robot." **Leron, junior, 2nd year ASR**

● "I've learned that more often than not, research doesn't go exactly as you plan, and you may end up spending a lot of time on something you thought would be a quick fix. One of the best parts of the class is working in a group of motivated students. You learn to give and receive constructive criticism on ideas and projects. I've had a lot of fun in this class and I'd recommend it to anyone interested in science." **Olivia, junior, 2nd year ASR**



The Winners' Circle

The 2013 Synopsys Championship Winners' Circle celebration was held at the Santa Clara County Office of Education in San Jose on October 10, 2013.

What's Next?

If you are one of the Synopsys Championship participants whose project was judged as a First, Second, Honorable Mention, or a Special Award winner, you will be invited to attend the Awards Ceremony which will be held on Sunday, April 6, 2014. Check out www.Science-fair.org after March 22 to see if you are a winner

and to find out the details for this event. There will be two ceremonies that day, one for the middle school winners and one for high school winners. If you are a winner, congratulations! Be ready to wend your way onto the stage with your group for your moment of glory as your name is called. You'll shake hands with the presenter and receive your ribbon or medal. 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! And if you don't "win" a spot at the Awards this year, you are still a cool young scientist, with more experience now and an even better chance at winning when you enter a project at the Championship next year!

It Takes a Village to Support a Science Fair

Do you ever wonder why PBS stations ask for small donations when they recognize huge donors on their big programs?? It is because the IRS requires nonprofit organizations to demonstrate broad public support to maintain their nonprofit status. Each year every nonprofit files a form explaining what they do and how they are supported. Each contribution that is less than 2% of the total donations over the last five years is categorized as contributing to broad public support. Non-profits must have at least one third of their support come from this broad public support.

We are very fortunate to have some very generous donors who contribute major funding to the Championship which covers the majority of our costs. But we also need many small donors to contribute the other third of our funding to retain our non-profit status with the IRS.

So if you feel our efforts are beneficial to your school, community, children, etc., please consider sending us a donation of any size you are comfortable giving. You can mail a check directly to us or you can use Pay Pal on our web site if that is more convenient. Please mail your check to SCVSEFA, c/o Treasurer, PO Box 307, Los Altos, CA 94023-0307.

“A Healthy Disregard for the Impossible”



My name is David Zarrin, and I am a freshman at UC Berkeley studying Mechanical Engineering. I participated in the Silicon Valley Science and Technology Championship for seven consecutive years, starting in 6th grade when I tested various catapult efficiencies and ending with several inventions of my own in the later middle school and high school years. The knowledge I take away from my experience as a young scientist—which is both scientific and communicative in nature—could not have easily been found in any place other than science fairs in the heart of the Silicon Valley.

Entering the giant blue tent in San Jose as a 6th grader, I was

incredibly nervous. The fear of not being able to answer judges’ questions or forgetting important parts of my project ran through my mind. Most participants feel this at some point. For me, the nervousness I felt when walking into the blue tent diminished as years of the Fair went by.

I soon realized there was nothing to be worried about. The science fair transformed from a competition to an amazing place where young thinkers could show the innovative ideas they had developed over the past year while simultaneously seeing what others like themselves had been up to. At the Fair, one can meet anyone from a 6th grader programming advanced code to an experienced NASA scientist. Seeing a student explaining his inventive circuit board to a perplexed electrical engineer is not unusual. I realized all you had to do was be a sponge: absorb the knowledge permeating the air and contribute to it with your own ideas.

It took me time to understand that science fairs are not about being right or wrong so much as they are about learning. At first, judges seemed to be the people to impress. Soon I learned

that sharing my project was another opportunity to take input from the experienced judges and improve my project. I was excited when a lot of judges and parents (during public viewing) visited my board because there were more people to share ideas with and learn from. From this perspective, it became clear there was nothing to be nervous about.

If you’re looking for inspiration for a project, just think of your everyday life and find something that you think could use fixing—then set out with a stubborn will to fix it! Co-founder of Google, Larry Page, once said that it’s good to, “have a healthy disregard for the impossible.” Choosing to follow his advice by refusing to accept that the problem you want to solve can’t be solved is the best starting point and attitude to have throughout your whole journey. Once you’ve reached your destination and have an idea, take it to the Fair and share it with the team—the team of Judges, other scientists, fellow students, and parents who all carry the same message that you do too: science is *cool*; pass it on.

—David Zarrin

Double Take on Broadcom MASTERS

The young astronomers, identical twins, Shashank (left) and Shishir (right) Dholakia, have developed their passion for science through a series of middle school science fairs leading them to the CSSF and the Broadcom MASTERS competition.

Shishir and Shashank started out with a sixth grade botany project that they entered in their first Synopsys Championship. They won a first place, a trip to CSSF, and they made the semifinals at the Broadcom MASTERS science fair.

In the seventh grade, while attending a star party, the twins discovered a passion for variable stars (stars that change in brightness). They worked together for three months, floundering outside in the cold night after night, battling bad weather for data, performing photometry with an average digital camera, and compiling several hundred-page spreadsheets of data

until they finally had a “lightcurve,” or a graph of the star’s brightness over time. They entered the Synopsys Championship again.

Shashank writes, “Through the several hours of mouth-drying presentations, we eagerly presented our project to judges who bombarded us with questions, some easy, and others difficult. All of the judges did an excellent job of removing my barriers of nervousness and apprehension. I found that I could communicate and freely express my passion for my project.

“I waited until the award ceremony, not knowing what to expect. We got a first place category award and a special prize from the US Air Force. We also got a nomination to CSSF as well as to the Broadcom Masters program. We went to CSSF and were floored



when we learned that we won a first place there as well.

“It was more difficult to explain our project, enthusiasm, and curiosity in the few hundred words we were allowed for the on-line Broadcom form, but we did our best. We also had to apply separately, so our projects were judged individually. I was pleasantly surprised when we both made it into the semifinals. Then, after a few weeks, we received a phone call from Washington DC and were informed that we had made it to the finals of the Broadcom MASTERS competition, which selects from 30 science fairs around the US! Not only that, but

both of us had made it in independently! We went to Washington DC to present our project and participate in group activities and competitions. We collaborated with like-minded peers and loved the creative, friendly and charged atmosphere.

“Imagine our surprise at the award ceremony when we learned that every one of the 30 participants—as well as their teachers—would get an asteroid named after them! We also won \$2000 for our school, which we donated to the science department and science teachers, who had gone out of their way to give us support and helpful advice throughout our projects and in our school.

“Our curiosity unquenched, we continued the project in eighth grade

as well, and we loved it even more. Our past experience with science fairs has been nothing short of awesome, and we will continue to participate through high school. It has sparked in us an enthusiasm for science that will stay with us forever. We have enjoyed the journey immensely so far, and I am certain that we will continue to do so throughout high school, college, and the rest of our lives.”

And Shishir adds, “Every time I do a science fair, I become more motivated to do the next one better. My recollections of the science fairs have been those of tremendous exhilaration and fun. My twin brother and I found our passion for the science fair through our seventh grade project, and that wonderful experience has motivated

us to do a science fair every year since then. Each year I have competed in the fair, my experience has been totally unique. Each time I have felt the excitement and anticipation build up in the months leading up to fair. Every single time, just prior to the fair, I have felt my unease and nervousness overshadowed by an overwhelming sense of accomplishment and confidence in myself and my project.

“For us, science fairs have been among the most influential experiences in our lives. The fair is an amazing opportunity to pursue and find out more about your most passionate subjects, whatever they may be. Our advice to those doing a science fair is to, above all, enjoy the ride and have fun!”

Special Awards, Sponsors

Agilent Technologies	Dr. Paul X. Callahan in Memoriam	Santa Clara Valley Science & Engineering Fair Association Best School Award
Al Foster Award	DuPont Industrial Biosciences	Santa Clara Valley Science & Engineering Fair Association Best Teacher Award
American Association for Laboratory Animal Science, Northern California branch	Fair Manager’s Graphic Design Award	Schonert Award
American Chemical Society, Santa Clara Valley Local Section	Hegland Award	Shaeffer - Schmahl Science Award
American Institute of Aeronautics and Astronautics (AIAA)	I-SWEEEP	Society for In Vitro Biology
American Meteorological Society	Inez M. Lechner Award	Society of Vacuum Coaters (SVC)
American Psychological Association	Institute of Electrical and Electronics Engineers (IEEE)	Society of Women Engineers
American Society of Civil Engineers	Intel Excellence in Computer Science Award	Stockholm Junior Water Prize
American Vacuum Society, Northern CA Chapter	Labcoat Award for Lab Bench Finesse	System Safety Society
Apatite to Zircon, Inc. Award	MedImmune	TechLab Education
ASM International A Society for Materials, Santa Clara Valley Chapter	Morgan Lewis	The ROD Women in Science Award
Association for Computing Machinery, San Francisco Bay Area Professional Chapter	Mu Alpha Theta	The Synopsys Outreach Foundation n+1 Prize
Association of Women Geoscientists	NASA Ames Research Center	The Tech Museum of Innovation
Association for Women in Science, Palo Alto Chapter	National Oceanic and Atmospheric Administration	Trimble Navigation, Ltd.
Broadcom MASTERS	Northern California Institute of Food Technologists (NCIFT)	UCSF Center for Systems and Synthetic Biology Award
California Association of Professional Scientists	Promethium Chapter of Iota Sigma Pi	United States Air Force
California Society for Biomedical Research - Ron Orta Excellence in Biomedical Research Award	Resource Area for Teaching (RAFT) Teacher Award	United States Coast Guard Auxiliary
Common Ground Organic Garden Supply & Education Center	Ricoh Corporation	United States Metric Association
	SAMPE—Society for the Advancement of Material and Process Engineering	United States Navy and Marine Corps
	San Jose State University College of Engineering	U.S. Public Health Services Award
	San Jose State University Student Affiliates of the American Chemical Society	Varian Medical Systems
	Santa Clara County Biotech Education Partnership (SCCBEP)	Veenstra Award
		Whitney Education Foundation
		Yale Science and Engineering Association 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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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.

2013 Volunteers returning for 2014	49 (out of a total of 55) + 13 new
Scientific Review Committee Volunteers	15
Staff and Board Members volunteering at the Championship	27

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