



NorCal STEM Education Foundation Spent 17 Days at the California State Fair!

The NorCal STEM Education Foundation spent 17 days exhibiting at the California State Fair this summer. Participants from the 2016 Synopsys Sac STEM Fair who still had their projects were invited to come out and showcase their hard work for interested passersby, while Foundation staff provided a STEM quiz where visitors had a chance to win free swag. It was a wonderful opportunity to get more people interested in STEM (Science, Technology, Engineering and Mathematics), and for us to spread the word about all the programs that the Foundation has to offer.

To those of you joining our Mailing List as a result of the State Fair, WELCOME! We'd like to take this opportunity to tell you a bit more about ourselves.

The Sacramento Regional Science & Engineering Fair Foundation (dba NorCal STEM Education Foundation) is a 501(c)(3) non-profit organization dedicated to increasing student interest in STEM, hopefully encouraging them to pursue STEM degrees and careers. The Foundation was founded in 2002. In the fourteen years since, the Foundation has added more programming and increased our service area in an attempt to capture the attention of students from all over northern California and demonstrate to them the excitement that is STEM.

Currently, the Foundation has several programs available to northern California students and teachers: a [STEM Speaker Series](#), where professional scientists and engineers join students in the classroom to discuss the day-to-day activities involved in their career; a [Regional STEM Mentoring Program](#), where those same STEM Professionals are put into an after-school setting with students, performing hands-on, interactive STEM experiments and learning the basics of the different types of STEM projects; [Professional Development](#) for teachers, incorporating lessons on how to turn a STEM Fair Project into a cross-curricular NGSS and Common Core satisfying activity; in-class [STEM Fair Presentations](#), where students learn the ins and outs of Fair registration and what approvals they might need; the [Sacramento Regional STEM Fair](#), where students can bring their projects (either individual or teams of up to 3) and showcase or compete to win scholarships or prizes; and the [College & Career EXPO](#), where local colleges, universities, and STEM-related businesses interact with NorCal students to help them understand what to expect if they wish to pursue a career in STEM.

Please [visit our website](#) to learn more about the Foundation's many programs dedicated to increasing student interest in STEM.



CA State Fair Showcase Students!

CALENDAR OF EVENTS

BACK TO SCHOOL!

- September 6** - Broadcom MASTERS semi-finalist announcement
- September 10** - Electricity Fair at Folsom Power House 10am-2pm
- September 16** - Outstanding Young Scientist Competition
- September 20** - Broadcom MASTERS Finalist Announcement

SAYING GOODBYE TO LYVIN

This week is our intern's last at the NorCal STEM Education Foundation. Lyvin has been a phenomenal asset to our organization whose cheerful demeanor and problem-solving skills helped us immensely through Fair season. But, all good things must come to an end, and in this case, Lyvin is leaving us for bigger and better things! Lyvin has completed his degree in Neurobiology, Physiology, and Behavior from UC Davis and will be taking some time between the rigors of school and starting his "real job" to enjoy his family and prepare to take the GRE. Thank you, Lyvin, for all you've done for our Foundation. We wish you the best in the years to come, and hope you come back as a volunteer judge!

DONATE TO THE FOUNDATION WHILE SIMPLY SHOPPING FOR GROCERIES!

Do you shop at Raley's, Bel-Air, or Nob Hill? If so, please join the Extra Credit program for the Sacramento Regional Science and Engineering Fair Foundation. [See instructions on how to sign up here.](#) It's all online and just takes a few simple clicks to support the Foundation!

ARE YOU A STATE WORKER LOOKING TO DONATE THROUGH "OUR PROMISE" (formerly CSECC)?

PIN DESIGN CONTEST OPEN

Do you consider yourself somewhat of an artist? If so, we want YOU to help us design our 2018 STEM Fair pin! Each year, the NorCal STEM Education Foundation provides pins to participants at the Sacramento Regional STEM Fair to commemorate the event. These pins travel with the winners who go on to compete in the Intel International Science & Engineering Fair and are traded among competitors from all over the world! Imagine YOUR design traveling to Europe, Asia, even Australia!

The contestants for the Pin Design Competition will be featured on-site at the 2018 Sacramento Regional STEM Fair and the winner will be named at the Awards Ceremony.

Rules to Enter:

All designs should be scalable (submitted in EPS format) and visually appealing when reduced to 1 1/2 x 1 1/2 inches. Designs will be displayed in color in two sizes for voting. Designs will be shown in a print area of 4x6 inches alongside a pin preview thumbnail of 1 1/2 x 1 1/2 inches. Pin designs should state "2018" and "Sacramento Regional STEM Fair." The chosen pin is subject to change to reflect the name of the 2018 Fair.

Individual submissions only. Contest is limited to students in grades 5-12 who reside in the NorCal STEM Education Foundation's service area.

To learn more, [visit our website](#).



Past Pin Designs

The donation website for "Our Promise" has been taken offline, but state employees can still make their donations the old-fashioned way! The Sacramento Regional Science & Engineering Fair Foundation (dba NorCal STEM Education Foundation) hopes you will elect to donate to our organization. We've even prepared the form for you with our information to make it simple. Use the Our Promise form with our information [here](#).

SPONSOR THE FOUNDATION TODAY!

Does your organization support STEM Education? Would you like to be more involved? Then consider becoming a sponsor of the NorCal STEM Education Foundation, today! All sponsorships get featured on our website and in the STEM Fair program, and all the money goes toward increasing student interest in STEM! It's a win-win! If you or someone you know is interested in sponsoring the Foundation, either monetarily or with in-kind goods or services, please visit our [sponsorship page](#) on the website to learn more.

SCIENCE SPOTLIGHT

BIONIC LEAF MORE EFFICIENT THAN NATURE

Ever heard of solar energy? Well, researchers at Harvard have taken the idea to new heights. They have created the "Bionic Leaf 2.0," which has the ability to harness the power of photosynthesis to make liquid fuels. Researchers say that the new system can now convert energy into biomass with 10 percent efficiency, which is TEN TIMES that of the world's fastest growing plants. The system uses hydrogen-eating bacteria to breakdown the products of photosynthesis into fuels like isopropanol and isobutanol. Researchers say that there is more room to improve, but they believe that even now, it is effective enough for commercial applications. Learn more about the bionic leaf [here](#).

ROBOTS ARE GOING SOFT(-BODIED!)

Robot humanoids may soon be science fact! Engineers at Harvard have recently developed a robotic feature that mimics soft-bodied muscle. These "actuators" generate movement similar to human muscle by using vacuum power to move soft rubber beams. The process creates a contraction that is similar to muscle contraction that can be used in robots. The material is soft, shock-absorbent, and danger-free, making it a great feature for future robots. Since they resemble muscle, there may also be implications in medicine and prosthetics as well. We may be nearing the age of robots very soon. Find more information [here](#).

BRAIN RESEARCH OVERCOMES A "SNAG"

Will computers ever be biologically similar to the human brain? Yes and no. Right now, the fastest computer operates 4 times faster than the average human brain, and can hold 10 times as much data.



Classroom Presentations!

Teachers! Want a STEM Fair presentation at YOUR school? Presentations are a great way to drum up student excitement about conducting their own research, and can allow us to directly handle your students' registration questions! If YOU want us to come to your classroom, contact us today!

http://sacstemfair.org/teachers---coordinators.html#request_presentation

SUMMER SCHOLARSHIP OPPORTUNITIES

We've found a few more scholarships than normal available for the August issue, so we've included them here instead of in the sidebar! Please be sure to apply to any and all scholarships you qualify for - extra funds for your education are always useful! Be sure to notify your parents of what scholarships you are applying to so that if these organizations make any attempt to contact you through them, they know to answer!

First Site Guide Scholarship

"Blogs are everywhere" - from electronic to printed newspaper. The modern age consists of advances in technology that enable us to read

Don't Text and Drive Scholarship

Do you know how far you travel on the freeway if you take your eyes off the road for the average time it takes to send a text? An ENTIRE football field! Digital Responsibility is encouraging students to express their thoughts in writing about texting and driving. Students in high school through graduate school are eligible to apply. The winner will receive a \$1,000 scholarship. **The deadline for submission is September 30, 2016.** To apply, complete the online application and write a 140 character message about Texting and Driving. The top 10 finalists will be eligible to write a 500-1,000 word essay

biographies of historical people through tablets and "tweet" on the fly. First Site Guide challenges you to ask the question: "Why should you start a blog?" Answer the question and submit a short (1500-word) essay, and you could win a \$1,500 scholarship toward tuition or books! Any high school or degree-seeking student enrolled in an accredited college or university may apply. The deadline for submission is **August 31, 2016**. More information can be found [here](#).

Writers' Square Scholarship Writer's Square is holding session 3 of their writing contest, challenging students to answer the question: "How can you make the world a better place?" The contest is open to students in grades 1-12 and in college through graduate school. Students will be competing within their grade level. Essay length and awards given are dependent upon grade level. **The deadline for submission is September 30, 2016.** Visit their [website here](#).

expressing their feelings about this very important topic. For more information, and to apply, [visit their website here](#).

ARTBA Student Transportation Video Contest

Transportation and infrastructure influence your life in a big way. Every day, families travel to work or school on roads and freeways, in their own cars or by public transportation. The American Road & Transportation Builders Association is challenging students to create a video examining any aspect of transportation in the US. They are looking for creative ideas that stretch the bounds of the imagination. Students in elementary through graduate school are eligible to apply. Contestants compete by grade level. Winners, one per category, will each receive a \$500 award. The deadline for submission is August 31, 2016. For more information and to find topic selection help, please [visit their website here](#).

So what's stopping them from taking over the world? Computers efficiently use functions of algebra (dubbed "Boolean logic") to perform many of their modern-day tasks, but they are unable to perform higher biological tasks such as survival, adaptation, and reproduction. Recently though, researchers have determined a way to use the mathematics of SNAGs (Simple Non-Abelian Groups) to further bridge the gap between computers and the biological brain. "SNAGs can be thought of as the 'multiplication tables' of how symmetries interact, rather than for how to multiply numbers." Researchers have found several implications of SNAGs that involve describing self-repair, "cell suicide" (apoptosis), and cancer, and hope to find more soon. For more information on SNAGs, visit: <http://phys.org/news/2016-05-hidden-mathematics-cells-decipher-brain.html>.

OTHER COMPETITIONS

Siemens Competition for Math, Science and Tech

Registration is open for the 2016 Siemens Competition for Math, Science, and Technology! The competition is open to all high school students (grades 9-12) of US citizenship. Students in grades 9-11 may compete in teams, while students in grade 12 can only compete individually. The California competition takes place at the California Institute of Technology in Pasadena, CA this year on November 12 and 14. **Registration for this competition is due September 20, 2016!** For more information about registration, the schedule or project specifics, [please visit their website here](#).

eCYBERMISSION, sponsored by NTSA & US Army

Designed to increase students' experience in STEM-related fields this free competition encourages 6th-9th grade students to use the scientific method/inquiry or engineering design process to solve real-world challenges. Students can win on a state, regional, and national level, with national winning teams receiving up to \$8,000 in U.S. EE Savings Bonds, valued at maturity. **The teacher who registers the most students by December 14th will win a \$600 gift certificate for Vernier Probeware in their classroom.** For more information, please [visit their website](#).

LEGO Rebrick Make Something! Competition

Are you using LEGO bricks to solve everyday problems in a new awesome way? Are you building cool innovations that could change the world for the better? We want YOU to be a LEGO MAKER and share your ideas! Contest is open to all children 13 years and older. Winners will receive an all-expense paid trip to LEGO World Copenhagen, a Lego Mindstorms 31313 set, and a Lego Mindstorms "MAKE SOMETHING" T-shirt. [Visit their website](#) to learn more.



The Regional STEM Mentoring Program

Great minds follow great mentors! The Regional STEM Mentoring (RSM) program provides a foundation for students to build hands-on skills, receive advice, and grow into independent individuals ready to jump-start their careers. The RSM program dedicates itself to opening the minds of students to pursue greater STEM careers with a passion for what they want to do. Students who go through the program emerge better equipped for the STEM workforce and their future careers! Please visit our website for more information and to sign up for this amazing experience:

www.sacstemfair.org/regional-stem-mentoring-program

WHY SHOULD I ASK QUESTIONS?

Food coloring is commonly found in household kitchen cupboards. What would happen if a kitchen microscope was just as common? If I had a microscope and some food coloring, I would probably try to observe the close-up merging of two drops of different colors. As I look, however, the two drops instead seem to be dancing around, almost as though they're alive. At first glance, it seems as if these drops are living, but that doesn't make sense.

I've made some observations, but they're causing me to ask some questions. So, being the 21st century maverick that I am, I head to my favorite question-answering resource: the Internet. From there, I find out that the droplets are actually not living creatures, but are dancing around randomly due to chemical and physical interactions. Saddened by the results, I decide to end my research there, but the inquisitive scientist in me won't allow it!

Under a microscope, food coloring acted like soap bubbles in a dishwasher. But they didn't need any agitation to move the way they did. Could they be used to clean something that's hard to move? I think to myself that food coloring probably couldn't be used to clean, but perhaps a solvent with some of the same ingredients as the food coloring could! I have just made a hypothesis and am well on my way to conducting an experiment! Now, to figure out what ingredients made the food coloring dance around...

By formulating a hypothesis, identifying a solution to a problem, and using the same principles found in the food coloring discovery, I've determined a great starting point to engineer a state-of-the-art soap able to clean things that can't go into a dishwasher for one reason or another, like electronics!

This particular discovery was actually made by a team of Stanford scientists last year. They hypothesized that a similarly made solvent could be used to create self-cleaning solar panels. By asking questions and making observations, they realized that while they had not discovered new life, they DID create a novel cleaning solution. The smallest questions and observations can have large implications on your future, and humanity's. Keep a keen eye, and maybe someday YOU will discover something no one else has ever seen.

Read more about the Stanford Scientists' discovery [here](#).