

Silicon Valley Chemist

Santa Clara Valley Section

American Chemical Society

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MAY 2014 NEWSLETTER TOPICS

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SCV-ACS Day at the Exploratorium

Join us for a day of exploring our world! On Saturday, May 17, we'll meet at the Exploratorium in San Francisco at Pier 15 (Embarcadero at Green Street) for a day to connect with your inner kid-scientist at your local science museum and playground. Explore how humans think, feel and act. Tinker with marble machines. Experiment with sight, sound and motion. Investigate life in the Bay and beyond. Explore the geology and geography of your local environment. There are so many things to do and see for you and your entire family!

We'll meet in the plaza between piers 15 and 17 at 10 a.m. and enter the museum at 10:30 a.m. The event does not include a group tour; we will purchase our tickets indi-

vidually. Tickets are \$20 for adult Bay Area residents and \$15 for seniors, children (4-17), persons with disabilities, teachers, and students (bring your student ID!). Children under 3 are free. See www.exploratorium.edu for more information. You can purchase your tickets online or at the door.

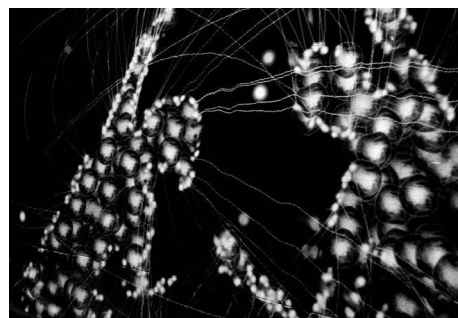
Please sign up on our website (www.scvacs.org/Local_Folder/din_mtg.html) so we know you're coming.



Living systems, investigate the living world.



Tinkering, think with your hands.



Comfort zone, an interactive installation that integrates choreography into a virtual experience.



Tinkerer's clock, a clock full of tinkers that chimes with time. Photos: © The Exploratorium

Connect with Chemists

Meet fellow, local chemists for an early morning coffee
Look for Ean at a table with CH₄ and CO₂ molecular models

Tuesday, May 20th at 7 a.m.

Specialty's Café and Bakery
3399 Bowers Avenue, Santa Clara

Thursday, May 22nd at 7 a.m.

La Boulange
151 University Avenue, Palo Alto

Chair's Message

by Ean Warren



At the last Executive Committee meeting, after much discussion and debate, we voted to increase our local section dues by \$2 to \$14. These dues are voluntary donations to the local section that come with your annual membership invoice. Our dues have not increased in many years, and we decided the increase was necessary to keep pace with inflation. Voluntary dues account for about 25% of the section's income. The rest of our income comes from ACS National, grants, reimburse-

ments, advertisements, Chememployment abstract fees, and dinner receipts. Our income allows us to hold many events such as our monthly dinners, movies, seminars or picnics as well as organize outreach programs such as Teach the Teachers, Tech Trek, National Chemistry Week and Earth Day. We run local student competitions such as Chemistry Olympiad and Synopsys Championships. We give deserving chemists awards such as the Harry and Carol Mosher Award, the Shirley B. Radding Award, the Abraham Ottenberg Award, and the Community College Teacher Scholar Award. We also give grants such as the BUBBLE Grant and

continued on next page

Chair's Message, continued from front page

Project SEED, distribute a monthly newsletter, participate in governance of the National ACS as well as in national committees, and support local meetings such as the Western Regional Meeting and the Undergraduate Research Conference. Our volunteers actively apply for grants to fund these activities. We received over \$8,000 in support of outreach and over \$14,000 for councilor travel. So while we try very hard to augment our income with grants and decrease our expenses, we feel we must increase the dues to cover the increasing expenses of providing programs. If you have any questions, please contact me at chair@scvacs.org.

Our Connect with Chemists meetings in May will be on Tuesday, May 20 at 7am at Specialty's Cafe (3399 Bowers Avenue, Santa Clara) and Thursday, May 22 at 7am at La Boulange (151 University Avenue, Palo Alto). Network with other chemists and discuss ACS, chemistry, careers, life, anything. Everyone is welcome to come and participate.

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Councilor's Report

From the 247th ACS National Meeting in Dallas, TX, the following activities and announcements are reported by Herbert Silber.

Perhaps the most notable item was the announcement that Madeleine Jacobs, Executive Director and CEO of the ACS, plans to retire by the end of 2014. A national search will commence later this year.

The Council Meeting was held on Wednesday, March 19. Candidates for the Fall 2014 ACS National Election were named. There were two candidates selected to run for President-Elect: Peter K. Dorhout and William A. Lester, Jr. Nominees for District Director in Region III and VI were named. For our District (VI), the nominees are Paul W. Jagodzinski and Lee H. Latimer.

Reports from the Society administrators were presented. The report from the Budget and Finance Committee (B&F) informed the Council that the Society's Reserves have almost doubled in the past year. B&F moved that the escalated dues for 2015 will be \$158. The Council passed this motion. The report from

the Committee on Education (SOCED) described a new group for K-12 educator, the American Association of Chemistry Teachers (AACT) has been formed and will start working later in 2014. The Council Special Discussion was centered on what the ACS could do to increase the quality of science in grades 7-12. The Committee on Divisional Activities (DAC) moved for a change in Division Allocation Formulas. This motion was approved by Council. The Local Section Activities (LSAC) presented a motion to change the boundaries of the North Jersey Local Section to include what was part of the Monmouth County Local Section, which was dissolved by the end of 2013 due to inactivity. The Council unanimously approved this motion. A motion by the International Activities Committee (IAC) to establish a new chapter, the Malaysia International Chemical Sciences Chapter, was approved as well. All in all, this was a tame Council Meeting without major disagreements



Welcome to the Santa Clara Valley Section of ACS

Each month the section receives a spreadsheet from national ACS with the names of members new to our section. The members are either new to ACS, have transferred in from other areas, or are the newest members -- students. To welcome you to the section and get to know you, the Executive Committee offers new members a free dinner! To encourage you to attend a monthly section seminar meeting, we would like you to be our guest. When you register, make certain to mention that you are a new member and you and a spouse (or friend) will be our guests. The seminar meetings are often the 3rd Thursday of the month at a local spot, somewhat convenient to the entire section. If you are unable to attend in the evening, perhaps you would join us for an outreach event, like judging a science fair, participating in the Chemistry Olympiad, or a National Chemistry Week event in October. Then, there is our annual wine tasting and awards picnic in July. The local section is a volunteer organization. Please attend an event, volunteer to help, and get to know your local fellow chemists. Welcome!

New Members for April

Erin Askounis	Dr. Helen Hansma	Ekta Mahajan
Patrick Benitez	Colin James Bell Harvey	Jiangwen Majeti
Christopher Borg	James Lupton Hedrick III	Dawn M. Makley
Michael Douglas Browne	Carlo D. Izzo	Daniel McCurry
Dr. Pamela Campbell	Hyungrak Kim	Dr. Amit Mehta
Christopher J. Chappo	Dr. Chandraiah Lagiseti	Jaewook Myung
Baili Chen	Solveig S. Laturner	Nhung T. H. Nguyen
Casey Ching	Carmen Leal-Cervantes	Nhi T. Nham
Mimi Cho	Dixie Lee	Rifat Emrah Ozel
Prof. Drew Endy	Miss Marissa Kim Lee	Valerie Perez
Jeremy Feldblyum	Ivan Leung	Katie Pickrahn
Dr. Shrubha Gangopadhyay	Matthew Michael Logan	Dr. Rolf Andrew Ramelmeier
Ryan G. Hadt	Angela R. Madrigal	

Wilkins Award to Dr. Bonnie Charpentier

The American Chemical Society, Santa Clara Valley Section congratulates Dr. Bonnie Charpentier, our Regional Director on the ACS Board of Directors. Bonnie received the 2014 Dr. Sherrie Wilkins Award for Distinguished Professionals from the Northern California Chapters of the Association for Women in Science (AWIS). The award honored Dr. Charpentier during the AWIS 20th Annual Awards and Recognition Banquet.

The Awards and Recognition Banquet was held on Monday, May 5, 2014, from 6:00 to 9:30 PM at the Holiday Inn located at 275 South Airport Boulevard, South San Francisco, CA. For more details, please visit www.pa-awis.org/flyers/2014_AWIS_Banquet and view the announcement.

Chemistry Quiz

The ingredients of a popular all-natural, organic food product are listed below. Can you guess what it is? The answer will appear in next month's newsletter.

Ingredients: Water (75%), Sugars (12%) [Glucose (48%), Fructose (40%), Sucrose (2%), Maltose (<1%)], Starch (5%), Fiber (E460), Amino Acids (<1%) [Glutamic acid (19%), Aspartic acid (16%), Histidine (11%), Leucine (7%), Lysine (5%), Phenylalanine (4%), Arginine (4%), Valine (4%), Alanine (4%), Serine (4%), Glycine (3%), Threonine (3%), Isoleucine (3%), Proline (3%), Tryptophan (1%), Cystine (1%), Tyrosine (1%), Methionine (1%)], Fatty acids (1%) [(Palmitic acid (30%), Linoleic acid (14%), Linolenic Acid (8%) Oleic Acid (7%), Palmitoleic Acid (3%), Stearic Acid (2%), Lauric Acid (1%), Myristic Acid (1%), Capric Acid (<1%)], Ash (<1%), Phytosterols, E515, Oxalic acid, E300, E306 (Tocopherol), Phylloquinone, Thiamin. Colors: Yellow-orange E101 (Riboflavin), Yellow-Brown E160a. Flavors: [3-methylbut-1-yl ethanoate, 2-methylbutyl ethanoate, 2-methylpropan-1-ol, 3-methylbutyl-1-ol, 2-hydroxy-3-methylethyl butanoate, 3-methylbutanal, ethyl hexanoate, ethyl butanoate], pentyl acetate, 1510, natural ripening agent (ethene gas). Trace minerals.



The Chemical Heritage Foundation has a free virtual chemistry set for the iPad.

Visit www.chemheritage.org/Chemcrafter/index.html

2014 Synopsys Championship

by Susan Oldham-Fritts

The 54th annual award ceremony for the Santa Clara Valley Science and Engineering Fair, the Synopsys Championship, was held Sunday, April 6, at the Heritage Theater in Campbell. The SCV-ACS special awards were presented by Susan Oldham-Fritts (committee chair), and Mark Kent to the following winners:

\$650 First Place Individual Award: Audrey Caroline Cheng, 10th grade, Gunn High School, for *Novel Mechanism for Attachment of Peptides to Functionalized Carbon Nanotubes*

\$350 Second Place Individual Award: Avni Pravin Madhani, 8th grade, Challenger School -Sunnyvale, for *Lye or Lime? Examining the Effect of Sodium Hydroxide and Calcium Hydroxide on the Pretreatment of Corn Husks in Ethanol Production*

In addition, Mark presented the \$50 award from the Pro-methium Chapter of Iota Sigma Pi (the national honor society of women in chemistry) to Ananya Karthik, 7th grade, Challenger School -Sunnyvale, for *A Greener Cleaner: Investigating a Potential Biosorbent for the Removal of Heavy Metals from Aqueous Solutions.*



Mark Kent presenting the middle school awards at the Synopsys Championship.



Susan Oldham-Fritts presenting the high school award at the Synopsys Championship.

Redesigning A New Chemistry Set

Many scientists credit childhood chemistry sets with inspiring a lifelong passion for tinkering in the lab. Professor George A. Olah recalls starting a fire in the basement with his. Kary B. Mullis set off the contents of his with a dynamite fuse from the local hardware store. Intel cofounder Gordon E. Moore used his to make rockets in his parents' shed.

The chemistry sets that Moore and Mullis played with as youngsters are not available to aspiring chemists of today. Worries about safety and litigation have led to the removal of most chemicals from chemistry sets. "This generation of kids doesn't have the opportunity to mess around, get their hands dirty, and get excited about science," says Janet Coffey, program officer at the Gordon and Betty Moore Foundation.

The Moore Foundation is committed to bringing a hands-on experience to aspiring chemists while maintaining contemporary safety standards. Along with the Society for Science and the Public they launched a competition last October to find a modern equivalent of the chemistry kit. The Science, Play, And Research Kit (SPARK) contest challenged participants to draw inspiration from the chemistry sets of the 20th century to design a product capable of inspiring teens and preteens to explore chemistry.

The SPARK contest's top prize, for first-place prototype, went to Professor Manu Prakash and graduate student George Korir in the department of bioengineering at Stanford University. The kit they fabricated combines a plastic microfluidic chip with a hand-cranked revolving cylinder covered with pins. The pins read a punch card designed by a user. When a pin aligns with a hole in the punch card, it triggers a pump or valve within the microfluidic chip to release and mix chemicals stored within.

Prakash says he got the idea for the kit when his wife brought home a music box from a holiday gift exchange. Music boxes produce tunes when their rotating pins pluck the teeth on a metal comb nearby. In his toy-filled office, Prakash played with this music box and got the idea that the rotating pins could also be used to pump fluids through tiny channels or to control valves and droplet generators in a programmable fashion.

"Punch-card paper tapes like this have been used to program computers and fabric looms, so why not chemistry?" he said

Microfluidics chips are increasingly common in research labs, but require expensive equipment and electricity to run. The expense

and equipment required limits the adaptation of this technology for science education. By creating an inexpensive, hand-powered, self-contained and programmable variant, Prakash hopes to bring tools for discovery to a broad spectrum of users without dumbing down the tools.

Like the music box, the prototype includes a hand-cranked wheel and paper tape with periodic holes punched by the user. When a pin encounters a hole in the tape it flips and activates a pump that releases a single drop from a channel. In the simplest design, 15 independent pumps, valves and droplet generators can all be controlled simultaneously. Although the original prototype was made from music box parts, Prakash and Korir have many versions in which the crank and pins (they call this part the actuator) were printed on a 3-D printer. The actuator, the paper tape and the silicon chip can all be modified to meet different uses, and can be made from inexpensive, durable materials costing less than \$5. A kit for kids would come with several chips containing different types of channels and a few pre-punched tapes. The chemicals never leave the chip, thereby minimizing chemical exposure.

Eventually, users could advance to designing and punching their own holes to

program new experiments.

The kit may have application beyond education as an inexpensive field instrument for chemical testing. For example, to test water quality one might create a chip with channels that combine the water with chemicals that detect contaminants, pH, or the presence of microorganisms. Another kit might force droplets through a twisting pattern to mix chemicals within the drops. After analysis, each chip can be rinsed out and reused with a new batch of chemicals.

Prakash said inspiring kids to be interested in science is directly tied to solving real-world problems. "Science education in developing countries doesn't exist and that's probably one of the reasons why we don't have enough doctors and scientists," he said. "It's not just about resources. It's about people not realizing that this is something they want to invest their life in." Korir was born and raised in Kenya. "If we were curious and wanted to explore, for example, to find out what was out there in the muddy water, or to find out why some water tastes different than other water, we had no way to do that," he said. "Having something that you could use to ask these questions would open up the space to kids but also to other people all over the world. It really democratizes chemistry."

Volunteers Needed for Science Education

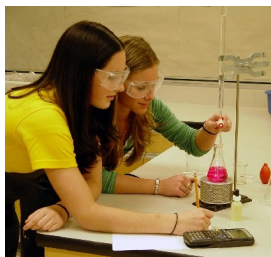
Volunteers are needed to participate in the science classroom working with teachers to set up experiments and demonstrations as well as to teach students how to record and analyze observations. TOPS (Teaching Opportunities for Partners in Science) of the Santa Clara Valley is a local program aimed at stimulating greater interest in science among students at the elementary and middle school levels. TOPS is organized as a joint program with the IEEE Life Member Group of Santa Clara County and includes volunteers that serve primarily in schools in the San Francisco Bay Area. Anyone with a science and/or engineering related background is welcome to participate. Volunteers generally spend one or two days per week working with a teacher-partner during the school year. Participants typically receive training before being matched with a teacher to work with students. TOPS volunteers have proven to be successful in helping students to elevate their performance.

For more information, please visit the website: www.topsofscu.org or contact Stephen Mori, TOPS Coordinator, at E-mail: stadashmor@gmail.com.



SCIENCE EDUCATORS - WIN A BUBBLE GRANT!

UP TO \$500 WILL BE AWARDED



SUBMISSION GUIDELINES

The Santa Clara Valley Section of the American Chemical Society wants to help provide elementary and secondary school educators with the tools they need to revitalize science programs. The section is pleased to announce a call for proposals from K-12 science teachers to apply for a BUBBLE grant of up to \$500 for worthwhile science projects. Grants will be awarded for projects that enhance the teaching of physical, life or earth science. This grant program will consider funding of amounts requested in a proposal, but reserves the right to fund some proposals partially. The grant may not be used for teacher awards or compensation. Qualified uses of the funds are for purchases related to the proposed project such as scientific equipment, instructional materials and/or supplies.



PROJECT DESCRIPTION

The proposals should total no more than two pages (700 words or less) and should include the following items:



- An explanation of the project and/or specific learning activities
- Targeted student population
- Expected outcomes
- Effective evaluation methods to measure achievement
- Grant amount requested (up to \$500)
- Specific use of the funds
- Brief description of the school and how this grant would be beneficial including information that demonstrates financial need (200 words or less).
- Contact person for proposal (name, school affiliation, phone, e-mail)



TIME SCHEDULE

The annual grant program is open for applications on March 1. The deadline for submission of all proposals is September 1. The winners will be announced and contacted by e-mail after October 1.

PROPOSAL EVALUATION

A panel of professional scientists who are members of the American Chemical Society will score all applications on the basis of innovative ideas, plans for implementation and financial need.

GRANT TERMS AND CONDITIONS

Schools must be state-accredited and have 50 or more students. Only one application per school is allowed. The grant application must be submitted by an employee of the school who is 18 years of age or older. The winners are expected to submit a summary report for dissemination. **All applications must be submitted electronically in either a Word or Adobe PDF file and sent by e-mail to: BUBBLE_Grant@scvacs.org.**



SANTA CLARA VALLEY SECTION
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FUTURE MEETINGS

- May 17** SCV-ACS Day at the Exploratorium
Exploratorium Pier 17
San Francisco, CA
www.exploratorium.edu
- May 19-21** John Stauffer Lectures at
Stanford University
https://chemistry.stanford.edu/stauffer_lectures
- May 20** Connect With Chemists
Specialty's Café, Santa Clara
- May 22** Connect With Chemists
La Boulange, Palo Alto
- June 22-25** Northwest Regional Meeting
Missoula, MT
<http://norm2014.sites.acs.org/>
- Jul 19** Annual Wine Tasting, Picnic
and Awards Ceremony
Stanford Chemistry Department
Stanford, CA
- Aug 10-14** 248th American Chemical Society
National Meeting
San Francisco, CA