

Silicon Valley Chemist

Santa Clara Valley Section

American Chemical Society

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MARCH 2016 NEWSLETTER TOPICS

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Connect with Chemists

Meet fellow local chemists for an early morning coffee.

Look for Ean at a table with molecular models.

Thursday, March 10, 2016, at 7 a.m.

Coupa Café, 538 Ramona Street, Palo Alto (a half a block off from University Avenue)

SCVACS By The Numbers

463

Number of new members who joined the SCVACS in 2015

Issues of the newsletter in 2015

12

8

Dinner meeting speakers in 2015

Connect with chemist breakfast meetings in 2015

10

Councilor Column

Membership in the ACS: What's in It for Me?

Herb Silber

The American Chemical Society is a professional society with more than 158,000 members. Members often are not familiar with all of the benefits of membership. The first is the opportunity to network with other members of the Society throughout the year. Each member receives the weekly news magazine *Chemical and Engineering News* as a member benefit, sent either electronically or via the post office. I prefer to receive mine electronically and I note that I get everything that is in the printed version. Each paid member can get up to 25 free Scifinder personal searches a year. For those not familiar with Scifinder, it is a literature search service, the electronic equivalent of those massive *Chemical Abstracts* volumes used heavily before digital media became the norm. In addition, each member can get a limited number of free reprints from ACS journals each year.

ACS members get discounted admission to National and Regional Meetings. It is worth noting that the combined cost of ACS Membership and member registration fee for

a national meeting is lower than the meeting's non-member registration fee. The majority of ACS members do not attend ACS national meetings – attendance has been between 10,000 and 17,000 per meeting the past five years. For those members not in attendance or for those who did attend and want to rewatch presentations, the ACS now posts many presentations on the web for later access by members. The *ACS Presentations on Demand* collection includes more than 1,000 presentations and posters from the Technical Divisions, ACS committees, and thematic events that take place at national meetings.

Unemployed members can use the Career Consultant services and recruitment services at national meetings with no fees or meeting registration. All members can get group life insurance and/or disability insurance coverage at favorable rates. New this year, all members can get Professional Liability Insurance at a cost that is dependent upon your job activities. If you have tried to get your

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Chair's Message

Jane Frommer



The SCVACS is entering the aqueous phase of its 2016 event programming.

Our next two months' events involve water, from the different perspectives of politics and purification. Where's the chemistry? See items 4, 9, 17, 21 and 23 on the "What's Next" list in my February 2016 Chair's Message.

Our April speaker is Dr. Peter Gleick, author of *Water in Crisis: A Guide to the World's Fresh Water Resources and Bottled & Sold: The Story Behind Our Obsession with Bottled Water*.

Dr. Gleick is the co-founder and president of the *Pacific Institute*, a global water think tank that carries out independent research and outreach to improve the understanding of threats to sustainability. Based in Oakland, the Pacific Institute incorporates into studies of water

policy the interrelated issues of environment, security, and economic development on global and statewide scales. More will be written on Dr. Gleick and his SCVACS presentation in our April newsletter.

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Membership in the ACS, continued from front page

own liability insurance you know how difficult and expensive this can be if you do not have a group. All educators can get teacher's liability insurance from the ACS.

The ACS has arranged group discounts from various companies that provide products and services such as rental cars, shipping, computers, and office supplies. More information can be found [here](#).

Members are offered the opportunity to provide research experience to economically disadvantaged high school students through Project SEED. This places the budding scientists in an academic, government or industrial laboratory to do one or two summers of research. Email projectseed@acs.org for more information. In addition, there is an ACS Scholars Program that offers scholarships of up to \$5000 a year (dependent on need) for underrepresented students graduating from high school or in an undergraduate program. These are renewable and to date about 90% of these students have graduated from college.

Memberships come at a variety of levels, from Student Members through 50-Year Member categories. Dues vary based upon the membership category. Many members can get their annual dues paid by their employers. Unemployed members can receive a dues waiver. Each year, the Society both gains and loses over 20,000 members, with most of the resignations coming within the first five years of membership. The Society is studying why members drop out early and welcomes your feedback. Send me an email with your reasons for joining or leaving the ACS: herbert.silber@sjsu.edu

What you get out of ACS membership is a function of what you want to do. One thing most members do not know is that the actual cost of membership is greater than what each of us pays. How is this made up? The

ACS runs a publishing business (journals and Scifinder) and these are profitable. A portion of the profits is given back to the Society to be used for member activities.

All members are automatically enrolled in one Local Section with voluntary local section dues. We are the Santa Clara Valley local section though we are considering changing the name to the Silicon Valley local section of the ACS. The section stretches from South San Francisco to Monterey, with discussions underway about creating a separate subsection for members in the Monterey Bay area. Each local section carries out its own activities. In the SCVACS, we have monthly events, often dinner meetings with talks. Each July, we gather on the Stanford Campus for a picnic and wine tasting. The dinners and the picnic have costs associated with them, only a portion of which members pay to attend the event; the section subsidizes the rest. The local section confers awards for extraordinary service to the ACS and to the community on members of the section and on regional and national figures. The section provides opportunities for members to get involved in various activities, including judging on an ACS team at science fairs, hands-on workshops for children living in homeless shelters, answering high school chemistry teachers' requests, and authoring newsletter articles. Becoming active in the leadership of the local section is easier than expected because fresh faces and minds are truly welcomed. The local section leadership team (AKA Executive Committee, ExComm) has multiple annually refreshed positions: Chair, Secretary, Treasurer, Councilors, and Alternate Councilors. Participants can serve on the ExComm or in a group of committee members. We are always looking for volunteers to participate in activities. Contact us! chair@scvacs.org

Chair's Message, continued from front page

Our March event is a chemist's tour of the *Silicon Valley Advanced Water Purification Center* (SVAWPC). This center is not to be confused with a water treatment plant. The purification center's process picks up where the water treatment plant leaves off, taking the treated water through the additional steps of microfiltration (100 nanometer pore size), reverse osmosis, and UV irradiation. The resulting water is devoid of dissolved material, so 'pure' that its use as drinking water is brought into question because of its potential to extract nutrients.

Sam Kean - author of *The Disappearing Spoon*, an outstanding collection of short stories about elements of the periodic table - provides us with an apt introduction to the March SCVACS event with his recent article in the Chemical Heritage Foundation's periodical, *Distillations*. "Waste Not, Want Not - Is recycled wastewater too much to swallow?" describes the "toilet-to-tap" recycling of water as once offensive yet likely to become mainstream as droughts and overpopulation persist. From a public-health perspective, recycled waste water is purer than tap water and far purer than bottled water. "By the time water in the Mississippi River reaches New Orleans, scientists estimate that five different animals have swallowed each molecule and urinated it out".

Kean's colorful description of a water molecule's history, though lacking in literature citation, reminds of the shared nature of water, the solvent of life on our planet.

Closer to home, he cites the example of San Diego where a \$2.9-billion sewage-treatment plant expansion to recycle wastewater is planned to fill one third of its water needs, compared to current importing of 90% of its water from distant sources.

The Silicon Valley Advanced Water Purification Center in San Jose is the largest advanced water purification plant in Northern California. This state-of-the-art facility opened in 2014.

Join us on Saturday morning, March 26, for a tour of the center and to see Sam Kean's writing in action. The registration form required for the tour can be found in this month's newsletter and [here](#).

The Chemical Heritage Foundation's *Distillations* quarterly magazine contains outstanding writing on science, culture and history. Contact me for a free trial subscription: chair@scvacs.org.

Chemistry Quiz

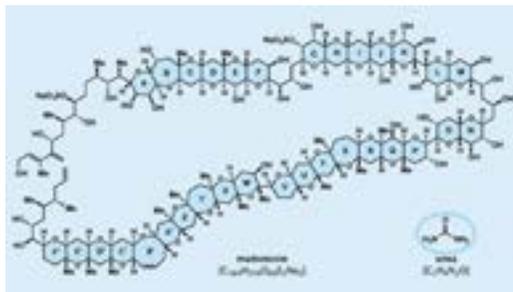
Who was the first African American to receive a Ph.D. degree in chemistry in the United States?

What institution conferred his degree?

Last Month's Quiz

This extremely potent toxin with 32 rings and 98 stereocenters, is the largest and most complex natural product that is neither a protein nor a polysaccharide. What is the name of this molecule and where does it come from?

Maitotoxin (or MTX) is an extremely potent toxin produced by *Gambierdiscus toxicus*, a dinoflagellate species.



A Chemist's Tour of the Silicon Valley Advanced Water Purification Center

March 26, 2016 San Jose CA

Even in the midst of El Niño, California is currently facing an exceptional drought and water conservation is still of utmost importance. One large-scale method to work towards conservation involves the purification of treated wastewater and the eventual incorporation of that purified water into the current drinking water supply. Without this sort of recycling, the treated wastewater would reenter the water cycle, allowing nature to achieve the same end yet after significantly more time. The bay area has recently taken a step towards reaching this goal through the construction and operation of the Silicon Valley Advanced Water Purification Center (SVAWPC).

We are proud to announce that in collaboration with the Santa Clara Valley Water District, the Santa Clara Valley ACS section has organized a private tour of the SVAWPC facility with scientific explanations of the whole process. This tour is geared toward chemists and includes discussions of water conservation, the treatment process, and the treatment's impact on the environment and on humans. We welcome all with technical backgrounds to join us for this exciting opportunity on Saturday, March 26th at 10:00AM. Registration is required by Monday, March 21st.

Please note that there are some safety constraints due to this being an operational plant:

- This tour is not children-appropriate and is geared toward professional chemists. Tours for the public are given regularly by the SVAWPC that welcome older children. The center does not admit children under the age of 10 due to the technical nature of the center.
- For safety purposes, sturdy closed-toe shoes/boots are required for all participants as this is a walking tour of a working plant. High heels and sandals are not permitted.
- Please check the weather and dress appropriately for both outdoor and indoor settings. Light rain will not cancel the tour.
- Parking is limited and carpooling is suggested.

This tour is limited to 50 participants.

Tour: Silicon Valley Advanced Water Purification Center

Date: Saturday, March 26th

Time: 10:00AM – noon

Location: Silicon Valley Advanced Water Purification Center
4190 Zanker Road
San Jose, CA 95134
(tour will begin at the Visitor Center Trailer)

Cost: Free

Reservation required, please register [here](#) by March 21. If you have any questions, please email chair@scvacs.org.

Molecule of the Month

From Chemical Entities of Biological Interest (ChEBI)

S-Propyl propanethiosulfinate

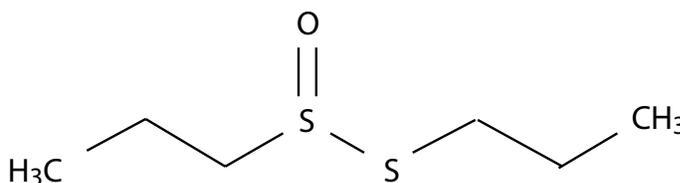
Many plants are famed for their putrid smells, and it has been known for decades that unpleasant sulfurous odors are released when soil is disturbed around the roots of some plants. It has always been assumed that these odors are released passively as a result of tissue damage. Now a team of researchers led by Dr. Rabi Musah at the University at Albany in New York has discovered a previously unknown defense mechanism in plants: roots that actively release a foul odor when they sense the touch of a potential predator.

Studies were performed using *Mimosa pudica*, a perennial shrub native to Brazil but now widely distributed throughout the world. Its roots are known to emit a cocktail of small organic and inorganic sulfur compounds into

the environment, but with no detectable odor. However, when soil around the roots is dislodged or when seedling roots are touched, a distinctive odor is detected. By using high resolution mass spectrometry techniques, the researchers were able to attribute the odor to the emission of increased amounts of S-propyl propanethiosulfinate (ChEBI:91021), propanesulfenic acid, 2-aminothiophenol and phenothiazine. Moreover, the team also observed that the roots seemed to distinguish between different kinds of touch. While touching the roots with soil

or human skin elicited a strong odor, agitating the roots with other materials such as glass or metal did not induce a similar response. Finally, by growing seedlings of *M. pudica* in a sterile environment, the team was able to ascertain that emission of the organosulfur volatiles occurred exclusively from the roots and not the aerial parts of the plant. The team has also found that at least six other *Mimosa* species produce the same smell and now plans to study plants in the closely related *Acacia* genus.

From *Chemical Entities of Biological Interest (ChEBI)*
<http://www.ebi.ac.uk/chebi/entity/MonthForward.do>



An Image Woven in Silk Prefigures a Data-driven Future

By Benjamin Gross

In December, 1839, mathematician and economist Charles Babbage sent a letter to French astronomer François Arago. “There has arrived lately in London...a work which does the highest credit to the arts of your country,” he wrote. The item that had captured Babbage’s attention was a portrait of French inventor Joseph-Marie Jacquard. Babbage wanted a copy to show off in his London home, where he often entertained members of the British elite. Three years later, he welcomed a pair of very special guests, the Duke of Wellington and Queen Victoria’s husband, Prince Albert. He later recalled the moment in his autobiography:

When we had arrived in front of the portrait, I pointed it out as the object to which I solicited the Prince’s attention. “Oh! that engraving?” remarked the Duke of Wellington. “No!” said Prince Albert to the Duke; “it is not an engraving.”

The prince had seen another copy of Jacquard’s portrait, based on a painting by Claude Bonnefond, and knew its secret. As Babbage explained later, it was a “sheet of woven silk, framed and glazed, but looking so perfectly like an engraving, that it had been mistaken for such by two members of the Royal Academy.”

For Babbage, the portrait was much more than a fine example of textile arts: what fascinated him was the mechanism through which it was created. The silken image and the machine that made it (seen on the desk next to Jacquard in the portrait) represented the technological potential of the calculating machines that had occupied Babbage’s attention for the past two decades.

For centuries, weavers had relied on a machine called a drawloom, which drew up the lengthwise (warp) threads individually, allowing different-colored cross (weft) threads to be inserted underneath. By selecting which threads to raise and lower during each pass of the shuttle, weavers created patterns or images in their tapestries, but the task was cumbersome. Each row of weaving might contain hundreds of warp threads—so many that a second person (a “drawboy”) was typically enlisted to keep track of which ones to raise or lower.

Over the years, many people had tried to speed up the weaving process. In 1745, a talented machinist, Jacques de Vaucanson, designed a loom that used a spoked metal cylinder—similar to those found in music boxes—to trigger hooks that would raise or lower



An 1839 woven silk portrait of French textile merchant and inventor Joseph-Marie Jacquard, recently added to CHF’s collections. The portrait, made on a Jacquard loom, required more than 24,000 cards to create the pattern. (CHF Collections/Jesse Olanday)

particular threads. Vaucanson’s prototypes worked well, but the cylinders were expensive and could only generate a single, repeated pattern.

Jacquard, who had worked as a drawboy in his youth, inherited his father’s weaving business in Lyon but found it difficult to make a profit. After squandering most of his inheritance, he later took up arms to support the French Revolution, returning home in 1798 after the death of his son. By the turn of the century, he was working on an invention that had both local and national implications. Success would bolster silk production in Lyon and support Napoleon’s efforts to match the industrial output of Great Britain.

From the Chemical Heritage Foundation
<http://www.cbheritage.org>



New SCVACS Members for January

Russ B. Altman
Dr. Richard Thomas Beresis
Joshua Borrajo
Adithi Chandrasekhara
Allis S. Chien
Jennifer Cosman
Felix Deanda
Benjamin Ross Elling
Dawei Feng
Kristina Flavier
Katherine Gaffney
Eliot Arthur Harper
Dr. Darleane Christian Hoffman
Stefanie Khoo
Jayanthi Lakkyreddy
Dr. Philippe Lam
Bianca Lang
Ms. Monica R. Lares
Eric Lebel
Yekaterina Lin
Lester Ludwig
Victor Lundin
Dr. Chris Lyons
Elias Hanna Makhoul

continued on next page

Local Science Fairs in 2016

by Susan Oldham-Fritts

This month is your last chance to judge at one of this year’s regional science fairs. While all of these fairs need category judges, **we especially need members for our SCVACS special awards team to judge the 100 plus chemistry projects at the Synopsys Championship. Please contact me at sfritts@garlic.com if you can join our team on March 17, 10 AM-4PM, at the McEnery Convention Center, San Jose.** Category judges in chemistry, botany, biology, biochemistry, chemistry, microbiology, and the behavioral/social sciences are needed at the following fairs. (So ask professionals you know in these fields to join us and judge, too.)

Monterey County Science and Engineering Fair (March 5, 2016)

California State University, Monterey Bay – University Center, Building 29

www.montereycountysciencefair.info

Santa Cruz Science Fair (March 12, 2016)

Santa Cruz County Fairgrounds

<http://www.science.santacruz.k12.ca.us>

San Francisco Bay Area Science Fair (March 16, 2016)

San Francisco County Fair Building - Golden Gate Park

<http://sfbasf.org>

Synopsys Championship (March 17, 2016)

San Jose Convention Center, San Jose

www.outreach-foundation.org/judges.html

The interaction between the students and judges is the heart of each and every science fair. The encouragement, critiquing, and interest we as judges share with the students benefit all of the participants. So, no matter which fair includes your home town, now is your last chance to **volunteer!**

Michael J. Martinelli
Dr. Dustin Lee McMinn
Dr. Jeff Merit
Xiaoquan Min
Frank Russell Moss III
Kong T. Nguyen
Derek Nowak
Robert Ovadia
Dr. Sankha Pattanayak
Janice Patton
Dr. Xiomara Andrea Perez
Simon Rondeau-Gagne
Kristina Rucker
Lance P. Sager
Ailen Sanchez
Dr. Dustin Scott Siegel
Steven W. Suljak
Dr. Hwei Ru Tsou
Jessica Yang
Dr. Chunrong Yin
Yinan Zhang
Alice Zhou
Dr. Xiaoti Zhou
Weichao Zhuo

20th Annual Green Chemistry & Engineering Conference

June 14–16, 2016 Portland, Oregon

The Green Chemistry & Engineering Conference (GC&E) is an international technical conference bringing together the cross section of disciplines working on green chemistry and engineering research, innovations, and implementation. Attendees include scientists, sustainability leaders, industry executives, government officials and policy makers, educators, students, and chemical R&D professionals.

The conference includes 30 technical sessions over three days with daily keynote speakers. The program includes sessions on curriculum & education, designing more sustainable products, design of next generation catalysts, the state of the art in green chemistry and engineering, sustainable materials and synthetic design in green chemistry.

During the conference, the ACS Green Chemistry Institute hosts the only business plan competition (BPC) exclusively devoted to innovations in sustainable green chemistry and engineering. Applicants have the chance to receive expert feedback, training and mentorship, and the opportunity to market their business idea to their target audience. Application instructions, and an overview of the competition are available at <http://www.gcande.org/program/business-plan-competition/>. Applications must be received by 5:00 p.m. (EDT), April 8, 2016.

Early bird registration is open from March 1st until April 29th, with discounts available for students and 50-year members of the ACS. Advance registration runs from April 30th until June 12th, with on-site registration for last-minute attendees. Visit <http://www.gcande.org/registration/> for further details.



CHEMPLOYMENT ABSTRACTS MARCH 2016

CHEMPLOYMENT ABSTRACT 3992

Position Title: Research Associate, Synthetic Organic or Medicinal Chemist.

Job Description: Responsible for the following:

- Develop and implement synthetic routes for production of arrays of synthetic compounds;
- Perform laboratory synthesis of organic molecules and prepare the intermediates for the synthesis of these molecules;
- Apply modern techniques of organic synthesis including a variety of organic reactions at several scales, microwave chemistry, inert atmosphere techniques, LC-MS, HPLC, MS, flash chromatography, recrystallization, and distillation.

QUALIFICATIONS DESIRED:

Education: MS/BS in organic chemistry or related field. The ideal candidate will have educational background and experience in the field of medicinal chemistry.

Experience: We are seeking several M.S./B.S. level synthetic organic or medicinal chemists to join our expanding medicinal chemistry department. Candidates must have a M.S./B.S. in synthetic organic chemistry, medicinal chemistry, or closely related field with 0-5 years of industrial experience involving drug discovery. Strong organizational, communication and interpersonal skills are critical. The successful candidate must have the ability to work on multiple projects and adapt rapidly to new projects, must be a highly motivated, independent, and productive team player. Candidates with a demonstrated record of expertise in modern synthetic organic chemistry methods or medicinal chemistry are preferred.

LOCATION, SALARY, EMPLOYER:

Job Location: Santa Clara, CA

Salary: At Nanosyn, we offer a very competitive compensation and benefits package.

Employer Description: Nanosyn is a well-established and growing medicinal chemistry and biological services contract research organization located in the SF Bay Area. We provide made-to-order focused compound libraries, hit-to-lead optimization, medicinal chemistry services, lead identification and profiling, and other innovative solutions to meet the drug discovery needs of our clients.

Application Instructions: For further details and to apply, please visit the careers section at <http://www.nanosyn.com/careers/> or email to careers@nanosyn.com

CHEMPLOYMENT ABSTRACT 3993

Position Title: Ph.D. Medicinal and Synthetic Chemists

Job Description: The successful candidate must be familiar with techniques in synthetic organic chemistry, including but not limited to laboratory skills, data interpretation from various spectroscopic techniques.

QUALIFICATIONS DESIRED:

Education: Candidate must possess a Ph.D. in Organic Chemistry with 1 or greater years industrial experience. Strong organizational, communication and interpersonal skills are critical. Must be a highly motivated independent productive team player.

Experience: We have multiple openings for organic chemists with a Ph.D. degree in synthetic organic chemistry. Applicants must have 1 or greater years of industrial experience, be highly motivated, with good problem solving skills, good organizational skills, ability to work in a disciplined team, good communication skills, methodical and diligent. The successful candidate must have the ability to work on multiple projects and adapt rapidly to new projects. Applicant will work on early stage drug candidates and advance these to lead candidates and to development candidate selection.

LOCATION, SALARY, EMPLOYER:

Job Location: work on early stage drug candidates, advance these to lead candidates and to development candidate We have multiple openings for organic chemists with a Ph.D. degree in synthetic organic chemistry. Applicants must have 1 or greater years of industrial experience, be highly motivated, with good problem solving skills, good organizational skills, ability to work in a disciplined team, good communication skills, methodical and diligent. The successful candidate must have the ability to work on multiple projects and adapt rapidly to new projects. Applicant will selection.

Salary: At Nanosyn, we offer a very competitive compensation and benefits package.

Employer Description: Nanosyn is a well-established and growing medicinal chemistry and biological services contract research organization located in the SF Bay Area. We provide made-to-order focused compound libraries, hit-to-lead optimization, medicinal chemistry services, lead identification and profiling, and other innovative solutions to meet the drug discovery needs of our clients.

Application Instructions: For further details and to apply, please visit the careers section at <http://www.nanosyn.com/careers/> or email to careers@nanosyn.com



SANTA CLARA VALLEY SECTION
AMERICAN CHEMICAL SOCIETY
P.O. Box 395, Palo Alto, CA 94302

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is published on our web site, sign up at:
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SANTA CLARA VALLEY SECTION

2016 Section Officers

Chair	Jane Frommer	408-927-2224	frommer@scvacs.org
Chair Elect	Todd Eberspacher	650-723-2505	eberspacher@stanford.edu
Past Chair	Ashley Piekarski	408-855-5269	ashley@scvacs.org
Secretary	Richard Bone	650-714-7897	rgab@scvacs.org
Treasurer	Ihab Darwish	650-594-1654	darwishis@yahoo.com

Councilors

2014-2016	George Lechner	408-226-7262	glechner@aol.com
2014-2016	Herb Silber	408-924-4954	hbsilber@science.sjsu.edu
2016-2016	Peter Rusch	650-961-8120	pfrusch@aol.com
2015-2017	Ean Warren	650-329-4554	ewarren@scvacs.org
2016-2018	Bonnie Charpentier	650-380-5353	charpentierbon@yahoo.com
2016-2018	Linda Brunauer	408-554-6947	lbrunauer@scu.edu
2016-2018	Sally Peters	650-854-4614	sallybrownpeters@gmail.com

Alternate Councilors

2014-2016	Mark Kent	408-736-0989	markkent@yahoo.com
2015-2016	Howard Peters	650-854-4614	peters4pa@sbcglobal.net
2015-2017	David Parker	408-615-4961	drdrparker@comcast.net
2015-2017	Ashley Piekarski	408-855-5269	ashley@scvacs.org
2016-2018	Natalie McClure	650-906-7831	nmclure@drugregulatoryaffairs.com
2016-2018	Heidi Vollmer-Snarr	650-723-9518	hrvsnarr@stanford.edu
2016-2018	Stephanie Bachmann	408-429-9681	s_gehling@hotmail.com

Newsletter

Editor	Kevin Greenman	408-634-2309	editor@scvacs.org
Assoc. Editor	Partha P. Bera		partha.pb@gmail.com

ChemPloyment Abstracts

Director:	Liang Cao	liang.cao@aol.com
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FUTURE EVENTS

- Mar 17** Santa Clara County Synopsys Championship Science Fair
San Jose Convention Center
Judges needed!
See article in this newsletter
- Mar 26** SCVACS March Event
Silicon Valley Advanced Water Purification Center - a tour for chemists
San Jose, CA
Registration required
<http://scvacs.org>
- Apr 20** SCVACS Dinner Seminar
Dr. Peter Gleick, speaker
Pacific Institute For Studies in Development, Environment and Security
"Water Scarcity in CA and Abroad"
Michael's at Shoreline
Mountain View, CA
- May 25** SCVACS Dinner Seminar
Dr. Pat Brown, Impossible Foods
"Replacing the World's Most Destructive Industry"
Michael's at Shoreline
Mountain View, CA