

THE VORTEX

AMERICAN CHEMICAL SOCIETY
VOLUME LXXVI NUMBER 7

CALIFORNIA SECTION
SEPTEMBER 2015



The Santa Clara Valley Section selected
Dr. Attila Pavlath for the 2015 Mosher Award

SEPTEMBER SECTION MEETING	PAGE 2
SCIENCE CAFE	PAGE 2
CHAIR'S MESSAGE	PAGE 3
ACS FELLOWS	PAGE 4
ACS 2016 CANDIDATES	PAGE 4
CALACS JUNE AWARDS MEETING REPORT	PAGE 5
TOXIC TERRA PART 3 (W. Motzer)	PAGE 6
SOLANO STROLL	PAGE 8
WCC MAY MEETING REPORT (STEPHANIE MALONE)	PAGE 9
CALACS YCC & AICHE JULY MEETING REPORT (SERGIO MACIEL)	PAGE 10
MOSHER AWARD	PAGE 10
BUSINESS DIRECTORY	PAGE 11
INDEX OF ADVERTISERS	PAGE 11

American Chemical Society

“The Flavor of Chemistry: A taste of wine, cheese, and olive oil”

“SAVE THE DATE”

September 12, 2015

1:30 pm-6:00pm

The Robert Mondavi Institute
Silverado Sensory Theater
392 Old Davis Road
Davis, CA. 95616

The California, Sacramento and Santa Clara Valley ACS local sections have joined forces for their September Section meeting to bring you “The Flavor of Chemistry: A taste of wine, cheese, and olive oil”. The event will be located at the Robert Mondavi Institute at the Silverado Sensory Theater from 1:30pm – 6pm. The first speaker is Dr. Moshe Rosenberg who is a Professor and Specialist of Dairy Engineering and Technology at UC Davis and he will be giving a talk about the “Chemistry of Cheese”. Following Dr. Rosenberg will be Dr. Andrew Waterhouse, Professor of Enology at UC Davis, who will be giving a talk about the “Chemistry of Wine”.

After the presentations, there will be a wine and cheese tasting! We also have a tour of the LEED Platinum Teaching and Research Winery scheduled for the afternoon. In addition, Dr. Selina Wang, Director of Research at the UC Davis Olive Center who will be presenting “The Chemistry of Olive Oil and tasting”! A reception honoring 50 & 60 year ACS members from the Sacramento section will follow to wrap up the festivities.

Parking is free, Cost is \$20 for ACS Members and students, \$30 for nonmembers, Register at http://www.scvacs.org/Local_Folder/din_mtg.html

Science Café

Topic: Drones are here to stay. So how does this new technology impact our lives? What are the rules and policy issues?

Date: Wednesday, September 30, 2015 7pm

Location: Lafayette Library and Learning Center, Community Hall 3491 Mt. Diablo Blvd., Lafayette, CA

Information and Register: at: www.tinyurl.com/LLLCDrones
or call (925)283-6513 x 103

THE VORTEX

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Chair's Message

September is signaling that summer is nearly



over and Fall is around the corner. CALACS has had a more active summer than we typically have with several informative and fun events developed for our members. During each of June, July and

August, there has been at least one CALACS event taking place. These have included regular section meetings in June; David Sedlak from UC Berkeley talked about Water 4.0 at Chevron in Richmond as well as a panel discussion on Cannabis Science in August at The Englander in San Leandro. We have also had a major outreach event with chemistry demonstrations at the San Leandro Library organized by Alex Madonik during late June. We were delighted to have hundreds of young kids and their families participate in this fun event which was supported by quite a few members and student assistants! Finally our Younger Chemist's Committee (YCC) continues to put on unique and exciting events such as the wonderful event in July on Engineering Brandy presented by Konrad Miller at Two Mile Wines in Oakland.

We are capping off our summer events with a special event on "The Flavor of Chemistry: A Taste of Wine, Cheese and Olive Oil" that will take place on Saturday, September 12 at

the Robert Mondavi Institute at UC Davis! This activity is sponsored by the California, Santa Clara Valley and Sacramento local ACS sections. We will have several speakers presenting on the science behind wine, cheese and olive oil and will get to sample a variety of locally produced products. It will be a delightful and convivial event for members, family and friends.

This summer, our Executive Committee has also been active with task forces continuing discussions about our Long Term Strategy (led by Lou Rigali, our Chair-elect) as well as developing revised Vision and Mission statements (led by Marinda Wu). In addition, as I write this, our Councilors and other ExComm members are heading to Boston for the 250th National ACS meeting. I am certain they will bring back lots of useful information that may impact our local activities as well.

Finally, looking forward, Lou Rigali and Wally Yokoyama are planning a terrific slate of activities for Fall 2015 – Spring 2016. In addition, as part of our efforts to develop programs that are relevant for our members. In the Fall we will be polling all 3500 members to understand what is most important to you. However, you certainly don't have to wait for the poll to arrive by email; feel free to contact me at charles.gluchowski@gmail.com or 925-640-0550 if you have any suggestions, comments or feedback of any kind.



ACS Fellows

The American Chemical Society (ACS) Fellows Program was created by the ACS Board of Directors in December 2008 to recognize members of ACS for outstanding achievements in and contributions to science, the profession, and the Society. The selection of ACS Fellows is based on documented excellence and leadership in both of two areas: (1) science, the profession, education, and/or management, and (2) volunteer service in the ACS community.

Inducted at the August 2015 ACS Boston Meeting, from the California Section, Mark Frishberg and Marinda Wu. Congratulations!



ACS Elections 2015

Around October 3, ballots for the ACS National 2015 Election will be sent to all eligible Members. Ballots must arrive by October 30. The Full slate of candidates are shown on our website along with a statement by each of the two President-Elect, 2016 candidates, G. Bryan Balazs, Lawrence Livermore National Laboratory, Livermore CA and Allison A. Campbell, Pacific Northwest National Laboratory, Richland WA. There are six candidates for Director at-large.



G. Bryan Balazs
Lawrence Livermore
National Laboratory
Livermore, CA



Allison A. Campbell
Pacific Northwest
National Laboratory
Richland, WA

Directors-at-Large, 2016-2018 - Candidates



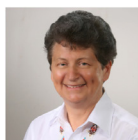
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Rochester Institute of
Technology
Rochester, NY

California Section Awards Ceremony June 6, 2015



Chair, Charles Gluchowski, presents the 2015 Petersen Award to Dr. Eileen Nottoli



Past ACS President Marinda Wu presents the Partners for Progress and Prosperity (P3) Award to Elaine Yamaguchi



Chair, High School Teachers Committee, Eileen Nottoli, presents the Lloyd Ryland Outstanding Teachers Award to Julie Hubbard



Charles Gluchowski presents the Community College Faculty Award to Raymond Chamberlain, PhD,



Awardees & Attendees



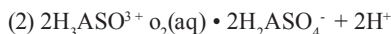
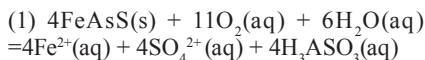
TOXIC TERRA (PART 3)

Bill motzer

In part 1 of this series (September 2014 *Vortex*), I discussed a simple classification of naturally occurring hazardous substances (NOHS). In part 2 (February 2015 *Vortex*), I discussed the crustal and environmental distribution of arsenic including its speciation, relative toxicity, and bioavailability, particularly in groundwater. Dissolved element and element complexes can be readily observed using redox (eH-pH) diagrams (see figure 2 in part 2). Arsenic contaminated groundwater typically contains soluble oxyanions that are extracted and/or formed from the underlying aquifer's alluvium or rocks adjacent to or surrounding the aquifer. These generally exist in near neutral groundwater as HASO_4^{2-} and H_2ASO_4^- .

Arsenic in California's central valley is a continuing problem (figure 1) for water providers. A conceptual model of arsenic in this region (figure 2) suggests that several sources and factors are responsible for arsenic's accumulation. Geogenic or naturally occurring arsenic oxyanions result from chemical weathering of upland igneous and metamorphic rocks in the Sierra Nevada and western metamorphic belt adjacent to the Sierra Nevada. Such rocks also contain the mother lode mineralized gold belt, which have abundant sulfide-bearing minerals such as arsenic-bearing pyrite (Fe_2S_2) and arsenopyrite (FeAsS). These sulfide minerals weather in the surface and shallow subsurface resulting in oxidation that may be additionally enhanced or catalyzed by microbial activity [e.g., acidithiobacillus ferrooxidans in reaction (1), below] causing

waters to become more acidified and enriched in sulfate anions and heavy metals. Bacterial oxidation of dissolved Fe_2^+ also results in various iron oxide formation [reaction (2)]; this also becomes important because As(V) is less toxic, less soluble, and adsorbs more efficiently than as(III) under acidic conditions.



Additionally, for reaction (2), arsenite oxidation is slow, particularly under acidic conditions, but it may be catalyzed by bacterial activity (e.g., *Thiomonas* sp.).

Weathering of arsenic-bearing minerals also results in iron oxide coating on sediment that both adsorbs and releases arsenic depending on subsurface geochemical conditions. For example, an increase in pH (e.g., Resulting from weathering of silicate minerals by hydrolysis or cation exchange and calcite dissolution may cause desorption of arsenic from iron oxides.

Geogenic arsenic sources may also be mixed with anthropogenic sources such as previous applications of arsenic-containing fertilizers and/or pesticides/herbicides (e.g., February 2007 *vortex*: arsenic and old poop). Once in central valley groundwater under more reducing environments, soluble arsenic may again precipitate as sulfides or be sorbed to clays. As groundwater tables decline in these zones, subsequent oxidation and pH increases can once again release accumulated arsenic.

In a future article, I will continue this discussion with arsenic's considerable impact to water resources and people in East Asia.

Figure 1: Arsenic concentrations in California's groundwater (2010).

Source: State Water Resources Control Board. GeoTracker GAMA (Groundwater Ambient Monitoring and Assessment) Database at: http://www.waterboards.ca.gov/water_issues/programs/gama/geotracker_gama.shtml.

(continued on page 7)

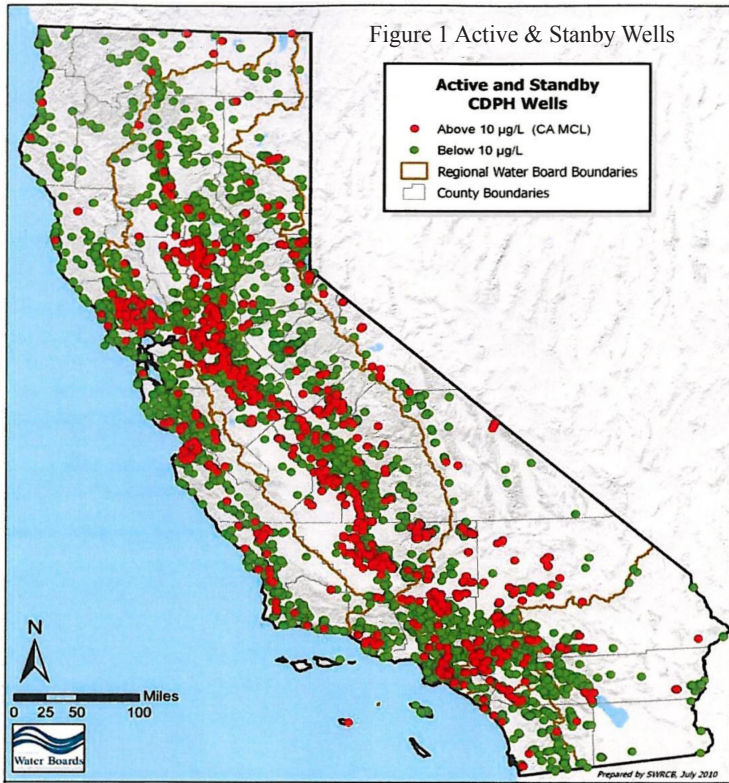
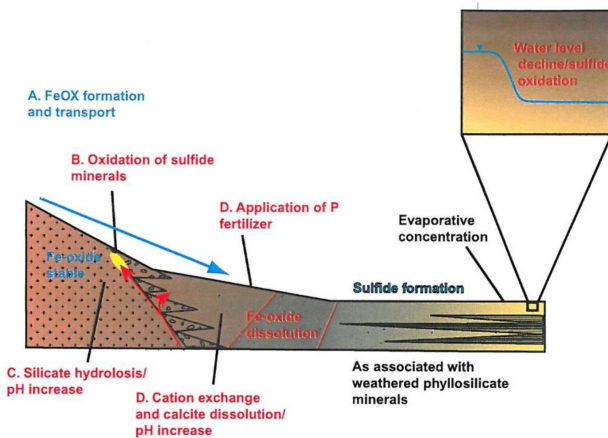


Figure 2: Conceptual model of arsenic cycling in California's Central Valley groundwater



Solano Stroll

CalACS will once again have a booth with games, prizes and supprises.
 Sunday – September 13 2015, 10 am – 6 pm

Since 1974 Solano Avenue and the twin-cities of Albany and Berkeley CA have hosted the Solano Avenue Stroll, the East Bay’s largest street festival! The Solano Avenue Association invites you to see what makes Solano Avenue a wonderful place. We feature over five hundred vendors including 50 entertainers, 50 food booths, 150 government and non-profit agencies, 150 juried hand-crafters, a 75 entry parade, state of the art mechanical rides and much more! (Parade begins at 10am.)

Solano Stroll Booth Location Map

ROSEBUD ANTIQUES 17' 1857	<div style="border: 2px solid red; padding: 2px;">AMERICAN CHEMICAL SOCIETY (CA)</div> ROSIE THE RIVETER TRUST SAN FRANCISCO CHRONICLE 1/2	KEEP OPEN (ANDRONICO'S SAA)	
PEGASUS BOOKS 39' 1855	KEEP OPEN (PEGASUS BOOKS SAA)	SOL-CART 6/6 (CHURRO CART) (FOOD / Roaming)	
ZACHARY'S PIZZA 20' 1853	KEEP OPEN (ZACHARY'S PIZZA SAA)	KEEP OPEN (ANDRONICO'S SAA)	ANDRONICO'S MARKET 1850
SOLANO ORIENTAL RUGS 34' 1849	ROARING FORTIES PRESS SHOTGUN PLAYERS YOUTH MUSICAL THEATER COMPANY PACIFIC BOYCHOIR ACADEMY	KEEP OPEN (ANDRONICO'S SAA)	
SOTTOVOCE 23' 1845	BERKELEY PLAYHOUSE	OPEN 2015 (C)	
TROY GREEK 17' 1843	ASHKENAZ MUSIC AND DANCE CENTER EAST BAY CHILDREN'S THEATRE FREIGHT AND SALVAGE	SHAWL ANDERSON DANCE CTR BERKELEY SYMPHONY RICHMOND ART CENTER	SOLANO CONOCO / PHILLIPS (GAS STATION) 1840
GREETINGS 17' 1841	HILLSIDE CLUB	INSTITUTE OF MOSAIC ART	NOT CORNER (SEE MAP 04)

STAGE DOOR

WCC May Meeting Report Innovative Food Processing for Improved Health, Safety, and Sustainability

It is easy to take the readily available snacks in the grocery store for granted. On May 2, Dr. Tara McHugh demonstrated how much thought and effort go into these foods during her talk, “Innovative Food Processing for Improved Health, Safety, and Sustainability”. Over 30 people attended to learn about her work as the research leader for the Healthy Processed Food Division of the Albany USDA, whose mission increases the value, nutrition, and energy efficiency of agricultural products.

Increasing the value and shelf life of American-grown products ensures the creation and retention of local jobs, as well as improve overall nutrition by adding fruit consumption to new markets such as the school lunch program. For example, creating value-added products such as 100% fruit bars enabled apple and pear growers in the Northwest to compete with cheaper fruit grown overseas.

Novel food processing methods also increase consumption of nutritious foods. Knife-edge casting techniques create fruit and vegetable films that can replace nori and tortillas. By adjusting the tensile strength, solubility, and hydration properties, the same technique can even be used to form sheets of ham glaze that dissolve on contact. Extruding legumes creates puffed snacks and cereals. Exposing mushrooms to UV metabolizes ergosterol into bioavailable,

vegetarian source of vitamin D. McDonalds is able to offer healthy alternatives such as sliced apples because the company uses the process her group developed that prevents browning in cut fruit for up to 30 days.

Other novel methods increase energy efficiency and create uses for waste streams. Microwave, solar, and IR are such promising alternatives for blanching and drying that the California Energy Commission funded testing. IR, for example produces oil-free fruit and veggie chips currently being developed by a local startup.

Her group is pioneering alternative processing olive and grape pomace (the leftovers from oil and wine-making) into flours for cookies, crackers, and other baked goods. In addition to being delicious, these products demonstrate health benefits; chardonnay flour has been shown to lower cholesterol in animal studies, and is currently in human trials at the Mayo clinic.

Dr. McHugh has been involved in a wide body of work over her career at the USDA Agricultural Research Center. Her group’s work integrates chemistry, biology, and engineering, and is having observable impacts on the food supply and US health. We’ll all be looking forward to seeing the next products that come out of her research.

Stephanie M. Malone, Chair, YCC



Attention

On a first come, first serve basis, there are 26 volumes of Annual Reviews of Biochemistry (1970 to 1997), volumes of Methods in Enzymology., and eleven volumes of Annual Reviews in Microbiology (1971 to 1982) that a Member would like to donate to anyone or an institution that could use them.

Email office@CalACS.org

*ACS Younger Chemist and
AICHE Young Professionals'
July Meeting Report*

The July joint event “Engineering Brandy” was a huge success, with 80 attendees. The event took place on Monday July 20th at Two Mile Winery in Oakland, CA. It began with social time during which students, young professionals, and seasoned professionals from various industries mingled over delicious wine, appetizers, and even an assortment of cupcakes labeled and organized as a periodic table of the elements. Following social time, Konrad Miller of E&J Gallo gave an elaborate and interesting presentation of the brandy-making process. During Konrad’s presentation the audience was able to ask questions concerning Gallo’s brandy, the process, and even his favorite wine. It was a fascinating inside look into the brandy-making process.

Sergio Maciel



The Harry and Carol Mosher Award

This award was established in 1980 by the Santa Clara Valley Section to: Recognize and encourage outstanding work in chemistry, advance chemistry as a profession, and recognize service to the ACS.

The award is named for the late Dr. Harry S. Mosher of Stanford University, Palo Alto, California, and Carol W. Mosher of the Stanford Research Institute International, Menlo Park, California, husband and wife, charter members and long-time supporters of this Section. The award currently consists of an engraved plaque and a check for \$2000.

Dr. Attila Pavlath Past ACS President and thrice Chair of the California Section was selected as recipient of the 2015 Mosher Award

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There are many companies and organizations searching for chemical and biochemical personnel to fill important jobs in their organizations.

- Companies for laboratory and management positions
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- Hospitals for technical and research personnel

There are several web sites that may help you search for these open positions.

- www.mboservices.net
- <http://www.calacs.org/page.asp?id=22>

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ACS Vortex	11
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NuMega Resonance Labs	11
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