

THE VORTEX

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AUGUST 2014



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Start planning now for the ACS National Meeting & Exposition August 2014



**221 Fourth Street
San Francisco CA 94103**

Bring the whole family, and especially young children, to Moscone Center for a day of science fun and discovery at one of SF's favorite venues for kids.

Exploring Our World Through Chemistry

ACS Public
Outreach Event

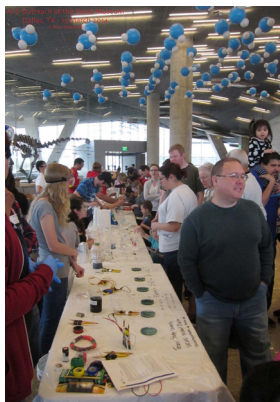
**Saturday
August 9th, 2014
10 AM to 2 PM**



Volunteers Needed: Sign up online at

<http://fs23.formsite.com/kate1dc/form55/index.html>

Contact: alexmadonik@sonic.net 510-872-0528



Co-sponsored by the ACS Committee on Community Activities (CCA) and the
ACS Office of Volunteer Support

Join Us In San Francisco at IUPAC 2014!

For the first time, an IUPAC Congress of Pesticide Chemistry will be held in conjunction with an American Chemical Society (ACS) National meeting. Sponsored by the Division of Agrochemicals or AGRO, it will be held at the ACS National Meeting and Exposition in San Francisco on August 10-14, 2014 at the beautiful San Francisco Marriott Marquis.

THE VORTEX

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Chair's Message

Mark Frishberg

I hope everyone is having a great summer vacation thus far.

If you see this message prior to the ACS National meeting August

10-14, please make sure that you attend and say hi to your other local section members at the Hospitality booth at the foot of the escalators in Moscone Center North, visit the Bay Area Chemistry Hall of Fame posters in the Hilton hotel and other areas around the meeting, and share the festivities with us at the free Chemluminary Awards poster session and awards ceremony on Tuesday evening, August 12th, from 8-10pm at the Palace Hotel, with music and dancing afterward until midnight – and if you get to the meeting early, don't miss our joint public outreach event with the ACS Committee on Community Affairs from 10am-2pm on Saturday, August 9th, at the Children's Creative Museum across the street from Moscone North (behind the big carousel).

If you are seeing this message after the National ACS meeting, I certainly hope that you took advantage of the meeting being in San Francisco to enjoy all of the professional and personal enrichment opportunities that this kind of meeting has to offer, and that you had the chance to renew acquaintances with old friends and made some new ones

along the way.

If you are seeing this message after the meeting and were one of our volunteers at any of the venues, please accept my personal thanks for your time and efforts. Please share any interesting experiences that you may have had and any suggestions for improvements or new ideas that we should consider in preparation for when the ACS National meeting returns to San Francisco in the Spring of 2017.

While local section governance takes a break over the summer, please take note of the many advance notices, in the Vortex and the CAL-ACS website, of section activities being planned for the fall season, from our participation in the Solano Stroll and the Bay Area Science Festival, to our local section meetings, and the many activities being planned in conjunction with National Chemistry Week in October.

For undergraduates, grad students, and post doc thinking about your careers after college, this is the time to be planning for the future and recognizing that the fall is the start of the prime recruiting season. Unemployment for new science graduates is as high as it has ever been, so please take our advice and not wait until near graduation to begin preparing for and looking for your first professional position after college. CAL-ACS, in conjunction with the Santa Clara Valley local section and the regional

(continued on page 8)

CHOCOLATE IN SAN FRANCISCO

(an update from the March 2010 Vortex & I WOULD RATHER FALL IN CHOCOLATE....

Howard & Sally Peters (aka Mr. & Mrs. Chocolate) ACS Santa Clara Valley Local Section



For 2014 the ACS National Chemistry Week focus in October is the chemistry of candy. So for the chocolate lover in all of us, San Francisco is the place to be. Here are some tips about our local *Theobroma cacao* – Food of the Gods and not-so-cheap thrills. Just Google or Yahoo and search for: chocolate san francisco.

Ghirardelli: www.ghiradelli.com The iconic Ghirardelli Square is no longer a wonderfully smelling food factory but has many tourist boutiques. Domenico Ghirardelli's old neighbor James Lick moved from Chile to San Francisco about 1847. Lick soon wrote and advised Ghirardelli in Chile that gold had been discovered in California and to come quickly and get rich. Ghirardelli came but was a terrible early gold miner- but found his 'brown' gold in great

chocolate. A visit to this corner chocolate shop is pricy but worth it – if only for the smell. Also visit Ghiradelli at 42 Stockton St.

See's Candies: www.sees.com. The trademark black and white See's Candies shops are found in downtown San Francisco. e.g. The Flat Iron Building, 540 Market St. (near Montgomery), Three Embarcadero Center (on Commercial St.), etc. Mary See and family came from Canada to Pasadena about 1920 - and the rest is history. The iconic "I love Lucy" chocolate line episode was filmed at the See's factory then in Pasadena – but now closed. See's has been owned since the 1970s by Warren Buffett and Charles Munger's Berkshire-Hathaway (FYI & B-H also owns Dairy Queen.) Local Guittard Chocolate www.guittard.com/ of Burlingame is their long-term premium chocolate supplier.

Scharffen Berger: www.scharffenberger.com. John Scharffenberger was an early champagne maker in Napa county. He sold off the bubbly and joined with physician Dr. Robert Steinberg (now deceased) to create this premier chocolate company. Scharffen Berger can usually be found at Whole Foods and a shop is in the Ferry building. John S. was an angel investor when we started our chocolate adventures 10 years ago. He responded to our request for chocolate samples for our attendees with over \$1,000.00 of chocolate.. sorry, and it is all gone. FYI - This high end line was purchased by Hershey in 2005. The local factory/headquarters on Heinz St. in Berkeley was closed in April 2009. So far Hershey hasn't tinkered with their formula for success and manufactures all SB chocolate in downstate Illinois.

T CHO: www.tcho.com This relative newcomer has made a splash on Pier 17 in San Francisco. It is founded/managed by a venture capitalist and a NASA engineer and everything is done very scientifically - even down to beta testing of the products. You may have to visit the home site on Pier 17 on the waterfront for samples, a possible tour, and also check out their web site.

(continued on page 5)

(continued from page 4)

Many other specialty chocolate shops abound.... Check the web for times and special events. Happy hunting...

Some Things Extra....

Fog City News at 455 Market St. (near Montgomery) still carries over 500 different varieties of chocolate bars from around the world. It is worth a visit - with restraint.

Nearby: Preston's Candy www.prestonscandy.com/ in Burlingame near SFO has been a local favorite for over 60 years. At Passover/Easter, they even carry chocolate covered matza.

Charles Chocolates <http://charleschocolates.com/> now has a location at 535 Florida St. in the SF Mission District and also offers a high tea & chocolate. It is definitely worth a visit.

Belmont (20 miles away near SFO & only in October) features The Chocolate Church – for those who know that chocolate is a religious experience. Google search for chocolate church Belmont to learn about their 30+ year old Octoberfest in chocolate...all the chocolate items you can sample (plus champagne & coffee) in three hours for about \$20.00. This event never makes any money on us.

DO HAVE FUN WITH YOUR CHOCOLATE...
ALWAYS MORE CHOCOLATE ...



California Section Election – 2014

The California Section, ACS, will hold an election this fall for the following positions: Chair-elect, Secretary, Director, Councilors, Alternate Councilors, and Members-at-Large. All these positions are members of the Section's Executive Committee. The first three positions are members of the Section's Board of Directors. If you have an interest in being a candidate for one of these positions or would like more information, please contact Paul Vartanian [(510) 763-0195, pfvartanian@gmail.com], a member of the Nominations and Election Committee, or Wally Yokoyama [(510) 559-5695, wally.yokoyama@ars.usda.gov], the chair of the committee, by September 10, 2014. While the first five elected positions may be filled only by full members of the ACS, the positions of Member-at-large are open to both members and student members of the Society.

WCC May Meeting Report: Application of Material Science in High Power Laser Systems

Iyun Lazik

On the afternoon of May 3, 2014, the California Section of the Women Chemists Committee (WCC) held a meeting on the campus of California State University East Bay (CSUEB) in Hayward. A very diverse group of about 30, ranging in age from 18 to 90+, gathered to hear Dr. Kathleen Schaffers of the National Ignition Facility (NIF) at Lawrence Livermore National Laboratory (LLNL). She concentrated on her research to make the materials used for the highest-power lasers in the world. In addition, Professor Monika Sommerhalter and her colleagues in Chemistry and Biochemistry at CSUEB arranged a special tour of the department that occurred after a social following the talk. The event had the sponsorship of several groups on campus: the Department of Chemistry and Biochemistry, the Alchemist Club (a student organization), and the Institute for Science, Technology, Engineering, and Math (STEM). The WCC was delighted to have such strong support for this meeting.

Trained as an inorganic chemist and materials scientist, Kathleen has been focusing on new materials for use in high power lasers for about 20 years at LLNL. We learned first about the NIF which is the size of 3 football fields and is the world's largest and most energetic laser facility ever built. It is also the most precise and reproducible laser as well as the largest optical instrument. Just imagine, there is a laser with nearly 40,000 optics that precisely guide, reflect, amplify, and focus 192 coordinated laser

beams onto a fusion target the size of a pencil eraser. With this laser, deuterium- and tritium-containing spheres are compressed, leading to fusion. This is the current state of technology.

The materials discussed have high fluence and damage thresholds, so are capable of withstanding high repetition rates of pulses of intense light while suffering minimal degradation. New laser glass and crystals were needed to amplify the laser energy and to convert frequencies. Desirable characteristics for the former include large aperture, long emission lifetime, and rapid crystal growth nearly free from imperfections. Frequency converters' desirable characteristics include low interaction with the beam, high thermal conductivity, and high conversion efficiency. Kathleen gave the audience background information on the challenges of growing uniform and defect-free crystals. Some of her crystals were huge and take a long time to grow!

A lively social followed the meeting. Then Professors Sommerhalter and Danika Leduc led us on a tour of their department, featuring the teaching labs, the computer room, and the new 500 MHz NMR which was recently purchased. Well-trained students may use the instrument for their research. In addition, students from certain nearby colleges that do not have such an instrument may have their samples run on this NMR if appointments are made.

This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

(LLNL-MI-656046)



VISIT THE CALACS BOOTH AT THE SOLANO STROLL

Sunday – September 14 2014, 10am – 6pm

Over one mile of FREE family fun!

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. 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!



ELK-N-ACS
Evaldo Kothny

*Periodic Table
of the Elements:
an historical
review.*

In an early college
text book of 1867
(gifted to me by Herb

Reid, editor of the California Mining Journal), the elements were arranged by their reacting valence. In this book, there is the mention of Ilmenium, a heavier element which is analogous to Niobium (also called columbium) but appeared to be Niobium contaminated with Tantalum. There was also Glucinium, later named Beryllium. Manganese belonged to the Fe-Co-Ni group together with Cr. The Earth Metal group comprised Al-Zr-Th- Beryllium and 6 rare earths, i.e., Y (discovered in 1794), Ce (discovered in 1803 by Berzelius and Klaproth) and 4 other metals discovered by Mosander in the period of 1839 to 1843 (Lanthanum, Erbium, Terbium and Didymium). Later it was found that Erbium was a very complex mixture of Yt, Sc, Ho, Tu, Dy and Eu. In 1885, Didymium was split into Praseodymium and Neodymium by Auer von Welsbach. In the book appear other names such as Fuscobaltic acid (a complex Cobalt base with ammonia), Iserine (a Fe titanate), Leukon (a silicon oxyhydride), Mellitic acid, Thorium (late renamed Thorium) and Turpeth (a mercury compound) which adorned the literature but do not belong to any new element. The oddities continued and the study of chemistry at that time was an extensive knowledge of art.

Four years later, the great chemist Mendeleev made a new table and tried to establish in 1871 possible characteristics for several missing elements. The study and discovery of radioactive emission allowed the expansion of the listing of elements. After the turn of the century, the following elements filled several vacancies as follows:

Actinium No. 89, discovered about 1899-1902 by Debierne and Giesel in the decay series of Uranium 235. The most stable

isotope is 227 with a half life of 22 years. One ton of pitchblende may contain just 0.15 mg.

Radon or Radium Emanation No. 86, an inert gas discovered in 1900, is emitted during the decay of Radium.

Radium No. 88, an earth alkali prepared in 1898-1911 from Uranium residues by Marie and Pierre Curie and by Beaumont. The most stable isotope among 33 isotopes is 226 with a half life of 1600 years.

Protactinium No. 91, discovered 1913 by Fajans and Gohring. The isotope 231 with a half life of 32,000 years was discovered by Hahn, Meitner plus 4 coworkers in 1917. It resembles Tantalum and exists in Uranium ores to the extent of 0.34 parts per million.

Francium No. 87, an alkali, discovered in 1939 by Perey. Its longest half life isotope from 19 isotopes between 204 and 244 is only 22 minutes. The Earth crust may bear a constant 24 grams in equilibrium with all natural decay products of Francium.

Astatine No. 85, a heavier halogen similar to iodine but more basic. The isotope 211 was obtained in 1940 by irradiating Bismuth with alpha particles. Other known isotopes with half lives of up to 8 hours are 215, 218 and 219. In the body they concentrate together with iodine in the thyroid gland.

Rhenium No. 75, the element predicted by Mendeleev, was discovered in 1925. Rhenium is the first naturally stable element from the manganese group with 3 stable isotopes: 185, 186 and 187. The isotope 187 is weakly radioactive with a half life of 100,000 million years which decays into Osmium. The element occurs in certain ores of Nb, Mo, rare earths and sulfides. The crustal abundance is comparable to the platinum group elements. It is a non-toxic element usually of valence 7 and very soluble. Natural mobility is comparable to Sr, Se, CaF_2 in granites during weathering alterations. The natural content of Re increases from basic to acid rocks. Because of its mobility, most Re is lost by solubility during alteration of rocks.

New methods and discoveries seemed to influence science, and in the thirties, just after the discovery of Re, one could read names in magazines and newspapers

(continued on page 8)

(Chair Continued from page 3)

AIChE chapter, continues to offer free, full day interview practice workshops on college campuses throughout our region. Consider discussing with your student groups and faculty advisors if the time is right to invite us to schedule one of these programs on your campus and make your initial contact through our local section office at www.office@calacs.org. In addition, the National ACS offers, at National and Regional ACS meetings, four-hour career preparation workshops, including "Finding Your Career Pathway" and "Acing the Job Interview." At a cost, these programs can also be arranged

with ACS to be presented locally at other times, and myself and other local section members are certified to present them in our roles as ACS Career Consultants and Workshop Presenters. Also, I have a one-two hour presentation on "Gaining Professional Employment" that can be tailored to any audience and covers topics from thinking about your career, to resume and interview preparation, and interview trips, which I would be glad to discuss scheduling at no cost anywhere in our local section.

That's it for now. Enjoy the rest of the summer!

Mark Frishberg, Chair, CAL-ACS



Future California Section Meetings

September

Date: September 25, 2014, 5:30 PM

Event: Dr. Lisa Ellerby, The Buck Institute, will talk about her research on Huntington's Disease

Location: The Buck Institute, Novato, CA

October

Date: October 21, 2014, 6 PM

Event: A special event during National Chemistry Week: Dr. Carl Djerassi will host the San Francisco premiere of his play, *Insufficiency*, followed by a discussion of Chemistry and the Arts led by Dr. Djerassi. This will be a special performance exclusively for ACS members, family and friends. <http://zspace.org/new-work/insufficiency-by-carl-djerassi>

Location: Z-Space Theater, 450 Florida St., San Francisco, CA

(Continued from page 7)

such as Masurium and Illinium for two of the missing elements No. 43 and 61.

In 1937 with the study of decay series of radioactive elements, the former element No. 43 came into life with the new name of Technetium. This is another predicted element from the Manganese group. All isotopes of Technetium are radioactive, and just a tiny fraction are produced naturally from the spontaneous fission of natural Uranium. The longest half life isotope of Tc is the No. 97 (2600 thousand years). This is followed by No.98 (1500 thousand years) and by No.99 (212 thousand years). Accordingly, these isotopes are incapable of surviving existence on planet Earth. These isotopes can be produced artificially by irradiating Molybdenum, and they also have been detected in stars. The Tc chemistry

resembles that of Re. It reacts with valence 4 and 7 or, less commonly, with valence 3. It precipitates with hydrogen sulfide, reacts with sulfur forming a disulfide and with carbon forming a carbide. It dissolves in dilute nitric acid, in aqua regia, and in concentrated sulfuric acid. Metallic Tc has a high melting point (ca. 2200 C).

Illinium. Similarly to Tc, this element No. 61, a lanthanide that in 1914 was supposed to be an impurity of Europium, was renamed Promethium in 1926. It is a beta-decay element of valence 3. Its existence remained questionable until 1947 after processing radiochemical waste products. The most common isotopes are found between the No. 141 and 156. The longest half life isotope is No. 145 with about 30 years.



National ACS Meeting Highlights of Special Interest to CAL-ACS Members

Saturday August 9

Public Outreach Event – co-sponsored with ACS Committee on Community Affairs, 10am-2pm, Children's Creativity Museum, Howard Street adjacent to Moscone Conference Center South – behind the large carousel. Hands-on chemical demonstrations on ground level plus CAL-ACS demos on roof, CAL-ACS/SCV-ACS Hospitality Booth – foot of escalator, Moscone South

3pm-6pm. Chemistry posters, directions, hand-outs. Staffed by local section members.

Sunday, August 10

CAL-ACS/SCV-ACS Hospitality Booth – foot of escalator, Moscone South, 7:30am-6pm, Bay Area Chemistry Posters – Hilton Hotel, 333 O'Farrell Street, hallway ballroom level, Posters highlighting eminent Bay area chemists, companies, and awards
emical Education Division Reception - with comments honoring the legacy of George Pimentel, 5:30pm-7pm, Moscone South, Esplanade Ballroom 310

Monday, August 11

ACS Fellows Induction Ceremony and Reception – Hilton Hotel, Grand Ballroom B, 2pm-4pm, Come celebrate the induction into the ACS Fellows ranks of CAL-ACS members, Alex Madonik, T. Don Tilley, and Paul Vartanian, CAL-ACS/SCV-ACS Hospitality Booth – foot of escalator, Moscone South, 7:30am-6pm, Bay Area Chemistry Posters – Hilton Hotel, 333 O'Farrell Street, hallway ballroom level Posters highlighting eminent Bay area chemists and award

Tuesday, August 12

Science and Legacy of Attila Pavlath – 8am-noon, Moscone West, Room 3002, History Division, Local speakers – 8:10am Paul Vartanian – CAL-ACS history;

11:25am – Attila Pavlath reminisces on career, Women Leaders of the Global Chemistry Enterprise, Women Chemists Committee, 8am-5pm, Hilton Hotel, Franciscan D ballroom

Local speakers – 10:15am Darlene Hoffmann; 4:45pm Marinda Wu, Chemluminary Awards Poster Session – 8pm-9pm, Palace Hotel, Ralston, View the CAL-ACS Poster and those of other award nominees, Chemluminary Award Presentations, 9pm-10pm, Palace Hotel, Grand Ballroom – free event, CAL-ACS is nominated in seven award categories, come cheer us on!, CAL-ACS/SCV-ACS Hospitality Booth – foot of escalator, Moscone South

7:30am-6pm, Bay Area Chemistry Posters – Hilton Hotel, 333 O'Farrell Street, hallway ballroom level Posters highlighting eminent Bay area chemists and awards

Wednesday, August 13

CAL-ACS/SCV-ACS Hospitality Booth – foot of escalator, Moscone South, 7:30am-6pm, Bay Area Chemistry Posters – Hilton Hotel, 333 O'Farrell Street, hallway ballroom level Posters highlighting eminent Bay area chemists and awards

248th American Chemical Society National Exposition Guide

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PIKE Technologies	325	Thermo Scientific	814
Pine Research Instrumentation	508	815	
Pittcon 2015	409	Thieme Chemistry	607
Postnova Analytics	219	Thomson Reuters	831
PSS USA, Inc.	1040	Tosoh Bioscience LLC	411
Qorpak	1108	TSI, Inc.	305
Quantachrome Corp.	327	United Science	1526
Quark Glass	1211	University Science Books	504
Renishaw Inc.	442	US EPA Green Chemistry Program	829
Research In Germany	233	Vacuubrand, Inc.	1218
Richman Chemical Inc.	402	Vacuum Atmospheres Co.	716
Rieke Metals, Inc.	1331	Vacuum Technology Inc.	319
Rigaku Americas Corp.	924	Vapourtec Ltd.	1441
Roberts and Company Publishers	1315	Vernier Software & Technology	808
Royal Society of Chemistry	701	Vigor Gas Purification Technologies	404
Royal Society Publishing	431	Vindum Engineering	433
RT Instruments, Inc.	1004	VUV Analytics, Inc.	334
Rudolph Research Analytical	331	Waters Corp.	1117
Schrödinger, Inc.	901	Wavefunction, Inc.	611
SciAps, Inc.	414	WELCH-ILMVAC	405
Scientific Computing & Modelling NV	1424	Wilmad-LabGlass	509
Scilligence Corporation	1308	World Fusion US, Inc.	1226
Semichem	929	Wuxi AppTec (Shanghai) Co., Ltd.	211
Serena Software	937	Wyatt Technology Corp.	906
Shanghai Tech University	1326	XDL Petro-Chemical Science & Technology Trade	
Shimadzu Scientific Instruments Inc.	709	Co. (China)	1431
Showa Denko America Inc.	1314	Yamazen Science, Inc.	400
Sigma-Aldrich	517		