

THE VORTEX

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Eileen Nottoli, recipient of the 2015 Petersen Award

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Eileen M. Nottoli, Recipient of the 2015 Petersen Award

Eileen has been an active member of the California Section for more than 20 years and served for many of those years as a Councilor and a member of the ACS Committee for Environmental Improvement. Eileen has been Section Chair twice during that time. She is also the Section's Chair of the High School Teacher Committee and has initiated workshops for teachers. She is also the Olympiad Coordinator.

She received a Ph.D. in chemistry from Northwestern University and later obtained a J.D. from the University of San Francisco School of Law. She is Of Counsel in the San Francisco law office of Allen Matkins and practices in the area of environmental law with a focus on advising clients on compliance and transactions as well as representing clients in administrative enforcement and civil litigation. Eileen has extensive expertise in state and federal regulatory programs governing exposures to toxins including Proposition 65, and managing hazardous materials, hazardous wastes (including mining wastes and recycled materials), toxic air emissions, mold, wastewater, storm water, asbestos, lead, PCBs, wastewater recycling, and worker exposure. She has managed numerous environmental investigations and re-mediations of contaminated sites as well as buildings with mold and indoor air quality issues. In addition, Eileen has prepared environmental compliance handbooks and compliance programs for clients. Prior to joining Allen Matkins, Eileen was with the law firms of Beveridge & Diamond, LLP and Brobeck, Phleger & Harrison. From 1976-1988, she was a research chemist with Chevron Chemical and Chevron Research Companies where she managed the commercialization, fuel and lubricating oil additives, developed a commercial steam and gas turbine oil and formulated diesel fuel additives.

The presentation of the award will take place at our annual Awards luncheon at Scott's Seafood Restaurant, 1333 N. California Blvd., Walnut Creek, CA, Saturday, June 6, 2015. Time: 11:45 – 12:30 pm, no-host, social; 11:45 – 12:30 pm, lunch, 1:45 pm, award presentations. Cost \$32, includes entrée, dessert and coffee or tea, Choice of entrée: Salmon Alla Bella, Chicken Piccata or Pasta Primavera.

The Section also presents the Lloyd Ryland award to honor outstanding high school chemistry teachers within the California Section, the Community College Faculty Award to honor outstanding community chemistry faculty. As is the custom, the Section honors 50, 60 and 70 Year Members of the American Chemical Society.

Marinda Wu, ACS will give the keynote address, *Reflections of a Past ACS President* and present the Partners for Progress and Prosperity (P3) award.

The purpose of the Walter B. Petersen Award is to recognize persons who have made significant contributions over a period of years to the well-being of the California Section. Walter B. Petersen, for whom this award is named, is thus honored for his many years of outstanding service to the Section. He held numerous section offices over the years and was Chair of the California Section in 1969. For many years he authored a popular column in the *VORTEX* entitled "Personals by Petersen" that covered news of promotions, awards and general information about Section members. It is in his honor, with recollection of his high standards of service, that we recognize others who have given significantly to the advancement of the California Section.

This award was established in 1982 and is supported by the California Section. Nominees must be a member, a former member, or an affiliate of the Section. The honoree is presented with an engraved plaque and a \$200 gift from the Section to commemorate this award.



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Chair's Message

Charles Gluchowski
June brings us to summer and also our mid-year opportunity to recognize local members and educators for their contributions to the ACS, our local section and their communities.



The CALACS awards luncheon will be held on June 6, 2015 at Scott's Seafood in Walnut Creek. We would like to thank Dow Chemical Company which has made a contribution to support this event. In addition, Dr. Marinda Wu (CALACS member and 2013 ACS President) will give the keynote address: "Reflections of a Past ACS President: Partners for Progress and Prosperity".

Regarding awards and honors, we will be recognizing our 50, 60 and 70 year ACS members for their continual service to the ACS. It is always a pleasure to speak with these folks about their experiences in local and distant chemistry related businesses and activities from the past. The passage of time certainly does not change their passion for chemistry!

In addition, it is great that we get to honor folks who are involved in the educating of our current generation of citizens. This year we recognize Ms. Julie Hubbard, Chemistry teacher at Brentwood High School as

the recipient of the Lloyd Ryland Award, given yearly to an outstanding high school educator in the CALACS district. We are also delighted to recognize Dr. Raymond Chamberlain, a Chemistry Instructor at Merritt College who will be awarded the Community College Faculty Award in honor of his long-term contributions to chemical education at Merritt. These folks serve as the backbone for the science education process in our communities and deserve all the recognition that we can give.

Finally, we honor a couple of long term CALACS members and Executive Committee participants: Eileen Nottoli is this year's recipient of the Walter B. Petersen Award in honor of her continued and exemplary service to the section over a sustained period. Eileen has contributed greatly to many areas for the section including serving twice as Section Chair. Most recently she has been coordinating activities related to high school outreach and, for the first time this year, the Chemistry Olympiad. Under Eileen's leadership our section will be sending two local high school students out of 20 finalists Nationwide to the US National Chemistry Olympiad Study Camp in Colorado! The two students are Alvin Hsu, Mission San Jose High School, Fremont and Anushka Walia, Irvington High School also in Fremont! This is an exceptional accomplishment for the students, their teachers and Eileen.

(Continued on page 4)

*JUNE MEETING Of The CALIFORNIA SECTION
OF THE AMERICAN CHEMICAL SOCIETY*

**“Is There Room for a Chemist at the Fourth Revolution in Urban Water,”
Speaker-Dr. David Sedlak, Malozemoff Professor in the Department of Civil &
Environmental Engineering at UC Berkeley, Berkeley, CA**

Time: June 10, 2015, 5:30 – 6:45 PM Social Hour, 7:00-8:15 PM Presentation

Location: Auditorium at Chevron Facility, 100 Chevron Way, Richmond CA 94802

Cost: \$10 Members, \$15 Non-members, Includes Appetizers and Non-alcoholic beverages during Social Hour

Reservations: Please contact Julie Mason at office@calacs.org, 510-351-9922.

Abstract:

Throughout history, the expansion of cities has necessitated the development of new approaches for managing the urban water cycle. Fundamental changes in water systems usually occur abruptly, as society recognizes that existing technologies are no longer able to achieve the goals of protecting public health and assuring a reliable source of water. Population growth, climate change and under-investment in existing assets are currently creating conditions that are conducive to a fourth revolution in urban water systems. In many cases, the need to create water supplies that are less susceptible to droughts will require the exploitation of sources that currently are not considered fit for potable use (e.g., wastewater effluent, urban runoff). Furthermore, a growing recognition of the impact of trace organic contaminants on aquatic ecosystems is leading to calls to rethink municipal wastewater treatment and storm water management. Advanced treatment systems and actively managed natural systems provide an option for removing chemical contaminants from

these water sources. By considering examples of regions where water systems are undergoing transformation, insight can be gained into the ways that chemists can support the transition to more resilient and effective urban water infrastructure.

Biography:

Professor David Sedlak is the Malozemoff Professor in the Department of Civil & Environmental Engineering at UC Berkeley, Co-Director of the Berkeley Water Center and Deputy Director of the NSF engineering research center for Reinventing the Nation's Urban Water Infrastructure (ReNUWIt). He received his PhD from the University of Wisconsin in Madison and conducted postdoctoral research at Eawag in Zurich, Switzerland. Professor Sedlak's research addresses the use of natural and engineered systems to remove chemical contaminants from water prior to potable water reuse or use for habitat restoration. In addition to maintaining an active research program, Sedlak is the author of Water 4.0 and editor-in-chief of the ACS journal, *Environmental Science & Technology*.



(Chair's message continued from page 3)

Last but not least, we are also honoring Elaine Yamaguchi as the first recipient of the Partners for Progress and Prosperity (P3) Award (developed by our own Dr. Marinda Wu) given for her dedication to the national ACS as well as local CALACS over the years. In particular, this award recognizes Elaine for her contributions to our local SEED program as well as her contributions to the Women Chemists Committee (WCC).

These activities are nationally recognized within the ACS and the local communities. In particular, our local SEED activities are exceptional, providing students an opportunity to get paid doing scientific research. Hundreds of high school students from our most economically challenged regions in the CALACS section have participated in the program.

We look forward to seeing you at the luncheon!



Win a Free Trip to Azerbaijan, The Site of the 2015 International Chemistry Olympiad.

This year four American high school



students will compete in July at the International Chemistry Olympiad in Baku, Azerbaijan. Seventy-five countries participated in the Olympiad in Vietnam in 2014. In 2016 and 2017 the Olympiad competition will be held in Russia and Thailand, respectively. This year two students from the California local section qualified to attend the two week Study Camp at the U.S. Air Force Academy in Colorado Springs. They are two of the top 20 students out of more than 1000 students who took the local National exam in April 2015 and were selected to attend the USAFA Study Camp. The students are Alvin Hsu, Mission San Jose H.S., and Anushka Walia, Irvington H.S.

The road to Azerbaijan is not easy. The students first had to pass a qualifying exam provided by ACS administered at their high school. ACS National allocates the number of students who can take the national exam depending on the size of the local section.

The California section was allowed 18 spots. Twenty schools from Chico to Fremont participated with 274 students taking the qualifying exam. The 18 students with the highest scores (with a maximum of two students per high school) are eligible to take the national exam. At the Colorado Springs Study camp the students will receive more training in chemistry and the top 4 together with about 10,000 from other countries will attend the International competition in Baku, Azerbaijan. Last year at the International Competition in Vietnam the U.S. won 1 gold and 3 silver medals.

Shown below are the 18 California section and 14 Santa Clara students taking the written portion of the National exam at Santa Clara University on April 18.



California section volunteers in the background (left to right) are Al Verstuyt, Eileen Nottoli (Olympiad chair), and Bryan Balazs.



The two California section students are Anushka (left) and Anjali (right) Walia from Irvington H.S. in Fremont.

The above photo shows the laboratory segment of the National Exam. Anushka Walia is one of the two students from our section qualifying to attend the Study Camp in Colorado Springs, Co.

The other qualifying student from our Section is Alvin Hsu from Mission San Jose H.S. in Fremont

At least 75 countries worldwide think chemistry is important enough to sponsor students to the International Chemistry

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THE VORTEX



Volcanic Violence (Part 3)

Bill Motzer

In the May 2013 Vortex (Volcanic Violence – Part 1) I noted that the anniversary of each May 18th reminds me of a cataclysmic event that

I experienced while living in the Pacific Northwest. This was the eruption of Mount Saint Helens – the only volcanic eruptive episode that I experienced on a scientific and personal level. This May 18th will have marked the 35th anniversary of its explosive eruptive phase that resulted in the deaths of 57 people including a colleague, Jim Fitzgerald. Volcanoes such as Mount Saint Helens, and others, are essentially physical “heat engines”, but they are also “chemical engines” in the gases that they exude (see Volcanic Violence – Part 2, May 2014 Vortex). However, modern-day volcanic eruptions pale in comparison to some historic and prehistoric eruptions, particularly those that are now designated as supervolcanoes. A supervolcano is classified as any volcano capable of producing volcanic eruptions with ejecta volumes greater than 1,000 km³ (Figure 1). This is generally several orders of magnitude greater than “normal” volcanic eruptions. Such supervolcanoes occur when magma from the mantle rises into crustal rocks from a hotspot but is unable to break through the crust. Pressure then increases in a very large and growing magma pool and at some point the overlying crust cannot contain the magmatic pressures. Supervolcanoes

may occur at convergent plate boundaries, where a plate is undergoing subduction (e.g., Mount Toba, Sumatra, Indonesia) but they may also occur within a continental plate, particularly in areas undergoing crustal extension (e.g., Yellowstone). There are only about 47 known Quaternary (last ~2.6 million years) supervolcanic eruptions; these typically cover huge areas, with lava flows and volcanic ash resulting in long-lasting changes to climate and weather (e.g., triggering of a small ice age) and also causing some species extinction. Compositionally, supervolcanoes range from andesitic to silicic volcanism with the silicic volcanism perhaps being the most dangerous because of the large amounts of water and gases that accelerate the eruptions.

One of the largest active continental silicic volcanic fields in the world is the Yellowstone supervolcano (now a series of calderas). The U.S. Geological Survey (USGS) has been actively observing, surveying, and mapping the Yellowstone National Park volcanic field for several decades. Over the past 2.1 million years, Yellowstone has had at least three major eruptive events resulting in ash and debris blanketing large parts of the North America (Figure 2). These eruptions created sizable calderas or basins resulting from surface collapse after depletion of subsurface

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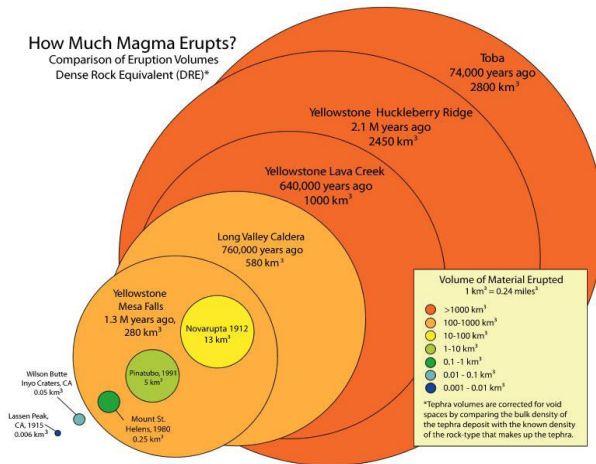


Figure 1: Comparison of relative sizes of volcanic and supervolcanic eruptions. Source: USGS: <http://volcanoes.usgs>.

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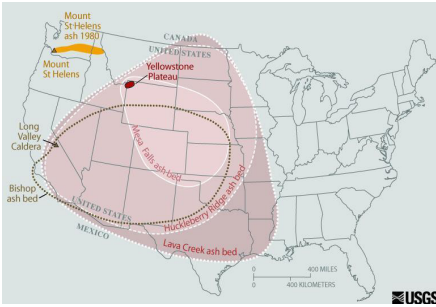


Figure 2: Comparison of the extent of volcanic ash from modern and supervolcanic eruptions. Source: USGS: <http://pubs.usgs.gov/fs/2005/3024/>

magma reservoirs. The last caldera collapse, now covering about one-third of the park's land area, occurred about 640,000 years ago followed by numerous less explosive but large lava flows, the last erupting 70,000 years ago.

The question in several TV documentaries and newspaper reports is, "Will Yellowstone erupt again in our lifetimes producing a "doomsday" scenario"? I will address this and other such issues in the next article in this series.



The Santa Clara Valley (SCVACS) June dinner meeting will be held jointly with the Golden Gate Polymer Forum (GGPF) "Materials for Enabling Nanomanufacturing"

Alshakim Nelson, Ph.D.

University of Washington and IBM Almaden Research Labs

Date: Monday, June 22

Location: Michael's Restaurant at Shoreline Park, 2960 N. Shoreline Park, Mt. View, CA 94043

Time: 6 PM social hour, 7 PM dinner 8 PM lecture

Cost: Early Registration, \$30, Students/unemployed/retired \$15, Lecture only is free

Registration: Please register on the web page <http://www.ggpf.org/> or contact: Len Radzilowski, email: lradzilo@te.com phone: 650-361-3264

Deadline for registration: Friday, June 12 for early registration discount. 5PM, Friday, June 19 for regular registration.

Dinner Selection: Seafood - Broiled salmon with lemon *beurre blanc*, Chicken Picata, Vegetarian - Vegetable Brochette

Abstract:

Nanomanufacturing in the semiconductor industry is driven by our ability to rapidly process and manipulate materials into their required forms. This seminar will highlight some of our work to develop materials for the semiconductor field and beyond. First, core-shell ferromagnetic nanoparticles (FMNPs) developed for self-assembled magnetic storage media will be presented. While FMNPs are susceptible to magnetically induced aggregation, nanoparticles coated with a diblock copolymer are stable in solution and can easily be processed as thin films. As a result, these core-shell particles are suitable for investigating self-assembly

processes for creating prototype magnetic media. Next, a simple and facile strategy for high-throughput directed self-assembly of nanoparticles on lithographically defined substrates via spin-coating will be presented. The two-dimensional arrangements of nanoparticles were formed deterministically in just 30 seconds by the strategic placement of topographical features on a substrate. Finally, the integration of dynamic covalent chemistry into nanoimprint lithography will be discussed.

Biography:

Dr. Nelson completed his undergraduate studies in chemistry at Pomona College

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Olympiad. In the U.S. high school students have many distractions and unless chemistry is promoted we will not have future generations of scientists because chemistry is the foundation for most physical and biological sciences. Like the marathon, the chemistry competition gives students something to aim at.

If you believe that activities like the Olympiad are important, you can help support local chemistry programs by contributing. It is easy; the Section has several chemistry and science related outreach programs for K-12 students.

A donation of \$1000 supports the Lloyd Ryland award which provides \$500 to a deserving High School Teacher and \$500

to their chemistry department for supplies.

A donation of \$400 to our Educational Grants Program will supply, on the average, one K-12 school with laboratory equipment and supplies.

A donation of \$50 will provide a one year membership to the American Association of Chemistry Teachers (AACT), an ACS affiliate.

Your company may have a matching program for donations to non-profit organizations. Donations to the California Section are tax deductible. Any amount is appreciated and acknowledged.

Go to the Donations tab on the CALACS.org web page. If you prefer you can talk with Charles Gluchowski, Chair, 925-640-0550, or Lou Rigali, Chair-Elect, 510-868-8788.



Photo showing one of a number of Azerbaijani national dances

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in 1999. He received his Ph.D. in organic chemistry from the University of California at Los Angeles in 2004, where he studied carbohydrate-containing polymers and macrocycles with Professor J. Fraser Stoddart. He was then an NIH postdoctoral fellow at the California Institute of Technology working for Professor Robert Grubbs on olefin metathesis catalysts for the formation of supramolecular ensembles. Dr. Nelson joined IBM Almaden Research Center as a Research Staff Member in 2005, where he focused on synthesizing building blocks that enable large area nanomanufacturing via self-assembly. His research interests also include silicon-based polymers for lithographic applications, magnetic nanoparticles, directed self-assembly of nanoparticles, and hydrogen

bonding block copolymers. Dr. Nelson has over 40 publications and 11 issued patents, and in 2011 he was designated as an IBM Master Inventor. In 2012, he became manager of the Nanomaterials Group, which includes the Synthetic Development Lab.

Dr. Nelson will join the chemistry department of the University of Washington in the 2015-16 academic year. His research will focus on the synthesis, characterization, and patterning of polymeric and supramolecular materials for the bio-interface.



The Vortex staff wish all a happy summer. We will be back in the fall with the September issue. Continue to visit the website, www.calacs.org

Earth Day Celebration at John Muir National Historic Site, Martinez, April 18, 2015

Sheila Kanodia

Members of The California Section of ACS set up and again hosted a CalACS booth for a full day celebration of Earth Day in Martinez, CA. This annual festival at the John Muir National Historic Site brought together representatives of 52 groups to engage the public in celebrating both Earth Day and John Muir's birthday. This was a Celebration of John Muir's legacy with a special treat, a keynote talk from Beth Pratt-Bergstrom, California Director - National Wildlife Federation. The program included a recycled fashion show, and a talk about Muir's famous sequoia tree. The event featured many booths on environmental issues and included eco-friendly exhibits, several speakers, live music, a silent auction, and presentation of the 37th annual John Muir

Conservation Awards recognizing the work of several groups and individuals. The event drew a crowd of hundreds of people.

The ACS theme this year was "Climate Science: More Than Just A Weather Report" developed by the ACS Committee on Community Activities (CCA) as part of its Chemists Celebrate Earth Day (CCED) Program. Visitors to the booth participated in two sorts of activities: hands-



Kids learn to build molecular models of simple organic compounds, assisted by retired chemistry teacher Tanya Phillips.



Kids learn to build molecular models of simple organic compounds, assisted by plant chemistry expert Greti Séquin

on demonstrations, and Smells of Plants and Molecule Building, set up by Dr. Margareta Séquin, as this activity was a big hit with both children and adults in our last several events. We also displayed banners, T-shirts with Earth Day theme, Earth Day balloons, and handed out the Earth Day 2015 Edition of Celebrating Chemistry as well as other conceptual aids and previous years' Earth Day brochures. The Science Department Chair (Deborah Yager) and three students from Castro Valley High School, which has an ACS club, joined us in the afternoon and helped present some of the demonstrations.

The response from visitors to the Cal ACS booth was positive for both sets of activities. Children as well as adults participated in the

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water-themed hands-on demonstrations that included: 1. producing color changes using pencil electrodes and red cabbage juice during water electrolysis (with generation of H^+ and OH^- ions, and formation of H_2 and O_2 gas bubbles), 2. observing exothermic decomposition of H_2O_2 catalyzed with yeast to give O_2 (the bubbling of O_2 was enhanced by food coloring), 3. separation of purple Gatorade color into blue and pink using C_{18} solid phase extraction mini columns, 4. comparing the number of drops of plain water versus soapy water that can be placed on a penny before the water spills off the surface, and 5. showing the acidification of red cabbage juice indicator solution in a closed zip lock bag when sufficient CO_2 is generated to inflate the bag. One visitor made an unusual request, that we explain how to balance chemical equations because they'd found it an elusive task in high school chemistry class many years before – but still wanted to know how to accomplish

it. Teaching aids were on hand for this unusual outreach moment since explanatory information regarding the principles involved in the demonstrations, especially electrolysis, included illustrative chemical equations, which we discussed with our visitor! Our exhibit on guessing plant smells and then building models of some molecules found in the plant fragrances with molecule kits proved popular with children, parents, and grandparents alike, and found special interest with teachers. A few children kept coming back, trying to build ever more complex molecules.

Perfect mild temperatures on a sunny day made the event very popular and gave us the opportunity to reach out to the public with eco-friendly chemistry activities.

The section engaged children, adults of all ages, teachers and other professionals. The participation by the CalACS section in the event continues to build a positive image of chemistry and of science in general.



Members of The California Section of ACS

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