

# THE VORTEX

AMERICAN CHEMICAL SOCIETY  
VOLUME LXXVIII NUMBER 9

CALIFORNIA SECTION  
NOVEMBER 2016

## CALACS Slate of Candidates--Please Vote

ELECTION BALLOT – 2016  
California Section, American Chemical  
Society

### CHAIR ELECT (Vote for One)

1.  Margareta Sequin
2.  \_\_\_\_\_ (write in)

### SECRETARY (Vote for One)

3.  Michael Cheng
4.  \_\_\_\_\_ (write in)

### DIRECTOR (Vote for One)

5.  Charlie Gluchowski
6.  Wally Yokoyama
7.  \_\_\_\_\_ (write in)

### MEMBER-AT-LARGE (Vote for Three)

8.  Lee Latimer
9.  Peter Olds
10.  Linda Wraxall
11.  \_\_\_\_\_ (write in)

### COUNCILOR (Vote for Three)

12.  Bryan Balazs
13.  Daniel F. Calef
14.  Don MacLean
16.  Paul Vartanian
17.  Elaine Yamaguchi
18.  \_\_\_\_\_ (write in)

|                                     |         |
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*A joint program sponsored by The Santa Clara Valley,  
and California Section of  
The American Chemical Society*

**Time:** Tuesday, November 15, from 6-8 pm.

**Place:** Golden State Brewery, 1252 Memorex Drive, Santa Clara, CA 95050

The Younger Chemists Committee (YCC) of the Santa Clara Valley Section and the California Section of the ACS will be hosting a brewery tour, tasting, and talk at Golden State Brewery in Santa Clara on Tuesday, November 15, from 6-8 pm. This event requires registration, and it is open to all. We would especially like to extend this invitation to the Senior Chemists of the SCV section to attend and see first-hand what's happening with local YCC efforts. The event will begin with a tour from the head brewer and owner, Seth Hendrickson. Following the tour, Seth will give a brief talk about the brewing process with a Q&A session to follow. Registration will include a flight of six signature Golden State beers as well as a meal voucher to be used at on-site food trucks. The YCC will also be announcing details of a future event, so be sure not to miss this one!

*Memorial for Rollie J. Myers, Jr.*

Date: November 13, 2016 2:00pm – 4:00pm

Location: Sequoia Lodge - 2666 Mountain Blvd. Oakland, CA 94611

Please join family and friends in remembering the life of this remarkable man

Contact Mary Myers with any questions: #510-846-5969

Email: marymyrs@yahoo.com



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# THE VORTEX

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## *Chair's Message*

Chemistry is great! You might ask, "why are we preaching to the choir?" While most of the California Section members are chemists, not all are--there are chemical engineers, biologists, botanists, and many that work outside the traditional areas of chemistry. But even for chemists it is appropriate to be reminded of the significant role that chemistry has played and is still playing. By nature I am not usually optimistic, maybe realistic, but often cynical, so I need to be reminded of life's profound joys and some of chemistry's uplifting achievements.

This time of year i.e. the time for state and national elections, when it seems that each candidate outdoes their opponent with negative comments, and each one seemingly hoping to win; what, a race down the sewer?

These are times when I have to step back and focus on positive images and situations. It does my sense of wellbeing and comfort no good to focus on the negative, or on the differences between people.

On a physiological level, the focus on the negative activates our flight or fight response and limits our ability to see all options. A positive outlook, on the other hand, reinforces our sense of security, sends more blood to the brain, freeing it to be creative to

see options and find solutions to a problem rather than seeing problems with the solution. A simple observation like enjoying the view not often visited, from the Berkeley hills is relaxing and enjoyable.

But I digressed we were talking about chemistry and being reminded of the enjoyment of chemistry in our everyday lives: from the chemicals that give cheese their flavor and fragrance to knowing a little about the processes of how milk and grape juice are changed into pleasurable, flavorful and fragrant experiences.

In a more profound way, chemists are playing a key role for every one on this planet, by their discoveries that cure diseases and find ways to reduce effects of global climate changes.

I have not gone to any of our section programs and not come away with a renewed spirit of hope and enthusiasm. I highly recommend attending.

Lou Rigali

P.S. Please remember to vote in the section elections; it reminds those of us who are volunteers that you appreciate the effort. And if you do not, I am listening.



## *The California Section, ACS, Election of Officers*

Chair-elect - Margareta Sequin

Secretary - Michael Cheng

Director - Wally Yokoyama and Charlie Gluchowski

Member-at-Large - Linda Wraxall, Peter Olds, and Lee Latimer

Councilor – Bryan Balazs, Dan Calef, Don MacLean, Paul Vartanian, Xiaoxi Wei, Elaine Yamaguchi

The 2016 election will be conducted electronically via SurveyMonkey. You will be notified by SurveyMonkey via e-mail; please follow the link to candidate statements, voting instruction, as well as casting your votes. If you wish to cast your vote on a paper ballot, you can download the instructions and ballot from a link that is on the front page of the website. If you have trouble locating this link, please call the California Section office at 510-391-9922, or by e-mail to [office@calacs.org](mailto:office@calacs.org). All ballots must reach the office by November 8, 2016. The candidate statements are also available at the [www.calacs.org](http://www.calacs.org).

### *2016 Candidate Statements*

#### **Margareta Séquin – Chair Elect**

Diploma and Ph.D. in Chemistry, University of Basel; Postdoctoral at Princeton and at Technical University, Munich. Lecturer of chemistry at Dominican University and at San Francisco State University for more than thirty years.

I have been a member of the ACS California Section for almost 20 years and have been co-chair of its Women Chemists' Committee for two years. During this time I have become well acquainted with our California Section's multifaceted projects. I have helped organizing many of the section's public outreach events, addressing people of all ages and backgrounds, and involving college students as volunteers to support our activities. I am active in organizing meetings for our section members.

I intend to continue to reach out to existing and new members, including younger chemists and college students, through events that provide opportunities for networking and professional development. I am committed to continue my support of the section's public outreach programs and its programs for teachers, to improve understanding of chemistry and its roles in today's world.

My background is in natural products chemistry. I'm the author of "The Chemistry of Plants", RSC, 2012, and working on "The Chemistry of Plants and Insects", to be published by RSC 2017.

#### **Michael Cheng - Secretary**

I have been a chemist at Chevron Research since 1988. I was trained as an organic chemist, but I happen to know mass spectrometry, therefore, all of my working career has been in the mass spectrometry laboratories. I have been a member of the Northern California Section of ACS since 1983, but it was not until 1998 when I became actively involved in local section activities. Through these involvements, I acquired many valuable skills both as a chemist and as a person.

It seems to me that the active members of the California Section change very little. I think, in order to have a vibrant and flexible group, there needs to be more diversity in this group of people. Also the communication machinery needs to be updated. Last year I installed electronic voting for the annual election of the Section officers, saving approximately 3000 dollars per year. We should work towards eliminating paper communication.

#### **Charles Gluchowski - Director**

I am delighted to be a candidate for Director for the California Section of the ACS. I firmly believe that I have the people and leadership skills to work with my colleagues to continue to strengthen this terrific local section. I look forward to working with the membership and executive committee to continue to develop programs that address the needs of the section.

I have learned quite a lot about the section

*(continued on page 5)*

*continued from page 2)*

and its contributions while serving as Chair Elect in 2014, Chair in 2015 and Immediate Past Chair in 2016. These experiences have provided excellent preparation to work with the Executive Committee and other board members in supporting the programs for the section. I am currently the President of Life|Science Innovations LLC, a consulting firm that provides chemistry, R&D and business development services to start-up and established life science companies. In addition, I teach Chemistry part time at Las Positas College. I have a PhD in Organic Chemistry and have spent much of my career working in increasingly responsible R&D and executive leadership roles in small to mid-sized biotechnology and pharmaceutical companies.

I am confident that I can apply these skills as a Director of the California Section.

#### **Wally Yokoyama- Director**

I am proud and honored to be a candidate for Director of the California Section. I have been a member and executive committee volunteer of the section for about 20 years. I have served twice as Chair-Elect and Chair, local section Councilor, served on the local and national Project SEED committees and proctored the Chem Olympiad. I have also served as an ACS division chair and councilor. As one of the largest ACS local sections the California Section has a larger portfolio of science education and community activities than most local sections. These programs require resources. I will do my best to advise the section on the prudent use of resources in order to continue its high level of public outreach.

#### **Lee Latimer – Member At Large**

I am honored to run for Member at Large on the Executive Committee of the California Section. My service with many aspects of the California Section has given me a wide knowledge of activities and possibilities. As a member of the ACS Board of Directors, I am very interested in staying involved with the local section activities as a model section and to be able to hear the issues of all our members and I look

forward to continuing with your support.

**Brief Bio:** Consultant in biotech and Pharmaceutical Chemistry, 2011-present; Assoc. Director to Senior Director, Elan Pharmaceuticals from 1995-2011; Activities for CalACS include Chair 2004, Councilor 2004-2016, Western Region Meeting Co-Chair 2013, many committees and participating in various Family Science Nights, CCED, NCW and others. As Councilor, served on Local Section Activities and Council Policy Committees, and now serve on ACS Board of directors as a Director at Large, 2016-2018. Previous ACS local section service with the Rochester (Chair, 1988), Philadelphia and Santa Clara Valley Sections. Education: B.S., Tulane Univ., PhD., U. of Wisconsin, post-docs at Wisconsin and Cal-Berkeley, NIH Postdoctoral Fellowship.

#### **Peter Olds - Member at Large**

Having worked as a community college chemistry educator for 18 years, I see my role on the CALACS Executive Committee as continuing to encourage and facilitate participation of students and faculty in CALACS activities and events, in addition to providing employment and teaching experience opportunities to chemists trying to become chemistry educators.

More about me is that I have an ongoing obsession with the geological hypothesis that some ophiolite belts may mark the rims of ancient large terrestrial impact craters, that such large scale impacts may result in or modify existing plate boundaries, and that such craters are useful as strain markers for tracking subsequent motion/deformation at plate boundaries over geologic time.

A recent result obtained in collaboration with UC Davis geochemists is that shocked chromite grains, separated from the KT boundary impact layers collected from southern Colorado, are terrestrial (based on chromium isotopes) and so may imply an additional crater, than the known Chicxulub Crater, associated with the KT boundary impact event. A goal is to expand involvement in this research of community

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*Salty Solutions  
(Part 3)*

Bill Motzer

In Parts 1 and 2 (December 2015 and April 2016 Vortex), I discussed total dissolved solids (TDS) and electrical conductivity (EC) in the context of measuring water quality for irrigation. Almost all irrigation water contains salts and trace elements resulting from weathering processes and percolation of applied water through soil and rock. In sufficient concentrations these salts and trace elements can affect water infiltration rates and reduce plant growth. Normal infiltration rates may be affected by the sodium (Na) content relative to the amount of calcium (Ca) and magnesium (Mg) in water. Irrigation water with elevated Na concentrations may result the soil's clay breakdown by deflocculation; this is a process that tends to clog the soil's pore spaces, reducing the aeration and reducing the soil's capacity to transmit water. This process is of particular concern not only to agriculturists but also to golf course superintendents and park managers where turf grasses are subjected to heavy use. For both golf courses and high-use turf parks (including sports fields), infiltration and percolation problems can render the turf unusable for its intended purpose – potentially an expensive error that could be avoided with more careful irrigation water choices.

**Sodium Adsorption Ratio**

The likelihood that Na present in irrigation water will cause permeability problems can be evaluated by computing a parameter known as the sodium adsorption ratio, or SAR – a ratio of the Na ion concentration to Ca plus Mg ion concentrations; this can be calculated as follows:

$$SAR = [Na] / \sqrt{([Ca] + [Mg]) / 2}$$

Calculated SAR concentrations in the above equation are in milliequivalents per liter (meq/L) and not as milligrams per liter (mg/L) or parts per million (ppm). Because most commercial laboratories report Na, Ca, and Mg as mg/L, you have to convert mg/L to meq/L; to do this we can use the equation:

$$meq/L = C \times (V/MM)$$

Where: C = the concentration of the cation or anion in mg/L  
 V = the valence or ionic charge (either positive or negative),  
 MM = the molecular or formula mass (calculated from the masses of each atom in the formula).

For divalent and monovalent cations and anions, this is not a problem; e.g.:

For Ca<sup>2+</sup>, the MM = 40.06; so, 2/40.06 = 0.0499. If the Ca concentration is 25 mg/L, then  
 25 mg/L x 0.0499 = 1.25 meq/L.

For a more complex ion such as sulfate (SO<sub>4</sub><sup>2-</sup>), one can set up a table for the calculation, e.g.:

| Element               | No. of Atoms | Atomic Mass | Molecular Mass |
|-----------------------|--------------|-------------|----------------|
| S                     | 1            | 1 x 32.06   | 32.06          |
| O                     | 4            | 4 x 16.0    | 64.00          |
| <b>Formula Mass =</b> |              |             | <b>96.06</b>   |

Because the sulfate anion has a valence (negative charge) value of 2; the valence (ignoring the negative sign) is divided by the formula mass and then multiplied by the sulfate concentration in mg/L or ppm:  
 2/96.06 = 0.02082

*(continued on page 7)*

(Motzer continued from page 6)

If, for example, a  $\text{SO}_4^{2-}$  concentration of 1,700 mg/L is given, then:

$$0.02082 \times 1,700 \text{ mg/L} = 35.39 \text{ meq/L}$$

By converting the mg/L concentration to meq/L for all of the cations and anions, the unit concentrations for all of ions are now chemically equivalent. This allows one to calculate not only a SAR value (if it is not given as part of a standard irrigation water analysis) but also to calculate a cation-anion balance for the water analysis (see *Fingerprinting Water-Part 2*, June 2014 Vortex).

Generally, a SAR below 3 is safe for irrigating

turf and other ornamental landscape plants. A SAR greater than 9 may cause severe permeability problems when applied to fine-textured soil such as a silty clay loam. Therefore, such water should be avoided for irrigation. Coarse-textured (i.e., sandy) soils are generally less susceptible to permeability problems. For such soils, the SAR can be somewhat higher than for silty and clayey soils. However, if irrigation water contains elevated bicarbonate ( $\text{HCO}_3^-$ ), it can also affect the Ca and Mg soil concentrations when such  $\text{HCO}_3^-$ -rich irrigation water is applied. Some laboratories will compute and report an adjusted SAR that accounts for the  $\text{HCO}_3^-$ , Na, and Mg concentrations.

In the next installment of this series, we'll explore the relationship of EC and SAR in evaluating irrigation water quality chemistry.



## Celebrate Mole day by donating to Project SEED

The brief video produced by ACS highlights some of the reasons why donation to Project SEED and the many other outreach programs help support science and chemistry in our community schools. You can help support the programs including the work with the High School Chemistry Teachers programs through your donations. <https://www.acs.org/content/acs/en/campaigns/donate/project-seed/mole-day.html>

### Project SEED Opens Doors to Scientific Research

Project SEED offers bright, economically disadvantaged high school students rare opportunity to perform college-level scientific research. Each student receives a stipend while working under the supervision of a volunteer scientist mentor.

## Gifts & Donations

We wish to acknowledge a gift from Malcolm Singer, a former CalACS member and 1985 Chair for his gifts to PROJECT SEED and the Section. Malcolm has moved out of the area but wants to support the Section and its programs. Thank You.

It is easy to select the programs you want to support. Call or email and find out how your contribution can be used.

*continued from page 5)*

college students, several of whom have already made significant contributions to the effort, both in the field and in the laboratory.

#### **Linda Wraxall- Member At Large**

Members-at-Large are voting members of the local section Executive Committee and, as such, have a say in its decision making responsibilities. I have been involved with the California section for many years and have served as Employment Chair for most of them. I have also participated in Family Science Nights, helped to organize Science Cafes and judge science fairs, and generally been available as a volunteer for everything from national ACS Meetings to bylaw revision. I am therefore willing to take on this new role which will mean I can continue to lend support and be influential in a section that leads the way within the national ACS organization.

#### **Bryan Balazs – Councilor**

Serving the California Section and its members has been a unique privilege, and I would be honored to continue to serve

as one of your Councilors. My passion is chemistry, from my Ph.D. at Caltech in 1992 through the many projects that I have worked on at Lawrence Livermore National Laboratory. I have taken to heart my commitment to ACS service at all levels: as a candidate for ACS 2016 President-Elect, as a member of the Pacifichem 2010 and 2015 Organizing Committees, as a local section Councilor and twice as section Chair, as Chair of our section's Educational Grants Committee, and as a long-standing volunteer at many of our outreach and educational events. If re-elected as one of your Councilors, I will continue to address your issues locally and nationally, issues such as the changing nature of science education and the employment landscape, the value of the ACS to its members, and the fostering of more support from our communities and governmental organizations for our members and our profession. Thank you, and remember to vote in the ACS 2016 Fall election!



### SAVE THE DATE

#### *CALIFORNIA SECTION, ACS JANUARY MEETING*

“Can Geochemistry Help Solve our CO<sub>2</sub> Problem?”

Guest Speaker: Greg H. Rau

Senior Research Scientist, Institute of Marine Sciences, Univ. California, Santa Cruz and Visiting Scientist, Lawrence Livermore and Berkeley National Laboratories

Date: Thursday, January 19, 2017

Time: Reception: 5:30 – 6:00 pm, Talk: 6:00-7:00pm.

Place: USDA, 800 Buchanan St., Albany, CA 94706.

Cost: \$10 for light refreshments to be served from 5:30-6:00pm.

Reservations: Please register for meal or talk only by email [office@calacs.org](mailto:office@calacs.org) or 510-351-9922, no later than Monday, January 16, 2017. You may prepay by mailing your check to Cal. Section ACS at 2950 Merced St. #225, San Leandro CA 94577 or with PayPal using our email address [office@calacs.org](mailto:office@calacs.org).



# November Joint Meeting Report of The California Section of the ACS and The Electrochemical Society



Thanks to Dr. Ron Zuckermann, Facility Director of the Biological Nanostructures Facility at The Molecular Foundry who gave a fascinating presentation of his research studies and provided a tour.



of his laboratory at The Foundry. Dr. Zuckermann was able to rearrange his schedule and accommodate the two Sections after the scheduled speaker was unable to participate.

It would be difficult for those few Bay Area residents who have not driven along Grizzly Peak Drive in the Oakland/Berkeley hills to understand the envy one has for those LBL employees who work at this campus in the hills. The view is a local treasure.

The Molecular Foundry is organized into seven interdependent research facilities that support the four crosscutting scientific themes that are validated by a thorough strategic planning process. The Foundry provides access to state-of-the-art instrumentation, unique scientific expertise, and specialized techniques to help users address myriad challenges in nanoscience and nanotechnology. There is a lot more to say about the Foundry and you will see it published in "The Vortex" soon.

The 20-30 people attending the meeting had the opportunity to enjoy lunch with a view plus a privileged insight to the work of a creative chemist looking to discover pathways to synthesis of artificial proteins plus more.

Along the way to synthesize sequence-defined polymer chains that fold into precise

*(Continued on page 10)*

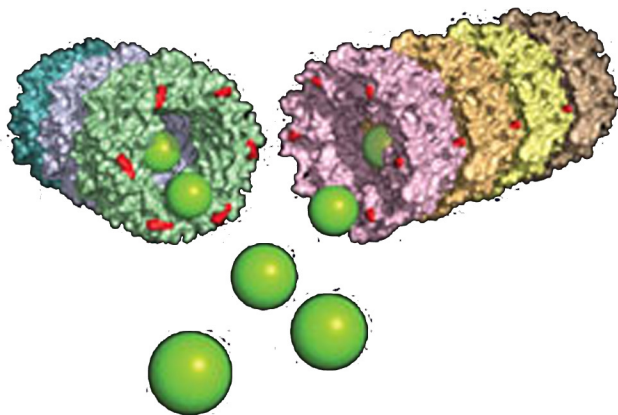
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protein-like structures there are a few steps like: efficiently produce information-rich polymer sequences using an automated solid-phase submonomer synthesis method to generate sequence-defined peptoid polymers up to 50 monomers in length. This method uses readily available primary amine synthons, allowing hundreds of chemically diverse sidechains to be cheaply introduced. Add in a little molecular modeling, to design, synthesize, assemble and engineer a variety of protein-mimetic nanostructures and form highly ordered supramolecular assemblies of

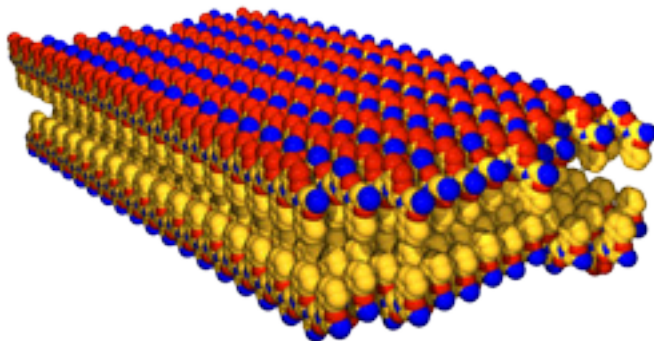
nanosheets and nanotubes. These can then be compared to the fundamental structures found in biology.

A few details may be missing in the above description but it is easy enough to learn more about chemical structure and molecular architecture of the peptoid nanosheet by seeing images, movies, computer simulations, interactive models and more! Check it out at <http://www.nanosheets.org>.

Lou Rigali



Tailorable nanotubes that can be lengthened, shortened, or adorned with molecules that give the tubes specific functions.



Peptoid Nanosheets:

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## SEARCHING FOR THAT SPECIAL JOB?

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- Companies for laboratory and management positions
- Universities & Colleges for teaching positions and laboratory personnel
- 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.mboservices.net)
- <http://www.calacs.org/page.asp?id=22>

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