THE VORTEX

AMERICAN CHEMICAL SOCIETY **CALIFORNIA SECTION**
VOLUME LXXVII NUMBER 1 **JANUARY 2016**

Happy New Year

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Science café

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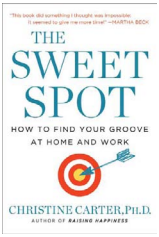
How to Achieve More by Doing Less

Dr. Christine Carter

Sociologist and senior fellow at UC Berkeley's Greater Good Science Center

Wednesday, January 13, 2016
7:00pm to 8:30pm Community Hall



Presenting the latest research on productivity and elite performance, Christine Carter, PhD, demonstrates a sweet paradox: by doing less we can actually accomplish more. Using surprising science and lively anecdotal evidence, Carter offers a practical game plan for mitigating stress by working with our brain's innate hardwiring to increase happiness, balance and ultimately, success.

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Chair's Message

Lou Rigali

Happy New Year. It is a time of the year when many of us reflect on the past year's accomplishments and make resolutions that are intended to improve our lives. One resolutions i have for this new year among oher are plans to make participation easier for Members by having teleconferencing at our meetings.

The challenges of the future can only be met successfully through the help and cooperation of others. I acknowledge the foundation of the Section upon which many have contributed. We all appreciate the participation of those members who have volunteered their time and energy to bring the California Section into the present century from its beginning in 1901. The California Section has been recognized from the start as one of the leading and most innovative sections in the country. A long overdue document will be prepared that gives a history of the Section and its accomplishments.

New members and others often ask why the name, The California Section? There are lots of ACS Sections in California. In 1901 there was only the one and we are their descendents. Soon there were two, one in Southern California. I am not sure if there were any discussion to change the name to The Northern California Section, but I would like to think that those early members saw that there would be many more Sections, in both Southern and Northern California so they spent their time supporting the goals of the Section and not worrying about how to rename the Section every few years.

Speaking of goals, I applaud the committee which worked hard to get a consensus from the Executive Committee on the following Mission Statement, *"The California Section of the American Chemical Society promotes chemistry and the chemical profession in the Northern California area: We provide programs and services for members, recognize and assist educators and students, and host public outreach events to convey the importance of chemistry in today's rapidly changing technological society."*

The We" in the above paragraph is not the Imperial 'We, It is the collective 'We'; dues paying members, retired members, student members and other affiliated groups. All members have a choice on various levels to support or not, to participate or not, to influence or not any and all aspects of the Section's Activities. Are you getting your money's worth? An active member has the most influence. This is not to say or imply active members only gain when they influence. You only have to spend a few minutes listening to the committee members who work with teachers, and students of all ages and hear the stories of grateful parents as well as those from teachers and students.

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Joint Meeting, Santa Clara Valley and California Section

At this meeting the Santa Clara Valley Section (SCVACS) will present The Mosher Award. This award was established in 1980 (SCVACS) to:

1. recognize and encourage outstanding work in chemistry,
2. advance chemistry as a profession, and
3. recognize service to 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 SCVACS.

The California Section is pleased to participate in the event and honor a long time Member and Past Chair x3 of our Section and past President of the ACS.

Place: Basque Cultural Center, 599 Railroad Avenue, South San Francisco, CA

Date: Thursday January 21, 6-9 pm, Social at 6:00, Dinner at 7:00 and at 8:00, the Presentation & Mosher Talk "Does the public realize what chemistry has done for them?" by Attila E. Pavlath, ACS President 2001

Meal: Choice of entrees:

Veal Roast
Breast of Chicken Chasseur
Vegetarian Pasta

(Please indicate your choice of entrée when making your reservation.)

Cost: $30.00 - Regular members
$15.00 - Students
$15.00 - Emeritus

Reservations are required: RSVP no later than Wednesday, January 13, 2016 to Julie Mason at California Section Office by email at office@calacs.org or phone 510-351-9922. Please pay in advance by sending a check made payable to California Section, ACS, to 2950 Merced Street, #225, San Leandro, CA 94577 or thru PayPal and using our email address.

Tentative Monthly Section Programs 2016

Following is a list of some of the meetings that are being planned. Arranging meeting places and coordinating with the speakers' schedules is always a challenge. Please feel free to recommend topics and speakers.

February--Susan Altenbach, USDA, —Wheat allergies

March--Xiaoxi Wei, PhD, X-Therma, Inc. A young company located in the Bay Area with the mission to develop potent biomaterials for both medical and industrial applications via Biomimetic Nanoscience.

April—Justin Siegel, U Washington —Startups

May--Jyllian Kemsley, Ph.D, C&E News Editor, Laboratory Safety Bay Area and Chico

May—Awards Luncheon

Other potential Meetings

Torey Arvik, Sonomaceuticals, LLC. Obesity, inflammation and grape seed prebiotics

Ruihong Zhang, UC Davis, Recycling waste for energy self sufficiency

Recognizing our Heroes of Chemistry

Who are our heroes today? The media recognizes athletes and entertainers, as well as policemen and firefighters as heroes. At the American Chemical Society (ACS), we appreciate that chemical scientists are everyday heroes who impact our world in ways both great and small.

Since 1996, the ACS Heroes of Chemistry program has recognized chemical scientists whose work in various fields of chemistry and chemical engineering has led to the successful innovation and development of commercial products based on chemistry. The Heroes program also highlights the vital role of industrial chemical scientists and their companies in improving human welfare through successful commercial innovations and products. It presents an ideal opportunity to enhance the public image of the chemical and allied industries.

Each year, Heroes of Chemistry are nominated by their respective companies to recognize their talent, creativity, and innovation. Our previous Heroes have excelled in innovation at prominent international corporations, and have developed numerous commercial products that demonstrate strong financial performance. The commercial success of their products in the marketplace is an important criterion for this honor, because we recognize that good business results follow good science.

2015 Heroes of Chemistry

Bristol-Myers Squibb

ELIQUIS® (apixaban), an orally bioavailable small molecule Factor Xa (FXa) inhibitor that is administered as a safe and efficacious oral anticoagulant agent during the treatment of cardiovascular disease.

Awardees: Robert Knabb, Patrick Lam, Michael Orwat, Donald Pinto, Mimi Quan, Pancras Wong

Celgene Corporation

POMALYST® (pomalidomide), an oral immunomodulatory agent to treat relapsed multiple myeloma cancer.

Awardees: Roger Shen-Chu Chen, George Muller

Dow Chemical

INSITE™ technology, a single-site, constrained-geometry metallocene catalysis platform that led to creation of novel polyethylene elastomers marketed under the brand names ENGAGE™, NORDEL™, and AFFINITY™.

Awardees: David Devore, Morris Edmondson, Pradeep Jain, George Knight, Brian Kolthammer, Shih-Yaw Lai, Robert LaPointe, David Neithamer, Peter Nickias, Jasson Patton, Robert Rosen, James Stevens, Francis Timmers, Daniel VanderLende, David Wilson

Eastman Chemical Company

Tritan™ Copolyesters, a new family of engineering plastics that are clear, tough, stain-resistant, and free of Estrogenic Activity (EA).

Awardees: Benjamin Barton, Emmett Crawford, Ted Germroth, Christopher Killian, Anthony Messina, David Porter

Gilead Sciences, Inc.

HARVONI®, the first single-tablet regimen (STR), for the treatment of Hepatitis C virus. Harvoni® is a combination drug containing Sofosbuvir and Ledipasvir.

Awardees: Benjamin Graetz, John Link, Erik Mogalian, Rowchanak Pakdaman, Bruce Ross, Robert Scott, Michael Sofia, Cheng Yong Yang

Pfizer

XELJANZ® (tofacitinib citrate), a revolutionary oral therapy for the treatment of rheumatoid arthritis. Xeljanz® is the first oral kinase inhibitor approved for a non

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Salty Solutions (Part 1)

Bill Motzer

I almost became a soil chemist, about an aeon ago, when I was completing my Master's degree, one of my thesis committee members was a soil scientist and he tried convincing me to major in soil chemistry. Alas (for him), I continued with my geochemistry studies, but retain to this day a soft spot for soil and agricultural chemists. With California's continuing drought, an understanding of salt impacts to our soils and surface and groundwater in agricultural and other areas of the state becomes exceedingly important. California has some of the west's most saline impacted soils (Figure 1). California also has a continuing drought and water crisis, prompting the State Water Resources Control Board to issue a policy increasing other water source uses such as recycled water (RW) (see The Vortex December 2011 and January – February 2012 issues: Recycling Water). Additionally, this policy requires completion of Salt and Nutrient Management Plans (SNMPs) by applicable local agencies to facilitate basin-wide management of salts and nutrients from all sources in a manner optimizing RW use. I'll discuss SNMPs in more detail in a future article.

Salts are invariably added to soil with application of each irrigation supply. Generally, salt concentrations are lowest in precipitation and surface water such as streams, increasing in concentration in rivers and lakes (Table 1) and RW. Therefore, water derived from rivers and lakes can have significant salt concentrations and when used for irrigation such salts can impact crops by reducing crop yield. To determine water for crop usage suitability, water quality by chemical analysis of the dissolved salts becomes crucial. Because salts vary in any given surface water and groundwater type, they may be determined by Na^+ and Cl^- or total dissolved solids (TDS) analysis or by measuring other parameters such as electrical conductivity (EC). These are the most common methods for determining water salinity.

The transport and fate of salinity in infiltrating water through soil, rock to surface water and groundwater is largely governed by the amount of TDS, which is defined as the total quantity of solids in mg/L or parts per million (ppm). Commonly, this is determined in the laboratory by evaporating a water sample and weighing the solid residue. However, it can also be calculated from a standard water analysis of the basic intrinsic cations (e.g., Ca^{2+}, Mg^{2+}, Na^+, and K^+) and anions (HCO_3^-, Cl^-, SO_4^{2-}, and NO_3^-) with additional cations (e.g., Ba^{2+}, Fe^{2+}, and Mn^{2+}) and anions (e.g., F^-) then by summing the total cations and total anions. However, for greater accuracy silica, (Si^{4+}) should also be included. Water quality classifications may be based on TDS and – although the definition of what is fresh versus saline, etc. varies in the literature – the most commonly used classification is from the U.S. Geological Survey (Table 2).

TDS transport through soil is typically dominated by soluble anions (i.e., Cl^-, SO_4^{2-}, HCO_3^-, and NO_3^-); these anions are not inhibited or retarded by soil sorption because soils have very little anion exchange capacities. Soil, however, may retain the cations (Ca^{2+}, Mg^{2+}, Na^+, and K^+), particularly if clays are present. Additionally, local surface water and related groundwater quality may be impacted by inflow of salts from surrounding geologic formations. For example, sedimentary rocks of marine origin and their residual soils have naturally deposited salts that can contribute to the genesis of the saline soils. Although at first minimal, such salt contributions may remain a factor because these salts tend to accumulate over time in crop root zones and thereby will also contribute to natural saline groundwater. Where soils contain extensive clay pans, shallow (perched) water tables predominate, particularly in areas having gentle to flat slopes. Generally, when the water table rises to within 5 or 6 feet of the soil surface, groundwater has a tendency to move upward into the root zone and to the soil surface. Under such conditions, groundwater and irrigation water will both contribute to the soil salinization.

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(Motzer continued from page 6)

As described above, the major potential impact to such soil, would be additional salt loading with subsequent leaching and runoff to eventually impact surface water and groundwater. Impacts to surface water and groundwater may also result from improper pesticide usage. Modern management practices (also known as best management practices or BMPs) for salinity, irrigation, and pesticide usage can be employed to minimize and mitigate impacts to irrigated land and these will be discussed in a future article.

EC is commonly measured in micromhos per centimeter (µmhos/cm). It is also known as specific conductance, or just conductivity and is defined as the conductance of one cm3 of H_2O at 25°C. EC measurements in agricultural literature are commonly measured in deciSiemens per meter (dS/m), where 1.0 dS/m is equal to 1,000 µmhos/cm. Water salinity may also be classified based on TDS and EC (Table 2). Non saline water generally has TDS concentrations less than 500 ppm and EC values of less than 0.7 dS/m. Non saline waters will have the lowest impact to agricultural lands and are preferred for irrigation usage.

Another approximate relationship between TDS and EC is that in the range of natural water:

~100 to 5,000 µS/cm ≈ 1 meq/L of cations = 100 µS/cm and therefore 1.0 mg/L = 1.56 µS/cm.

I will continue this discussion in Part 2.

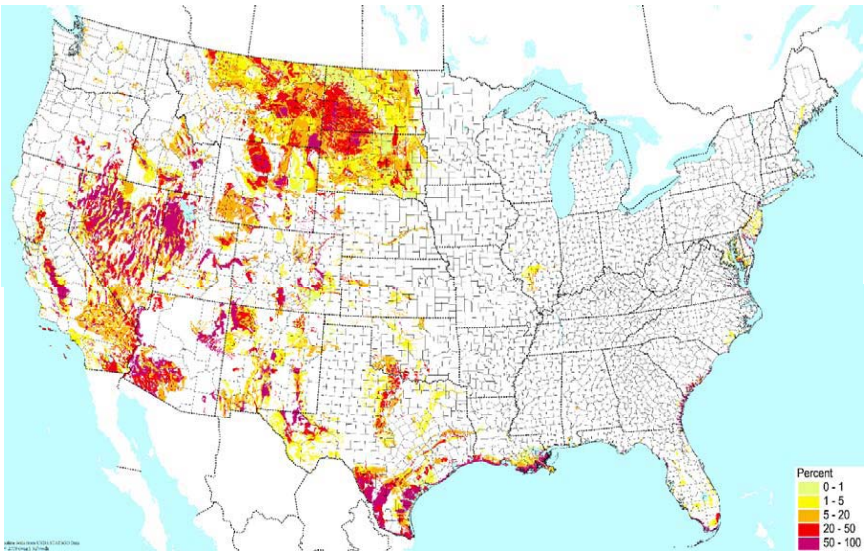

Figure 1: Salty soils based on high electric conductivity. Source: http://www.bonap.org/2008_Soil/SoilTypesRelatedMaps.html

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Table 1: Salt Concentrations in Freshwater Bodies

Freshwater Body	Salt Concentration (ppm)
Rain	1 – 10
Streams	100 – 1,000
Rivers	1 – 10,000
Lakes with outflow	10 – 10,000
Lakes without outflow	1,000 – 700,000

Table 2: U.S. Geological Survey Classification of Water based on TDS

Classification	TDS (mg/L)
Fresh	<1,000
Slightly Saline	1,000 to 3,000
Moderately Saline	3,000 to 10,000
Very Saline	10,000 to 35,000
Brine	>35,000

(Heroes continued on page 5)

oncology indication.
Awardees: Douglas Ball, Todd Blumenkopf, William Brissette, Matthew Brown, Frank Busch, Paul Changelian, Robert Dugger, Eileen Elliott, Michael Fisher, Mark Flanagan, Sally Gut-Ruggeri, Elizabeth Kudlacz, Michael Munchhof, Chakrapani Subramanyam, Frank Urban, Rajappa Vaidyanathan

Chemists--Artists

The Section website store is looking for a Periodic Table design that is copyright free that can be used to imprint t-shirts, puzzles, place mats and framed posters. Send your suggestion to Lou Rigali LR101898@aol.com

Advising the Next Generation of Chemists and Chemical Engineers

Liam Berryman, Member at Large, ACS & Undergraduate Lead, YCC

I think we can agree that the opportunities for a professional with a chemistry background are quite diverse, challenging, and above all, rewarding. On November 30th, the Younger Chemists Committee of the California Section ACS teamed up with the American Institute of Chemical Engineers (AIChE) Berkeley chapter to co-host a career panel exemplifying some options available to young professionals. "Careers in Chemistry and Chemical Engineering," an event targeting undergraduate and graduate students, drew over fifty attendees. The panel held an engaging range of talent and background--by name and title, the six panelists were: Toby Astill PhD, Sr. Sales Specialist, PerkinElmer Inc, Janet Schunck, Siemens Clinical Laboratory, Jessica Siu, Research Technician, Chevron, Hayden Taylor PhD, Assistant Professor at UC Berkeley, Yaya Zhu, Research Technician, Chevron, and Xiaoxi Wei, PhD, Co-founder and CEO of X-Therma Inc. With topics ranging from GPA to experience to connections, the panelists were impressed with the preparedness of the attendees, and gave thoughtful, convincing answers on how and when to properly accelerate careers. Further, each panelist was able to provide deep advice on their area of expertise--Professor Taylor discussed the pros and cons of pursuing a PhD, Dr. Astill stressed how important it is to consider offers outside pure wet lab work, and Dr. Wei walked through the necessary steps for the entrepreneurs among us. As the discussion progressed, more questions from the audience turned towards closing the gap between school and work through self-presentation, networking, skill building, and attitude. Ms. Siu advised for focused pursuit of a select few interesting companies, Ms. Zhu encouraged experience based connections through internships and research, and Ms. Schunck implored students to self-study the intricacies of a given field. All the panelists agreed that strong self-promotion among chemistry and non-chemistry related circles alike is important for both personal development and job prospects. The open panel ran for one and a half hours, and the panelists were kind enough to stay an extra half hour afterwards to mingle and answer more personalized questions. The event was very well received by the student body, and requests for another have motivated a discussion for a spring career panel or networking event.

YCC Chair Stephanie M. Malone moderated the discussion and worked with Liam to plan, coordinate, and run the event. AIChE President Rahul Batra organized the event location and helped to publicize the opportunity among undergraduates.

Chair*: continued from page 3)*

There are significant networking benefits that are obtained when attending the monthly Executive Committee meeting, but also through the various committees such as the Program Committee as it plans and implements the local monthly speaker programs including participation at the Regional and National levels.

The Section needs your active involvement to carry on into the future as an outstanding award winning Section and meeting the needs of our Members and community. Below is a partial list of functions and positions for which we need volunteers.

I look forward to meeting you and hearing your ideas on how we can make the Section better.

Lou Rigali

Call for Volunteers

CalACS has ambitious and challenging programs and activities planned for 2016 and could use your help in all areas; but key areas are:

Assistant Editor for the Vortex: The present editor will be the Section's Chair for 2016 and needs help with the newsletter and website, together or separately. The Editor will arrange for training, if necessary. Plan on helping for at least 6 months or more and possibly becoming the Editor. The duties are to help lay out the monthly newsletter and update the website. No knowledge of html or programing language is necessary for the website maintenance and updating. The newsletter uses the Adobe In Design desktop publishing and some working knowledge is important.

Chair, co-chair or member of the Program Committee: Members on this committee will make and/or coordinate the arrangements for the Monthly Technical meetings.

Chair, co-chair or member of the new Communication Committee. Members on this committee will develop improved communications strategies to engage and inform members or section activities using the website, The Vortex, Social Media, and other communication methods.

Chair, co-chair, or member of the new Welcome Committee: Members in this committee will develop and implement strategies and tactics to make sure new members are appropriately welcomed and informed of the Section's activities and benefits. This committee will also be charged with developing programs that turn more members into active members. Send an email to Lou Rigali at lr101898@aol.com or call 510 868 8788.

Survey Results

Around October 2015, the Section with the cooperation of several members, Nikki Davis, Michael Chang, Charlie Gluchowski and Lee Latimer, put together a set of questions and sent them via a commercial survey company by e-mail to members of the Section for whom we had addresses. Lee Latimer tabulated the results. The following is a brief summary. Additional information can be requested through Lee. The comments are those of the writer.

1. To the instruction, rate your familiarity with the programs and activities of the California Section: about 28% responded "not very" 72% responded "moderately."
Comment: It looks like the Section does an effective job of getting information out about its programs and activities.
2. To the question, how many programs did you attend in the last two years? About 60% responded "0".
Comment: Clearly a lot of room for the Section to improve.
3. To the question, how satisfied are you with the communications of events, programs, and activities of the Section.? About 80% responded moderately to good.
Comment: The answer seems to be consistent with # 1
4.To the question, how satisfied are you with the Section? About 80% responded moderately to good
Comment: While the results seem very positive, there were 40% that responded with ratings of 3 out of 5. It will be an appropriate goal to move those 3s to 4s and 5s.
5. 70% of the responders have been members for 10 years or more, 40% for 20 years or more.
Comment: While the Section has made a start to be more relevant to younger members, continued effort and more resources seem called for.

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