

Silicon Valley Chemist

Silicon Valley Section

American Chemical Society

Volume 41 No. 2

FEBRUARY 2019 NEWSLETTER TOPICS

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Connect with Chemists

An early morning chat with fellow chemists

Thursday, February 21, 2019, at 7 a.m.

Coupa Café, 538 Ramona Street, Palo Alto

Contact Ean Warren (ewarren@scvacs.org)

for more information or ask for ACS at Coupa.

SVACS Teacher-Scholar Award Dinner Meeting

Why does it have to be so hard? Evaluating the value of a course in Organic Chemistry

Dr. Kathleen Armstrong



Abstract

Organic Chemistry has long been considered one of the most difficult undergraduate courses. One rationale offered by Chemistry faculty is that mastery of Organic Chemistry requires extensive application of Analytic reasoning rather than relying on memorized content knowledge. This claim is only true, however, when assessment methods require explicit application of critical thinking. Careful attention to assessment at Foothill College has proven valuable in developing this important learning outcome. Graduates report back on their career pathways and the extent to which skills developed in their Organic Chemistry course influenced their success.

Biography

Kathleen Armstrong received her Ph.D.

in Physical Organic Chemistry from the University of California at San Diego. While at UCSD, She worked in the laboratory of Professor Charles Perrin, studying Stereo-electronic effects on conformation in sugars and other simple monomers. Most of her work there involved the use

of NMR to probe three-dimensional structure and conformational equilibria. Following a post-doc at CSU in Fort Collins, CO, and a one-year teaching assignment at CU Boulder, Kathleen moved with her family to the SF Bay area and has been on the faculty at Foothill College since 2001. In addition to teaching Organic Chemistry, Kathleen has worked extensively on curriculum development and serves as faculty advisor for Foothill College's student chapter of the American Chemical Society. In the past 18 years at Foothill, she has had seen over 1000 of her students graduate.

Chair's Message

Grace Baysinger



Greetings! This month I would like to spotlight four areas: my goals as Chair, what's happening in the Silicon Valley Section, International Periodic Table of the Elements 2019 resources, and career and professional development resources on the ACS website.

SV Chair's Goals: Increase membership and engagement with graduate students, postdocs, and young professionals. Review SV committees and expand ExComm and member participation in these groups. Help improve / expand our website, social media

presence, and print materials. Also promote the adoption of a collaborative online environment to help facilitate SV internal communication and document management.

ACS Silicon Valley Section activities: On February 28th, we will have a Teacher-Scholar

Award Dinner Meeting at Foothill College to recognize Kathleen Armstrong. On March 8th, Phil Crews will offer a workshop at Cabrillo College on Wines and winemaking: merging chemistry fundamentals and sensory

continued on next page

SVACS Teacher-Scholar Award Dinner Meeting

Date: Thursday, February 28, 2019

Time: 6:30 - 8:30 pm

Speaker: Dr. Kathleen Armstrong
Foothill College

Location: Foothill College
12345 El Monte Rd
Los Altos Hills, CA 94022

Reservation: visit our website at
www.svacs.org

Chair's Message, continued from front page

evaluation outcomes to gain a 21st Century perspective. On April 18th, there will be a Conversation with ACS President, Bonnie Charpentier: the ACS Community and Priorities for 2019, at the Basque Cultural Center. Please check the [ACS Silicon Valley Section's website](#) for more details and to register for events.

International Year of the Periodic Table (IYPT2019): There's a 99 second visualization showing *300 Years of Element Discovery*. It is available on YouTube and was created by Dr. Jamie Gallagher. An online poster of *A timeline of the discoveries of the chemical elements – #IYPT2019 edition* was created by Andy Brunning and posted on his Compound Interest website. The January 17, 2019, issue of The Guardian Newspaper had this news: *St. Andrews find may be oldest surviving wall chart of periodic table* that appears to date from 1885 was found under the lecture hall during a clean-out. In celebration of IYPT 2019, be sure to check out ACS' *Periodic Table of the Elements* pages that includes educational resources by age group. Last but not least, follow what's happening this year and view more resources on the [IYPT2019.org](#) website from IUPAC.

Career and Professional Development Resources on the ACS website: *ChemIDP*, an individual development planning tool, is designed to help graduate students and post-doctoral scholars in the chemical sciences plan and prepare for rewarding careers. *Explore Career Options* has information and resources for chemists at all stages of their career. *ACS Leadership Development* provides an opportunity to learn essential skills and includes free and fee-based courses offered online and in person. Free *ACS Webinars* cover entrepreneurship, professional development, technology and innovation, drug discovery, culinary chemistry, and popular chemistry. *ACS National Meetings – Technical Meeting Archive* provides ACS Members free access to videos for the Kavli Lectures Series and Priestly Medalist Award winners.

Many thanks for being a member of ACS!

Grace Baysinger
ACS Fellow 2017

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SVACS March Dinner Meeting

Wines and Winemaking Merging Chemistry Fundamentals and Sensory Evaluation Outcomes to Gain a 21st Century Perspective

Professor Phil Crews, UC Santa Cruz and Pelican Ranch Winery

Abstract

Wine is a complex liquid comprised of many bioorganic and bioinorganic compounds in a 12.5% alcoholic solution with a pH range of 3-4. Wine quality assessment and winemaking methods have been in place for many centuries. Nowadays, contemporary approaches to winemaking are quite scientific as many aspects of this complex drink appear to be understood. For example, a fascinating book, "Understanding Wine Chemistry," by Waterhouse, Sacks, & Jeffery was recently published in 2016. Decades ago Wired Magazine reported on the Grapes of Math (GoM) in an comprehensive article to underscore that consulting companies exist to help winemakers craft award winning wines. The GoM approach uses databases created via metabolomics approaches. On the other hand, many subscribe to the idea that successful winemaking and wine quality evaluations can be achieved by just using a "right-brained" approach. In this wine-centric event we will explore principles of wine making and wines through sensory evaluations and correlating this with wine molecules. Different flavor outcomes achieved in winemaking as a function of grape variety and the terroir differences of vineyards in California will be illustrated. The approaches to wine creation will be explored using case examples. Everyone in attendance will have a chance to dissect the major and minor complex flavors aromas and the chemistry associated with wines. Answers to vexing questions will be sought by examining outcomes derived from tasting and talking about five different Burgundy and Rhône style California wines.

Biography

Phil Crews is a California native, and has spent most of his academic career in the State. He received his B.S. from the University of California at Los Angeles and his Ph.D. from UC Santa Barbara working with Domenick Bertelli. After a postdoc at Princeton University, in 1970, he started as an Assistant Professor and is currently an Emeritus Professor for the Chemistry and Biochemistry Department at UC Santa Cruz. The primary goals of his



research group were to understand the chemistry of tropical marine sponges and marine-derived fungi. Bioassay-guided isolation assisted in the discovery of natural products potent against human diseases such as cancer and neglected tropical diseases. The search for novel active compounds incorporated elements

of structure elucidation, employing state-of-the-art nuclear magnetic resonance (NMR) techniques.

A passionate home-wine-maker, wine educator took his "hobby" public. Specializing in Burgundian and Rhone style wines from select Coastal vineyards, the *Pelican Ranch Winery* is a family owned and operated winery in the heart of Capitola. Established in 1997, the winery is just a few blocks from the Monterey Bay which provides a constant, cool, coastal influence that allows for the making of fine elegant wines.



Pelican Ranch
Winery

SVACS March Dinner Meeting

Date: Friday, March 8, 2019

Time: 6:00 - 9:00 PM

Speaker: Professor Phil Crews
Department of Chemistry
and Biochemistry, UC Santa
Cruz and Pelican Ranch
Winery, Capitola, CA

Location: *Sesnon House*
Cabrillo College
6500 Soquel Drive
Aptos, CA 95003

Tickets: Regular \$30, Students \$15

Reservation: visit our website at
www.svacs.org

Volunteers Needed for the 2019 Chemistry Olympiad

The 51st International Chemistry Olympiad will be held in Paris, France, July 21-30. Some of the world's most talented high school chemistry students will be attending from about 70 countries. The U.S. will send a team of four outstanding students, who will be selected from a pool of 20 finalists from across the United States. If you remember, in 2013, Stephen Ting from our section, admirably represented the U.S. in Moscow and, in 2015 David Wang represented the U.S. and our section in Baku, Azerbaijan, and in 2017, Steven Liu represented us in Nakhon Pathom, Thailand. All three young men won gold medals!

The selection of the 20 finalists begins in the local sections. Chemistry students from the Santa Clara/Silicon Valley will participate by taking a standardized ACS written exam to determine their placement. The first round of testing is conducted in the local high schools in March. The local section invites and encourages over 100 high schools to participate and provides the testing materials.

Our section's top 16 students will meet on Saturday, April 27th, to compete in the national exams. That same weekend over 1000 students across the country will take the same written and lab exercises to determine the top 20 finalists for the U.S. This year, our

students will join the students from the California section for a day of testing at Santa Clara University. Our section will host the day's events and provide snacks and lunch. Santa Clara University and Dr. Linda Brunauer will provide the classrooms. This is an excellent time for our members to volunteer and proctor the labs and exam rooms. There is no teaching or paper grading as those exams are quickly sent to national ACS for grading.

The top 20 students, chosen from the 1,000 participants, will then attend a week-long study camp in June, usually held at the Air Force Academy in Colorado. The top four will then represent the U.S. in Paris, France, in July.

Would you like to help with the process? Encourage your local high school chemistry teachers to have their advance placement or honors students participate in the testing process. There are over 100 high schools in the valley and only about 25 schools compete. In January each school's science department is contacted by letter and invited to compete.

Local section members are needed to register the students and proctor the exams on April 27th at SCU. This is an excellent opportunity to volunteer and encourage these students to think about careers in chemistry. It is also an especially good opportunity to get to meet some of your section members. No heavy chemical knowledge is required! Lunch is even provided!

Also, if someone has access to a good color printer or scanner/printer, they could help by customizing the ACS student certificates that each participant receives before the end of the school year. There are usually about 150 certificates that need to be customized.

So here are some opportunities to help your local section with the 2019 International Chemistry Olympiad – encourage the teachers to participate (maybe even offer to help in their classroom or to grade the local exams!), volunteer to be a proctor, or help print certificates. If you need more information, please contact me.

Sally Peters

Chair of the Chemistry Olympiad Committee
Silicon Valley Local Section of the ACS
sallybrownpeters@gmail.com

650-447-3027

Local Science Fairs in 2019

by Susan Oldham-Fritts

While chocolates and flowers are high on many people's Valentine list, how a gift that keeps on giving? While the cost is minimal (a day of your time judging at the local science fair), the return is great (encouraging middle and high school students to participate in the world of STEM – science, engineering, math, and science). Sign up as either a **category judge** for one the following local area science fairs or **join our SVACS sponsored special awards judging team at the Synopsys Championship**. The latter is a qualifier for the International Science and Engineering Fair, ISEF.

Please contact me at sfritts@gmail.com to join our team of dedicated chemists at the Synopsys Championship on March 14th.

No matter which fair is close to home, **please volunteer now!**

Sciencepalooza!* February 2

Santa Clara County Fairgrounds

www.outreach-foundation.org/judges/

Santa Cruz County Fair March 2

Santa Cruz County Fair Grounds

http://www.science.santacruz.k12.ca.us/judges_registration_new.html

San Mateo County Science, Math, & Technology Fair March 3

San Mateo Events Center, Fiesta Pavilion

<https://www.stemfair.net/app/signup/judges>

Synopsys Championship March 14

San Jose Convention Center

<https://science-fair.org/judges-3/category-judges/judging-registration/>

Monterey County Science & Engineering Fair March 16

California State University, Monterey Bay, University Center, Bldg. 29

www.montereycountysciencefair.info

Golden Gate STEM Fair March 23

San Francisco County Fair Bldg., 9th & Lincoln, Golden Gate Park

<http://sfbasf.org>

Many students at these competitions are first time science fair participants.



Cartoon Contest

Win your own Sidney Harris original cartoon! A contest will be held in which ACS members can submit “one original cartoon caption” of 35 words or less. Cartoonist Sidney Harris will draw a cartoon based on the winning caption. The grand prize winner will receive the original cartoon based on his/her winning caption. The runner-up will receive a personally autographed copy of one of Harris's most famous cartoons chosen by Harris. For more information and the official entry form, please go to:

<http://acsbist.scs.illinois.edu/index.php>

fellow chemists. Welcome!



Chemistry Quiz

This element is the rarest in the earth's crust. The half-life of the longest lived isotope is 8 hours. A pure sample has never been assembled because any macroscopic specimen would be immediately vaporized by the heat of its own radioactivity. The English name derives from the Greek $\alpha\sigma\tau\alpha\tau\omicron\varsigma$, meaning unstable.

The answer will appear in next month's newsletter.

Last Month's Chemistry Quiz

This mixture of sulfur, carbon, and saltpeter (potassium nitrate) invented in 9th-century China was originally called huoyao (fire medicine). What is this mixture more commonly known as?

Black powder (gunpowder)

Sidney Harris' Cartoon



"ALTHOUGH YOUR DISCOVERY IS VERY IMPORTANT, THE CONSENSUS IS THAT YOUR ARTICLE ABOUT IT LACKED SUSPENSE, AND WAS COMPLETELY DEVOID OF HUMOR."

The incongruity of the reviewers' comments with the criteria that one thinks should govern the evaluation of a paper or proposal is what makes the cartoon funny. But, as is always true in Sidney Harris' cartoons, there is another message under the surface: Perhaps scientists should embrace the “broader audience” of their papers, or the “outreach” criteria of the granting agencies more openheartedly. Nothing in the nature of the world or the understanding of scientists would be damaged if humor and suspense were allowed to enter scientific papers. Gatekeepers relax!

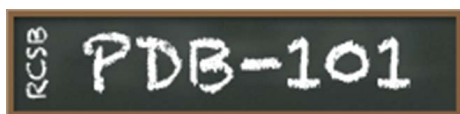
— Roald Hoffmann, Cornell University

Welcome to the Silicon Valley Section of ACS

Each month, the section receives a spreadsheet from national ACS with the names of members new to our section. The members are either new to ACS, have transferred in from other areas, or are the newest members – students. To welcome you to the section and get to know you, the Executive Committee offers new members a free dinner! To encourage you to attend a monthly section seminar meeting, we would like you to be our guest. When you register, make certain to mention that you are a new member and you and a friend will be our guests. The seminar meetings are held at a number of local venues. If you are unable to attend in the evening, perhaps you would join us for an outreach event, like judging a science fair, proctoring the Chemistry Olympiad or participating in a National Chemistry Week event in October. Then, there is our annual wine tasting and awards picnic in July. The local section is a volunteer organization. Please attend an event, volunteer to help and get to know your local fellow chemists. Welcome!

New SVACS Members

Veronica Anania	Dr. Laura S. Lehman	Dr. Huy Q. Nguyen
Dr. Angie Reyes Angeles	Leping Li	Emily Ostrin
Babak Basiri	Liesel Ang Lumangtad	Yi Peng
Joel Beatty	Mykola Makowsky	Jose Jesus Ramirez
Audrey L. Bryant	Chengyu Mao	Dr. Debjani Roy
Dr. Nicholas Cairns	Dr. Olivier J. G. Marcq	Alexis Torres
Jason Ross Casar	Julia Martin	Jun Wang
Michael Joseph Dremel	Dr. Mukund M. Mehrotra	Ke Xu
Dr. Donna Ann Dulo	Bryce Meredig	Crystal Su Ye
Dr. Laksheswar Kalita	Wayne Mullinax	Rongfeng Yuan
Dr. Dohyung Kim	Dr. Diane L. Neff	



<https://pdb101.rcsb.org/motm/229>

Fluorescent RNA Aptamers

RNA aptamers are being engineered to track molecules inside living cells

Scientists are constantly looking for new tools to explore cells in greater and greater detail. *Green fluorescent protein* is an example of a tool that opened entirely new doors. With it, we can tag specific proteins and then watch what they are doing inside living cells. Recently, scientists have been developing a new tool that allows us to watch RNA in a similar way. RNA itself is not fluorescent, so the trick is to design a short RNA that can bind to a fluorophore (a small fluorescent molecule) and enhance its fluorescence. Then, we can engineer this RNA into a natural RNA, such as a ribosome. When the fluorophore is added to the cell, it binds to the modified ribosome and we can watch where it goes.

Evolving Aptamers

SELEX (systematic evolution of ligands by exponential enrichment) has been used to discover these useful fluorophore-binding RNA molecules. The process begins mixing a fluorophore with many random RNA sequences, and then isolating any that bind. These are then randomly modified, and the best ones again selected. After several more rounds of modification and selection, an “aptamer” is found that binds to the fluorophore and enhances its fluorescence. The aptamer shown here, named “Spinach”, was discovered by this process using a fluorophore



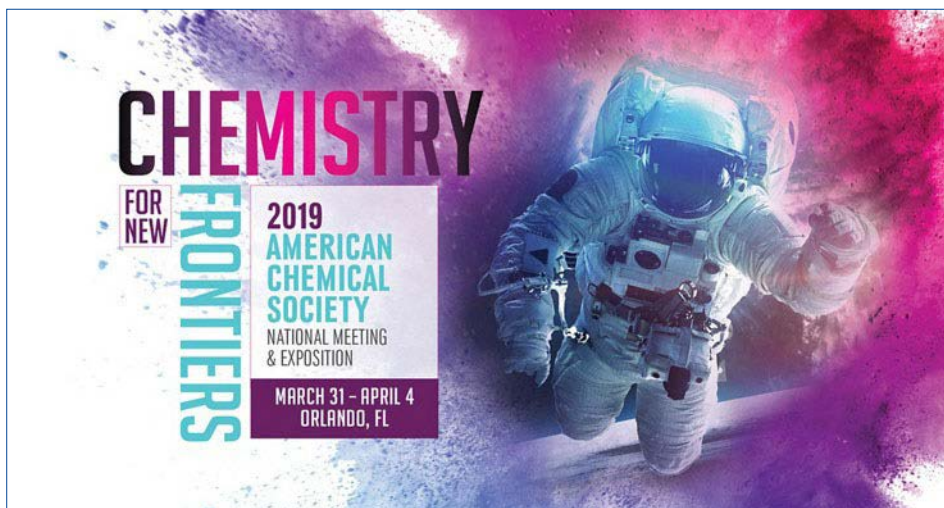
Molecule of the Month

similar to the one in green fluorescent protein.

Structure Challenges

The Spinach aptamer is a long hairpin, with an intricately-folded section at the center that surrounds the fluorophore. RNA is always difficult to crystalize, so two tricks were used to determine its structure. In PDB entry

4kzd (shown in the illustration), the loop at one end was engineered to bind to an antibody, which assists with forming a stable crystal lattice. In PDB entry *4ts2* (shown in the JSmol below), the loop was clipped off, making it easier for the molecules to pack end-to-end in to form a crystal.



ACS National Meeting and Expo

March 31 - April 4, 2019

Orlando, FL

Registration is now open online: <https://www.xpressreg.net/register/acsa0319/start.asp>

The Silicon Valley ACS Awards Committee invites you to submit nominations

*Shirley B. Radding
Award*



Since 1994, the award has been given annually to an individual who exemplifies the following:

- Been a member of the ACS ≥ 20 years.
- Demonstrated dedicated service and leadership to ACS and members through elected or appointed positions at local, regional and national levels over a sustained period of time.
- Made significant contributions to industrial, applied or academic chemistry.

The award consists of an honorarium of \$1000 and an engraved plaque. For each candidate, submit ≥ 1 letter of nomination relating the nominee's work to award criteria to Heddie Nichols (nichols@scvacs.org) by May 1.



SILICON VALLEY SECTION
AMERICAN CHEMICAL SOCIETY
P.O. Box 395, Palo Alto, CA 94302

Happy
Valentine's
Day

To receive an email when our newsletter
is published on our web site, sign up at:

<http://svacs.org>

SILICON VALLEY SECTION

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ChemPloyment Abstracts

Director:	Liang Cao	liang.cao@aol.com
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FUTURE EVENTS 2019

- Feb 28** SVACS Teacher-Scholar Award Dinner Meeting
Dr. Kathleen Armstrong
Foothill College, Los Altos Hills, CA
- Mar 8** Wine and Winemaking
Professor Phil Crews
Sesnon House, Cabrillo College
Aptos, CA
- Mar 31 – Apr 4** ACS National Meeting
“Chemistry for New Frontiers”
Orlando, FL
- Apr 18** Dr. Bonnie Charpentier
President of the American Chemical Society
and active member of our local section
Basque Cultural Center, South San Francisco
- Apr 21-27** Chemists Celebrate Earth Week
SVACS outreach events
“Take Note: The Chemistry of Paper”
Location TBD
- Apr 27** International Chemistry Olympiad exam
Santa Clara University

Click on links for more information or
see this newsletter at <http://svacs.org>