

SILICON VALLEY CHEMIST

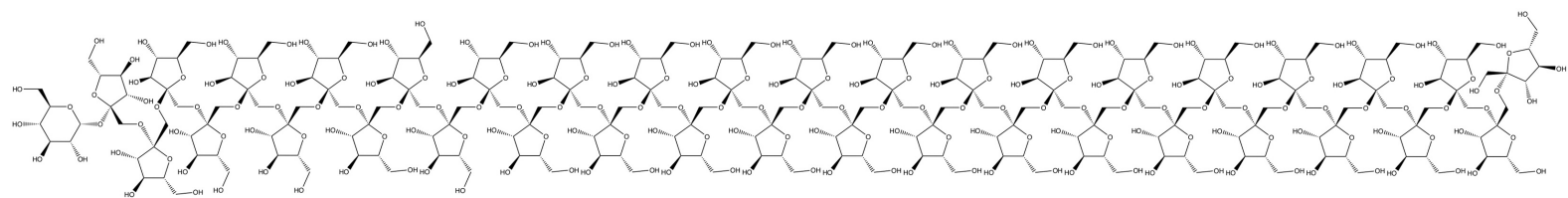


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Chemistry in the Kitchen: Promoting Appreciation of Chemistry and Science

For the past three years, I have been offering a course to Stanford freshmen titled "Chemistry in the Kitchen." Students are told the following before signing up for this course: This course examines the chemistry relevant to food and drink preparation, both in homes and in restaurants, which



Prof. Richard Zare,
Marguerite Blake Wilbur
Professor of Natural Science
Chemistry Department
Stanford University

makes what we consume more pleasurable. Good cooking is more often considered an art rather than a science, but a small bit of understanding goes a long way to make the preparation and consumption of food and drink more enjoyable.

The intention is to have demonstrations and tastings as a part of every class meeting. We will examine some rather familiar items in this course: eggs, dairy products, meats, breads,

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Chair's Message



Matt Greaney

What a great time to be a scientist in the U.S. job market! Did you know that according to the 2019 3rd quarter report from the U.S. Bureau of Labor Statistics, there are over 9.7 million people employed in the U.S. in STEM (Science, Technology, Engineering, and Mathematics) fields? This comprises over 6% of the country's workforce! Aside from the fact that the median salary for STEM workers is more than double that of the overall workforce, the projected growth rate in this field is nearly 9% over the next decade. Compare that to the 5% projected growth rate for the entire U.S. work force, and it starts to become very apparent that there is a pressing need to feed the nation's labor pipeline with ever-increasing classes of scientists and engineers. The American Chemical Society has recognized and attempted to address this need for decades, which is evidenced by a plethora of programs and resources designed for the benefit of the membership and society in general.

Even the federal government recognizes the need to feed and maintain a robust pipeline of STEM talent as reflected by the fact that the fiscal year 2020 federal budget appropriations include funding increases between 2.5-16% across almost all major agencies (i.e., NSF, DOE Office of Science, ARPA-E, NIH, EPA, NIST, and STEM Education). The lone exception is for the Chemical Safety and Hazard Investigation Board, which will maintain its FY 2019 funding levels. Considering the current political environment, as well as the fact that several of the agencies were originally slated for elimination in the President's FY(20) budget request, it seems clear that the majority of our government recognizes the value in fostering the country's STEM capabilities. It is in our national interest.

How does ACS factor into the picture? The answer to that could take up multiple newsletters, so I'll just focus on a few examples regarding STEM career-related support and development. As a member of the Committee for Economic and Professional Affairs, I've had a front row seat in watching and helping develop and improve many of the career-related resources available to the 155,000+ ACS members. A few useful resources to mention are the Career Consultants Program, the ACS Career Live!, and the ACS Salary Calculator.

These programs are constantly updated, and they are examples of just a few of the many efforts ACS makes to support career-related needs of the membership. Importantly, these resources can be accessed at nearly anytime. While the National Meetings are packed with career-focused programming like job fairs, mock interviews, and workshops, ACS recognizes the geographic and monetary limitations associated with attending National Meetings, and these programs offer convenient alternatives. From my own personal experience, I have found the Salary Calculator incredibly useful for negotiating compensation at a new job or rationalizing a request for a raise. An updated version was released in November 2019, reflecting the most recent STEM salary trends across the country. Check it out!

This Chair's Message is not intended to be a comprehensive overview of the ACS career programs, but rather point out that the current employment situation in our country is incredibly favorable for those looking for work, and the Society recognizes that the needs of a large percentage of the members involve assistance with jobs; finding them, preparing for interviews, negotiating, continuing professional development, etc. As a relatively early career chemist,

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Welcome to the Silicon Valley Section of ACS

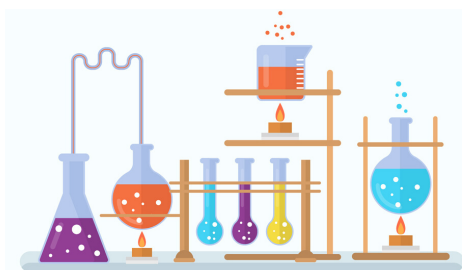
Each month, the section receives a spreadsheet from national ACS with the names of members new to our section. The members are either new to ACS, have transferred in from other areas, or are the newest members -- students. To welcome you to the section and get to know you, the Executive Committee offers 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 beer & 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

Mr. Yiran Bao
Mrs. Tane Boghoozian
Dr. Lynette Cegelski
Michelle Minh Duong
Dr. Andrey Feklistov
Dr. Maxime Grand
Mr. Anish Gupta

Peter K. Jackson
Robbie Korin
Cynthia Mach
Daniel Mahmoudi
Mr. Patrick Monreal
Jason Morton
Henrik Persson
Nicholas M. Riley

Gabriella Nicole Ruiz
Arup Saha
Dr. Krishnamohan Sharma
Michelle Solomon
Dr. Stephanie Stepp
Ms. Paola Vega Jaquez
Han-Jie Zhou



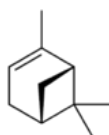
Chemistry Quiz

This month's trivia question:

The NSF Survey of Earned Doctorates published at the end of 2019 reports that 2,810 Doctoral degrees in Chemistry were awarded in 2018. Which sub-disciplines had the highest and lowest number of Doctoral degrees?

Last Month's Chemistry Quiz:

What is the name of this monoterpene? What does it smell like?



This molecule is (+)-alpha-pinene (PubChem CID:82227). It is found in the oils of many coniferous trees, and in the essential oil of rosemary (*Rosmarinus officinalis*) and *Satureja myrtifolia*. Both enantiomers occur in nature. The (-)-alpha-pinene is more common in European pines, whereas (+)-alpha-isomer is more common in North America. The racemic mixture is present as a component of eucalyptus oil and orange peel oil. Both enantiomers have the characteristic odor associated with pine trees.

Zare, continued from front page

vegetables, pastries, and carbonated beverages. We shall playfully explore the chemistry that turns food into meals. A high-school chemistry background is assumed; bring to class a good appetite and a healthy curiosity.

My goal has not been to make Iron Chefs or chemistry majors from those who take this course but instead to have the students learn how the science behind cooking can greatly increase their enjoyment of food. This lecture gives me the opportunity to tell you how this course came about and what aspects about the course make it a very popular course here at Stanford in which students leave the course with a new sense of the importance of chemistry in their daily lives.

Richard N. Zare is the Marguerite Blake Wilbur Professor of Natural Science. He is particularly proud to have received the National Medal of Science in 1983 and the Presidential Award for Science, Mathematics, and Engineering Mentoring in 2012. He also received the Robert A. Welch Award in Chemistry in 1999, the Wolf Prize in Chemistry in 2005, the ACS Priestley Medal in 2010, the King Faisal International Prize in Science in 2011, and the Othmer Gold medal in 2017.

Chemistry of Cooking Dinner and Lecture

Wednesday, February 19, 2020

6:00 Social Hour
7:00 Dinner
8:00 Seminar

Speaker:

Prof. Richard Zare, Stanford University
www.stanford.edu/group/Zarelab

Location:

Michael's at Shoreline
2960 N. Shoreline Blvd
Mountain View, CA

Cost:

\$20.00 students/\$35 non-students

Registration:

<https://www.brownpapertickets.com/event/4500627>

Production Redefined: Carbon's Digital Light Synthesis Platform



Dr. Jason Rolland
Senior Vice President of
Materials at Carbon 3D

This presentation will provide an overview of the Carbon Digital Light Synthesis™ (DLS™) technology and Digital Manufacturing Platform. We will discuss how DLS provides the key elements of speed, materials, and software to enable true digital manufacturing at scale. Carbon's dual-cure materials enable a broad portfolio of high performance resins for a variety of production applications. By combining light-curable chemistry with thermally-curable chemistry, high resolution parts with outstanding mechanical and thermal performance are now possible. Finally, we will present a variety of production applications enabled by DLS across a range of industries including consumer, automotive, dental, and medical.

As SVP of Materials at Carbon, Dr. Jason Rolland leads the development of new polymer materials for use with Carbon Digital Light Synthesis™ (DLSTM) technology to address product needs across a wide range of industries. He co-invented Carbon's dual-cure materials platform, which has led to the subsequent development of a broad range of high-performance materials, including rigid and flexible polyurethanes, polyurethane elastomers, high-temperature cyanate ester and epoxy-based resins, dental resins, and silicone-based materials. Previously, he was Senior Director of Research at Diagnostics for All, and co-founder and Director of R&D at Liquidia Technologies. Dr. Rolland holds a B.S. in chemistry from Virginia Tech and a Ph.D. in chemistry from UNC Chapel Hill. A named inventor on over 25 issued patents and over 40 pending patents, Dr. Rolland has received numerous awards recognizing his achievements, including the American Chemical Society (ACS) 2014 Kathryn C. Hach Award for Entrepreneurial Success. In 2019 he was named the recipient of the prestigious ACS POLY Young Industrial Polymer Scientist Award.

Tuesday, April 7, 2020

6:00 Social Hour
7:00 Dinner
8:00 Seminar

Speaker:

Dr. Jason Rolland
SVP of Materials at Carbon 3D

Location:

Michael's at Shoreline
2960 N. Shoreline Blvd
Mountain View, CA

Cost:

\$20.00 students/\$35 non-students

Registration:

TBA

Chair's Message, continued from front page

I've seen firsthand the heating up in the job market, and I know that talented, motivated chemists looking for employment are in a much better position today than they may have found themselves in a decade ago. Whether you're planning to start a career soon or considering a transition after several years in the industry, ACS has resources and programs in place to assist you. And as always, there are open eyes and ears awaiting feedback and suggestions to improve these efforts. As a professional organization intended to serve its members and the greater societal good, we rely on you to keep us on our toes and help us get better. Your feedback is valued!

Matt Greaney

SVACS Chair, 2020; Councilor 2020-2022

Matt Greaney is the 2020 Chair of the Silicon Valley section as well as a Councilor for the 2020-2022 term. He also serves on the Committee for Economic and Professional Affairs as a voting member. Please reach out to Matt with any comments, requests, or suggestions at chair@scvacs.org.

Teach the Teachers Workshop: Marvelous Metals

The annual Teach the Teachers Workshop, sponsored by Silicon Valley Section ACS with generous support from Gilead Sciences, Inc., will be held on Saturday, February 29, 2020 at BioCurious.

The theme for the workshop will follow the 2019 National Chemistry Week theme: Marvelous Metals! The workshop is designed for elementary and middle school educators and will feature several chemistry-related activities. Resources including a curriculum binder and all the materials needed to recreate the activities in the classroom will be provided free of charge to each educator who participates. If you know a 4th through 8th grade educator who would like to attend, please register at the link below. Registration is limited! Please register early and no later than February 22, 2020.

Volunteers are needed for this event. The opportunities and times are varied – come early (8:00 am) and help set up; help with registration (9:00 am); help with lunch set up and/or lunch takedown (12:30 – 2:00 pm); or help with the workshop take down (3:00 – 4:00 pm). If you have some time and would like to volunteer for this fun and worthwhile program or you have any questions regarding this workshop, please email us at TeachTheTeachersACS@gmail.com.

Saturday, February 29, 2020

8:00 Event set-up for volunteers
9:00 Registration
12:30 Lunch
3:00 Event clean-up for volunteers

Location:

BioCurious
3108 Patrick Henry Dr
Santa Clara, CA

Registration:

<https://teachtheteachersacs.brownpapertickets.com/>
Please register early and no later than Feb 22.

Molecule of the Month

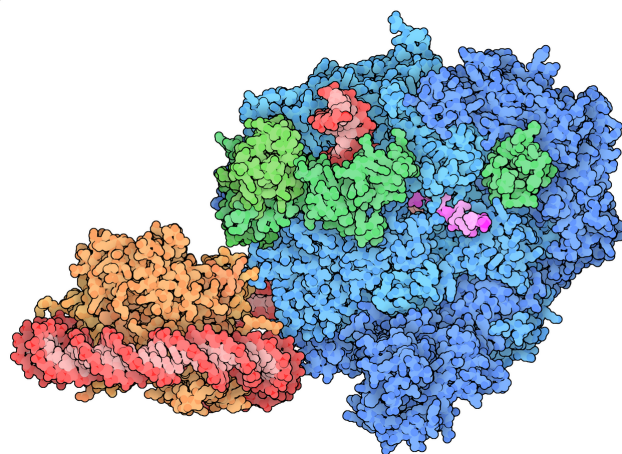
January 2020, David Goodsell
<https://pdb101.rcsb.org/motm/241>

Celebrating the structural biology revolution

Every month, I feel lucky to be a scientist (and a scientific artist) at this point in history. Structural biology is in the middle of a revolution that is revealing the atom-level workings of living cells. It all started with the structure of myoglobin, and today, you can find structures for everything from actin to zika. I'm happy to report that as of this month, I've been exploring the PDB archive for 20 years and sharing some of what I find in these Molecule of the Month columns. Here are a few thoughts as I look back over my 20 years of molecules.

The Structural Biology Revolution

Structural biology has come a long way since the pioneering work of Kendrew, Perutz, Watson and Crick. Methods are more efficient and successful in a wider variety of systems, so scientists are increasingly empowered to explore all aspects of cellular life. The structural genomics effort streamlined crystallographic structure determination, and methods like XFEL are opening new doors on the time dimension. NMR spectroscopy provides orthogonal views of biological systems and their dynamics that are inaccessible to other techniques. CryoEM microscopy is revealing the structures of enormous assemblies that were completely intractable before, and is promising to be the go-to technique for the next decade of structural biology.



RNA polymerase (blue) stalled while unwinding a nucleosome (orange, with DNA in red). Several elongation factors are in green, and a little piece of the transcribed RNA is seen poking out in magenta.

Molecular Stories

Every structure has a story to tell, giving us a new look at the inner workings of life. Some structures add a new piece to a growing puzzle, for example, filling out the entire glycolytic pathway. Other structures are a story all unto themselves. The one shown here captures a moment when RNA polymerase is transcribing RNA, and stalls when it hits a nucleosome (PDB entry 6j4y). Several elongation factors help the polymerase unwind the DNA from the nucleosome, so that it can continue. The structure shows the complex when the nucleosome is about half way unwound.

Volunteers Needed for the 2020 Chemistry Olympiad

The 52nd International Chemistry Olympiad will be held in Istanbul, Turkey, July 6-15. 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. You may 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 15 students will meet on Saturday, April 25th, 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 Los Positas Community College in Livermore. The California section will host the day's events and provide snacks and lunch. 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 weeklong study camp in June, usually held at the Air Force Academy in Colorado. The top four will then represent the U.S. in Istanbul, Turkey, 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 120 high schools in the valley and only about 25 schools compete. In January I contacted each school's science department by letter and invited them to compete.

Local section members are needed to register the students and proctor the exams on April 25th

at Las Positas. 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 and printed.

So here are some opportunities to help your local section with the 2020 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 ACS

sallybrownpeters@gmail.com



SILICON VALLEY SECTION

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

Chemistry of Cooking: Dr. Richard Zare Michael's at Shoreline Mountain View, CA	Feb 19
Teach the Teachers Workshop Jigisha Shah jssheth@syr.edu	Feb 29
CTO Redwood Materials Dr. Andy Stevenson	Mar TBD
PBSS: Preclinical Models in Oncology Foster City Crowne Plaza https://tinyurl.com/pbssoncology	Mar 9
ACS National Meeting & Expo Philadelphia, PA	Mar 22-26
25th Annual Stauffer Lectureship Prof. Jacqueline Barton, Stanford Chemistry https://tinyurl.com/25thlectureship	Mar 31
Dr. Jason Rolland VP of Materials at Carbon Michael's at Shoreline	Apr 7
Annual Picnic, Awards and Winetasting Stanford Chemistry Dept.	Jul 11