

# Silicon Valley Chemist

Santa Clara Valley Section

American Chemical Society

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## DECEMBER 2015 NEWSLETTER TOPICS

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## Connect with Chemists

Meet fellow local chemists for an early morning coffee.

Look for Ean at a table with molecular models.

**Thursday, December 17, 2015 at 7a.m.**

Coupa Café

538 Ramona Street, Palo Alto

(a half a block off from University Avenue)



## Chair's Message - Final Goodbye

Ashley Piekarski



This message will be my last Chair's message. It has been wonderful serving as your Chair this year! As I reflect back on this year, I like to talk about some highlights that stand out in my mind!

- The Teacher Scholar award given to Dr. Robert Tricca from Canada College. This event was held at Mission College in February, and it had about 70 people in attendance! Students from Canada, Foothill, and Mission College attended this fun event.
- Our annual July picnic at Stanford. This was the first time I was able to attend the event, and it fascinated me to hear the stories of our 50-, 60-, 65-, and 70-year members!
- Our joint collaboration with the California and Sacramento ACS sections at UC Davis. We had 70 people in attendance! It was truly a memorable event full of good wine, cheese and olive oil. Hopefully we can host one of these events again!

Serving as Chair has been such an amazing learning experience! When Peter Rusch asked me in 2013 to serve as Chair-Elect, I was a little apprehensive and nervous. I had never served in such a leadership role before. At the same time I also just got elected as

Department Chair of Chemistry at Mission College. I knew I was going to be busy, but I wanted to get as much experience as possible. I was so fortunate to have wonderful mentors along the way. I cannot thank Ean Warren, Sally Peters, and Howard Peters enough! Anytime I had questions or needed advice, I knew I could always count on them! Our current Chair-Elect, Jane Frommer, has been an amazing mentor too! We are lucky to have her serving as Chair in 2016!

So thank you all who have made this a wonderful year by attending events and volunteering your time! I hope you all have a lovely holiday season!

## ¡Así se celebra la química!

Angela Zapata

For three consecutive years, students at the River Glen school, a k-8, two-way bilingual immersion school in the San Jose Unified School District, have put on their chemist labcoats to celebrate National Chemistry Week, or as they would say it: Semana

Nacional de la Química.

Kids LOVE science, especially when it involves hands-on experiments in which they get to employ laboratory tools to make gooey, glowing, color-changing, fizzy reactions! Since the first year a National Chemistry Week event was organized at our school, I have been referred to as the science lady, and I've had many students approach me to ask further questions about an activity we did in the classroom, tell me about experiments they have tried at home, ask when is the next time we'll do science, or to simply say thank you. When public school systems have limited financial and time budgets dedicated



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to inspiring the future generation of scientists and innovators, it is upon parents, teachers and other education stake holders to take on the job. Thus, with the support of the ACS Santa Clara Valley Section, we have successfully reached more than 800 students over the past 3 years. This year, I was amazed to hear students tell me the themes and experiments we had done every year since 2013! I recently

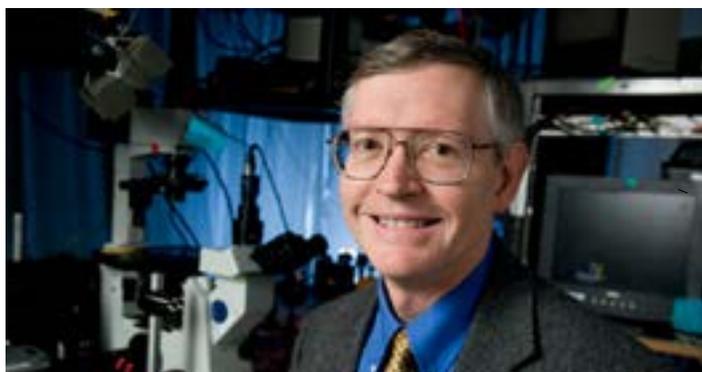
asked a parent about the impact our event had in her son's interest in science, and she responded: "He found it extremely motivational and engaging, he came home excited to show us all the science he had learned at school". We know we are doing something right when a child says "I love science". A special thank you to Abby Kennedy of the Santa Clara Valley Section, for her continued



support to educating our young scientists. Our gratitude also goes to Ihab Darwish for facilitating the events and to the wonderful ACS team who prepares all the NCW resources available to educators. Until next year, I am sure our students will be thinking about how ¡a química colorea nuestro mundo!

## Seeing the Light – from a Single Molecule

By George Lechner



At our October 27, 2015, Dinner Seminar at Michael's at Shoreline, Stanford Professor W. E. Moerner gave us a fascinating view of things so small you can hardly see them – but you know they're there – things like small molecules, viruses and the like.

In the 1980s, when he was working at IBM-Almaden, Dr. Moerner and his colleagues, using super-resolution spectroscopy found that they could measure the light absorption of a single molecule. Go figure! Later at Stanford, he expanded his work by studying 2D- and 3D-super-resolution imaging and was able to capture real time motion of cellular components in three dimensions. All this work and more led to sharing the 2014 Nobel Prize in Chemistry with two other chemists, Eric Betzig and Stefan W. Hell. They changed optical microscopy to nanoscopy, allowing us to "see" viruses, proteins, small molecules like never before, all in motion doing their stuff. Oh, to have had this insight when I was a young aspiring chemist!

Of course, all the work that Dr. Moerner did required a lot of thinking and experimenting, trying different approaches, looking at things using many wavelengths of light, time and again, over and over, until he saw what was there.

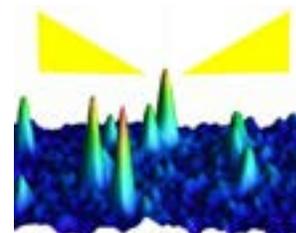
Hearing his talk, I was reminded of an old joke I knew as a kid. (Don't ask me why!) G and W were walking along and G said, "Pete and Repete were on a bridge. Pete fell off. Who was left?" W said, "Repete." But G heard "repet" and then repeated, "Pete and Repete

were on a bridge. Pete fell off. Who was left?" Again, W said, "Repete." G then repeated, and on and on --- until he saw the light.

If you were not fortunate enough to attend Professor Moerner's SCV ACS dinner lecture, you can watch him tell his story here:

<http://www.mediatheque.lindau-nobel.org/videos/34730/william-moerner-light-single-molecules>

or here: <https://www.youtube.com/watch?v=OyJ3IWmZ4Ww&feature=youtu.be>



## Chemistry Quiz

In 2014, Agilent announced they would cease making and selling nuclear magnetic resonance (NMR) spectrometers. Agilent's NMR capability came entirely from the acquisition of which Palo Alto-based firm?

### Last Month's Quiz

An alternate nuclear energy reactor was developed at the Oak Ridge National Lab in the 1960 which uses a molten salt reactor. This system has several advantages over  $^{235}\text{U}$  and  $^{238}\text{U}/^{239}\text{Pu}$  reactors: it operates at lower pressure, has no risk of nuclear meltdown, and can receive fuel by pumping without shutdown. What is the fissile isotope used in this reactor?

**The fertile isotope is thorium ( $^{232}\text{Th}$ ) which is transmuted to the fissile  $^{233}\text{U}$ . Thorium contains only trace amounts of fissile isotopes (such as  $^{231}\text{Th}$ ) which are insufficient to initiate a nuclear chain reaction.**

# ACS Program-In-A-Box 2015 Events for Small Chemistry-related Businesses

By Joy Wu and Jane Frommer

The ACS Program-In-A-Box provides programs designed to help small, chemistry-related, businesses in the many facets of

running a successful enterprise.

The first 2015 offering, Creating a Safety Culture While Growing Your Busi-

ness, was attended in April by two dozen professionals from large and small businesses as well as from academia in the SF Bay Area. The second 2015 offering, Establishing and Protecting Your Intellectual Property, brought together a dozen participants of widely varying backgrounds, mostly from small businesses. Represented were an organic lab with 3 employees in San Jose, a chemistry software company, and a nonprofit research organization newly launched with fewer than 10 people.

The format is unconventional. Presentations are beamed to local gatherings from ACS headquarters in Washington DC. Q&A afterwards occurs in real-time over an audio link. The event wraps up with a local networking social, enlivened with refreshments courtesy of the local ACS section. Evans Analytical Group (EAG) in Sunnyvale graciously provided their site to host both 2015 events.

November 10th's intellectual property program featured two Washington DC patent lawyers as speakers: Robert Koch of Milbank, Tweed, Hadley & McCloy and Justin Hasford of Finnegan, Henderson, Farabow, Garrett & Dunner. Their presentations were loaded with details, including a tiered patent-filing fee for small-vs.-large companies, expenses to expect in conducting prior art research and in engaging a patent attorney, and provisional patent applications useful for small businesses looking to protect their intellectual properties. Afterwards, refreshments provided a relaxed environment for informal networking. A raffle sent two winners home with ACS coffee travel mugs.

The two 2015 gatherings constituted a test of the Program-in-a-Box format for presenting topics of interest to small chemistry-related businesses. The Santa Clara Valley ACS section was pleased to participate in this trial and welcomes your input on its continuation. Even better, we welcome your suggestions of effective modes for bringing together and supporting the small chemistry-related business community. Contact us at [chair@scvacs.org](mailto:chair@scvacs.org).

**ACS PROGRAM**  **BOX**

for Chemical  
Business Groups

## Welcome to the Santa Clara 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 spouse (or friend) will be our guests. The seminar meetings are often the 3rd Thursday of the month at a local spot, somewhat convenient to the entire section. If you are unable to attend in the evening, perhaps you would join us for an outreach event, like judging a science fair, participating in the Chemistry Olympiad, or 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 Members for October

Dr. Toby Astill	Dr. Michael Holmes	Brian Patrick
Kimberly Barrett	Hayden Robert Holmlund	Dr. Anthony B. Port
Hunter Bryan Boyce	Dr. Allen Y. Hong	Frances P. Rodriguez
Amanda Brambila	Wenrong Huang	David Michael Sanchez
Lauren J. Bruns	Dr. Toan Huynh	Dr. Melody T. Schmidt
Bryce Cai	Dr. Barbara M. Jagodzinska	Barry Sharp
Dr. Jennifer Cottine Hitchcock	Dr. Barbara A. Jones	Peyton Shieh
Dr. Charles A. Crichlow	Yukyung Jung	Hui-Wen Shih
Joshua Thomas Eggold	Dr. Carl R. Kemnitz	Hanna Grace Tempesta I
Whitney Francis	Ashley Kim	Andrew Patrick Teuthorn
Cooper J. Galvin	Eric Lansdon	Eric S. Tillman
Rosalia Pet Gemora	Quang Luu Nguyen	Dr. Brian Toleno
Gwendolyn E. Gibbons	Dr. Joseph P. Lyssikatos	Dr. Anthony Tsuchien Tu
Mark Gregory Gorelik	Dr. Robert R. Milburn	Alexandra Ulicki
Christopher Steven Gradwohl	Dr. Ronald McRae Milburn	Raymond J. Vass
Dr. Stefanie M. Gravano-Doerffler	Ioannis Mountziaris	Haopeng Wang
Imad Haidar Ahmad	Matthew Munson	Katharine White
Dr. Anna Harrison	Lidia Nazarova	Tiffany Williams
Dr. Feras Hatahet	Eric T. Newcomb	Dr. Christina Woo
Jocelyn Havel	Darlene H. P. Nguyen	Hang Yu
Alastair Neale Herron	Dr. Steven H. Olson	Ying Zhu
Alexandra Lauren Holme	Dr. Lakshmipathi Pandarinathan	

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# Teach-the-Teachers Workshop

By Kristan Hutchison

Casting rainbows and crushing charcoal sound like lessons from Hogwarts, but these engaging activities were part of the American Chemical Society Teach-the-Teachers workshop I attended at Mission College on November 14, 2015. The topic year was "Chemistry Colors Our World" and kids love color, so I signed up without being sure how I'd relate it to my science lessons.

The workshop started with explanations of the biology and physics of color. My first insight came when we were shown TWO kinds of primary colors, light vs. pigment. We soon had a chance to try both.

I've played with prisms before and have bemoaned the price of a quality classroom set, so I was fascinated when we were challenged to coax a rainbow from a plastic cup of water. At lunch I found myself playing with my water bottle in a sunbeam, mesmerized by the patterns it cast and imagining a lesson in which students try a variety of different shaped clear containers.

When we returned to the lab, we were handed round stones and bags of charcoal, with instructions to pulverize. How often does a student get to smash something in class? My students will love that. We then mixed the charcoal powder with two different liquids and compared the resulting paint. The charcoal in milk created a subtle gray wash while charcoal in egg yolk became a thick black paste. Both paints stuck to the page surprisingly well, but the best was yet to come in the form of lowly vegetables turned artist crayon. Rubbing the cabbage leaf across the charcoal-coated page created lovely shades of lavender, while the radish streaked lipstick-red. The art became even more interesting when we brushed over the charcoal page with acids and bases, bringing out greens and blues as the natural pH indicator in the cabbage reacted. Fascinated by the colors and creative process, I kept scrib-

bling with the radish even after the workshop moved on to testing mystery liquids with red cabbage juice.

The day after the ACS workshop I began outlining a curriculum on "The Science of Art." It's a topic that has bounced around in my brain for several years, but now that I've seen what can be done with vegetables and egg tempera, I know I have the basis for my lessons. It will be a good way to introduce chem-

istry to artistically-minded students. I'll make sure the students get to play with colored light as well, so they can compare how the colors mix and discover the differences between the two types of primary color. I can't wait to see their science journals, in full color.

Kristan Hutchison teaches at Rock-It Science in Santa Clara ([rockitscience.org](http://rockitscience.org)). She is also a freelance writer, editor and curriculum designer.

**Breaking Boundaries**

**Chemists Wanted!**

If you are a chemist, YOU are wanted in a local public high school! Students learn about chemistry from their teachers, books, and labs. But the question remains: "What does chemistry look like in REAL LIFE?!"

That's where YOU are needed. We need YOUR expertise to tell us about chemistry in the professional world. Advanced Placement Chemistry at Overfelt High School in San Jose has 24 inquisitive, amazing students curious about applications of chemistry. Several even want to pursue chemistry as a career.

Want to help? Visit our classroom and interact with students through hands-on activity, conversation, and inspiration.

Contribute to education!  
Break boundaries and become a Science Coach today!

Contact: [shiojia@esuhsd.org](mailto:shiojia@esuhsd.org)

## Bay Area Families Discover Colorful Chemistry at AT&T Park

By Alex Klevay

The crown jewel of the annual Bay Area Science Festival is Discovery Day, an action-packed, bayside science exhibition for families with curious kids of all ages. The free event drew record crowds for its fifth year running. In harmony with the theme of National Chemistry Week, the SCV ACS chapter showcased hands-on activities to illustrate how Chemistry colors our world.

Vibrant color changes in blueberry extract indicated how anthocyanins respond to pH. Eye-catching swirls of food coloring were shuttled across milky surfaces by the surfactants in dish soap. Suspenseful iodine clock reactions, prepared by Rudy Wojtecki of IBM, magically flashed from clear to blue.

Support provided by Rain Mariano and the Stanford Chemistry Club ensured that the

exhibit left a colorful impression on hundreds of the next generation's potential Chemists.



Alex Klevay, Garret Gomes, and Brad Haubrich showcase crowd-pleasing Chemistry (photo by Charlie Gluchowski)



## Reminder: SCVACS Dinner Meeting, January 21, 2016

### Mosher Award Recipient Attila Pavlath



Attila Pavlath was born in 1930 in Budapest and received all his education there. In Hungary he was an Assistant Professor at the Technical University of Budapest. He was the

co-founder of fluorine chemistry in Hungary. In 1956, after the Hungarian Revolution he escaped Hungary together with his family. After two years at McGill University in Montreal, Canada, he joined Stauffer Chemical Company in Richmond, California, to lead a research group on agriculture-related problems. In 1967, on the invitation of the U.S. Department of Agriculture, he continued his research at the Western Regional Research Center, in Albany, California, where he headed various research projects. He is still doing research there as a senior emeritus scientist.

In his 60+ years of teaching and research career Dr. Pavlath pioneered research not just in fluorine chemistry, but also in areas of glow discharge, biomass, biodegradable films and various agricultural chemistry problems. He published more than 130+

research papers, he wrote 10 books and larger chapters. He also has 25 patents. He lectured throughout the world. In 1997, he received the Pioneer of the Year Award from American Institute of Chemists and, in 2004, he was elected to the Hungarian Academy of Science. He received the Kenneth Spencer Award for outstanding achievements in food and agricultural chemistry in 1997.

In addition to his internationally known scientific research, he is also known in the American Chemical Society for his continuous activities to modernize the Society and to improve the public image of chemistry worldwide. In 1999, the members elected him as President and he is still very active in the society.



## 2016 Heroes of Chemistry Nominations

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.

The deadline for submissions is February 29, 2016. Please visit the Nominations Procedures page or email [chemhero@acs.org](mailto:chemhero@acs.org) for further details.

Share Connect Succeed

## American Association of Chemistry Teachers

The Santa Clara Valley Section American Chemical Society

supports local educators by paying

half of the \$50 membership fee

or all of the \$50 membership fee on recruiting two others

### Benefits of AACT Membership

- ◇ **Chemistry Solutions** - online resource for and by chemistry teachers
- ◇ AACT resource library, lesson plans, labs
- ◇ **ChemMatters** subscription
- ◇ **Common Core & Next Generation activities & teachers' guides**

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## FUTURE EVENTS

- Jan 21** SCVACS Monthly Dinner Meeting, joint with the California section ACS Moshier Award presentation to Attila Pavlath Basque Cultural Center South San Francisco, CA  
<http://scvacs.org>
- Feb 18** SCVACS Monthly Dinner Meeting Teacher-Scholar community college teaching award and dinner  
<http://scvacs.org>
- Mar 26** SCVACS Monthly Meeting Silicon Valley Advanced Water Purification Center tour Alviso, CA  
<http://scvacs.org>
- Apr 20** SCVACS Monthly Dinner Meeting Peter Gleick, Pacific Institute for Studies in Development, Environment and Security "Water Scarcity in California and Abroad" Michael's at Shoreline Mountain View, CA  
<http://scvacs.org>