

Silicon Valley Chemist

Santa Clara Valley Section

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JUNE 2013 NEWSLETTER TOPICS

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Stephen Ting Does It Again!

Stephen is the Santa Clara Valley finalist in U.S. National Chemistry Olympiad for the second year in a row. He attended the study camp in 2012 and qualified again this year by scoring among the top 20 high school students in the country in the USNCO exam on April 13th.



Stephen just made a difficult decision. He will be attending Stanford University in the Fall. To prove what an excellent student he is, he was accepted at both U.C. Berkeley and Stanford to study

chemistry! But he is not just a nerd! At Monta Vista, he has run cross-country and track, and he especially enjoys jazz and plays 3 instruments: piano, guitar and trumpet.

At a young age, he has learned what teachers have known for generations; that teaching others adds to the teacher's knowledge of chemistry, math and science. He helps Ms. Gupta, the AP teacher, set up the AP labs for this years' students.

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Annual Family Picnic and Awards Ceremony

Please join us for our Summer Annual Family Picnic on Saturday, July 13th. The event will feature a wine tasting that will include premium California wines from a local winery and will be presented in the Keck Science Building. After the wine tasting, there will be a catered picnic dinner outside the Mudd Chemistry Building at

Stanford. An awards ceremony will be presented following the dinner to honor our 50-, 60-, 65- and 70-year members and other award winners.

Wine Tasting:

The wine tasting will feature four different wines from Savannah-Chanelle

continued on next page

RESERVATION FORM

Wine Tasting, Family Picnic and Awards Ceremony

Stanford University – Saturday, July 13, 2013

Deadline for Reservations – Wednesday, July 10, 2013

Name(s): _____
 Please list all names so we can make a name tag for every member of your family, including children.

Telephone No.: (____) _____

Number of Reservations at \$17.00 x \$17.00 = \$ _____

Number of Children (age of 5-12) at \$5.00 x \$5.00 = \$ _____

Total Amount Enclosed \$ _____

Make check payable to: Santa Clara Valley Section – ACS

Mail check and reservation form to: Karl Marhenke, 1710 Wilshire Drive, Aptos, CA 95003-2836

Please check if you can volunteer: I can help set-up I can help clean-up

Steven Ting, continued from previous page

Since we live in an era of social media, he is active in that as well. Monta Vista has a chemistry Facebook page where students can get help with chemistry questions. He makes certain that students understand the foundation of their topic, not just the answers. Sounds like a real professor in the making! Also this year, Stephen has been involved in (unpaid) tutoring math and science in a low income housing area near his home and in the science department at school.

But more to the item at hand – the USNCO study camp. For 2 weeks in June, Stephen and 19 other exceptionally bright high school students will receive college-level training in all fields of chemistry. They will endure lectures, problem-solving exercises, lab work, and tests – lots of tests! In 2012, Stephen realized that the students were not cut-throat competitive, but supported and helped each other. At the camp's conclusion, four students and two alternates will be chosen to represent the U.S. at the International Chemistry Olympiad. The four students will travel to Moscow, July 15-24th, to compete with peers from more than 70 nations at the 45th IChO.

Congratulations to Stephen, and good luck at the study camp!

Chair's Message



Welcome to the good ole summertime. Our local section activities slow down a bit but there are some interesting things to do.

On July 13, we have our annual picnic. Things begin at 4:00

PM in the Keck Chemistry Building on the Stanford University campus. There will be a map on the SCV web site. Parking is across the street. The Rodin sculpture garden is near the parking garage and well worth a visit, day or night.

The Keck Building is a great location for the first part of the program: wine tasting. This year we are fortunate to have Savannah-Chanelle Winery to present some of its wines for our tasting. Located about three miles from downtown Saratoga, this winery makes many really nice wines. Even

Annual Family Picnic, continued from previous page

Vineyards located in the Santa Cruz Mountains. Light snacks will also be served during the tasting. (www.savannahchanelle.com)

Picnic Dinner:

The picnic dinner will be catered by Armadillo Willy's, and the tentative menu will include:

- Smoked barbecued chicken
- Beef brisket
- BBQ baked beans
- Potato Salad
- Corn bread muffins
- Wine, soda, and water
- Dessert

Honored Longtime Members:

50-Year Members

George J. Lechner
Dr. George A. Gray
John James Gannon, Jr.
Dr. Gerald A. Selter
Dr. Steven S. Kuwahara
Dennis M. Yasuda
M. Saul Hoffman
Yvonne J. Aronowitz
Dr. James Hart Smith
Dr. Peter Hammond
Prithipal Singh
David M. Takahashi
Dr. Ian T. Harrison
Dr. Robert D. Miller
Dr. John W. Quigley, Jr.

60-Year Members

Dr. Noreen Tingey Eldredge
Dr. Peter K. Mueller
Dr. Edwin Fisher Ullman
Edgar Ardeen Elkins, Jr.
Dr. James Paddock Collman
Sidney Green
Dr. Robert L. Baldwin

65-Year Members

Dr. Donald L. Hildenbrand
Edgar S. Oerman
Mary Harriette Huff
William B. Burton

70-year Member

Frederick William Hannsgen, Jr.

Location:

The Stanford Chemistry Department

Time:

4:00 p.m. Wine Tasting
5:30 p.m. Buffet BBQ Dinner
7:00 p.m. Award Ceremony

Directions

From Route 101 (Baysshore Freeway):

Take University Avenue west through Palo Alto. It becomes Palm Drive on the Stanford Campus. Turn right onto Roth Way and continue to the Chemistry Department. Park in the parking structure on your right. Keck and Mudd chemistry buildings are across Roth Way from the parking structure.

From Route 280:

Take the Sand Hill Road exit. Drive east and turn right on Stock Farm Road. Then turn left on Campus Drive West and right on Roth Way. Park in the parking structure immediately on your left. Keck and Mudd chemistry buildings are across Roth Way from the parking structure.

Reservations:

A reservation form for this event is on the front page. You can also download the form on our website: www.scvacs.org/Local_Folder/din_mtg.html. Remember, this is the one meeting where you have to send a payment with your reservation. The cost for the event will be: \$17 for adults, \$5 for kids 5-12, and kids 4 and under are free. Reservations and payments must be received by Wednesday, July 10th.



if you don't know much about wine, come along and taste. You can learn a lot from the winery staff and some of our members who are quite knowledgeable.

The next event is a picnic served by a fine barbeque house with a great variety of items and side dishes accompanied by soft drinks and the wine from the tasting. If you haven't been at one of these picnics, please

try to bring a folding table and chairs.

The program continues with awards presented to members. Every year we have a wonderful treat as we ask those receiving recognition for fifty or more years of ACS membership to briefly recount their careers in chemistry. These recollections are often entertaining and always enlightening.

Join us!

National Historic Chemical Landmarks in Your Community

By Keith Lindblom, ACS National Historic Chemical Landmarks Program Manager

ACS established the National Historic Chemical Landmarks program in 1992 to enhance public appreciation for the contributions of the chemical sciences to modern life in the United States and to encourage a sense of pride in their practitioners. To date, the program has recognized 70 subjects in the United States and around the world, including two within the ACS Santa Clara Valley Section. They include:

NMR and MRI: Applications in Chemistry and Medicine

In 1960, Varian Associates (now Agilent Technologies) introduced the A-60, the first commercially successful nuclear magnetic resonance spectrometer. While NMR had been developed by physicists, the affordability, reliability, and compact construction of the A-60 allowed chemists to perform non-destructive analyses to elucidate molecular structures. What previously took chemists a month to determine could now be discovered in hours, leading to its widespread use. Paul Lauterbur of Stony Brook

University used a Varian A-60 to take the science even further, demonstrating that NMR could generate multi-dimensional images.

Commercialization of Radiation Chemistry

Founded in 1957, Raychem Corporation was the first company to successfully apply the new science of radiation chemistry to commercial use. This accomplishment led to the creation of tough new materials and high-performance products such as irradiated polyethylene insulated wire and heat-shrinkable tubing through the crosslinking of polymeric materials. The success of this enterprise established radiation chemistry as a practical, safe, cost-effective use of ionizing radiation and helped make the United States the world leader in the development of commercial radiation technology and equipment.

To qualify, subjects must clearly represent seminal achievements in the history of chemistry; they must evidence significant

impact and benefit to the public and the chemistry profession; and they must be at least 25 years old. ACS local sections, divisions or committees can nominate subjects for the program.

For a complete list of National Historic Chemical Landmarks or more information about the nomination and selection process, visit www.acs.org/landmarks or contact the author at landmarks@acs.org.



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 dinner 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 dinner 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 List for May

Scott Auerbach
Jacob Cha
William S. Coats
Alan Downie
Taia V. Ergueta
Rosalia Pet Gemora
Jason E. Gestwicki
Robert Hartsock
Amy E. Hilderbrand

Archana Kumar
Paul Materum
Dr. Stefanie Ann Mortimer
Rachel Erin Muir
Richard E. Needham
Anh Nguyen
William D. Peltzer
Dr. Ge Peng
Samuel T. Picraux

Dr. John A. Pople
Dr. Ranga Thangamani Ranganathan
Evan Reed
Dr. Thomas Scherer
Shallu Soneja
Zachary Robert Tiffany
Nolan L. Wong
Dr. Kuang Jen Wu
Jiang Zhu

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Outstanding High School Chemistry Students for 2013

Sally Peters and Stephanie Bachmann, Co-Chairs

The national Chemistry Olympiad qualifying exam took place on Saturday, April 13th, at Santa Clara University. Sixteen outstanding students from our section joined with 17 students from the California section and competed with 1,000 students from across the nation for a spot to attend the study camp at the U.S. Air Force Academy in Colorado Springs, Colorado. The student allotment per section is dependent on the ACS membership of the section.

The results of the national exam determine who will attend the study camp. For two weeks at the camp in June, 20 students from across the United States will 'crum' material from all fields – organic, electrochem, biochem, cheminformatics, to mention just a few disciplines. After attending lectures, delving into books and blowing things up in the lab, four finalists and two alternates will be chosen from these 20 superior students to represent the U.S. at the 45th International Chemistry Olympiad in July in Moscow, Russia. Stephen Ting, a senior at Monta Vista High School, qualified to attend the study camp!

The process began right here in Silicon Valley in January when over 100 high schools were contacted and invited to participate. In March, teachers from 25 high schools tested their AP and honors students with an exam provided by the Education Division of the American Chemical Society. Some schools gave the local exam to all of their AP or honors chemistry classes as a prelude to the AP exam. Other schools administered it only to interested students. The teachers graded the local exam, and the 16 students who scored the top grades were invited to participate in the national test on April 13th. These students are smart! For the first time, the range of scores was 50 to 59 correct out of 60 questions! It was a difficult test. Check out the local and national exams:

http://portal.acs.org/portal/acs/corg/content?_nfpb=true&_pageLabel=PP_SUPERARTICLE&node_id=1508&use_sec=false&sec_url_var=region1&_uuiid=24c8f96a-38d2-4e80-a971-9b45089279b0

Home schooled and online students participated for the first time in our section. These students all had affiliations with more traditional schools for their AP laboratory work.

Special thanks go to section volunteers George Lechner, Ken Zhang, Bruce Raby, and Dave Parker for also giving up their Saturday to proctor the exam. Dr. Linda Brunauer was our sponsor and host at Santa Clara. She and her students prepared the lab for the 33 participating students.

Really special thanks go to the high school teachers who make it possible for their students to participate. They gave up personal and classroom time to communicate the program, organize the testing and grade the exams. Additional high schools that participated in the local exam were: Bellarmine, Carlmont, Cupertino, Fremont, Hillsdale, King's Academy, Live Oak Academy, Los Altos, Los Gatos, Mercy, Milpitas, Mitty, Piedmont Hills, St. Francis, and the School for Independent Learners.

The Santa Clara Valley outstanding high school chemistry students and their teachers are:

Leland High School: Shivaal Roy* and Sam Kumar*;
Arturo Zamora (teacher)

The Harker School: Vikram Sundar and Varun Mohan*;
Robbie Korin

Palo Alto High School: Nicolas Quach**; Carolina Sylvestri

Stanford Online High: Augustine Chemparathy;
Home Schooled (Stanford Online)

Monta Vista High: Edward Wang* and Jeffrey Chen*;
Kavita Gupta
Stephen Ting**; Attended the study camp in 2012

Mountain View High: Evan Cohen; Katie Thornberg

Gunn High: Audrey Cheng* and Andy Zhang; Elana Zizmor

Lynbrook High: Tony Jian and Alice Tang; Roy Rocklin

Saratoga High: Evan Lee; Kathy Nakamatsu

Palma High: Jack Correnti; John Chipley

* Denotes Honors out of the 2013 UNESCO top 147 students

** Denotes High Honors out of the 2013 UNESCO top 147 students



Silencing Bacterial Communications

By Sarah Webb (C&E News Online)

With the ever-growing specter of antibiotic resistance, scientists would like to develop new strategies and drugs to prevent bacterial infections. Now researchers have found potent new molecules that could keep staph infections at bay by disrupting how these cells communicate with each other to coordinate their pathogenic attacks (J. Am. Chem. Soc. 2013, DOI: 10.1021/ja3112115).

Helen E. Blackwell of the University of Wisconsin, Madison, and her colleagues have been studying the chemical signals that bacteria use to sense how many other

microbes of their kind are around, a phenomenon called quorum sensing. As the numbers of bacteria grow, so do the levels of the signaling molecules. These molecules activate receptors on the surfaces of the microbes. Once the molecules' concentrations reach critical levels, the bacteria can change their behavior and act as a group to overwhelm the immune system of the host. Individual cells can't do much on their own, Blackwell says. "They lie in wait until they reach that critical density."

Messing with these bacterial communication pathways may lead to new antibacte-

rial agents, says John K. McCormick of the University of Western Ontario, in Canada, who was not involved in the study. Because inhibitors of quorum sensing don't kill the bacteria, they should be less likely to trigger bacterial resistance, he says.

In *Staphylococcus aureus*, cyclic peptides serve as quorum sensing signals. Although other researchers had tried blocking quorum sensing in the more common group I and II staph, Blackwell and her team chose to look at the group III bacteria that cause toxic shock syndrome, a possibly

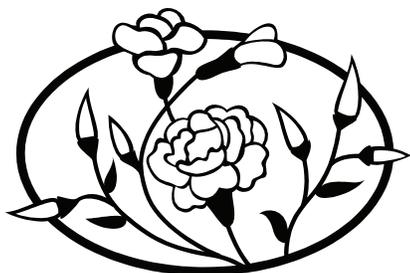
continued on next page

Silencing Bacterial, continued

fatal form of infection.

The chemists changed individual amino acids within each peptide and examined how the substitutions affected the molecules' ability to turn on the quorum sensing receptors. Based on this information, they determined which amino acids were important for the peptides' activity.

For example, a simple modification in the original peptide structure, replacing an

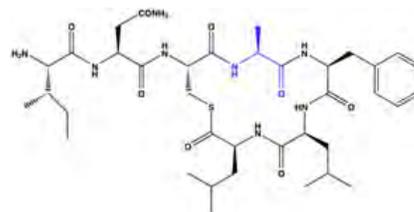


aspartate amino acid with an alanine, led to a very potent inhibitor. In biochemical tests with *S. aureus*, that compound was far more potent than others developed against quorum sensing in the species, and is active against all four strains of the bacteria, not just group III. At nanomolar concentrations, this peptide lowered the production of toxic shock syndrome toxin, which is regulated by quorum sensing pathways, in group III staph by 80%. That peptide also showed 40 times greater inhibition of quorum sensing than the previous best inhibitor against the more common group II strain.

Richard P. Novick of New York University Langone Medical Center calls the results "quite nice," but cautions that the thiolactone linkages within the inhibitors are relatively unstable. With such

instability, the compounds would break down in the body before they could effectively hit pathogens.

Blackwell and her colleagues are already working on more stable, simplified inhibitor structures that are easier to synthesize in large quantities. Eventually, they'd like to study the compounds in animal models of human infections.



*Bacterial Silencer: Replacing a single aspartate residue in this cyclic peptide with an alanine (blue) produces a potent inhibitor of quorum sensing in *Staphylococcus aureus* (Credit: Helen Blackwell)*

Analyzing Fingerprints With A Dash Of Turmeric

By Erika Gebel (C&E News Online)

Turmeric has a long history as a kitchen spice, dye, and traditional medicine. Now researchers have cooked up a new use for the gold-colored powder: Its main ingredient, curcumin, could help forensic scientists analyze the molecular constituents of fingerprints using mass spectrometry (Anal. Chem., DOI: 10.1021/ac4007396). Chemical information from fingerprints might reveal characteristics such as a suspect's sex or if a person has recently handled cocaine, the researchers say.

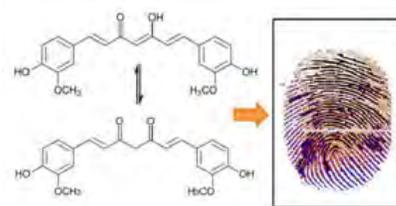
Typically, forensic experts study fingerprint patterns to connect a suspect to a weapon or the scene of a crime. Simona Francese of Sheffield Hallam University, in the U.K, develops ways to get chemical

information from the prints using matrix-assisted laser desorption ionization (MALDI) mass spectrometry. In this technique, researchers crystallize samples within a chemical matrix to protect the molecules and help ionize them. When the researchers shine a laser on the crystals, the sample molecules ionize and fly into the air. A mass spectrometer then measures the mass of the jettisoned ions.

Unfortunately, the dust used to visualize prints can obscure mass spectrometry results. Francese thought curcumin would be a MALDI-friendly alternative to the standard dust because its structure—with its multiple double bonds—suggested it could make a good matrix. She got this insight after reading a 2011 study that

showed curcumin works as a nontoxic and inexpensive dusting agent on a variety of surfaces (Egypt. J. Forensic Sci., DOI: 10.1016/j.ejfs.2011.04.011).

Francese and colleagues dusted half of a fingerprint with curcumin and the other half with α -cyano-4-hydroxycinnamic acid, a standard matrix. They then scanned a laser over the fingerprint's surface, collecting spectra on the constituent compounds as they went. The researchers compared the intensity of the signals from each half of the fingerprint. "In most cases," Francese says, "we found that curcumin performed better," generating taller and sharper peaks on the spectra for fatty acids and other molecules. In another experiment, the researchers spiked fingerprints with cocaine, which curcumin effectively ionized, producing a clear spectrum.



Caught Yellow-Handed: Dusting with curcumin (left) can enhance mass spectrometry images of fingerprints (right). Darker areas indicate a higher concentration of oleic acid, a fatty acid abundant on fingers. (Credit: Anal. Chem.)



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44th Western Regional Meeting The Many Elements of Chemistry! October 3-6, 2013 Santa Clara, CA



Co-hosted by the California and Santa Clara Valley Sections

An exciting technical and event program is planned for the 44th Western Regional meeting to be held at a great venue in the Silicon Valley-San Francisco Bay area. Highlights of the meeting will include a Nuclear Chemistry Symposium in honor of Priestley Medalist Dr. Darleane Hoffman of UC Berkeley and Lawrence Berkeley National Laboratory, and the Cope Scholar Symposium in honor of Dr. Sarah Reisman of the California Institute of Technology. For updated information please see www.wrm2013.org.

We encourage scientists at all levels to submit papers and posters as soon as possible as space is limited. The closing date for submissions is Friday, August 23, 2013. The closing date for early registration is Thursday, September 12th. For details on early registration and submission of papers and posters, please see the website above.

The location is at the Hyatt Regency Santa Clara, convenient to the San Jose International Airport, where a special \$139/night room rate has been arranged, which includes free wifi and free parking.

The wide-ranging technical program offers something for everyone, from traditional areas to more specialized programs. Planned sessions include:

Analytical Chemistry	Hydraulic Fracking	Organic Chemistry
Biochemical Technology	Inorganic Chemistry	Organometallic Chemistry
Biofuels	Chemistry and the Law	Pharmaceuticals
Chemical Safety	Medicinal Chemistry	Physical Chemistry
Entrepreneurship	Nanomaterials	Polymer Chemistry
Environmental Chemistry	Natural Products	Process Chemistry
Ethnobotany	Nuclear Chemistry	Renewables
Fuel Chemistry		Solar Chemistry

There will also be several programs for educators at the high school and college levels. Workshops in Career Development, Leadership Development, Safety and a special workshop in Polymorphs and Salt Selection, co-hosted by CACO-PBSS, are scheduled. Poster sessions are being scheduled throughout the meeting.

There will be a large Exhibition with commercial vendors and university graduate school representatives and will include small group presentation opportunities. Vendor early registration closes July 1. Early registration is recommended as space may become limited. Please see www.wrm2013.org for more information.

Special evening events will include the regional awards banquet featuring a talk by Priestly Medalist Dr. Richard Zare, an evening with Dr. Charles Bamforth on beer chemistry, and an evening with Shirley Corriher and Dr. Sara Risch on flavor chemistry. Luncheons with ACS President Dr. Marinda Wu sponsored by the California Section WCC and an ACS Governance lunch meeting with members of the Board of Directors are also planned. A Sunday public outreach event at the nearby Great America Theme Park is also in the works!

Make your plans now to join us for a great meeting, and don't forget to submit your paper or poster!

Highlights of the May Dinner Meeting with Dr. Jim Mason



Sally Peters, Stephen Ting, Chemistry Olympiad Winner, Li Chung Ting



Speaker Jim Mason



Bruce Raby and David Nehrkorn



Stanford Students Alison Roy-Ting and Katy Murphy



Stanford Students Caitlin Ortega and Qudus Lawal



Peter Rusch, Abby Kennedy and Ean Warren

CHEMPLOYMENT ABSTRACTS JUNE 2013

For a complete list of current abstracts, please visit: www.scvacs.org/Local_Folder/abstract.htm

CHEMPLOYMENT ABSTRACT 3983

Position Title: Chemist

Job Description: The analytical chemist is responsible for assembling and testing new suppressor products and new chromatography consumable products. Approximately 80% of the job duty is lab work. Info at www.thermofisher.com/careers - jobcode: SB20131802-69726

QUALIFICATIONS DESIRED:

Education: Bachelors Degree required in Chemical or Biological Sciences or similar preferred

Experience: Minimum of two years of practical experience with analytical instruments preferably HPLC or related technologies or one year of the above experience with a MS degree in a related area.

LOCATION, SALARY, EMPLOYER:

Job Location: Sunnyvale, CA

Salary: Commensurate with experience

Employer: Thermo Fisher Scientific is the world leader in serving science. Our mission is to enable our customers to make the world healthier, cleaner and safer, with revenues of \$13 billion.

Application Instructions: Please apply online at www.thermofisher.com/careers - jobcode: SB20131802-69726



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ChemPloyment Abstracts

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

- Jun 23-27** 43rd National Organic Symposium
Seattle, WA
www.organicdivision.org/amalorig/NOS/index.html
- Jun 24-26** Fundamentals of Adhesion Science
Golden Gate Polymer Forum
www.ggpf.org
- Jul 21-24** Northwest Regional ACS Meeting
Corvallis, OR
www.norm13.org/ACS_Norm13/Home.html
- Jul 22-29** ACS Summer School on Green
Chemistry and Sustainable Energy
Golden, CO
www.acs.org/gcsummerschool
- Aug 21** BioScience Forum
www.biosf.org/programs.htm
- Sep 8-12** 246th ACS National Meeting
and Exposition
Indianapolis, IN
- Oct 3-6** Western Regional Meeting
Santa Clara, CA
www.wrm2013.org