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SCALACS

May/June 2015

A Joint Publication of the Southern California and
San Gorgonio Sections of the American Chemical Society

Section Meetings

Educational Awards Banquet

Friday, May 15, 2015

Mount Saint Mary's University Doheny Campus

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**Congratulations to our
2014 Richard C. Tolman Award
Recipient**

Prof. William Evans

June 11, 2015

UC Irvine University Club

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**San Gorgonio Section
8th Annual Goldstein Distinguished
Lecture**

May 15, 2015

**Distinguished Lecturer: Dr. Malika
Jeffries-EL**

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SCALACS

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**Southern California and San Gorgonio Sections of the
American Chemical Society**

Volume LXX

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Southern California Section

Chair's Message



We had a great April dinner meeting at Los Angeles Trade Technical College with an outstanding talk given by Dr. Karl Christie. What I enjoyed most about this event was that both our members and the college community came together to hear the seminar. Below is a picture of Dr. Christie with the Trade Tech's science club members. The enthusiasm of the students was a nice treat.

As we head into May, our section will be hosting the Southern California Section Educational Awards Banquet on May 15th at Mount Saint Mary's University Doheny campus. See page 3 for more details. This is a great time to honor our top high school students. We know these achievements have come from hard work and dedication.

Please also see the announcement on Page 9 for the Chemistry Merit Badge Activity at the Youth Expo at the Rose Bowl. Volunteers are needed!

In June we will be having the Tolman Award dinner on June 11, 2015 at the UC Irvine University Club. Join us as we honor Prof. William Evans for the outstanding research his group has done.

As we move into the summer, remember we are planning our next year programming so be sure to contact me with any ideas. Our success as a section is directly related to its members participation.

Have a great summer!
Veronica Jaramillo
vijaramillo@pasadena.edu



Southern California Section

Educational Awards Banquet

Friday, May 15, 2015

Mount Saint Mary's University, Doheny Campus
Donahue Center
10 Chester Place
Los Angeles, CA 90007

Awards will be presented to the top-placing students in the local High School Chemistry Olympiad, to their teachers, and to local ACS scholars

6:00 p.m. Check-in

6:45 p.m. Dinner

7:30 p.m. Presentation of Awards

This year, we had 1,040 students representing 39 high schools throughout Los Angeles County take the Local ACS Exam in March. Whitney High School finished first overall while North Hollywood High School finished first for first year students. The winners of the local exam were invited to participate in the national exam on April 18th at Occidental College for a chance to be part of the International Olympiad in July in Baku, Azerbaijan. These students, as well as the top performers and teachers from each school of 10 or more participants, will be honored at our annual Educational Awards Banquet.

Reservations: We have an All American Cookout Buffet featuring hamburgers, garden burgers, chicken breast and hotdogs with all the fixings. The cost of the dinner is \$20 per person or \$15 for students, cash or check at the door. Please call Nancy Paradiso in the Section Office at 310 327-1216 or email office@scalacs.org by **Monday, May 11, 2015** for reservations.

Directions: The meeting will take place on the Doheny Campus in the Donahue Center in McIntyre Hall. For directions and a campus map, please go to <http://www.msmc.la.edu/about-msmc/our-campuses/driving-instructions.asp>.

Southern California Section

Tolman Award Dinner Meeting

Thursday, June 11, 2015

UC Irvine University Club

801 East Peltason Drive

Irvine, CA 92697-5625

**“A Retrospective on the “Roads Not Taken”
on the Way to Discovering New Oxidation States
of the Rare Earth and Actinide Metals in Molecular
Complexes”**

William J. Evans

2014 Richard C. Tolman Medal Recipient

Department of Chemistry

University of California, Irvine

6:00 p.m. Check-in & Hosted Social Hour

7:00 p.m. Dinner

8:00 p.m. Presentation

The Award: The Richard C. Tolman Medal is awarded each year by the Southern California Section of the American Chemical Society in recognition of outstanding contributions to chemistry in Southern California. The Tolman Medal recognizes broad accomplishments in chemistry rather than a single fundamental discovery. These contributions may be of several kinds, including seminal research of widely regarded influence, achievements of broad impact in chemical technology, significant contributions to chemical education, and outstanding leadership in science on a national level. To be eligible for the Medal, the recipient must have accomplished a major portion of his or her work while a resident of Southern California.

Abstract: A fundamental aspect of the chemistry of any element is the number of formal oxidation states available in molecules for chemical reactions. The range of accessible oxidation states for all of the elements has been continuously tested for decades and the boundaries were thought to be well-established across the (*Continued on Page 5*)

Southern California Section

Abstract (Continued from Page 4)

periodic table. However, recently the special environment provided by three silyl-substituted cyclopentadienyl ligands has led to the discovery of the first examples of formal +2 oxidation states in molecular complexes of the following nine metals: yttrium, holmium, erbium, praseodymium, gadolinium, terbium, lutetium, uranium, and thorium. This talk will retrospectively examine the research path that led to these discoveries and discuss the many "roads not taken" that may have led to these results in different ways.

Please see Prof. Evans Biography on the next page.

Reservations: There will be a buffet dinner including London Broil, Lemon Caper Chicken, and Penne Pesto. The cost is \$45 per person including the hosted social hour and wine with dinner, cash or check at the door. Please RSVP to Nancy Paradiso in the Section Office at office@scalacs.org or 310 327-1216 by Tuesday, May 26th. *Note: Please honor your reservation. If you make a reservation and do not attend, you may be liable for the cost of the dinner.*

Directions: For directions to the campus and a campus map, please go to <http://uci.edu/visit/maps.php>.

Congratulations to 2015 Priestley Medalist Jacqueline K. Barton

The Southern California Section congratulates Jacqueline Barton for receiving the 2015 ACS Priestley Medal, the Society's most prestigious award. Prof. Barton is recognized for her pioneering work in discovered fast, long-range electron transport in DNA, for her dedication to training young investigators, and for her unwavering support of the chemistry enterprise.. Prof. Barton is the Arthur and Marian Hanisch Memorial Professor of Chemistry and Chair of the Division of Chemistry and Chemical Engineering at the California Institute of Technology. She has received many other prestigious awards including the 1994 Tolman Medal and the 2010 National Medal of Science.

William J. Evans 2014 Richard C. Tolman Medal Recipient

William Evans was born in Madison, Wisconsin and raised in Menomonee Falls, Wisconsin. He received a B.S. degree from the University of Wisconsin, where he did undergraduate research on pentaboranes with Professor Donald F. Gaines. He obtained a Ph.D. from UCLA under the direction of Professor M. Frederick Hawthorne studying metallocarboranes. He did postdoctoral research on transition metal phosphite complexes with the late Professor Earl L. Muetterties at Cornell University. When he began his independent career in 1975 at the University of Chicago, he chose an area of research completely different from his training and experience, namely the chemistry of the rare earth metals and actinides, with the central thesis that the special properties of these metals should lead to unique chemistry. After receiving tenure at Chicago in 1982, he was recruited to the University of California, Irvine, where he has been a Professor since 1983.

Prof. Evans has received the American Chemical Society Award in Inorganic Chemistry, the American Chemical Society Award in Organometallic Chemistry, the Sir Edward Franklin Award of the Royal Society of Chemistry, the Frank Spedding Award for Excellence in the Science and Technology of Rare Earths, the Terrae Rarae Award of the Tage der Seltenen Erden Society in Germany, a Special Creativity Extension Award from the National Science Foundation, the UCI Physical Sciences Outstanding Contributions to Undergraduate Education Award, and the UCI Distinguished Faculty Award for Research.

The Southern California Section extends their warm congratulations to Prof. Evans as the 2014 Recipient of the Richard C. Tolman Medal for his pioneering work in the coordination chemistry of the late elements, notably the lanthanides and actinides. Over the years, he has made a tremendous impact in the use of heavy metal coordination compounds for catalytic, energy and environmental applications.



Insights Into IP Law

Keith Orso*, Irell & Manella LLP
KOrso@irell.com

Recent installments of this column have addressed several reasons why it remains important, from a patent law perspective, to properly use and maintain lab notebooks notwithstanding the recent transition from a first-to-invent to a first-inventor-to-file patent system in the United States. Another reason relates directly to strategies that defendants can use in patent litigation to undermine or even dismiss a patent owner's infringement case. One strategy is to try to prove that the asserted patent fails to name as an inventor someone who actually contributed to the conception of a claimed invention—an omitted inventor.

Patents are supposed to name as inventors the people who actually engaged in the act(s) of inventing the subject matter claimed. Failing to name a co-inventor, even inadvertently, can be likened to taking credit for the inventive contributions of that co-inventor, and is prohibited. A defendant in a patent suit can assert that a patent is invalid on such grounds. Also, there is a connection between inventorship and ownership, as discussed previously. Ownership of a patent vests by default in the inventor(s), so an attack on inventorship can affect who owns the patent.

Under the Patent Act, inventorship errors can generally be corrected upon proof of the facts, but fraud before the patent office (e.g., by an inventor) can render the patent unenforceable. Findings of such fraud are rare, and often the omitted inventor was under an obligation to assign his or her invention to the Patent Owner, so correcting the patent to add the inventor often does not affect ownership. But sometimes, an allegedly omitted inventor does not have any such obligation. In such cases, the defendant in litigation can seek out the individual and obtain a license to any rights the individual might have in the patent by virtue of his or her inventorship. As a general rule, a co-owner of a patent is free to license the entire patent to others without the consent of co-owners. Accordingly, obtaining a license from an omitted inventor can turn what would be an infringing use of the patented invention into an authorized use. Moreover, all co-owners of a patent must join in an infringement suit, so the existence of an omitted inventor who is not obligated to assign the invention to the plaintiff and refuses to join can result in dismissal of the litigation. Keeping proper lab notebooks documenting conception of all aspects of inventions can help defend against litigation-inspired assertions that inventors were omitted. Please email korso@irell.com with desired topics for the future.

* The author earned engineering and chemical engineering under-graduate and graduate degrees, and is a patent attorney and partner at the law firm of Irell & Manella LLP. This column does not constitute legal advice and does not necessarily reflect the views of the firm or its clients.



This Month in Chemical History

Harold Goldwhite, California State University,
Los Angeles
hgoldwh@calstatela.edu

In a recent column I discussed the acetone crisis of World War I drawing on a recent book: "The Chemists' War 1914 – 1918" by Michael Freemantle published by The Royal Society of Chemistry in the U.K. this year (2015). That war, called in the past The Great War (though it was dwarfed by World War II in geographic scope and casualty numbers), saw the advent of gas warfare on the Western Front in 1915 with the release of chlorine by Germany against French troops in Northern France. The allies were quick to respond, also initially with chlorine, but in this column I will discuss the introduction of a fearsome new class of chemical warfare agents by both sides: mustard gas.

There are different types of mustard gas. This column will focus on sulfur mustard, bis-(2-chloroethyl)sulfide. This compound was probably first synthesized in 1822 by a young French chemist, Despretz, by reaction between ethylene and sulfur dichloride. He noted the oily nature of the product and its bad smell. The German production method for the sulfur mustard used in World War I was based on a process devised by Viktor Meyer and modified by Hans Thacher Clarke which included the production of 2-chloroethanol from ethylene and hypochlorite, treating that compound with sodium sulfide, and generating sulfur mustard from the product of that reaction by treatment with concentrated hydrochloric acid. Both Meyer and Clarke noted that sulfur mustard is toxic and inflicts wounds on the skin that are slow to heal. An accidental spill of sulfur mustard by Clarke while working in Fischer's laboratory in Berlin in 1915 incapacitated Clarke for two months and this prompted an investigation into its use in chemical warfare. The Bayer company began to produce sulfur mustard, and it was used in battle by the Germans in July 1917.

The Allied response was prompt, and the chemical team was led by William Jackson Pope, a distinguished British organic chemist. Pope considered sulfur mustard a 'humane' war gas because while it incapacitated troops for long periods, it rarely killed. The compound (which has a slight odor of mustard oil due to impurities – hence the name mustard gas) is a vesicant raising severe blisters on the skin, damage to the lungs if inhaled, and causing temporary or permanent blindness if it gets into the eyes. Pope and co-worker Charles Gibson modified a reaction first studied in by Frederick Guthrie in 1860. This involved bubbling ethylene through sulfur chlorides. Pope and Guthrie obtained good yields of sulfur mustard by passing ethylene through sulfur monochloride at 50 -70°C. French chemists later improved the yield by running the reaction at 30 – 40°C.

The calculus of killing is disturbing. In a book on chemical warfare Augustin Prentiss concluded that sulfur mustard is "by far the most effective" of war gases. This is primarily because it is persistent, unlike chlorine or phosgene. *(Continued on Page 9)*

This Month in Chemical History

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Prentiss calculated that there was one casualty per 60 pounds of sulfur mustard and one casualty per 500 pounds of high explosive.

There is an American connection to this story. James Conant was recruited for the U.S. Chemical Warfare Service in 1917 and was charged with the production of sulfur mustard. His team used the French chemists' version of the Pope and Gibson reaction, and by mid-1918 were producing about 10 tons of sulfur mustard a day. Since the Armistice was signed in November 1918, only a fraction of the American product was used in battle. Altogether the Allies used around 3000 tons of sulfur mustard in World War I, and the Germans around 7000 tons.

While the sulfur mustards have not found uses outside of battle, their analogs the nitrogen mustards, chloroalkylamines, were among the first compounds successfully used in chemotherapy. But that is a story for another month.

Southern California Section Outreach Activity

On **May 30, 2015 from 8:00 am to 3:00 pm**, SCALACS will be hosting its annual **Chemistry Merit Badge activity at the Youth Expo being held at the Rose Bowl Pavilion**. Last year we helped 150 youths get their chemistry badges. If you would like to volunteer, please contact Derek Marin at Derek.Marin@DunnEdwards.com or Jerry Delker at delker@earthlink.net.

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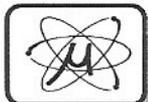
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San Gorgonio Section

Chair's Message



Congratulations to all students and teachers who participated in the San Gorgonio Local Olympiad exam this year! Two hundred and ninety-nine students from seventeen high schools competed this year, an increase of 100 students from the 2014 exam! The growth is attributed to the change in testing venues.

The San Gorgonio section encompasses a large geographical area, approximately 200 miles from east to west and 90 miles from north to south. The distance has made it challenging for students throughout the Section to physically get to testing center. This year, schools were given the option of administering the exam on their campuses or sending students to one of the three testing centers. Ninety percent of students took the exam on their high school campus. With such a large increase in the number of students who participated this year, this is definitely a successful change!

The San Gorgonio Local Olympiad exam is used to nominate ten students to advance to the National exam competition. The nominees for the 2015 National Exam are:

Damien High School	Xincheng Shen* Tianhao Raymond Liu
Diamond Bar High School	Junxi Zhu* Bryant Lu*
Diamond Ranch High School	Nicholas Ury
Etiwanda High School	Karl Chen
Great Oaks High School	Rishi Patel
Walnut High School	Yun-Ta Tsai* Ayesha Ng*
Western Christian High School	Jack Wu

The San Gorgonio Local Olympiad exam is also used to award five scholarships. Students whose names are marked with an asterisk are also Section scholarship winners.

I would like to acknowledge and express my thanks to the people who made it possible to hold this successful event this year: Dennis Pederson, Davis Srulevitch, Ernie Simpson, Virgil Lee and Laurie Starkey. Many thanks to CSU San Bernardino, Cal Poly Pomona and UC Riverside for allowing the use of their campus as testing centers. And my sincere gratitude and admiration to the dedicated high school teachers who took the time to coordinate the participation of their students in the 2015 Olympiad Exam.

- Eileen DiMauro, Chair

San Gorgonio Section

8th Annual Goldstein Distinguished Lecture

May 15, 2015

**Lunch and Student Awards 12 -1 pm
Distinguished Lecture at 1 pm**

**Kellogg West Conference Center
Cal Poly, Pomona**

Distinguished Lecturer: Dr. Malika Jeffries-EL

Martin Luther King Jr., Visiting Professor-Department of
Chemistry, MIT

Associate Professor, Department of Chemistry, Iowa State
University

“Living in a Materials World: Designing Organic Semiconductors for Advanced Applications”

Since their discovery almost 40 years ago, conjugated polymers have been of tremendous scientific and technological interest due to their semiconductor properties. As a result they are well suited for organic use in applications, such as solar cells, transistors and light emitting diodes. Unfortunately, there are several issues that have to be addressed before real-life commercialized products based on these materials can be developed. Since the properties of organic semiconductors can be readily modified through chemical synthesis, we have turned our attention towards the design and synthesis of novel building blocks. Our system of choice, polybenzobisazoles, possesses many exceptional electronic, optical and thermal properties and thus are ideally suited for diverse organic semiconducting applications. However, these materials have found limited utility due their lack of solubility in organic solvents and the harsh conditions required for their synthesis. Our group has developed a mild approach for the synthesis of benzobisoxazoles resulting in several building blocks suitable for designing new polymers. As a result we have been able to prepare wide band gap materials for use in organic light-emitting diodes and narrow band gap materials for use in photovoltaic cells. Our work on the synthesis and properties and utility of these polymers will be presented.

Biography: Malika Jeffries-EL is an Associate Professor of Chemistry at Iowa State University. She received BA degrees in Chemistry and African Studies at Wellesley College and Master's and Ph.D. degrees in chemistry from George Washington University. After spending one year at Smith College as a Mendenhall Fellow she worked as a post-doctoral fellowship under the direction of Professor Richard D. McCullough at Carnegie Mellon University. In 2005, she joined the faculty in the Chemistry Department at Iowa State University and was
(Continued on Page 13)

San Gorgonio Section

Student Scholarship and Awards Recognition Banquet

Tuesday, May 19, 2015

California State University San Bernardino

5500 University Parkway, San Bernardino, CA
Chuck Obershaw Dining Room, University Commons
(Building labeled CO on the campus map)

“Where Can Chemistry Take You”, A Panel Presentation

Social and Check-in: 5:45 PM

Dinner: 6:30 PM

Panel Presentation: 7:15 PM

Awards/Recognition Program Following

In March, nearly 300 students from 15 high schools in the San Gorgonio Section region took the local section Chemistry Olympiad examination. This evening allows us the opportunity to recognize and honor the top performing student from each school, the 10 students who, based on their score qualified for the National Chemistry Olympiad, and the 5 students who earned San Gorgonio Section-sponsored college scholarships. We also shall be recognizing the teachers of these outstanding students. Please join us in honoring these truly remarkable students and their teachers at this meeting. The evening will also be an opportunity to hear a presentation by several graduates of our local universities answering the question **“Where can chemistry take you?”**. Career opportunities abound for those excited by chemistry and this presentation will highlight a few of the many possibilities.

Buffet Dinner: Greek Salad with Balsamic Vinaigrette, Lemon Chicken with White Wine Sauce, Vegetarian Pad Thai, Basmati Rice with Almonds, Lemon Garlic Broccoli, Chocolate Layer Cake, Ice Tea, and Coffee.

Cost and Reservations: The cost (meal, tax and tip) is \$15 members, \$18 non-members, \$12 seniors and retirees, \$8 students, free for student honorees and their teachers, cash or check only, at the door. Make your reservations no later than Friday, May 15th by 12 noon by contacting Dennis Pederson (dpedersn@csusb.edu) or Eileen DiMauro (edimauro@mtsac.edu). Include names and number of persons. Please be certain to honor your reservation.

Parking: Free parking with pass in Parking Lot D. Pick up your parking pass at the kiosk (Parking Services Information Booth) or risk a \$30 fine. Tell the attendant that you are attending the Chemistry Awards Dinner.

Directions: Please go to <http://www.csusb.edu/mapsDirections/index.html> for directions to the CSUSB campus. There is a link for the campus map.

Attention Chemistry Professors: Please bring any extra science or chemistry textbooks that you may have so that we may donate them to the students and high school libraries. Thank you!

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Goldstein Lecture Biography (Continued from Page 11)

promoted to associate professor with tenure in 2012. She is currently a Martin Luther King Jr. Visiting Professor in the Chemistry Department of the Massachusetts Institute of Technology.

Dr. Jeffries-EL's research focuses on the development of organic semiconductors—materials that combine the processing properties of polymers with the electronic properties of semiconductors. She has authored over 30 publications, received over 1200 citations and given over 75 lectures domestically and abroad. She has won numerous awards.

Reservations: There is no cost to attend the event, but reservations are a must! **RSVP by May 1, 2015** by email to: goldsteinaward@cpp.edu or by phone: 909-869-3653

Directions: For a campus map and directions please go to this link:
<http://www.csupomona.edu/maps/dynamic>

**SOUTHERN CALIFORNIA SECTION
AMERICAN CHEMICAL SOCIETY**

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Contains Dated Meeting Announcement

PERIODICAL

Bi-Section Chemists' Calendar

For more information on these events, please check our website at
www.scalacs.org

May

- 15 SC Educational Awards Banquet—see page 3
- 15 SG Goldstein Distinguished Lecture with Dr. Malika Jeffries-EL—
see page 11
- 19 SG Student Scholarship and Awards Recognition Banquet—see
page 12
- 30 Chemistry Merit Badge activity at the Youth Expo—see page 9

June

- 11 Tolman Award Dinner honoring Prof. Williams Evans at UC
Irvine—see page 4

Have a great summer!