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**April 2019**

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

## **Southern California Section**



**Announcing the 2018  
Richard C. Tolman  
Award Recipient:  
Prof. Clifford Kubiak,  
University of California,  
San Diego  
See Page 3**

**Undergraduate Research Conference  
Saturday, April 13, 2019  
Mount Saint Mary's University, Chalon Campus  
See Page 5**

## **San Gorgonio Section**

**April 27, 2019  
National Chemistry Olympiad at U.C. Riverside  
See Page 11**

**May 17, 2019  
High School Student and Teacher Recognition Banquet  
at California Baptist University  
See Page 11**



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**TABLE OF CONTENTS**

So. Cal. Chair's Message	2
So. Cal. Meetings & Information	3-5
This Month in Chemical History	6-7
Insights Into IP Law	8
S. G. Chair's Message	10
S. G. Meeting Notice	11
Index to Advertisers	12
Chemists' Calendar	bc

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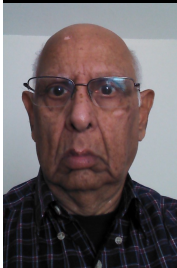
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# Southern California Section



## Chair's Message

Greetings everybody. I received a communication from John Gardiner, Program Manager, ACS Membership & Society Services, enclosing a list of members of our SCALACS Section who have reached the "remarkable milestones" of 50, 60 and 70 years of membership and service to the American Chemical Society in 2019. His letter read: ***"Everyone at the Society takes great pleasure in acknowledging these distinguished members who have contributed so much to the continued success of the ACS. We offer robust congratulations and sincere gratitude for their many years of service and dedication to the chemical sciences"***. I am sure that you all join me in extending our warmest appreciation and deepest sense of gratitude to these awesome folks. We will honor them in September at our annual luncheon.

I take the opportunity to congratulate Prof. Clifford Kubiak, University of California, San Diego, recipient of the Richard C. Tolman award for 2018.

I attended the seminar by Dr. Tamitha Skov, Research Scientist, Aerospace Corporation, Los Angeles, on March 16<sup>th</sup>, under the joint auspices of SCALACS and LAUSD along with Prof. Brian Foley of California State University Northridge who hosted the event. It was attended by a number of Science Teachers of LAUSD and some members of ACS/SCALACS. It was a scintillating lecture touching upon how certain processes occurring in the Sun produces radiation which affects (and virtually shuts down) the GPS system, cell phones, electrical transformers, other communication systems and even causes commercial pilots to lose track of their location. She stressed on the need for enhanced interaction between atmospheric physicists (an upcoming branch of science) and meteorologists, scientists, engineers and health professionals in order to forecast and warn the public on the risks to life and daily activities on earth and take appropriate precautionary measures.

This year also happens to be the 150<sup>th</sup> anniversary of the discovery of the periodic table by Mendeleev and I mentioned to all participants of the March 16<sup>th</sup> seminar (and to members of our SCALACS region through my earlier messages) that we should celebrate this event as part of the Earth Week event celebrated by ACS during April 21-27. I will be contacting a number of Professors from local universities/colleges as well as scientists from the industry to discuss what type of events we can organize. Science Teachers from LAUSD, as well their students will also be part of these celebrations. We will keep you informed. Watch our website for upcoming events, [www.scalacs.org](http://www.scalacs.org).

Krishna Kallury, Chair , [\[kkallury@socal.rr.com\]](mailto:kkallury@socal.rr.com)



### Announcing the Richard C. Tolman Award Recipient:

**Professor Clifford Kubiak  
University of California, San Diego**

**Dinner Date and Venue to be  
Announced**

**Tolman Address: “If you make a fuel from air, water, and  
sunlight, what should it be?”**

**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:** Catalysts for the reduction of  $\text{CO}_2$  are of interest in the production of solar fuels, and as a means of mitigating atmospheric  $\text{CO}_2$ . The question of which solar fuels should be made from  $\text{CO}_2$  is an important one. Unlike water splitting ( $\text{H}_2\text{O} \rightarrow \text{H}_2 + \frac{1}{2} \text{O}_2$ ) where a single reduced product ( $\text{H}_2$ ) is obtained, the reduction of  $\text{CO}_2$  can produce a variety of different chemical reduction products,  $\text{CO}$ ,  $\text{HCOOH}$ ,  $\text{H}_2\text{CO}$ ,  $\text{CH}_3\text{OH}$ ,  $\text{CH}_4$ , to name a few, as well as  $\text{C}_2$  and higher products. Which product(s) will be produced from solar energy, and then be used as building blocks to manufacture higher fuels and specialty chemicals is not presently known. Indeed, the question of whether  $\text{CO}_2$  should be reduced electrochemically to an organic molecule, or instead, hydrogen produced by water splitting, should be used to *hydrogenate*  $\text{CO}_2$  to organic products is not clearly understood at this time. There are very few known catalysts for the  
(Continued on Page 4)

## Southern California Section

### Clifford Kubiak Abstract (Continued from Page 3)

efficient hydrogenation of CO<sub>2</sub>, so whether electrochemical reduction or hydrogenation of CO<sub>2</sub> is ultimately practiced on an industrial scale, the development of new catalysts will be required to enable new technology. Results from several recent approaches to producing higher value solar fuels from CO<sub>2</sub> including synthetic biology and tandem catalysis are presently under investigation. Several recent accomplishments in the activation and electrochemical reduction of CO<sub>2</sub> have been achieved. These include the use of earth-abundant metals including manganese, in place of rhenium and ruthenium, and the use of artificial co-factors to promote catalysis. Other recent approaches to developing catalysts for the reduction of CO<sub>2</sub> include the deployment of proton relays in associated ligands to manage proton transport, introduction of new systems in which proton coupled electron transfer for efficient H-atom transfers can be effected, supramolecular catalyst assemblies that use non-covalent interactions to direct catalyst centers toward substrate activation, and artificial metalloprotein electrocatalysts. The general properties of molecular catalysts on conducting substrates under bias as probed by surface spectroscopies pose challenges to researchers attempting to do catalysis at an electrified interface. Surface spectroscopies can provide detailed information about the electronic structure and environmental effects of catalysts operating within the diffusion layer of an electrode under bias. Recent results of achieving highly active hybrid electrocatalyst materials based on molecular catalysts and graphitic carbon supports for selective reduction of CO<sub>2</sub> in water at neutral pH will be highlighted.

Please watch our website for information about the Tolman Dinner, [www.scalacs.org](http://www.scalacs.org).

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### **Congratulations to the 2018 Recipient of the Richard C. Tolman Medal Prof. Clifford P. Kubiak**

Clifford P. Kubiak is Distinguished Professor and the Harold C. Urey Chair in Chemistry at UC San Diego. He was born in Stamford, CT, and studied at Brown University (Sc. B. in chemistry), and the University of Rochester (Ph. D. in chemistry) with Rich Eisenberg. After a postdoctoral appointment at MIT (1980-1981) with Mark Wrighton, he joined the faculty of Purdue University where he served (1982-1998) until moving to UCSD, where he has spent the last twenty years. His research spans the fields of inorganic chemistry, physical chemistry, and nanomaterials. His research group has been investigating the chemistry, electrochemistry, and photochemistry of carbon dioxide since 1987. The catalytic reduction of carbon dioxide is a topic of considerable current interest in the field of artificial photosynthesis, where researchers seek to develop light harvesting materials and catalysts for the chemical conversion of carbon dioxide, water, and sunlight to liquid fuels. Kubiak has been a Principal Investigator of the Joint Center for Artificial Photosynthesis (JCAP) since its inception in 2010. Kubiak also has a long standing interest in inorganic mixed valency, especially systems where rates of intramolecular transfer occur on the picosecond time scale and give rise to coalescence of infrared spectra in a manner reminiscent of dynamic NMR, but on a time scale that is a billion times faster. Kubiak was one of the first inorganic chemists to work in the area of molecular electronics. He was a member of a research team that made the first direct measurements of the electrical resistance of individual molecules by scanning probe methods. He has published over 270 articles on these and other subjects. He supervised the research of 80 Ph. D. graduate students and postdoctoral researchers. His honors include the American Chemical Society Award in Organometallic Chemistry (2018), the American Chemical Society Award in Inorganic Chemistry (2012), the Fred Basolo Medal for Outstanding Research in Inorganic Chemistry (2015), Inter-American Photochemical Society Award in Photochemistry (2013). He was elected Fellow of the American Academy of Arts and Sciences (2014).

## Southern California Section

### Undergraduate Research Conference Saturday, April 13, 2019

**Mount Saint Mary's University, Chalon Campus**  
12001 Chalon Road  
Los Angeles, CA 90049

The 2019 Undergraduate Research Conference in Chemistry and Biochemistry will be held at the **Mount Saint Mary's University, Chalon Campus on Saturday, April 13, 2019. The deadline for abstracts is March 31, 2019.** For more information, please contact Katherine Liu at [kliu@msmu.edu](mailto:kliu@msmu.edu) or Dr. Eric Stemp at [estemp@msmu.edu](mailto:estemp@msmu.edu). The SCURC website is: <https://www.msmu.edu/undergraduate-bachelor-programs/physical-sciences/scurc2019/>

### Outreach Activities

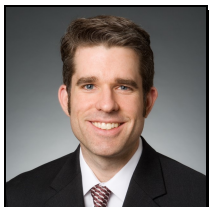


Chemists Celebrate Earth Week is April 21-27, 2019 and the theme is "Take Note: The Chemistry of Paper". Check out our website at [www.scalacs.org](http://www.scalacs.org) in the coming weeks for more events. Here are some of our upcoming activities:

**Monday, April 22, 2019: Chemists Celebrate Earth Week at the California Science Center.** If you would like to volunteer to help with the event, please email Dr. Henry Abrash at [abrash8@aol.com](mailto:abrash8@aol.com).

**High School Chemistry Olympiad:** The top scorers on the local exam are nominated to compete in the National Exam which will take place on **April 27th, 2019 at California State University Dominguez Hills.** We will recognize the top local students at our Educational Awards Banquet to be held on **May 17th, 2019 at Mount Saint Mary's University Doheny campus.** For more information, please contact Dr. Jerry Delker at [delker@earthlink.net](mailto:delker@earthlink.net) or Nancy Paradiso in the Section Office at [office@scalacs.org](mailto:office@scalacs.org).





## **Insights Into IP Law**

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

Inventors who allow unrestricted and uncontrolled use of their inventions before filing patent applications may forfeit patent rights based on prior “public uses.” In general, a use that is sufficient to place the invention in the public’s possession is a prior “public use.” The previous installment of this column discussed a recent case addressing whether a patent to a drug formulation was invalid based on an earlier clinical trial using a formulation developed and tested by someone other than the inventor on patients who were under no obligations of confidentiality. The patent was not held invalid.

In a case decided this past January, the question was whether a surgeon who obtained a patent on a system and method for aligning vertebrae to treat aberrant spinal column deviations publicly used the invention more than a year before he filed a patent application. The surgeon used his invention in three surgeries over about a two-month period. At trial, a jury found that the surgeries did not constitute invalidating public uses. The court upheld the jury verdict, concluding that the surgeon did not relinquish control of his invention. He was the only person who performed the surgeries, and although other people were present in the operating room (an anesthesiologist, two assistant physicians, a scrub technician, a neurophysiologist, a circulating nurse, and an equipment representative), there was sufficient evidence for a jury to find that the invention was not accessible to the public.

The court explained that in assessing accessibility to the public, several underlying facts are considered: the nature of the activity that occurred in public; the public’s access to, and knowledge of, the public use; and whether there was any confidentiality obligation imposed on the persons who observed the use. Applying that standard to the facts, the court found that the evidence in the case established that very few of the people in the operating room actually had a clear view of the surgery. They were either not permitted near the sterile field, or their views of the surgery were obstructed by a drape. Moreover, the court stated that a use might not be publicly accessible where the evidence establishes a sufficient obligation of confidentiality. The court emphasized that this confidentiality can be implied rather than express, and ruled that there was evidence that the people in the operating room with the surgeon were under an implied duty of confidentiality covering at least the tools and techniques used by the surgeon.

The court also addressed whether the surgeries constituted experimental uses. That question will be discussed in the next edition of this column.

\* The author earned engineering and chemical engineering undergraduate 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

I have just finished reading a fascinating book that is a part of chemical history in the United States. It's entitled "The Poison Squad". The author is Deborah Blum who directs a Science Journalism program at MIT and is a Pulitzer Prize winner for a series of articles on primate research. "The Poison Squad" is subtitled "One chemist's single-minded crusade for food safety at the turn of the twentieth century."

In a column I wrote some time ago I discussed the career of Frederick Accum who published in 1820 "A Treatise on Adulterations of Food, and Culinary Poisons" (popularly known as "Poison in the Pot" ) that was perhaps the first book by a chemist pointing out the sometimes literally poisonous additives unscrupulous vendors were adding to food to improve its color or flavor or longevity on the grocer's shelf: "our pickles are made green by copper; our vinegar rendered sharp by sulphuric acid....". Eventually this and similar revelations led 40 years later to the passage of the first British legislation imposing (modest!) fines on those found guilty of such adulterations.

While there were voices raised in the United States against similar practices there were no laws banning them at the beginning of the twentieth century. Enter Dr. Harvey Washington Wiley. He was a Professor of Chemistry at Purdue who had an M.D. from Indiana Medical College but found chemistry more to his taste than medicine, and so went on to get a degree in chemistry from Harvard. Purdue appointed him as its first Professor of Chemistry, and he later spent a sabbatical year in Europe, mostly in Germany, working in food-quality laboratories and attending the lectures of August Wilhelm von Hoffmann. Returning to Purdue he was asked by the Indiana State Board of Health to examine the quality of commercial sweeteners sold as "honey" and "maple syrup". Some 90% of the samples he tested were fraudulent, mostly made of corn syrup with coloring added, or fake additives (paraffin posing as honeycomb). He published his findings in "Popular Science" delighting some bee-keepers and maple sugar providers, but angering the growers and processors of corn syrup.

*(Continued on Page 9)*

## **This Month in Chemical History**

*(Continued from Page 8)*

In 1883 Wiley was appointed chief chemist of the United States Department of Agriculture and began using the rather limited resources of his new department to investigate cases of adulteration of food and drink. Of particular concern was the purity of milk. This “healthful” beverage, consumed mainly by children, was adulterated by being watered, or by having formaldehyde added to it to prolong its shelf life. Wiley recruited a group of young men as volunteers who became known as “The Poison Squad” and they began tasting the dubious food items that the group was investigating. They occupied their own dining room in the USDA cafeteria, emblazoned with the slogan “Only the Brave Dare Eat the Fare”.

Wiley had allies including Fanny Farmer, author of a famous cookbook; Upton Sinclair, novelist, and author of “The Jungle”, an expose of conditions in the Chicago stockyards; and Henry Heinz, proprietor of the food company that still bears his name, and who was a passionate advocate for pure foods. It was still an uphill battle because of vigorous lobbying from many segments of the food and grocery industries, but persistence won out in the end. In 1906 Congress passed, and President Theodore Roosevelt signed, two landmark bills: The Meat Inspection Act, and The Food and Drug Act, putting into law some of the safeguards that had been urged by Wiley. To some The Food and Drug Act became known as Dr. Wiley’s Law.

Wiley continued his work at the USDA under a Department Chief who was not very supportive, studying ketchup, cola beverages, corn syrup, bleaching agents for flour etc. But the constant battles to have his views heard and published were taking their toll. In March 1912 Wiley resigned from the USDA after 29 years of dedicated service to the health of the citizens of our country. He took a position on the staff of the magazine “Good Housekeeping” and continued his campaign against food, drug, and beverage adulteration from that “bully pulpit”. Harvey Wiley died in 1930 at the age of 86 fighting for his causes to the end. He had just completed his autobiography, but its publication came just too late for him to hold a copy in his hands.

### Chair's Message



Some of my best lectures in my 40 years at Cal Poly Pomona were "dreamed" up as I laid awake or asleep, but they were never recorded or were never nearly as good as I dreamed. A few nights ago, I had some twilight thoughts about writing this Chair's Message, but again I can't remember much.

I will start with thanking our fantastic volunteers on our SGS Board who help plan, attend, and carry out SGS activities as well as members & non-members who attend SGS events such as the 80 people who came to my "Identifying International Wines Using the Periodic Table" talk at CPP on February 22. We all got an extensive exercise in using atomic numbers and element symbols to decode the five given clues for each of nine wines from nine different countries. For those that got the right country/wine type or grape varietal, we used the vintage year and the percent alcohol to the nearest 0.1% as tie-breakers: Spain/Cava, New Zealand/Sauvignon Blanc, France/Chardonnay, Germany/Riesling, Italy/Barbera, Calif./Zin, Argentina/Malbec, Chile/Cab. Sauvignon, Portugal/Port. The event raised almost \$2300 for the Simpson Collins College Scholarship.

On Saturday, March 9, we had 35 attendees and 7 speakers at our "Careers for Chemists (Alternatives to an Advanced Degree)" at Cal. Baptist University in Riverside. In March and April, we are busy with our CHM Olympiad testing. At press time we have a SGS record of 405 High School students taking the test. Thinking back to my HS years in Albuquerque, the post-Sputnik era created a precursor of AP Chem at Highland HS. Mr. Hopperton let some 25 of us do our thing because we/he thought we were geniuses. He did arrange for several lectures by Chemistry Professors at UNM, one of whom was Guido Daub on benzene's structure. Some 8 years later my Ph.D work with Guido involved synthesis of some polycyclic aromatics. UNM did not require SAT scores for admission and after getting my B.S., they didn't require me to take the GRE. I'm sure my SAT & GRE scores would not have been stellar.

Today I would probably flunk the ACS CHM Olympiad test since I haven't taught freshmen CHM in over 35 years. My one year position at Pomona College replacing Freeman Allen on sabbatical helped me immensely in my 40 years teaching at CPP and service to ACS. At UNM I don't remember ACS (Continued on Page 11)

## San Gorgonio Section

### Chair's Message (Continued from Page 10)

activities as an undergrad and I didn't join ACS until I was well into my grad. work. Of course, back then to become an ACS member you needed to have a B.S. degree in CHM and 1-2 nominations from ACS members. Today, in SGS about 30% of our members are students who have not or may never complete a CHM degree. My year at Pomona College also helped Guido and Kay Daub's children, Bill, Betsy, and John, decide to attend PC, major in CHM, go onto Ph.D's in CHM, and Bill is still teaching at Harvey Mudd.

Ironically, on Feb. 27 I attended 57th Robbins Lecture Series at PC featuring our 2017 ACS President Dr. Allison Campbell. The February 18 C&EN issue advertised the same one year position at PC that I filled back in 1967. Since I have recycled myself as SGS chair for 2019, I won't apply, but I wonder what the salary is 52 years later?

Ernie Simpson, Chair

### **Upcoming activities in the San Gorgonio Section: Mark Your Calendars!**

**April 27, 2019**

**National Chemistry Olympiad at U.C. Riverside**

The top ten scorers from the 400+ students who took the local exam have been nominated to take the National Olympiad exam.

**May 17, 2019**

**Save the Date!**

**High School Student and Teacher Recognition Banquet  
at California Baptist University**

The National Chemistry Olympiad qualifiers, scholarship winners, high scorers from each school and teachers will be honored.

# San Gorgonio Section

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**Bi-Section Chemists' Calendar**

For more information on these events, please check our website at  
[www.scalacs.org](http://www.scalacs.org)

**April**

- 13 SC Undergraduate Research Conference at MSMU Chalon  
Campus—see page 6
- 27 SC National Olympiad Exam at CSUDH—see page 6
- 27 SG National Olympiad Exam at UC Riverside—see page 11

**May**

- 17 SC Educational Awards Banquet at MSMU—see page 6
- 17 SG High School Student and Teacher Recognition Banquet at Cal.  
Baptist University—see page 11