



April 2015

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







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SCALACS

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Chair's Message

As I write this I am preparing to attend the Spring 2015 national ACS meeting. I generally attend the Spring meeting as they celebrate the chemistry clubs and I get the honor of bringing undergraduates. It is always interesting to me that some of my students have never flown or left California. The

students are so excited by the grandness of the national meeting and they definitely leave inspired. It is through their eyes that I get excited by the experience.

This month our April dinner meeting will held at Los Angeles Trade Technical College where Dr. Karl O. Christie from USC will be presenting on his award winning research, "Fifty Years of Iodine Research".

This month we are celebrating **Earth Day**, where the theme is **"Climate Science – More Than Just A Weather Report!**". Our section, headed by Dr. Henry Abrash, will be arranging activities at the California Science Center (see below). We will also be having an Earth Day Illustrated Poem Contest for K-12th grades, see page 6.

We are also planning our second annual Chemistry Bowl for our local section Chemistry Clubs. Please contact me if your chemistry club is interested in participating. We are also looking for volunteers to help us with planning this event. If you are interested, please email me.

The **2015 Western Regional Meeting** is being hosted by the Orange County Section. The dates are November 6-8, 2015 at California State University, San Marcos. Mark your calendars!

The Southern California Section would like to congratulate **Prof. William Evans** of the University of California, Irvine, as the 2014 Richard C. Tolman Medal recipient. The dinner will be on June 11th at the University of California, Irvine. More information will be in the May issue of SCALACS.

Best, Veronica Jaramillo vijaramillo@pasadena.edu

Chemists Celebrate Earth Day

April 19 (10 am - 4 pm) & 22, 2015 (10-2) Chemists Celebrate Earth Day Activities at the California Science Center, 700 Exposition Park Drive, Los Angeles, CA 90037. The 2015 theme is: "Climate Science–It's More than a Weather Report". Join volunteers for CCED activities. Dates and times will be listed on the SCALACS website. For more information, or if you would like to volunteer, please contact Henry Abrash at: abrash8@aol.com.

Southern California Section



Section Dinner Meeting Thursday, April 2, 2015

Los Angeles Trade Technical College Dinner in Aspen Hall TE 101 and Talk in Aspen Hall TE 111

400 West Washington Blvd. Los Angeles, CA 90015

"Fifty years of lodine Research" Karl O. Christe

Loker Research Institute and Department of Chemistry, University of Southern California, Los Angeles

Check-in: 6:00 p.m. Dinner: 6:30 p.m. Presentation: 7:30 p.m.

Abstract: A review will be given of our research in the field of iodine chemistry including the following topics. Using IF₅ as a solvent for halogen fluoride ions, the IF_6^+ , IF_6^- , $I_2F_{11}^-$ and $I_3F_{16}^-$ ions were synthesized and characterized. Subsequently, the IF₂, IF₄, IF₄⁺, and IF₄O ions were prepared. The most interesting species was the IF_5^{2-} anion which has an unprecedented pentagonal-planar structure. The long-standing problems of the fluxionality of IF₇ and the steric activity of the free valence electron pair in the halogen hexafluoride anions were solved. At the limits of coordination and oxidation, the IF_5O^2 , $IF_5O_2^2$ and IF_6O^2 , the first examples of pentagonal-bipyramidal AX_5E_2 , AX_5EO , AX_5O_2 , and AX_5YZ species, were prepared, and a novel method for the stepwise replacement of two fluorines in iodine fluorides by an oxygen was developed. With $I(CIO_4)_3$ and $I(CIO_4)_4$, the first examples of highly explosive iodine perchlorates were discovered, and fluorocarbon perchlorates were prepared by the reaction of fluorocarbon iodides with halogen perchlorates. Similarly, chlorine fluorosulfate and perfluoroisopropyl iodide yield $i-C_3F_7I(SO_3F)$ 2, a compound with an iodonium cation and an iodite anion. Iodine fluorosulfate, ISO₃F, can also be added across olefinic double bonds producing iodoperfluorocarbon fluorosulfates. Further examples of the broad scope of this work of are the syntheses FOIF₄O, CIOIF₄O, HOIF₄O, and tetrafluoroperiodates. study and the of the polymorphism in tetramethylammonium periodate. Recently, the potential of I_2O_6 as an agent for the defeat of weapons of mass destruction was demonstrated. Most of these compounds are not only of academic interest but have many applications as High Energy Density Materials, explosives, propellants, and chemical lasers. (Continued on Page 6)

Southern California Section

Karl Christe Talk (Continued from Page 6)

Biography: Dr. Karl O. Christe is a Research Professor with the Loker Hydrocarbon Research Institute and Department of Chemistry at the University of Southern California, Los Angeles, CA. He received his B.Sc. from the Technical University of Stuttgart, Germany, 1957 and the University of Vienna, Austria, 1958, his M. Sc., Technical University of Stuttgart, Germany, 1960 and his Ph. D., Technical University of Stuttgart, Germany, 1961.

Dr. Christe has 53 years of experience in the synthesis of novel high energy oxidizers and rocket propellants and has managed and scientifically directed a large number of government funded research contracts. He has achieved the first syntheses of many spectacular compounds, such as CIF_3O , CIF_3O_2 , halogen perchlorates, OIF_4OF , OsF_4O_2 , and ions, such as NF_4^+ , CIF_6^+ , CIF_6^- , $CIO_2F_2^-$, $CIO_2F_2^+$, CIF_2O^+ , CIF_4O^- , NF_3^+ , NF_2O^+ , and $NH_2F_2^+$. He has invented solid propellant fluorine gas generators for chemical laser weapon systems and has discovered the first purely chemical synthesis of elemental fluorine. He has pioneered the use of this compound as a source of "naked" fluoride ions, which has led to a renaissance of high coordination number chemistry. Among the novel compounds, which he prepared in this manner, are the XeF_5^- and IF_5^{2-} anions, which are the first known examples of pentagonal planar species.

Dr. Christe is a member of the American Chemical Society and the Gesellschaft Deutscher Chemiker, and has received numerous awards, including the ACS Award in Iodine Chemistry (2015), the ACS Tolman Award (2011), Elections to the European Academy of Sciences and Arts (2010), and the European Academy of Sciences (2009), the Alfred Stock Gedaechtnispreis of the German Chemical Society (2006), the ACS Award in Inorganic Chemistry (2003), the Prix Moissan (2000), the ACS Award in Fluorine Chemistry (1986), and the NASA Apollo Achievement Award (1969).

Reservations: There will be a buffet dinner. The cost is \$25 including tax, tip, iced tea and dessert, cash or check at the door. The talk at 8:00 is free to attend.

Directions: A campus map and directions are available at: http:// college.lattc.edu/about-lattc/campus-map/



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Southern California Section



Section Meeting

Tuesday, April 28, 2015 1:00 pm—2:00 pm

El Camino College

Distance Education Conference room, Library 166 16007 Crenshaw Blvd. Torrance, CA 90506

"A Few of My Favorite Rings" Prof. Vy Dong University of California, Irvine

Abstract: The presentation is tailored to cater to divergent audiences and is divided into four parts. The first part serves to introduce the field of Organic Chemistry to fresh undergraduate students, as well as to people from other walks of natural/physical sciences who are not familiar with this branch of chemistry. The second part deals with the concept of Chirality and explains how certain molecules can exist as both "left" and "right" handed entities, exhibiting different physical and chemical characteristics, although they have the same molecular formula/composition. This leads to the third part which elaborates on how these chiral entities can differ in their biological properties, with special focus on why this knowledge is vital in the design of safe drugs in the realm of medicine. Prof. Dong then transitions into the final part, which describes her research on the design of novel catalysts and the synthesis of ring structures.

Vy Dong was born in Big Spring, Texas and spent early Biography: childhood in west Texas before moving with family to Anaheim, California. She graduated magna cum laude from UC Irvine where she majored in chemistry and completed an honor's project with Larry Overman. After graduation, she joined David MacMillan's group at UC Berkeley, and then moved with his group to Caltech to complete her doctoral studies. Her Ph.D. thesis featured variants of the zwitterionic-Claisen rearrangement and a total synthesis of erythronolide B. As an NIH postdoctoral fellow, Vy pursued training in organometallic and supramolecular chemistry with Robert Bergman and Kenneth Raymond at Berkeley. She began her independent academic career at the University of Toronto, where she was promoted with tenure and named the Adrian Brook Professor. After six years in Canada, Vy returned to the United States to assume a professorship at her alma mater, UC Irvine. Professor Dong's research team is interested in new reaction methods, enantioselective catalysis, and natural product synthesis.

Directions: Convenient Parking is in Lot H, and is \$3. For directions and a campus map, please go to http://www.elcamino.edu/about/directions.asp.

Chemists Celebrate Earth Day Illustrated Poem Contest

As part of Chemists Celebrate Earth Day (CCED) activities, the American Chemical Society is sponsoring an illustrated poem contest for students in Kindergarten - 12th grade. Entries will be judged at the local section level and then be advance to the National contest for a chance at prizes there.

All poems must be no more than 40 words, and in one of the following styles to be considered: Haiku, limerick, ode, ABC poem, free verse, end rhyme or blank verse. Entries are judged based upon relevance and incorporation of the CCED theme ("Climate Science—More than Just A Weather Report"), word choice and imagery, colorful artwork, adherence to poem style, originality and creativity, and overall presentation.

All entries must be original works without aid from others. Each poem must be submitted and illustrated on an unlined sheet of paper (of any type) not larger than 11" x 14". The illustration must be created by hand using crayons, watercolors, other types of paint, colored pencils, or markers. The text of the poem should be easy to read and may be printed with a computer, before the hand-drawn illustration is added, or the poem may be written on lined paper which is cut out and pasted onto the unlined paper with the illustration. Only one entry per student will be accepted.

The deadline for entries is **April 24, 2015**. Please mail entries to: SCALACS, 14934 S. Figueroa Street, Gardena, CA 90248 or email to office@scalacs.org. Winners will receive a \$25 prize. For more information, contact the Section office at office@scalacs.org.

Outreach Activities

The 2015 Undergraduate Research Conference in Chemistry and Biochemistry will be held on Saturday, April 11, 2015 at the University of California, San Diego (9500 Gilman Drive, La Jolla, CA 92093). For more information, please visit the conference website (<u>http://chemistry.ucsd.edu/scurc/</u>) or contact Prof. Judy Kim at judyk@ucsd.edu.

The local High School Olympiad took place on March 18th and 19th at 39 schools in the L. A. Area. The **National Exam will take place on April 18th** at Occidental College, and our **Educational Awards Banquet will take place on May 15th at the Mount Saint Mary's University Doheny campus**. For more information, contact Dr. Jerry Delker at delker@earthlink.net or the Section Office at office@scalacs.org.

Save The Date! 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.

Congratulations 2015 ACS Awards Recipients

We would like to congratulate members of the Southern California Section who received awards at the National Meeting in Denver:

ACS Award for Creative Research and Applications of Iodine Chemistry: Karl O. Christe, University of Southern California Award Citation: For pioneering work on the preparation and characterization of novel iodine compounds and their use in synthesis, chemical lasers, explosives, and propellants.

ACS Award in Colloid and Surface Chemistry

Paul S. Weiss, California NanoSystems Institute

Award Citation: For establishing the ultimate limits of miniaturization and for developing game-changing methods of patterning and investigation of molecules on surfaces.

ACS Award in the Chemistry of Materials

Mark E. Thompson, University of Southern California

Award Citation: For pioneering the discovery and development of molecular materials for displays, lighting, and solar energy conversion and for combining unique insights from molecular photophysics and synthetic chemistry.

2015 Award in Experimental Physical Chemistry

Prof. Mitchio Okumura, California Institute of Technology "for scientific contributions serve as benchmark data to constrain climate models that describe the current state and future evolution of Earth's atmosphere"

2015 Early-Career Award in Theoretical Chemistry Prof. Thomas F. Miller, California Institute of Technology "for his development of dynamics, electronic structure, and statistical mechanical methods to elucidate the reactivity of biological and inorganic catalysts"

Congratulations to our **2014 Tolman Award Medalist, William J. Evans** of the University of California, Irvine, who is also being honored for the **ACS Award in Organometallic Chemistry**

Award Citation: For demonstrating the vitality of organometallic chemistry through the discovery of new oxidation states, ligand classes, structural types, and reaction pathways.



This Month in Chemical History Harold Goldwhite, California State University, Los Angeles hgoldwh@calstatela.edu

One hundred years ago, on April 22, 1915, Allied soldiers in their trenches defending the village of Langemarck, north of Ypres in Northern France, saw a cloud of a greenish gas slowly flowing towards them. Within a short time some 6000 French, Algerian, and Moroccan soldiers were dead, along with many horses. This was the first use of poison gas in modern warfare, devised, among others, by Fritz Haber, a Nobel laureate in chemistry for his work on ammonia synthesis. The attack used about 170 tons of chlorine. In September of the same year, the British unleashed their own gas attack, using about 140 tons of chlorine and 10,000 phosphorus bombs against German troops near Loos in Northern France. The era of gas warfare in World War I had begun.

I have just been reading an interesting book, from which the information above was obtained: "The Chemists' War 1914 - 1918" by Michael Freemantle published by The Royal Society of Chemistry in the U.K. this year (2015). The Great War, World War I, has often been called the chemists' war, because of the many contributions of chemists to the development of not only the weapons of war, but also to the multitude of other applications of chemistry during wartime. Some of these stories are so well-known that a few lines can recount them. For example the explosives used in the war were mostly nitro compounds (TNT, guncotton etc,) and the importation of South American nitrates obtained from guano into Germany became almost impossible after 1914 because of the British navy's blockade of the Atlantic and the North Sea. Just in time to avert a critical shortage of nitric acid, Haber and Bosch had developed both the scientific basis and the industrial production of ammonia from nitrogen and hydrogen, and Ostwald had shown how ammonia could be oxidized to nitrogen dioxide and then converted into nitric acid. Without these scientific and industrial discoveries and applications Germany might have run out of explosives within a year of the outbreak of the war in August 1914.

A less well-known story, which Freemantle calls the acetone crisis, began in 1915. The British army was facing a shortage of artillery shells that were propelled from guns by cordite, a mixture of guncotton (highly nitrated cellulose) and nitroglycerin. Acetone solvent was essential in the processing of cordite, and was in short supply. The needed acetone was imported from the USA and demand was exceeding supply. At that time acetone was almost completely obtained by the dry distillation of wood, though a process involving heating calcium acetate was under development.

Enter the biochemist Chaim Weitzmann. A Russian Jew born in 1874 who was educated in Germany and Switzerland, where he earned his doctorate for research on dyes, he moved to England in 1904. He was already a dedicated Zionist. Weitzmann became interested in fermentation biochemistry and became a self-taught biochemist and microbiologist. He investigated a range of

This Month in Chemical History (Continued from Page 8)

organisms that could convert potato starch and maize starch into industrially useful products like butanol and the pentanols. In 1913 he isolated a bacterium (Weitzmann's organism) that fermented maize starch into a mixture of butanol and acetone. This process was scaled to a production level of a few hundred kg of acetone a week - still not enough to supply the demand in the explosives industry. In early 1916 Weitzmann met the First Lord of the Admiralty, the head of the British navy, Winston Churchill, who asked him to build a pilot plant for acetone production using his biochemical method. Within months Weitzmann's process was making 500kg batches of acetone consistently, and by 1917 the process was making around 3000 tons of acetone a year from maize and rice starches at several factories in the U.K. For these achievements, Weitzmann has been called the father of industrial fermentation. The British government, perhaps influenced by his contributions to the war effort, issued the Balfour Declaration in late 1917, saying that Britain looked with favor on the establishment of a national home for Jews in Palestine. Weitzmann became the first President of Israel in February 1949, but his health was already failing, and he died in office in November 1952.



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April 2015



Insights Into IP Law Keith Orso*, Irell & Manella LLP

KOrso@irell.com

In response to a letter from a reader, last month's installment of this column alluded to two examples of why it remains highly important from a patent law perspective to properly use and maintain laboratory notebooks, so as to be able to evidence a date of invention and the identities of the inventors, notwithstanding the recent transition in the United States from a first-to-invent to a first-inventor-to-file system. This installment of the column elucidates those two examples.

First, being able to evidence a date of invention can be important to preserve rights if someone derives an invention from the inventor(s) and passes it off as his or her own. The Patent Act provides that a patent owner may have relief by civil action against the owner of another patent that claims the same invention and has an earlier effective filing date, if the invention claimed in the other patent was derived from the inventor of the invention claimed in the patent owned by the party seeking relief. To prove derivation, the true inventor(s) must establish prior conception of the complete invention (e.g., using laboratory notebooks), and prior communication of that invention to the alleged deriver.

Second, being able to evidence a date of invention can be important to preserve rights if the invention is disclosed in a publication by someone other than an inventor one year or less before the effective filing date of the claimed invention. The Patent Act states that a person is not entitled to a patent if the claimed invention was described in a printed publication before the effective filing date of the claimed invention. But the Act also articulates an exception when an inventor can show that, before such disclosure was made (but not earlier than one year before the filing date), the subject matter disclosed in the publication had been publicly disclosed by the inventor or a joint inventor or another who obtained the subject matter disclosed directly or indirectly from the inventor or a joint inventor. Such a showing may end up requiring evidence that the inventor or a joint inventor is actually the inventor of the subject matter of the earlier disclosure - e.g., laboratory notebooks proving the earlier invention - although this is not expressly required by the rules and the Patent Office has indicated that it may not be necessary in all cases. Tune in for more on lab notebooks, and their importance in litigation, next time. Please email me at korso@irell.com with suggested topics for future installments.

* 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.

San Gorgonio Section



Chair's Message Reflections on 30 Years of Teaching Chemistry

This school year I am celebrating my 30th year teaching chemistry at Mt. San Antonio College, a community college on the western edge of the San Gorgonio Section. Here are some of my rambling thoughts on my life as a chemistry teacher.

Something happened last semester that showed me how very little some things have changed. As I was preparing to go to class, my computer decided it did not want to participate. I turned to my filing cabinet and pulled out a set of hand -written, dog-eared lecture notes. Happily, the topics and problems aligned exactly with the textbook and the PowerPoint presentation I had planned on using. The lecture notes were dated 1986! Apparently freshman chemistry textbooks have not changed significantly in the last 30 years.

When I admit to new acquaintances that I am a chemistry teacher, their reactions fall into two categories: (1) I hated every minute I spent in chemistry class (90%); (2) chemistry was my favorite class (10%). In order to have my students fall into the second category, I attempt to relate chemistry to everyday life. Food is a topic that causes students to sit up and take notice. Students in Introductory Organic and Biochemistry are told the first day of class that for the final exam, they must be able to describe where every molecule in a hamburger ends up after it is eaten. Recently, a former student approached me; "Do you remember me? You were my chemistry teacher in 1995. I think of you every time I eat a Big Mac." I think he qualifies for the second category.

Introducing the topic of alcohol usually sparks a glimmer of interest. ACS.org had a recent link to an article "Beer Compound Could Help Fend off Alzheimer's and Parkinson's Diseases." The article contained the molecular structure of a polyphenol, very useful in introducing functional groups to students in introductory organic chemistry. The quote "Beer is proof that God loves us and wants us to be happy" appears on T-shirts in breweries and the Liberty Bell gift shop in Philadelphia. It is commonly attributed to one of my favorite scientists, Benjamin Franklin. The source of the quote is believed to be from a letter that Franklin wrote, "Behold the rain which descends from heaven upon our vineyards, there it enters the roots of the vines, to be changed into wine, a constant proof that God loves us, and loves to see us happy." This can serve as an introduction to the properties of water or resveratrol, depending on the course. It also allows me to mention that Benjamin Franklin was inducted into the International Swimming Hall of Fame in 1968.

If you are reading this, you are either a chemistry teacher or you have known chemistry teachers at several levels. Hopefully, you fall into the second category.

- Eileen DiMauro, Chair

Section Dinner Meeting

Tuesday, April 21, 2015

Keck Graduate Institute School of Pharmacy 535 Watson Drive Claremont, CA 91711

"You are Your Genes: Medical Therapy Designed for You"

Dr. Samit Shah Keck Graduate Institute, School of Pharmacy

Social and Check-in: 5:30 pm Overview of KGI School of Pharmacy: 6:00 pm Dr. Kathy D. Webster, Founding Dean Ms. Marcia Parker, Director of Admissions Dinner: 6:30 pm Program: 7:30 pm

Program Overview: There is a significant variability in how individuals respond to drugs. A drug that is effective in one individual may be totally ineffective and even produce adverse effects, in another individual. Healthcare professionals have typically used parameters such as age and weight, and a trial and error process to select the right medication and dose for a patient. Recent advances in the field of genomics have allowed the identification of genetic variants that influence the effectiveness of a therapeutic agent. These advances in the field of pharmacogenomics have brought us ever closer to the goal of being able to deliver the right dose of the right drug to the right patient at the right time. When individuals are diagnosed with a medical condition, pharmacogenomics will allow classification of individuals based on how they would respond to a certain therapy. This presentation will feature the basics of pharmacogenomics with some examples of drugs, where pharmacogenomic information can be used to guide therapy.

Speaker: Dr.Samit Shah currently serves as the Sidney J. Weinberg Professor and Chair of Biopharmaceutical Sciences at the Keck Graduate Institute (KGI) School of Pharmacy in Claremont, CA. At KGI, Dr. Shah is involved in teaching Medicinal Chemistry, Pharmacology and Molecular Biology to pharmacy students. His current research interests include the development of a novel siRNA delivery system that allows selective activation of RNA interference (RNAi) in tumor cells. Dr. Shah earned his B.S. in pharmacy from North Gujarat University, a PhD in pharmaceutical sciences from the University of Missouri-Kansas City, and an MBA from South University. He received post-doctoral training at the Massachusetts Institute of Technology. *(Continued on Page 13)*

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April Dinner Meeting (Continued from Page 12)

Dinner, Cost and Reservations: The Italian dinner will start with Hors D'oeuvres (Bruschettas, Cheese Tortellini on a Skewer, and Seafood Pockets) followed by a buffet (Gourmet Lasagna, Chicken Piccata, Vegetarian Corn & Parmesan Portobello Mushrooms, Caesar Salad, Antipasto Display, and Italian Bread Cascade), and topped off with a Dessert Station (Roasted Pear & Amaretto Trifle, and Chocolate Decadence Cake). The cost will be \$20 for ACS members, \$25 for nonmembers, \$15 for retirees and \$10 for students. Please make your reservation no later than 12 noon on Thursday, April 16th by contacting either Eileen DeMauro (EDiMauro@MtSAC.edu) or Dennis Pederson (909-537-5477, dpedersn@csusb.edu).

Directions: From the 10 Freeway, take the Indian Hill Blvd. exit, go north on Indian Hill Blvd., turn left onto Santa Fe St. (just prior to the railroad crossing), follow signs to second entrance on the left, turn right on Watson Dr. From the 210 Freeway, take the Towne Ave. exit, go south on Towne Ave., turn left onto Bonita Ave., turn right onto Cambridge Ave., turn left onto Wharton Dr., follow signs to the entrance on the right. Visitor parking (free) is located at the front of the main building, 535. The meeting will be in Building 517, Room P1. This room is located on the left after you enter Building 517.

SOUTHERN CALIFORNIA SECTION AMERICAN CHEMICAL SOCIETY 14934 S. FIGUEROA STREET GARDENA, CA 90248

IMPORTANT Do Not Delay!

Contains Dated Meeting Announcement

PERIODICAL

Bi-Section Chemists' Calendar

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

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11 Save the date: Tolman Award Dinner at UC Irvine. More information in the May issue of SCALACS