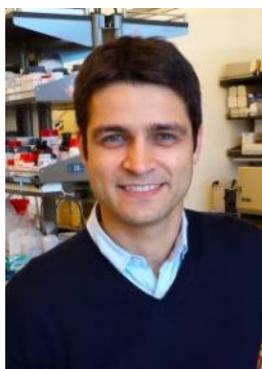


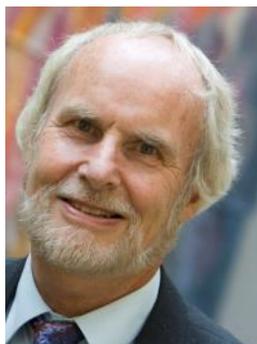
A Joint Publication of the Southern California and  
San Gorgonio Sections of the American Chemical Society

## Section Meetings



**“Biomolecular Engineering for Non-Invasive Imaging of Biological Function”**

**Mikhail G. Shapiro, PhD,**  
California Institute of Technology  
**Wednesday, March 18, 2015**  
**Luminarias Restaurant**  
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**“Fifty years of Iodine Research”**

**Prof. Karl Christe, USC**  
**Thursday, April 2, 2015**  
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# SCALACS

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Number 2

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## Southern California Section



### Chair's Message

We have started the year off with two great dinner meetings. We had Dr. Anthony Butch from the Geffen School of Medicine at the University of California, Los Angeles (UCLA) give us an inside look into sports drug testing. Our February dinner meeting had Dr. David Crisp from JPL talk about the OCO2 mission and carbon dioxide measurement.

We have more events planned for this year. On March 18, 2015, we will have Dr. Shapiro from Caltech presenting on "Biomolecular Engineering for Non-Invasive Imaging of Biological Function," see page 3 for more information. On April 2, 2015, Dr. Karl O. Christe from USC will be presenting on his award winning research, "Fifty Years of Iodine Research," see page 5.

We also look forward to hosting the Local Exam for the 2015 High School Chemistry Olympiad on March 18 and 19 in the Los Angeles area. This event is being arranged by Dr. Jerry Delker and I thank him for his efforts on this.

We would love to hear your ideas for our events. We are also looking for volunteers to help us with event planning. If you are interested, please let us know.

Best,

Veronica Jaramillo, Chair  
vijaramillo@pasadena.edu

### Undergraduate Research Conference

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). The deadline for submissions of abstracts is **Friday, March 13, 2015**. For more information, please visit the conference website (<http://chemistry.ucsd.edu/scurc/>) or contact Prof. Judy Kim at [judyk@ucsd.edu](mailto:judyk@ucsd.edu).

## Southern California Section

### Section Dinner Meeting

Wednesday, March 18, 2015

#### Luminarias

3500 Ramona Blvd.  
Monterey Park, CA 91754

### “Biomolecular Engineering for Non-Invasive Imaging of Biological Function”

#### Mikhail G. Shapiro, PhD,

Assistant Professor of Chemical Engineering  
California Institute of Technology

Check-in: 6:00 p.m.

Dinner: 7:00 p.m.

Presentation: 8:00 p.m.

**Abstract:** Many important biological processes – ranging from simple metabolism to complex cognition – take place deep inside living organisms, yet our ability to study them in this context is very limited. Technologies such as fluorescent proteins and optogenetics enable exquisitely precise imaging and control of cellular function in small, translucent specimens using visible light, but are limited by the poor penetration of such light into larger tissues. In contrast, most non-invasive technologies such as magnetic resonance imaging (MRI) and ultrasound – while based on energy forms that penetrate tissue effectively – lack the needed molecular precision. Our work attempts to bridge this gap by engineering new molecular technologies that connect penetrant energy to specific aspects of cellular function *in vivo*. In this talk, I will describe molecular reporters for non-invasive imaging using MRI and ultrasound developed by adapting and engineering naturally occurring proteins. These proteins have physical properties, such as paramagnetism or self-assembly into hollow nanostructures, that allow them to be sensitively detected with MRI and ultrasound. By engineering them at the genetic level, we have adapted these natural constructs into non-invasive molecular reporters of biological processes ranging from gene expression to chemical neurotransmission.

(Continued on Page 4)

## Southern California Section

### March Dinner Meeting (Abstract continued from Page 3)

**Biography:** Mikhail Shapiro is an Assistant Professor of Chemical Engineering at the California Institute of Technology. His research is focused on developing molecular technologies to image and control biological function non-invasively in living organisms. To achieve this goal, the Shapiro Lab adapts, evolves and engineers proteins and other biological structures into non-invasive reporters for imaging with MRI and ultrasound and control using magnetic and acoustic energy. Dr. Shapiro received his PhD in Biological Engineering from the Massachusetts Institute of Technology and a BSc in Neuroscience from Brown. He conducted post-doctoral research in biophysics at the University of Chicago and was a Miller Fellow at the University of California, Berkeley. Dr. Shapiro has been awarded the Hertz, Soros, Miller and Life Science Research Foundation fellowships, the Burroughs Wellcome Career Award at the Scientific Interface and the DARPA Young Faculty Award. The *Technology Review* has recognized him as one of the world's top 35 innovators under age 35. More information about the Shapiro Lab can be found online at [shapirolab.caltech.edu](http://shapirolab.caltech.edu).

**Reservations:** The entrée is Luminarias Chicken, double breast of chicken stuffed with asadero cheese, fresh spinach, sun dried tomatoes, roasted poblanos and guajillo cream sauce. The cost is \$34 including tax and tip, salad and dessert, cash or check at the door. Please call Nancy Paradiso in the Section Office at 310 327-1216 or email [office@scalacs.org](mailto:office@scalacs.org) by **Monday, March 16th**. *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:** A map and directions are available at <http://www.luminariasrestaurant.com/contact>.

## Expanding Your Horizons Conference

The **Expanding Your Horizons Conference** for middle school girls will take place on **March 14th, 2015** from 8:45 am to 2:45 pm at **Mount Saint Mary's University Chalon Campus, Los Angeles**. Expanding Your Horizons is a career day supported by SCALACS and organized by MATH/SCIENCE INTERCHANGE to inform young women about careers in math and science-related fields. The conference is for girls in grades 5-8. The fee is \$15 per person. For more information, please go to [www.expandingyourhorizonsla.org](http://www.expandingyourhorizonsla.org). Since this is a conference for girls, women volunteers to help out for the day are very welcome. If you would like to volunteer, please contact Dr. Eleanor Siebert at [esiebert@msmc.la.edu](mailto:esiebert@msmc.la.edu).

## 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 Iodine Research”

#### Karl O. Christe

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

Check-in: 6:00 p.m.

Dinner: 7:00 p.m.

Presentation: 8:00 p.m.

**Abstract:** A review will be given of our research in the field of iodine chemistry including the following topics. Using  $\text{IF}_5$  as a solvent for halogen fluoride ions, the  $\text{IF}_6^+$ ,  $\text{IF}_6^-$ ,  $\text{I}_2\text{F}_{11}^-$  and  $\text{I}_3\text{F}_{16}^-$  ions were synthesized and characterized. Subsequently, the  $\text{IF}_2^-$ ,  $\text{IF}_4^-$ ,  $\text{IF}_4^+$ , and  $\text{IF}_4\text{O}^-$  ions were prepared. The most interesting species was the  $\text{IF}_5^{2-}$  anion which has an unprecedented pentagonal-planar structure. The long-standing problems of the fluxionality of  $\text{IF}_7$  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  $\text{IF}_5\text{O}^{2-}$ ,  $\text{IF}_5\text{O}_2^{2-}$  and  $\text{IF}_6\text{O}^-$ , the first examples of pentagonal-bipyramidal  $\text{AX}_5\text{E}_2$ ,  $\text{AX}_5\text{EO}$ ,  $\text{AX}_5\text{O}_2$ , and  $\text{AX}_5\text{YZ}$  species, were prepared, and a novel method for the stepwise replacement of two fluorines in iodine fluorides by an oxygen was developed. With  $\text{I}(\text{ClO}_4)_3$  and  $\text{I}(\text{ClO}_4)_4^-$ , 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  $i\text{-C}_3\text{F}_7\text{I}(\text{SO}_3\text{F})_2$ , a compound with an iodonium cation and an iodite anion. Iodine fluorosulfate,  $\text{ISO}_3\text{F}$ , can also be added across olefinic double bonds producing iodoperfluorocarbon fluorosulfates. Further examples of the broad scope of this work are the syntheses of  $\text{FOIF}_4\text{O}$ ,  $\text{ClOIF}_4\text{O}$ ,  $\text{HOIF}_4\text{O}$ , and tetrafluoroperiodates, and the study of the polymorphism in tetramethylammonium periodate. Recently, the potential of  $\text{I}_2\text{O}_6$  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  $\text{ClF}_3\text{O}$ ,  $\text{ClF}_3\text{O}_2$ , halogen perchlorates,  $\text{OIF}_4\text{OF}$ ,  $\text{OsF}_4\text{O}_2$ , and ions, such as  $\text{NF}_4^+$ ,  $\text{ClF}_6^+$ ,  $\text{ClF}_6^-$ ,  $\text{ClO}_2\text{F}_2^-$ ,  $\text{ClO}_2\text{F}_2^+$ ,  $\text{ClF}_2\text{O}^+$ ,  $\text{ClF}_4\text{O}^-$ ,  $\text{NF}_3^+$ ,  $\text{NF}_2\text{O}^+$ , and  $\text{NH}_2\text{F}_2^+$ . 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 developed a synthesis for anhydrous tetramethylammonium fluoride and 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  $\text{XeF}_5^-$  and  $\text{IF}_5^{2-}$  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 Gedächtnispreis 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/>

## Southern California Section

### Outreach Activities

**Late April 2015 - Chemists Celebrate Earth Day Activities at the California Science Center**, 700 Exposition Park Drive, Los Angeles, CA 90037, website:

<http://www.californiasciencecenter.org>. **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](mailto:abrash8@aol.com).

**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 Scout Expo being held at the Rose Bowl Pavilion**. Last year we helped 150 scouts get their chemistry badges. If you would like to volunteer, please contact Derek Marin at [Derek.Marin@DunnEdwards.com](mailto:Derek.Marin@DunnEdwards.com) or Jerry Delker at [delker@earthlink.net](mailto:delker@earthlink.net).

### High School Olympiad

The Southern California Section has been administering the High School Chemistry Contest since 1914. This year, we will hold the local section **High School Olympiad on March 18th and 19th** at over 35 schools in the Los Angeles area. If you know of a school or student that would like to participate, please direct them to our website, [www.scalacs.org/?page\\_id=236](http://www.scalacs.org/?page_id=236), to download the letter and participation form. Last year, we have almost 1,400 students participate in the exam.

**The National Exam will take place on April 18th** at Occidental College, and our **Educational Awards Banquet will take place on May 16th at the Mount Saint Mary's University Doheny campus**. For more information, contact Dr. Jerry Delker at [delker@earthlink.net](mailto:delker@earthlink.net) or the Section Office at [office@scalacs.org](mailto:office@scalacs.org).



## **This Month in Chemical History**

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

In a recent column I discussed the career of an early science columnist, J. G. Crowther, whose book on “Statesmen of Science” was published in 1965. I now get to one of those statesmen-scientists who was an influential figure during World War II. I refer to Frederick Alexander Lindemann, later Viscount Cherwell. He was born in Baden-Baden in Germany in April 1886 to an American mother and an Alsatian father, an engineer, who emigrated to Britain after the Franco-Prussian war in which Germany annexed Alsace. Lindemann went to a preparatory school in Scotland and then to Darmstadt and Berlin. His Ph.D. was earned with Nernst working on specific heats at low temperatures to check Einstein’s formula. In 1911 he was the youngest attendee at that year’s Solvay Conference on modern physics.

Lindemann was an all-rounder. He was a first rate pianist and an excellent tennis player who competed at Wimbledon. When World War I broke out in 1914 he was competing in a tennis tournament in Berlin and had to leave so suddenly he was unable to collect the trophy he had won! He was also a vegetarian, a non-smoker, and a teetotaler.

During World War I he joined a team at the Royal Aircraft Factory to work on the problem of aircraft spin. He learned to fly and tested his own theories. When war ended he moved to Oxford as “Dr. Lee’s Professor of Experimental Philosophy” which also carried the responsibility of heading the Clarendon Laboratory of Physics, which was in a neglected condition after the war. He steadily built up the laboratory against the strong competition of the Cavendish Laboratory in Cambridge, headed by Rutherford. Many expatriate European scientists in the 1930s found a home with Lindemann at Oxford. His work in science continued including his ideas on chemical kinetics, upper atmosphere chemistry, and isotope separation with Aston. He was elected a Fellow of the

*(Continued on Page 9)*

## **This Month in Chemical History**

*(Continued from Page 8)*

Royal Society in 1920. And talking of society, Lindemann became friendly with Winston and Clementine Churchill in the 1920s and stayed at their country house, Chartwell, many times.

After the start of World War II in 1939, Churchill became Prime Minister in 1940 and he appointed Lindemann as the government's principal scientific advisor. He attended meetings of the War Cabinet and conferred with Churchill regularly. His ideas on the war in the air were controversial and often (in hindsight) erroneous. He downplayed the importance of radar and pushed for more powerful bombs and an infrared "death ray". Fortunately, at least as regards radar, other views prevailed. Lindemann, like a good scientist, trusted numbers, and he established a statistical service looking at food and fuel supplies, shipping and airplane losses and the like, so that the Cabinet could plan logistically for the future of the war effort. Later in the war he downplayed the possibility of a rocket bomb, the V2, and said that space travel was impossible. He was later proved wrong on both counts.

Lindemann was honored for his service to Britain. He was created Baron Cherwell in 1941 and Viscount Cherwell in 1956. From 1951 to 1953, when Churchill was again Prime Minister, Cherwell served as Paymaster General in his cabinet

Lindemann never married and when he died in 1957, at age 71, his titles died with him.

\* I am a co-author with Cathy Cobb and Monty Fetterolf of a new book "The Chemistry of Alchemy: From Dragon's Blood to Donkey Dung; How Chemistry was Forged" published by Prometheus Books in July 2014; it is available both as a hardback and as an ebook.



**Insights Into IP Law**  
**Keith Orso\***, Irell & Manella LLP  
KOrso@irell.com

Last month, a reader of this current series on inventorship wrote to inquire about the recent transition in United States patent law from a first-to-invent to a first-inventor-to-file system, and how that transition might impact incentives to properly use and maintain lab notebooks.

Under the first-to-invent system, which still applies to certain claims having an effective filing date before the transition, an individual who was first to invent something could obtain a patent even if a later inventor was first to file a patent application claiming the very same thing. Generally, whoever could prove that he or she invented first – e.g., by producing properly prepared laboratory notebooks evidencing the claimed invention – would be awarded the patent and the later inventor would not be entitled to any patent on the invention (the Patent Office is not supposed to issue two patents claiming identical inventions). Similarly, an inventor could avoid certain allegedly invalidating prior art references dated shortly before the patent application was filed simply by using lab notebooks and the like to establish a date of invention before the dates of the references.

Under the new first-inventor-to-file system (note that it is not just a “first to file” system because a first-filer is not entitled to a patent if he or she is not also actually an inventor), a person who was second to invent something can obtain a patent if he or she is first to file a corresponding patent application -- even if someone else could prove an earlier date of invention. Moreover, under the first-inventor-to-file framework, inventors can no longer simply antedate prior art dated after the invention but shortly before the effective filing date of the application. So are laboratory notebooks now irrelevant to patent issues? By no means!

Not only does it of course remain good practice from a scientific perspective to properly use and maintain lab notebooks, but it remains highly important from a patent law perspective as well. Being able to evidence a date of invention can be important, for example, to preserve rights if someone derives an invention from the inventor and passes it off as his or her own, or if the invention is disclosed in prior art, after being disclosed by the inventor, one year or less before the effective filing date of the claimed invention. Look for more about these examples, and others, in the next edition of this column. Please email me at [korso@irell.com](mailto:korso@irell.com) with topics you would like to see addressed in 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.

## San Gorgonio Section



### Chair's Message

#### Thoughts on the Passing San Gorgonio Parade

The San Gorgonio Executive Board has recently completed its annual report to the National organization. I always find this exercise to be effective in focusing energy and resources where they are most useful. This seems like a good opportunity to share some of the information that goes into and comes out of the process of creating the annual report.

The Section has remained relatively stable over the last few years with between 750 and 800 ACS members. The breakdown last year was 67 Emeritus members, 413 regular members, 282 regular student members, 23 retired members and 4 society affiliates. The largest population centers remain Riverside (300 members), Claremont (100 members). Two members, Dr. Frank Lambert and Mr. J. W. Mohlman, have belonged to ACS since 1942. We have eighteen members who have belonged to the organization for fifty or more years. The Section remains fiscally sound.

The annual report asks the section to reflect on successes and challenges. The successes were discussed in the January Chair's message, so let's look at the challenges. The large geographic area that comprises our Section creates the most formidable challenge. Section dinner meetings held in the more highly populated areas such as Claremont, Riverside and San Bernardino are generally well attended by local members, but are too far to travel for many. That seems to be a timeless challenge. One of the reasons that the San Gorgonio section was established sixty-five years ago was because it was too far for chemists in the Inland Empire to travel to events held in Los Angeles. Another challenge is the difficulty in recruiting people to run for Executive Board positions.

*(Continued on Page 12)*

## San Gorgonio Section

### Chair's Message (Continued from Page 11)

The annual report also asks about the Section's goals. The number one goal has remained consistent over the past several years – to increase participation in meetings and events. Another goal is to expand opportunities for high school students to participate in the Olympiad exam and Project SEED. A third goal is to improve communication by recruiting persons to act as liaisons at sites with a significant population of members such as UC Riverside, Loma Linda and Claremont.

I sincerely thank the members of the 2014 Executive Board who worked so hard to create our list of successes: Ernie Simpson, Dennis Pederson, David Srulevitch, James Hammond and Laurie Starkey. These dedicated people remain on the Board for 2015. I would also like to welcome Larry Mink to this year's Board in the position of Treasurer. And I extend an invitation to all ACS members who live in the San Gorgonio Section to participate in any capacity possible.

- Eileen DiMauro, Chair



Source: [http://www.guy-sports.com/funny/funny\\_science\\_jokes.htm](http://www.guy-sports.com/funny/funny_science_jokes.htm)

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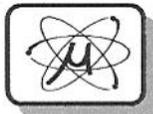
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**Bi-Section Chemists' Calendar**

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

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