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SCALACS

March 2018

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



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A Joint Publication of the
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American Chemical Society

Volume LXXIII March 2018 Number 2

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Chair's Message

Inspiration.



"We keep moving forward, opening new doors, and doing new things, because we're curious and curiosity keeps leading us down new paths."

- Walt Disney

This is my third opportunity to have the honor of being SCALACS chair. I have truly benefitted from many collaborations with our most "seasoned" members of the section. I am reminded that our ACS experience evolves through the "seasons" of our membership from Student Member to Younger Chemist and eventually to Senior Chemist. At a different scale our involvement in ACS governance takes us along all sorts of paths, perhaps in directions that we never even considered. Regardless, there is never a lack of inspiration.

I am inspired by those brave students who participate in the Chemistry Olympiad with competitive spirit and Jerry Delker who has tirelessly led the program for SCALACS for many years. The 2018 local exam will be held March 21st and 22nd.

This year we are expanding our collaboration with other local sections and we have several fun events we are co-hosting with the California Los Padres Local Section. On March 9th, with our friends from CALPACS we are co-sponsoring the 2nd Annual Collaborative Chemistry Conference which builds connections between chemistry educators. We are also planning several exciting events including an aquarium tour for Chemists Celebrate Earth Week in April.

Another source of inspiration is Eleanor Siebert and other local section members who contribute to the Expanding Your Horizons Conference which provides gateway STEM experiences to middle school girls. This year's conference is at Mount Saint Mary's University (Chalon campus) on Saturday April 7th. A friend of SCALACS, Dr. Elizabeth Cochran, a seismologist from the US Geological Survey in Pasadena, will be giving the keynote address.

(Continued on Page 4)

High School Olympiad



The Southern California Section of the American Chemical Society has been offering the Chemistry Contest since 1914, at which time Nordhoff High School was the top scoring school. It became the High School Chemistry Olympiad in 1968 when National ACS began sponsoring it. In 2008, the Section won a National award for 25 years of continuous support of the Chemistry Olympiad. In 2014, we celebrated 100 years of offering the High School Contest. The Southern California Section has the longest running contest in American Chemical Society history.

This year, the Southern California Section will hold the High School Chemistry Olympiad on **March 21st and 22nd, 2018** at over 35 schools in the Los Angeles area. The test is designed to test a student's knowledge of a wide variety of topics in chemistry. 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 to download the letter and participation form. We now offer the option to pay with a credit card online. The top scorers on the local exam are nominated to compete in the National Exam which will take place on **April 21st, 2018 at California State University Dominguez Hills**. The top 20 national winners are invited to attend an all expense paid two-week study camp at the U. S. Air Force Academy in Colorado Springs, Colorado. The top four finalists are then selected to represent the United States at the International Chemistry Olympiad which will be held in Bratislava, Slovakia and Prague, Czech Republic, July 19-29, 2018.

We will recognize the top local students at our Educational Awards Banquet to be held on **May 18th, 2018** with monetary awards and certificates. The Banquet will take place at the Mount Saint Mary's University Doheny campus. For more information, please contact Dr. Jerry Delker at delker@earthlink.net or Nancy Paradiso in the Section Office at office@scalacs.org.

Southern California Section

2nd Annual Collaborative Chemistry Conference

Friday, March 9, 2018

8:30 am—4:00 pm

Dr. Thomas Lakin Boardroom 108

761 East Daily Drive

Camarillo, CA 93010

The primary goals of the Annual Collaborative Chemistry Meetings are to promote COLLABORATION, build CONNECTIONS and provide PROFESSIONAL DEVELOPMENT opportunities between chemistry educators in Ventura, Los Angeles and Santa Barbara counties with the aim of enhancing student learning. The additional goals for this meeting include learning some of the high-impact practices in use on campuses, evaluating current ACS recommendations for 2 and 4-year schools, and giving faculty and students from our region the opportunity to present their work at a professional conference. Please join us for this exciting opportunity for faculty collaboration and professional development. Part-time faculty are especially encouraged to participate!

For more information, contact Jennifer Mallory at jmallory@vcccd.edu or Tiffany Pawluk at tpawluk@vcccd.edu.

This event is a co-hosted by SCALACS and CALPACS (California Los Padres Section).

Chair's Message (Continued from Page 2)

Chemistry Olympiad participants, my fellow local section leaders, and all of our partners live the ACS vision of **improving people's lives through the transforming power of chemistry**.

We will be better people and a better Society because of your contribution.

Adelante!

Bob de Groot
rdegroot@oxy.edu

Southern California Section

**2018 Expanding Your Horizons
Saturday, April 7, 2018**

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

Expanding Your Horizons (EYH), a career day generously supported by the Southern California Section, informs girls in grades 5-8 about careers in math- and science-related fields. Girls participate in hands-on workshops such as dissecting pig hearts, isolating DNA, and making colors with chemistry. There are also workshops for parents, teachers and counselors about making math and science a career option for girls.

Registration for the conference is open now. All girls in grades 5-8 and their parents are invited to participate. There is a \$15 fee for each participant to cover lunch and materials. Note that only paid registered participants may attend the conference. **Please register online; there is no on-site registration: www.expandingyourhorizonsla.org.**

We are in need of volunteers to help with the conference. 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@msmu.edu.**



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Rational Design of Sustainable Hair Colors Using Cheminformatics

Commercial hair dyes constitute a multi-billion dollar industry with a growth projection of 9% during 2015-2019. However, not much is known about their toxic effects in the public domain. Newer hair dyes have been developed with toxicological considerations, but they do not compete with the efficacy and low cost of conventional dyes. Conventional dyes fall into three classes. Temporary dyes last only one or two shampoo treatments and semi-permanent dyes last six to eight treatments and both do not penetrate deep into the hair and they involve non-oxidative chemistry. Permanent dyes last for long periods since they undergo an oxidation process during application and penetrate deeply into hair fibers and possibly chemically bind to nucleophilic sites on hair.

Williams and coworkers from North Carolina State University recently published an article in the journal ACS Sustainable Chemistry & Engineering (ASAP, Dec. 22, 2017) on approaches to designing new non-toxic hair dyes with a set of desired color and adhesion properties. As an initial step, they developed the largest publicly available database of temporary, semi-permanent and permanent hair dye substances used in commercial formulations, consisting of 363 dyes and 313 precursor chemicals. This database was then subjected to a cheminformatics study involving QSAR (quantitative structure-activity relationship) and QSTR (quantitative structure-toxicity relationship). Parameters studied to classify the dyes into clusters include molecular weight, octanol-water partition coefficients (log P), topological polar surface area (TPSA), hydrogen bond donor and acceptor capabilities. Temporary dyes mainly consist of azo, thioindigoid and triaryl-methane classes, while semi-permanent dyes possess nitro group. Permanent dye precursors are aromatic amines that can be oxidized to quinonoid structures.

Cheminformatics on the precursors also predicts that 65% (204 out of 313) are mutagenic, while 79% (248 out of 313) are skin sensitizers. A completely nontoxic hair color doesn't include what scientists consider to be six questionable ingredients commonly found in hair-color formulas: ammonia, resorcinol, parabens, phthalates, PPD and gluten. "These six ingredients are a mix of hair color 'actives,' preservatives and contaminants".

A recent review on hair dyes (Cosmetics 2015, 2, 110-126) provides detailed chemical structures of the three classes of hair colors as well as the chemistry of hair itself. The dermatologist's knowledge of hair care products, their use, and their possible side effects can extend to an understanding of cosmetic resources and help dermatologists to better treat hair and scalp conditions according to the diversity of hair types and ethnicity (International J. Trichology, 2015, 7, 2-15).

For more information on this story, follow this link: <http://pubs.acs.org/doi/abs/10.1021/acssuschemeng.7b03795>

Southern California Section

CHEMISTS CELEBRATE EARTH WEEK (CCEW)

Dive into Marine Chemistry

APRIL 22–28, 2018



Outreach

We have lots of exciting activities coming up! Chemists Celebrate Earth Week is April 22-28, 2018 and the theme is “Dive Into Marine Chemistry!”. Check out our website at www.scalacs.org in the coming weeks for more events. Here are some of our upcoming activities:

Friday, April 6, 2018—Getty GCI Lab Tour (co-hosted with CALPACS). Time TBD.

Dates TBD—Chemists Celebrate Earth Week at the California Science Center. If you would like to volunteer to help with events, please email Dr. Henry Abrash at abrash8@aol.com.

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"What about Instagram?"



This Month in Chemical History

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

I have sometimes started my columns in past years with a look back of a century through reviewing the Annual Reports of the Chemical Society on the Progress of Chemistry. This month's column will examine aspects of the chemistry of 1918 through such a review. The 1918 report (published in 1919 under the auspices of The Chemical Society of London, now known as The Royal Society of Chemistry) is a slim volume covering the final year of World War I, the Great War as it was known, when academic research in chemistry had to yield to the demands of wartime research.

The Reviewers in this volume are a distinguished group. The subject Radioactivity is covered by Frederick Soddy, collaborator of Ernest Rutherford, coiner of the term isotope, and Nobel Laureate in Chemistry in 1921. The subject I will highlight in this column is Physiological Chemistry, which nowadays would be called biochemistry. The reviewer is Frederick Gowland Hopkins, (later Sir Frederick), Nobel Laureate in Physiology or Medicine in 1929 for his work on vitamins. He later was President of the Royal Society.

The war is not left out in this supposedly neutral account of recent science. Hopkins begins with this sentence: "Sir Henry Thompson, late Professor of Physiology at Trinity College Dublin, whose death was due to the dastardly outrage which sank the Leinster, was the only individual who before the war had taken the trouble to estimate a nation's actual food supply – imported and home produced – in terms of protein and calories". [The Royal Mail Steamer Leinster was sunk by a German submarine in the Irish Sea on October 10, 1918, just a month before the Armistice that ended World War I, with the loss of over 500 lives.] But I choose not to write about food and nutrition, important as they are. I think that the following material on the phosphoric acid complexes of living cells may be a modest augmentation to the view that DNA research began with Watson and Crick in the 1950s.

Research on nucleic acids had been previously reviewed in Annual Reports in 1911, and the 1918 report covered here provides an update and overview since then. P. A. Levene, examining recent work on thymus
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This Month in Chemical History

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and yeast nucleic acids, has commented that the "apparent lack of differentiation in the nuclear material of living tissues was scarcely to be expected." As Hopkins notes, presciently: "The uniformity of the nucleic acids would seem to point to the fact that their structure is something fundamental to the make-up of the cell – something essential to the life of all tissues." He goes on to remind readers that the essential structure of nucleic acids is that they are polynucleotides. In mononucleotides, orthophosphoric acid is combined with a carbohydrate and a purine or pyrimidine base. The manner of the linkage of mononucleotides to give polynucleotides is still obscure. In thymus nucleic acid the four different mononucleotides contain the bases adenine, guanine, cytosine, and thymine.

Work on yeast nucleic acid apparently isolated, by mild hydrolysis, two dinucleotides, one containing adenine and uracil; the other guanine and cytosine. However on more careful examination these "dinucleotides" appear to be simply mixtures of mononucleotides. More careful and more recent work strongly indicates the presence of a trinucleotide from yeast containing cytosine, guanine, and adenine. In plant nucleic acids the carbohydrate has been tentatively identified as d-ribose. In animal nucleic acids it is believed that a hexose is present, but that, too, is tentative.

Let me close with a quotation that encapsulates the chemical challenges of this difficult field. "The nucleotide structure ... is remarkable. One feels how unlikely it is that pure chemical suggestion would by itself have led to the idea of the existence of natural compounds in which a carbohydrate links phosphoric acid to a base. ...Their synthesis should tempt the chemist."

It would take decades before such syntheses were accomplished.

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Insights Into IP Law

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

Over the past several issues, this column has been exploring what types of documents qualify as prior art “printed publications” that can render a potential invention unpatentable. “Printed publications” are generally documents (such as books, journal articles, periodicals) that have been disseminated or otherwise made publicly available to the extent that persons interested and ordinarily skilled in the subject matter of the art, exercising reasonable diligence, can locate them. Absent evidence of actual dissemination, a document must generally be catalogued or indexed in a meaningful way.

What if the document is catalogued or indexed in a non-customary manner? In one case, student theses at Reed College in Portland, Oregon were filed in the main college library and in the library of the particular department from which the work emerged. Each thesis was listed on an individual card, which showed the student’s name and the title of the thesis. Some of the theses had descriptive names, such as “Synthesis of Cyclic Methanedisulfonate Esters by Silver Salt Method.”

The cards were filed alphabetically by the author’s name. In the main library, there were approximately 6,000 cards listing theses. In the chemistry department library, there were approximately 450 cards stored in a shoebox. The cards were not assigned Library of Congress catalog numbers. Both the cards and the theses themselves were available for public inspection.

The question in the case was whether three of the theses, in particular, qualified as prior art printed publications that could render unpatentable proposed claims to a chemical compound for treating cancer. The majority of the court held that the theses did not qualify as printed publications because they had not been catalogued or indexed in a meaningful way. Although the titles of the theses were listed on three out of the 450 cards filed alphabetically by author in a shoebox in the chemistry department library, that was not sufficient “availability” to make them reasonably accessible to the public. The cards were indexed only by student name, which bore no relationship to the subject of the student’s thesis.

One judge filed a dissenting opinion arguing that the theses did qualify as printed publications despite their “non-customary” indexing because the theses were shelved in publicly accessible areas of the Reed College libraries.

* 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.

Chair's Message



A trip in January to the 2018 ACS Leadership Conference gave me an opportunity to learn from other sections how to better reach and serve our local members. Our section will keep organizing great events for senior members (A&D) as well as future chemists (B&C), such as the following:

- A. Chemistry of Wine by Dr. Ernie Simpson on Friday, February 16
- B. Chemistry Olympiad in March
- C. Annual high school student awards dinner in May
- D. Recognition luncheon for senior ACS members in September

At the same time, we plan to take new initiatives to better serve student and regular members such as:

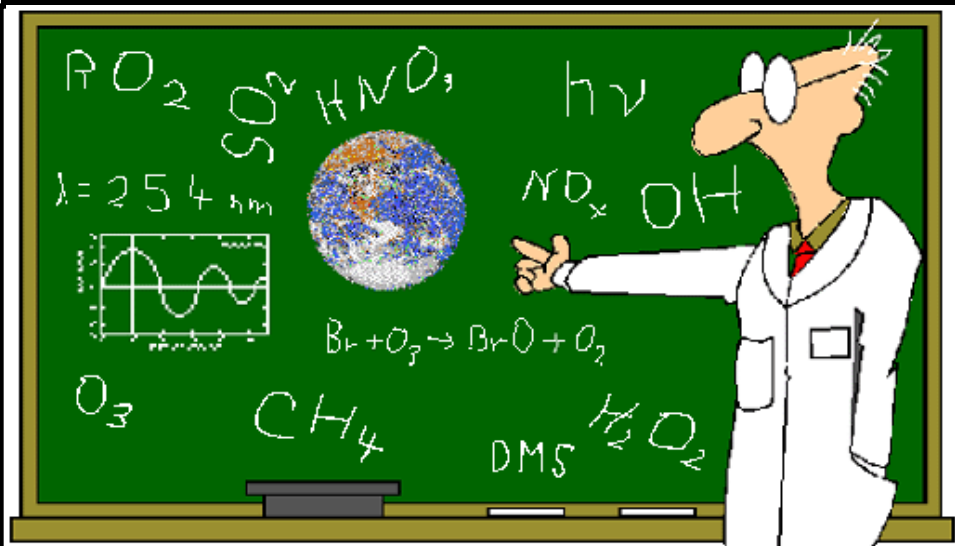
- Career development forum – What are the opportunities with a chemistry degree?
- Resume preparation help
- How to apply for chemistry graduate programs?
- Interactions with industrial recruiters

Our board member, Ms. Emily Viggers, who recently graduated from Princeton University's Chemistry Department, will lead the effort to reach student members. As an entrepreneur, I will be happy to coach members who are curious about starting a business. Several of our board members are tenure track professors. They can share plenty of experience if you want to pursue an academic career.

To better communicate with our members, we have created several new channels:

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San Gorgonio Section



High School Olympiad

It is the responsibility of the San Gorgonio local section to nominate ten students from our area to take part in the National Chemistry Olympiad exam. This exam is tentatively scheduled to take place at University of California, Riverside on **Saturday, April 21, 2018**.

In order to identify these ten students, we will conduct a local section exam during the week of **March 12-17**. Schools who register five or more students may choose to administer the exam on their campus. **The exam will also will be available at Mt. San Antonio College on Saturday, March 17, 2018** for students who are not able to take the exam at their school. The results of this exam will also be used to select five students who will receive San Gorgonio Section scholarships of up to \$1000 that can be used when they enter college. Registration forms have been sent to all area high schools and are also available at our website <http://www.sangorgonio.sites.acs.org>.

Students who are selected as participants in the U. S. National Chemistry Olympiad and as San Gorgonio Section scholarship winners will be honored at an awards banquet in May, along with their teachers. The student from each participating school who attains the highest score on the local section exam together with his or her teacher will also be honored.

San Gorgonio Section

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Please reach us using your favorite channels. We are right here to make your ACS membership more rewarding with a local touch. Again, please feel to contact me (cell: 515-306-6855, email: bruce@acbscitech.com) if you have ideas or would like to volunteer.

-Bruce Liu, Chair

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PERIODICAL

Bi-Section Chemists' Calendar

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

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