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SCALACS

April 2016

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



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Tolman Award Dinner
Wednesday, April 27, 2016**

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Tolman Medal:
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SCALACS

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

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Chair's Message



Welcome to another issue of SCALACS. I am very happy to report that the government of Pakistan has decided to withdraw its support for the 2016 International Chemistry Olympiad since so many countries have decided to boycott the event. It

will now be held in Tbilisi, Georgia. The United States will be hosting its annual training camp after all and will send a team to participate. This year's local section exam had nearly 1000 participants! A very nice turnout indeed.

We are going to have some very cool events coming up in the next few months. Our next Brewery tour is going to be in Torrance in August, we have a tour of Neutrogena coming up sometime this spring, and a water treatment facility also this spring. So keep an eye on SCALACS and our website, www.scalacs.org!

We are still increasing our presence on Social Media! We have more followers than ever and we are disseminating more information than ever. So please, right now, before you even read the next page, please start following us on Facebook and Twitter. It is the way of communication for the future and to reach our younger members we must grow accustomed to it.

As the end of term starts to approach for many of our academic members I would like to encourage you to consider inviting all of the students who are finishing your courses to join ACS. We have been very fortunate this year that our increase in membership has increased our allotment of semifinalists in the Chemistry Olympiad. We have grown by two spaces. It would be great if we could get that even higher. Remember that the number of students who can take the semifinal exam is based on our section enrollment.

- Best,
Michael Morgan

Southern California Section



Tolman Award Dinner Meeting

Wednesday, April 27, 2016

UCLA Faculty Center

480 Charles E. Young Drive, East
Los Angeles, CA 90095

“Drug Discovery in Academia: Successful Case Studies”

Michael E. Jung

Department of Chemistry and Biochemistry, UCLA

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

7:00 p.m. Dinner

8:00 p.m. Presentation

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

Abstract: The process of drug discovery in academia will be discussed with examples of prior and ongoing collaborations, including at least one success story. The areas of research include antitumor agents, osteogenic materials for spinal fusion and osteoporosis, and anti-leukemic agents. In particular, the biology and chemistry leading to the approved drug, enzalutamide (Xtandi) will be described.

Cost: There is a choice of dinner entrees of Tournedos of Filet Mignon w/ Braise Leeks, Black Truffles, and Sauce Bordelaise (\$42) or Portobello Mushroom Ravioli Gigante w/Wilted Spinach, Wild Mushroom Fricasse, and White Italian Truffle Oil (\$37). Both options include a hosted social hour, salad, dessert, wine with dinner and tax and tip, payable at the door with cash or check. **Please RSVP to Nancy Paradiso at office@scalacs.org or 310 327-1216 by Thursday, April 14th.**

Directions: For directions to the campus, use this link: <http://maps.ucla.edu/campus/?locid=83901>. Parking is \$12 for guest parking in Parking Lot 2 (just south of the Faculty Center).

Congratulations to our 2015 Richard C. Tolman Award Recipient Michael E. Jung

Michael Jung received his BA in 1969 from Rice University and his PhD in 1973 from Columbia University, where he worked with Gilbert Stork as an NSF Fellow. After a one-year NATO postdoctoral fellowship with Albert Eschenmoser at the ETH in Zurich, he joined the faculty at UCLA in 1974, where he is now a Distinguished Professor of Chemistry. He currently consults for 21 industrial laboratories in both biotech and big pharma settings and has founded six companies. He is an authority on synthetic organic and medicinal chemistry and has 64 patents and/or applications arising from both his consulting activities and his own research.

His current synthetic chemistry research interests include the easy preparation of hindered cyclohexenes via Diels-Alder reactions using new acid catalysts, the use of several epoxide rearrangements in synthesis (e.g., the non-aldol aldol reaction), and new types of gem-disubstituent effects. Recently he has expanded his role in medicinal chemistry and drug discovery at UCLA and has more than 15 ongoing collaborations. One of his compounds, Xtandi, was approved in September 2012 for the treatment of castration-resistant prostate cancer while several others are in various clinical and pre-clinical stages. He has supervised 90 PhD and 8 Masters theses and has taught 130 postdoctoral scholars. He has published more than 335 articles and given over 590 lectures on his research.

Prof. Jung has received the American Chemical Society Arthur C. Cope Scholar Award, the Team Science Award from American Association of Cancer Research, and was named a Fellow in the National Academy of Inventors. He recently was the Carl M. Franklin Lecturer on Science and Society at the University of Southern California. He will soon be the Glenn T. Seaborg Award Medalist at UCLA (November 2016). He is an excellent teacher and has won every teaching award offered at UCLA: the Departmental Hanson-Dow Teaching Award, the University Distinguished Teaching Award, and the inaugural Gold Shield Faculty Prize.

Southern California Section

Chemistry Bowl Competition

Pasadena City College

1570 E Colorado Blvd, Pasadena, CA 91106

Saturday, April 9, 2016

8:45 a.m. – 3:30 p.m.

The Chemistry Bowl will be a competition between local ACS student chapters in the Southern California region. The competition will consist of spectroscopy, lab bench challenges, relay obstacle course, and chemistry jeopardy. **Please contact Dr. Veronica Jaramillo, vijaramillo@pasadena.edu, for more information on how you can help make this event successful, or if your chemistry club would like to participate.**

The lab bench challenges will involve both qualitative and quantitative determinations of unknown substances. In the spectroscopy challenge, teams are given a spectrum from which to determine the correct chemical structure. The relay obstacle course will be done outside and will consist of a chemistry themed relay. Last is the chemistry jeopardy finale where the top three teams will compete to determine a winner. The chemistry content will be limited to general and organic chemistry. All teams competing will consist of five members. All competing teams will be divided into groups and will be rotated.

Schedule:

8:45 – 9:00 am	Registration and refreshments
9:00 – 9:10	Opening remarks

Competition:

9:15 – 10:00	Round 1 Wet Lab Competitions
10:15 – 11:00	Round 2 Wet Lab Competitions
11:15 – 11:45	Round 3 Spectroscopy/Obstacle Relay
11:45 – 12:20	Round 4 Spectroscopy/Obstacle Relay
12:20 – 1:00	LUNCH
1:15 – 1:45	Jeopardy Playoff—3 rd and 2 nd Teams
1:50 - 2:20	Jeopardy Playoff 2 RD
2:25 – 2:40	Final remarks and award ceremony

Southern California Section

Undergraduate Research Conference

The 2016 Undergraduate Research Conference in Chemistry and Biochemistry will be held in the Hall of Science (HSCI) on Saturday, **April 23rd, 2016** at California State University, Long Beach (1250 Bellflower Blvd., Long Beach, CA 90840). The deadline for submissions of abstracts was **Friday, March 25th**. For more information, please visit the conference website (<http://chemistry.csulb.edu/scurc>) or contact Prof. Chris Brazier at cbrazier@csulb.edu.

High School Olympiad

This year, the Southern California Section held the local section High School Olympiad on **March 16th and 17th** 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. The top scorers on the local exam are nominated to compete in the National Exam. The National Exam will take place on **April 16th** at California State University, Dominguez Hills.

We recognize the top local students at an Educational Awards Banquet on **May 20th** with monetary awards and certificates. The Banquet will take place at the Mount Saint Mary's University Doheny campus. **Prof. Harry Gray** from Caltech will be our honored guest speaker. For more information, contact Dr. Jerry Delker at delker@earthlink.net or the Section Office at office@scalacs.org.

Councilor Talking Points Council Meeting March 16, 2016

Councilor Talking Points from the Spring National Meeting in San Diego are posted on our website, http://scalacs.org/?page_id=44.

Southern California Section

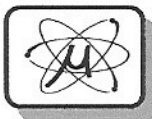
Expanding Your Horizons Conference

The **Expanding Your Horizons Conference** for middle school girls will take place on **April 30th, 2016** 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 intended for girls in grades 5-8. There are hands-on workshops for girls as well as parents, teachers and counselors. For more information, please go to 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@msmu.edu.

Chemists Celebrate Earth Day

April 22, 2016—Chemists Celebrate Earth Day Activities at the California Science Center, 700 Exposition Park Drive, Los Angeles, CA 90037. Check out their website at: <http://www.californiasciencecenter.org>. **The 2016 theme is: "The Great Indoors – Your Home's Ecosystem"**. Join volunteers for CCED activities. For more information, or if you would like to volunteer please contact Henry Abrash at: abrash8@aol.com.



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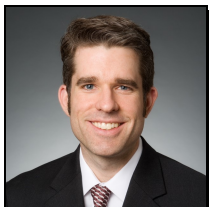
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Insights Into IP Law

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

The Supreme Court recently decided a case addressing whether certain patent claims were directed to naturally-occurring, patent-ineligible phenomena. The previous installment of this column introduced the case. This installment describes how the Court ruled.

As described previously, the patents at issue in the case claimed isolated segments of DNA coding for BRCA genes, and complementary DNA (cDNA) derived from such DNA (minus the non-coding introns). The Court addressed the DNA and cDNA separately, starting with the DNA.

The Court described the patentee's discovery of the locations and sequences of the BRCA genes as a "medical breakthrough," but stated that "[g]roundbreaking, innovative, or even brilliant discovery does not by itself satisfy the § 101 inquiry" into whether subject matter is eligible to be patented. Citing an earlier case finding a composition of naturally-occurring strains of bacteria unpatentable because the patent holder there did not alter the bacteria in any way, the Supreme Court ruled that finding the locations of the BRCA genes in this case did not render the genes patent eligible and therefore the isolated DNA claims were invalid. The Court stated that although the patent holder may have discovered the locations of the BRCA genes through a time-consuming, iterative process, "extensive effort alone is insufficient to satisfy the demands of § 101."

As for whether the DNA claims could be saved because isolating the DNA from the human genome severs chemical bonds and thereby creates a non-naturally occurring molecule, the Court answered "no," pointing out that the patent claims were not directed to chemical compositions and did not rely on any chemical changes to the DNA that may result from isolation. The Court also decided that the Patent Office's past practice of awarding gene patents was not entitled to deference.

Turning to the cDNA claims, the Court observed that cDNA differs from natural DNA in that it has only the coding exons of DNA, and not the non-coding introns. Although the nucleoside sequence of cDNA is dictated by nature insofar as the DNA sequence from which it is derived occurs naturally, the Court reasoned, "the lab technician unquestionably creates something new when cDNA is made." Accordingly, the Court ruled that cDNA is not a "product of nature" and is patent eligible (except to the extent that a short series of DNA may have no intervening introns to remove when creating cDNA). In sum, the Court found that the isolated DNA claims were unpatentable but the cDNA claims were patentable.

* 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

In my last column I continued a study of a summary of a year of chemistry of a century ago undertaken at the time by the Chemical Society of London (now the Royal Society of Chemistry) in its Annual Report reviewing the work of chemists. I will conclude my study of Annual Reports Volume XIII covering 1916 in this column. You will recall that at this time Great Britain and her allies (though not yet the United States) was engaged in a bitter war with Germany and her allies. Consequently this is one of the slimmer volumes in the series that is ongoing.

I don't know how familiar you are with the word caoutchouc. I admit I had to resort to a dictionary to confirm my original guess – which was correct. This is an obsolete term referring to natural rubber! The organic chemistry section in the 1916 Annual Report has over 5 pages devoted to this subject, indicating its significance to chemists of the period. It was already known that natural rubber was a “polymer” of isoprene, but there was still uncertainty about what a “polymer” was. The distinction between macromolecules and some undefined “collection” of small molecules had not yet been clarified. Staudinger's controversial later work from the 1920s on led to our present understanding of macromolecules (and may be the topic of a future column). The report says that in one paper published in 1916 no fewer than 29 methods for the preparation of butadiene are given. The work of the Russian chemist Ostromisslenski is given especial prominence in this review. “The goal of Ostromisslenski's work is apparently the production, by synthetical means, of elastic colloids which display the essential physical characteristics of natural caoutchouc”. Note the word colloids. This was the expression used at that time for many natural materials that we would designate as macromolecules. Much of this section of the review is focused on the possible synthetic production of rubber-like materials – a goal that was achieved on an industrial scale during World War II.

Work on the constitution of cholesterol, a natural product of continued importance since the 19th century, has progressed in 1916 especially in the laboratory of Windaus who received the Nobel Prize
(Continued on Page 10)

This Month in Chemical History

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in chemistry in 1928 for his work. We now know that cholesterol, like other steroids, is tetracyclic. In 1916 Windaus' work had led him provisionally to a tricyclic system with an undetermined C17 side chain. Evidence was also accumulating that the molecule contained only one double bond, rather than the two that had previously been postulated.

In a previous report Lifschitz had claimed the production of a remarkable new heterocyclic compound containing a five-membered ring of all nitrogen atoms, the so-called pentazoles. However in 1916 Curtius and his colleagues had demonstrated that in fact these compounds were tetrazoles, containing four nitrogen atoms and one carbon atom in the ring.

In an unexpected context within the organic chemistry section, under the heading of heterocyclic theories of the complex salts, there is an extended criticism by J.A.N. Friend of Werner's coordination theory of cobalt complexes. "The coordination theory, while assuming a definite valency for cobalt, nitrogen, and hydrogen atoms denies an equally definite valency to chlorine ...The "coordination theory" ascribes to cobalt a valency of six, which is opposed to ordinary experience". In reading this section it becomes clear that the distinction between valency or oxidation state and coordination number is a concept even experienced chemists were having difficulty with. Friend ascribes heterocyclic formulations to the cobalt complexes discussed.

Perhaps in my early columns of 2017 I will return to these Annual Reports of a century ago which give us remarkable insights into what our ancestral chemists were doing and thinking.

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San Gorgonio Section

Chair's Message



We often have to try to answer ethical questions as a result of new advances in science and technology. Over my more than fifty years as a member of the American Chemical Society I have often seen such questions raised in response to discoveries in the area of the chemistry of heredity. In the 1970's it was the work of Paul Berg's group at Stanford that demonstrated that it was possible to insert a fragment of DNA from a monkey virus into the DNA of the bacteriophage lambda. His and other scientist's realization of potential dangers associated with this recombinant DNA technology led to the convening in 1975 of the Asilomar Conference on Recombinant DNA. At this conference it was agreed that the research should continue, but under stringent guidelines. Key here is that it was the scientists who initiated the discussion and developed the guidelines. Even within these constraints the results of the application of recombinant DNA technology have at times been controversial. I have vivid memories of living in England and reading of people destroying test fields of genetically modified crops. I personally find it difficult to reconcile this fear of GMO with the fact that all the vegetables that I am growing in my garden are in fact hybrids. Seed catalogues every year proclaim the newest variety of tomato, broccoli, or squash. You can grow plants that are resistant to different diseases, that can tolerate our summer heat, or are drought resistant. Although these hybrids were not made by laboratory recombinant technology, DNA recombination did occur and the plants with the desired traits were selected for commercialization.

Recently, another exciting development in the area of the chemistry of heredity has been the discovery of what is termed the CRISPR/Cas system. This system was originally identified in bacteria where it functions to provide a mechanism for bacteria to identify and destroy DNA introduced into the bacterial cell via a plasmid or a phage. A key component of this system is a section of RNA that will specifically interact with the cell's DNA and determine the exact section of the DNA that will be cut. In the last few years scientists have modified this system and successfully used it to do specific gene editing in cells from a wide range of organisms, including humans. It is here where the major ethical questions have arisen. The potential to use the technique to study the function of specific genes, to replace disease-related defective genes, or to insert new genes is both exciting and potentially dangerous. The good news is that like the case over forty years ago when the potential consequences of recombinant DNA led to the Asilomar conference and to the development of specific guidelines for research in this area, this past December the International Summit on Human Gene Editing was held and the conclusion was to continue basic and clinical research under appropriate legal and ethical guidelines. This is the way I feel that science must function as we move in those areas where one needs to remain aware of the law of unintended consequences.

- Dennis Pederson, Chair

San Gorgonio Section

April 2016 Dinner Meeting

Thursday, April 21, 2016

What's in a Sprout? Using Sprouting to Nutritionally Enhance Grains and Beans

Dr. Maria Botaro Omary, The Omary Group

Lotus Garden

111 East Hospitality Lane
San Bernardino

Social and Checkin: 5:45 pm

Dinner: 6:30 pm

Program: 7:30 pm

Abstract: Sprouted seeds have been reported to be nutritionally superior to their respective seeds with higher levels of nutrients and polyphenols, lower amounts of anti-nutrients such as phytic acid and flatulence causing sugars among others, increased protein and starch digestibility, increased antioxidant activity and bioavailability of some minerals. Their inclusion along with that of their respective seeds in the formulation of healthy baked goods may provide a natural fortification/enrichment method. This presentation will discuss key points on the nutritional value of germinated grains and legumes.

Biography: Dr. Omary is a knowledge facilitator, researcher and passionate product developer. She is the Founder and Chief Innovation Officer of The Omary Group, a consulting organization that helps food companies with food product development and packaging solutions. She effectively blends a strong scientific background in food science & technology and chemical engineering with 20 years of research and teaching experience in academia at Cal Poly Pomona, CSU Los Angeles & Loma Linda University and in industry at Nutrilite - Amway. Dr. Omary holds a process patent on the manufacturing of a broccoli concentrate rich in phyto-chemicals and is lead author and co-author of multiple peer reviewed publications in scientific journals including the Journal of Food Science, Cereal Chemistry and Nutrition and Cancer among others. She received PhD and MS degrees in Food Science and Technology from Clemson University. Dr. Omary is originally from Colombia, South America.

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Dinner Meeting (Continued from Page 12)

Dinner, Cost and Reservations: The Chinese dinner will feature eight entrees, rice, and soft drink or iced tea (complimentary refills). The cost will be \$15 for ACS members, \$20 for nonmembers, \$10 for retirees and \$5 for students. **Please make your reservation no later than 12 noon on Tuesday, April 19th** by contacting either Dennis Pederson (909-886-2196 or dpedersn@csusb.edu) or David Srulevitch (srulev@charter.net).

Directions: From the west, take Interstate 10 to the North (second) Waterman exit in San Bernardino. Drive north on Waterman to the main intersection and turn left onto Hospitality Lane. From the east, take Interstate 10 to the Waterman exit. Turn left onto Hospitality Lane and go about 0.5 miles, the Lotus Garden will be on the left. Due to the restricted bus lane you will need to continue to the light and make a U-turn to get on the south side of the road. An alternative route from the north or south, is to take Interstate 215 to Orange Show Road, go east on Orange Show Road to "E" Street, turn right, go to Hospitality Lane, turn left, and go about 1 mile to the restaurant (on the right). The meeting room will be on the right as you enter the restaurant.

**SOUTHERN CALIFORNIA SECTION
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Bi-Section Chemists' Calendar

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

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