

March 2014

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



**Section Meeting
Sponsored by the Women
Chemists Committee**

**“New Enzymes By Evolution:
Expanding Genetically Encoded
Chemistry”**

Frances Arnold, Caltech

**March 6, 2014
Brookside Golf Club
See Page 3**



Beckman Model G Acidimeter
Circa 1935

**San Gorgonio Section
Celebrates 65 Years!**

See Page 10

**Save the Date!
7th Annual Goldstein
Distinguished Lecture**

**May 9, 2014
See Page 11**

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SCALACS

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Southern California Section

Chair's Message



It is exciting to know that we started off with great energy. There were so many people signing up our first event of 2014, visiting the Los Angeles Environmental Learning Center at Hyperion Treatment Plant in Playa Del Rey. We also had a great Women Chemists social event in early February.

We have more events planned for this year. We have another Women Chemists event on Thursday, March 6th at the Brookside Golf Club in Pasadena. Prof. Frances Arnold from Caltech will be giving a talk entitled "New Enzymes by Evolution: Expanding Genetically Encoded Chemistry". Please see additional information on page 3 of this issue of SCALACS and on our website, www.scalacs.org. And mark your calendar. March 16-20 is the ACS National meeting, which will be held in Dallas!

We also look forward to hosting the Local Exam for the 2014 High School Chemistry Olympiad on March 19th and 20th in the Los Angeles area. This is an event that that I always find myself to be blown away by so many bright students in our area. I sincerely thank Dr. Jerry Delker for his efforts on this. I also thank our local high school teachers for making this a successful event for many years.

I thank our Section members for planning these events. We would like 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,
- Yumei Lin, Chair
Yumei.lin@amway.com

Southern California Section

**Section Meeting
Sponsored by the Women Chemists Committee**

Thursday, March 6, 2014

Brookside Golf Club

1133 Rosemont Avenue
Pasadena, CA 91103

“New Enzymes By Evolution: Expanding Genetically Encoded Chemistry”

**Prof. Frances H. Arnold,
Dick and Barbara Dickinson Professor
California Institute of Technology**

Check-in: 6:00 pm
Dinner: 7:00 pm
Presentation: 8:00 pm

Biography: Dr. Frances H. Arnold is the Dick and Barbara Dickinson Professor of Chemical Engineering, Bioengineering, and Biochemistry at the California Institute of Technology. Her research focuses on directed evolution of enzymes and biosynthetic pathways, with applications to alternative energy, chemicals, and medicine. She pioneered directed evolution methods that are used in laboratories throughout the world to make products that range from medicines to foods, textiles, chemicals, and fuels. She has co-authored more than 250 publications and is co-inventor on 39 US patents.

Dr. Arnold received her bachelor's degree in mechanical and aerospace engineering from Princeton University in 1979. After a year working as an engineer in solar energy research in Brazil and Colorado (at the DOE's Solar Energy Research Institute, SERI), she enrolled as a graduate student at the University of California-Berkeley, where she earned her doctorate in chemical engineering in 1985. After postdoctoral work in biophysical chemistry at UC Berkeley and Caltech, she joined the Caltech faculty in chemical engineering in 1987.

(Continued on Page 4)

Southern California Section

Dr. Frances Arnold, Biography (Continued from Page 3)

Dr. Arnold is the recipient of numerous honors and awards, including the Eni Prize in Renewable and Nonconventional Energy, the National Medal of Technology and Innovation and the Charles Stark Draper Prize of the US National Academy of Engineering. She is the first woman to have been elected to membership in all three US National Academies, of Science, Medicine, and Engineering. Dr. Arnold was also elected to the American Academy of Arts and Sciences. Among many other activities, Dr. Arnold serves on the President's International Advisory Council of the King Abdullah University of Science and Technology (KAUST) and chairs the selection committee for the David and Lucile Packard Foundation Fellowships in Science and Engineering program.

Dr. Arnold is active in technology transfer to the private sector. She has served on the science advisory boards of numerous companies, including Genomatica, Amyris, Mascoma, Fluidigm, Codexis, and Maxygen. She co-founded Gevo, Inc. in 2005 (NASDAQ GEVO) to make fuels and chemicals from renewable resources and Provivi Labs in 2013.

Frances Arnold has three sons. James Bailey is currently serving as a medevac crew chief in the US Army. William and Joseph Lange attend La Canada High School.

Reservations: There will be a chicken buffet dinner. The cost is \$39 including tax, tip, and wine with dinner; cash or check at the door. Please call Nancy Paradiso in the Section Office at 310 327-1216 or email office@scalacs.org by **Friday, February 28, 2014** for reservations.

Directions: Go to the Brookside Golf Club website at <http://www.brooksidegc.com/> and click on the directions link in the top right corner. It will take you to Google Maps.

Undergraduate Research Conference

The 2014 Undergraduate Research Conference in Chemistry and Biochemistry will be held on **Saturday, April 12th** at **Concordia University, Irvine** (1530 Concordia West, Irvine, CA 92612). It will feature a keynote address by distinguished professor, **Dr. Harry Gray** of Caltech, followed by several sessions of short talks and presentations. The deadline for submissions of either oral or poster presentations is **Friday, March 7, 2014, and the registration deadline is March 28th**. For more information, please visit the conference website (<http://acsscurrecb2014.webs.com/>) or contact Grace Chong at grace.chong@eagles.cui.edu or Dr. John W. Kenney at 949-214-3298 or john.kenney@cui.edu.

Southern California Section

Younger Chemists Committee Ice Cream Social

The Younger Chemists Committee invites you to join them for an Ice Cream Social on **Saturday, April 5th at 12:00 pm**. This is a great opportunity to meet and network with fellow chemists in a fun and relaxing atmosphere. We will be meeting at **The Chocolate Chair**, an ice cream shop where each order is made right in front of you using liquid nitrogen! ACS members and non-members are welcome.

The Chocolate Chair
Madang Plaza
621 S. Western Avenue
Los Angeles, CA 90005

Please RSVP to office@scalacs.org by March 22, 2014. We hope to see you there!

High School Olympiad

The Southern California Section will hold the local section **High School Olympiad on March 19th and 20th** 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, 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 26th** at Cal. State Dominguez Hills and our **Educational Awards Banquet will take place on May 16th**. For more information, contact Dr. Jerry Delker at delker@earthlink.net or the Section Office at office@scalacs.org.

Southern California Section

Outreach Activities

The **Los Angeles County Science Fair** will be held on **Friday and Saturday, March 28th and 29th** at the **Pasadena Convention Center** from **10 am to 5 pm**. SCALACS will have an "Interactive Exhibit" table and we need volunteers to help. Please contact Bob de Groot at rdegroot@oxy.net. In addition, there is a need for **JUDGES** for the fair. Graduate students can get good experience working side-by-side with science and engineering experts in their fields. There could be good job contacts as well. Go directly to this site to volunteer for Judging: <http://www.lascifair.org/judges/>

The **Expanding Your Horizons Conference** for middle school girls will take place on **April 5th, 2013** from 8:45 am to 2:45 pm at **Mount St. Mary's College Doheny 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. 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@msmc.la.edu.

Save the Date! On April 12th, Pasadena City College Student Chapter, in collaboration with SCALACS, will hold a Chemistry Bowl at their campus. The Chemistry Bowl will be a competition between local ACS student chapters in the Southern California region. The competition will consist of lab bench challenges, spectroscopy, relay obstacle course, and chemistry jeopardy. Please contact Dr. Veronica Jaramillo, vjaramillo@pasadena.edu, for more information on how you can help make this event successful or if your chemistry club would like to participate.

Late April 2013 - Chemists Celebrate Earth Day Activities at the California Science Center, 700 Exposition Park Drive, Los Angeles, CA 90037, website: <http://www.californiasciencecenter.org>. **The 2014 theme is: "The Wonders of Water."** 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.

The Intel Science Fair will take place on May 13-16, 2014. If you would like to volunteer as a judge, please contact Brian Brady at brian.b.brady@aero.org.

Save The Date! On May 31, 2014 from 10:00 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 or Jerry Delker at delker@earthlink.net.



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

Suppose you possess rights to a patent for a composition comprising chemicals A, B, C, and D in admixture. Do you have the right to make and sell the patented composition?

Most people think that if a person possesses rights to intellectual property such as patents or trade secrets, then that person is free to exploit the patented technology or the trade secrets. But that is not the case.

To appreciate why, one must understand the nature of the intellectual property right in question. Intellectual property such as patents and trade secrets confer rights to exclude others from exploiting covered technologies, not affirmative rights to exploit those covered technologies.

This can be illustrated using the example above, featuring your patent covering the composition comprising chemicals A, B, C, and D in admixture. As owner of the patent, you can exclude others from making and selling that composition. But you are not necessarily free to make and sell the composition yourself because someone else may hold a patent that covers using chemical B, for example. Or perhaps someone holds a patent that covers compositions containing the subset of chemicals A, B, and C, as another example. You cannot make your patented composition comprising chemicals A, B, C, and D in admixture without using chemical B or without making a composition containing the subset of chemicals A, B, and C. Consequently, if chemical B, or the subcombination of chemicals A, B, and C, also is patented, then you are blocked from practicing your own invention unless you have rights to the other patents. Accordingly, the other patents in such a scenario are often referred to as “blocking” patents.

Of course, the owner of a patent that is blocked nevertheless has the right to exclude the owner of the blocking patent(s) from exploiting the blocked patent. So in our example above, the owner of a patent to a chemical composition containing the subcombination A, B, and C cannot make and sell your patented composition comprising chemicals A, B, C, and D. In fact, nobody is free to make and sell your composition without obtaining rights to other patents.

How, you might ask, could there exist both a patent to the combination of chemicals A, B, C, and D, and also a patent to subcombinations containing at least A, B, and C? Given the overlap between the combination and the subcombination, why would the United States Patent Office issue both patents? The answer is that the combination of chemicals A, B, C, and D may be patentably distinct from the subcombination of at least chemicals A, B, and C. What constitutes patentable distinctiveness will be explored in future columns, *(Continued on Page 9)*



This Month in Chemical History

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

Another local used bookstore has recently closed. (For those who know Pasadena, CA it was Cliff's Books on Colorado Boulevard). I feel a slight twinge of guilt because, before the rise of the Internet, I used to haunt used bookstores searching for older science books.

I still enjoy browsing the musty shelves when I have the opportunity – mostly when I'm traveling these days – but most of my recent purchases of used books have been online. Which brings me to the subject of this month's column: a recent purchase: "The Chemistry of Creation" by Robert Ellis F.L.S. The subtitle is "A sketch of the chemical phenomena of the earth, the air, the ocean" and the third edition before me was published in 1855 under the direction of The Committee of General Literature and Education appointed by The Society for Promoting Christian Knowledge (S.P.C.K.); clearly this Society saw no schism between science and religion. This volume was printed and published in England and includes 512 small format pages and a number of attractive engraved diagrams.

Robert Ellis was a physician and a devout Christian. He was widely published. In addition to being a Fellow of the Linnean Society (F.L.S.) he was also a Member of the Royal College of Surgeons (M.R.C.S.). His approach to medicine was sometimes controversial. In the 1860s he published several articles advocating anesthesia for childbirth and certain surgical procedures – a man ahead of his times. In 1848 he sent a proposal to the S.P.C.K. for a book on the chemical history of vegetation. The proposal was endorsed and the scope of the book was enlarged to become "The Chemistry of Creation". It was published in 1850. An interesting sidelight is that Ellis approached the photographic pioneer Fox Talbot for permission to use his process (Talbotype or Calotype) for the geological illustrations. The S.P.C.K. could not afford to use Talbotypes in the book, which was consequently illustrated with engravings and line drawings; just as well for me. If "Creation" had Talbotype plates of such an early date its current value would be at least ten times what I paid!

The success of "the Chemistry of Creation" in its several editions brought Ellis a new opportunity. (It is impressive that while being an active physician he managed to do so much writing and editing – typical of those hard working Victorian Brits.) The Royal Commissioners of the Great Exhibition of 1851 appointed him as the science editor of the Official Catalog of the exhibition, while he was still in his twenties. The Great Exhibition, sponsored by Queen Victoria's consort Prince Albert, was housed in a gigantic glass and steel construct built in Hyde Park. It was perhaps the first World's Fair. Ellis wrote the general introduction to the catalog based on information submitted by
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This Month in Chemical History

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exhibitors. He believed that the catalog was in the tradition of the collaboration between science and industry typical of British mercantile history. “In the seventeenth century Robert Boyle perceived the important results likely to arise from the “naturalist’s insight into trades”. It is to be hoped that such results will not now fail of their accomplishment”.

The catalog was not completed until almost the close of the Great Exhibition and Ellis wrote: “The first function of a Descriptive Catalog can therefore scarcely be fulfilled ere the great spectacle it illustrates will pass away”. But he expected that its value as a permanent record of “these wonders of Art and Industry which Man, taught by God, has been enabled by Him to accomplish” would be appreciated for a long time to come. Work on the catalog, overseen by Ellis, was contributed by twenty five authors including thirteen fellows of the Royal Society. Two of the most notable were Baron Justus von Liebig, a name known to all chemists; and Professor Richard Owen, biologist, anatomist, and paleontologist, noted for his work on fossils, who coined the term dinosaur, and helped found the Natural History Museum in London.

In a succeeding column I will look at the book “The Chemistry of Creation”.

Some of the material in this column was obtained from a review by David Cormack in the Internet Archive of the California Digital Library.

Insights Into IP Law

(Continued from Page 7)

but for now, consider the simple scenario where chemical D was previously unknown. Adding newly-discovered chemical D to the patented combination of A, B, and C could lead to a new, separate invention worthy of patent protection. Indeed, such an addition is just the sort of activity that the United States patent laws are designed to encourage. More on that in future columns too.

As always, please email me at korso@irell.com with any questions or issues that you would like to see addressed.

* The author earned engineering and chemical engineering degrees from Harvey Mudd College (undergraduate) and the University of Texas at Austin (graduate), before attending law school at UCLA. He is a registered patent attorney and a 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



The San Gorgonio Section was incorporated in 1949 in Riverside. As the Section celebrates its 65th anniversary, it seems fitting to look at one of the significant scientific innovations that originated in the region.

Eliza and Luther Tibbets settled in the Riverside area in the late 1860s. In 1873 they planted two distinctive orange trees in their yard. The trees were propagated from cuttings of a mutant Brazilian species that produced mutant, sterile oranges. This orange species was named “the Washington navel” and it thrived in the semi-arid climate around Riverside. Its successful cultivation revolutionized the local citrus industry.

In 1893 the Southern California Fruit Exchange was established in Claremont. Initially the Exchange supported growers in Riverside, Pomona, and San Dimas. By 1905 as it expanded to represent a larger region of growers, the name changed to the California Fruit Exchange. In 1909, the Exchange trademarked the name “Sunkist Growers, Inc.”

Now for the chemistry link. Accurately determining the pH of citrus juices was crucial to manufacturing byproducts such as pectin and citric acid. Sulfur dioxide, added to the juices as a preservative, created a bleaching affect that interfered with standard colorimetric techniques such as litmus paper used at the time. A glass electrode connected to a galvanometer gave reliable results but the system was too delicate and fragile for dependable laboratory use.

In the mid-1930s Glen Joseph, a chemist at the California Fruit Growers Exchange laboratory, requested assistance with the
(Continued on Page 12)

San Gorgonio Section

7th Annual Goldstein Distinguished Lecture

Save the date!

May 9, 2014

Time TBA

**Kellogg West Conference Center
Cal Poly, Pomona**

Speaker: Dr. Dennis Livesay

Associate Professor, Department of Bioinformatics and Genomics
University of North Carolina at Charlotte

Title: Does nature love chemistry and physics as much as I do? A biophysical chemist's attempt to explain protein family evolution.

For more information on the event as it becomes available check the website: <http://www.csupomona.edu/~chemistry/seminars.shtml>

For more information on the speaker: <http://coitweb.uncc.edu/~drlivesa/>

The Goldstein endowment was created to honor the memory of Professor Elisheva "Chevy" Goldstein. A recognized researcher in computational and theoretical chemistry, Goldstein developed courses in those fields that helped lay the foundation for the Chemistry Department's molecular modeling and simulation option.

After completing her master's in 1977 at Cal Poly Pomona, Goldstein earned her Ph.D. at USC, she taught at Cal Poly for 25 years before her untimely death in 2007. After her death, family and friends established the Chevy Goldstein Distinguished lecture Series. The funds underwrite the cost for the Chemistry Department to host an annual lecture and to award talented undergraduate and graduate students with research scholarships in her honor.

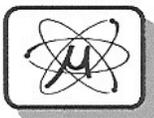
San Gorgonio Section

Chair's Message (Continued from Page 9)

problem of measuring acidity in citrus juices from Arnold Beckman, a chemistry professor at Cal Tech. Beckman was able to amplify the weak electrical signal provided by the glass electrode by connecting it to vacuum tubes instead of a galvanometer. The ability to amplify the signal allowed for the development of a sturdier, more dependable glass electrode and the "acidimeter" was born. The device Beckman created solved one problem for Joseph, but created a dilemma: Joseph quickly requested a second device because his colleagues kept borrowing his.

Beckman suspected that if Joseph and his laboratory colleagues found his device so useful, it might have a market. Beckman presented the "Model G Acidimeter" at the 1935 ACS meeting in San Francisco. The commercial success of the pH meter led to his resignation from Cal Tech to establish Beckman Instruments (now Beckman Coulter). His development of the pH meter was declared an ACS National Historic Chemical Landmark in 2004. One of the two original trees planted by the Tibbets, known as the Parent Washington Navel Tree, is still growing in Riverside.

- Eileen DiMauro,
Chair



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GARDENA, CA 90248

***IMPORTANT
Do Not Delay!***

Contains Dated Meeting Announcement

PERIODICAL

Bi-Section Chemists' Calendar

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

March

- 6 Women Chemists Committee Dinner Meeting featuring Prof.
Frances Arnold at Brookside Country Club—see pg. 3
19-20 SC High School Olympiad—see pg. 5
28-29 LA County Science Fair at Pasadena Convention Ctr.—see pg. 6

April

- 5 SC Younger Chemists event at the Chocolate Chair—see pg. 5
5 Expanding Your Horizons Conference at Mount St. Mary's
College—see pg. 6
12 SC Chem. Bowl at Pasadena City College—see pg. 6
12 Undergraduate Research Conference at Concordia University—
see pg. 4

May

- 9 SG 7th Annual Goldstein Distinguished Lecture—see pg. 11
13-16 Intel Science Fair—see page 6
31 Boy Scout Expo at Rose Bowl Pavilion—see pg. 6