ACS Chemistry for Life®

SCALACS

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

VOLUME LXXVII/No. 2 MARCH 2022

SOUTHERN CALIFORNIA Section

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"A person who never made a mistake never tried anything new."– Albert Einstein

CHAIR'S MESSAGE

ACS Local Section
Southern California

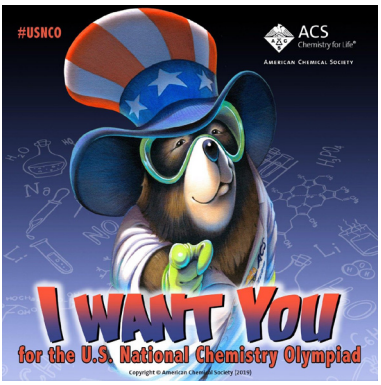
Greetings!

We have many events coming up during the month of March. The High School Chemistry Olympiad Local Exam will be conducted on **March 16 and 17** for our local high schools. Students from over 30 schools from Los Angeles area will take part in the examination. I am very glad to see that amidst all the challenges still posed by COVID-19, a team of teachers and brave students are working hard to use these opportunities to shape a very successful future. Their eagerness and preparation to participate in the Chemistry Olympiad with competitive spirit is worth mentioning and I wish them all the best. I appreciate the tireless efforts of Dr. Gerald Delker and team behind the success of the program in our section for many years.

Professor Arieh Warshel (Nobel Laureate and Distinguished Professor, University of Southern California) has kindly agreed to give a talk titled ***"From Kibbutz Fishponds to The Nobel Prize: Taking Molecular Functions Into Cyberspace"*** on **Monday, March 7** at **4:00-5:00 p.m.** (see page 3). I am grateful to Professor G. K. Surya Prakash, (Director, Loker Hydrocarbon Research Institute), Dr. Krishna Kallury and the Senior Chemists Committee (SCALACS) for their efforts. **March 8** is **International Women's Day** and the theme for the year 2022 is **"Break the Bias."** Professor Jenny Y. Yang (Chancellor's Professor, University of California Irvine) has also kindly agreed to give a talk based on the theme on **Thursday, March 17** at **6:30-7:30 p.m.**, featuring our celebration (see page 4). Thanks to our Women Chemists Committee for the arrangements. Both talks will be conducted online via zoom and I am confident that these talks will be greatly informative and encouraging for all of us. The 2021 Tolman Award recipient will be announced in the April issue of SCALACS. We hope to resume planning meetings on our visionary themes and community programs benefitting our community and the public, which we put on hold in 2020 for COVID-19 safety measures. You can find more details on the upcoming events in the monthly issue of SCALACS and on our website, www.scalacs.org. You may also contact me at tmathew@usc.edu.

With thanks, and best wishes,

Thomas Mathew
Chair, SCALACS
(tmathew@usc.edu)



High School Chemistry Olympiad Local Exam: March 16 & 17

The Southern California Section will hold the **ACS High School Chemistry Olympiad** on **March 16 and 17** at over 30 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 contact **Gerald Delker** at **Delker@earthlink.net** to receive the letter and participation form or **download from our website.**

The top scorers on the local exam are nominated to compete in the National Exam, which will take place on April 30 at a location to be determined. The top 20 national winners are invited to attend an all expense paid two-week study camp at the Air Force Academy. The top four finalists are then selected to represent the United States at the 55th International Chemistry Olympiad. We will recognize the top local students with monetary awards and certificates. A Banquet may be held in May, depending on conditions.

Early-bird participation fee starts at **$8/student. After March 1, the cost is $10.00/student.** Fees may be paid by check or online at **https://scalacs.org/?page_id=236.** Questions? Call SCALACS office at **(310) 327-1216.**

City of STEM Outreach Volunteer Opportunity

The **City of STEM Kickoff Festival** is on **Saturday, April 2** from **10:00 a.m. - 4:00 p.m.** It will be held at Columbia Memorial Space Center 12400 Columbia Way, Downey, CA 90242.

We are planning to have a SCALACS table at the City of STEM Kickoff Festival. **We are looking for volunteers to help at the table on this day.** Please email **Veronica Jaramillo (vijaramillo@pasadena.edu)** if you are interested in volunteering.

The month-long City of STEM Celebration kicks off with a HUGE festival at the Columbia Memorial Space Center. This day will include interactive booths from their STEM partners, mobile museums, live musical performances, fascinating panel discussions, food trucks and so much more!

Save the date! Come and see us at our Booth during the Kickoff festival. Here is a link to the overall event details: **https://cityofstem.org/calendar/2022/4/2/city-of-stem-kickoff-festival**

Environmental Science Committee

The Environmental Science committee is looking for new members interested in joining to help plan activities. Please check our website, www.scalacs.org or call our office, (310) 327-1216 for further information.

SENIOR CHEMISTS COMMITTEE

Chemist Virtual Seminar

From Kibbutz Fishponds to The Nobel Prize: Taking Molecular Functions into Cyberspace

presented by

Nobel Laureate Dr. Arieh Warshel

Monday, March 7 • 4:00 - 5:00 p.m. • via Zoom
Free to all. Register at www.scalacs.org

This 60-minute virtual seminar is hosted by SCALACS Senior Chemists Committee under the Diversity, Equity, Inclusion, and Respect (DEIR) grant from the American Chemical Society (ACS). This is a free event and everyone is welcome to join. Please sign up on our website **www.scalacs.org** or contact SCALACS office at **(310) 327-1216** to join in the seminar.

Dr. Arieh Warshel was born to a Jewish family in 1940 in Kibbutz Sde Nahum, Mandatory Palestine. He served in the Israeli Armored Corps. After serving the Israeli Army (final rank Captain), he attended the Technion, Haifa, where he received his B.Sc. degree in chemistry, Summa Cum Laude, in 1966. Subsequently, he earned both M.Sc. and Ph.D. degrees in Chemical Physics (in 1967 and 1969, respectively), with Shneior Lifson at Weizmann Institute of Science, Israel. After his doctoral studies, he did postdoctoral work at Harvard University until 1972, and from 1972 to 1976 he returned to the Weizmann Institute and worked for the Laboratory of Molecular Biology, Cambridge, England. He joined the faculty of the Department of Chemistry at USC in 1976 and has been there ever since.

Arieh Warshel is well-known for his work on computational biochemistry and biophysics and in particular for pioneering computer simulations of the functions of biological systems, and for developing what is known today as Computational Enzymology. For his outstanding work, he shared the 2013 Nobel Prize in Chemistry with Martin Karplus of Harvard University and Michael Levitt of Stanford University. What Warshel, Karplus, and Levitt achieved – beginning in the late 1960s when computers were still very primitive – was the creation of computer programs that describe the action of proteins and other biological molecules by "multiscale models." Such models describe the most important parts of the molecular system in more detail than the surroundings. For example, in exploring the way enzymes work, the programs describe the reacting bonds quantum mechanically and the surroundings by classical molecular mechanics. Such models can simulate how enzymes control key biological processes and how a drug molecule targets a protein in the body. Scientists can now let computers perform most of the work in predicting chemical processes in very large systems, saving extensive resources used in conventional laboratory experiments. Warshel's pioneering work has led to the ability to describe and understand the action of molecular machines, the activation of ion channels, and the ability to model electron and proton transport in biology, as well as to gain insight on other key biological processes.

See Abstract on Page 4

2022 International Women's Day Event

A Virtual Seminar Presented by:

Professor Jenny Y. Yang,
Chancellor's Professor, Department of Chemistry, University of California Irvine

6:30 - 7:30 p.m. • Thursday, March 17
Via Zoom

For more information and RSVP, visit the Meetings & Events page on our website: www.scalacs.org

Continue from Page 3.

From Kibbutz Fishponds to The Nobel Prize: Taking Molecular Functions into Cyberspace

Presented by:
Dr. Arieh Warshel
Distinguished Professor of Chemistry, USC
Fellow of the National Academy of Sciences
Nobel Laureate in Chemistry

Monday, March 7 • 4:00 - 5:00 p.m. • via Zoom

Abstract:
The talk will cover Dr. Arieh Warshel's life experiences. Warshel grew up in Kibbutz Sde Nahum, a communal agricultural farm in northern Israel. Warshel's research has often been ahead of his time, considered outside the box. Here is a man, a great innovator, who often sees connections that are not immediately obvious to others. This has also led to significant resistance to his ideas, although they have been eventually embraced by the broader community. The talk will include anecdotes about his family, upbringing, early education, and military service in the Israeli army. He will also cover his training at undergraduate (Technion) and graduate (Weizmann Institute of Science) levels, which has led him to study a wide-range of organic and biological systems from β-cyclodextrin to large enzymatic systems as F-ATPase. During his studies at the Weizmann Institute using a computer named "Golem," Warshel, together with Lifson (his Ph.D. mentor) and Michael Levitt, developed the consistent force field theory (CFF) that set the path for biomolecular simulations that are standard approaches/tools today. While at Weizmann, Professor Warshel began a fruitful collaboration with Levitt (currently at Stanford). That collaboration led to a landmark simulation of protein folding. It also led to sharing the Nobel Prize with Levitt and Martin Karplus in 2013. Warshel's rich academic career at USC since 1976 has revolved around understanding the importance of electrostatic effects in enzyme catalysis.

Abstract is also available at https://bit.ly/3uRN9Wy.
Recording of this event will be made on the website, www.scalacs.org.

Election for 2022 SCALACS Governance is Under Way. Deadline March 5.

Our 2021 Election for 2022 SCALACS Governance began mid-February and ends March 5. This election is being processed by ElectionBuddy.com. Your first invitation to participate went out by email on 2/13/2022. If you do not have an email address on file in our member roster, OR if your 2/13/2022 email invitation to vote bounced or was spam blocked, we sent you a ballot by surface mail. We thank all other members who have already voted, and encourage those who have not yet voted to do so. If you did not receive your email invitation to vote, please check your spam folders. If you still can't find it, contact Jenneva (office@scalacs.org) to receive a copy of your voting link or a paper ballot.

Our slate of candidates is as follows:

Candidate for office of Chair-Elect:

- ❏ **Edye Udell, Chemistry Teacher, Westridge School for Girls**

Candidate for office of Secretary/Treasurer:

- ❏ **Barbara Belmont, Lecturer, Department of Chemistry and Biochemistry**

Candidates for Executive Committee Member at Large:

- ❏ **Laxman Gurung, Senior R&D Chemist, PPG Industries**
- ❏ **Jake Rosener, Manager, Global Regulatory and Product Development, Skincare/iS Clinical**
- ❏ **Katherine Van Heuvelen, Associate Professor of Chemistry and Associate Dean of Faculty, Harvey Mudd College, Claremont, CA**

Candidates for Councilor:

- ❏ **Barbara Belmont, Lecturer, Dept of Chemistry and Biochemistry, California State University Dominguez Hills**
- ❏ **Robert De Groot, Physical Scientist, United States Geological Survey, Pasadena, CA**
- ❏ **Michael Morgan, Teacher, Francisco Bravo Medical Magnet High School, LAUSD**
- ❏ **Eleanor Siebert, Professor Emeritus and Former Provost and Academic Vice President, Mount St. Mary's University**

The election closes on <u>MARCH 5.</u>
All surface mail ballots must be postmarked by that date.

BY

KEITH ORSO
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KOrso@irell.com

In response to a reader's request, the previous edition of this column began discussing the topic of copyright protection in the United States. A copyright is literally a right to copy. And that right attaches to original works of authorship that are fixed – e.g., written down or otherwise recorded – in a tangible medium of expression that is sufficiently permanent or stable to permit it to be perceived, reproduced, or otherwise communicated for a period of more than transitory duration. So while it is easy to see how words chiseled in stone would be protected, it would be difficult to argue that sky writing is copyrightable.

Note that to by copyrighted, the work of authorship must not only be fixed in a tangible medium of expression, it also must be "original." It has been said that the sine qua non of copyright is originality. To be "original," as that term is used in copyright, the work must have been independently created by the author and must possess at least some minimal degree of creativity.

The "independent creation" requirement, as its label suggests, requires that the author created the work herself or himself, or that joint authors created the work themselves, as opposed to copying it from elsewhere. But consider what the "independent creation" requirement does not demand. It does not demand that the work of authorship be novel. A famous judge with a memorable name – Judge Learned Hand – once wrote:

> Borrowed the work must indeed not be, for a plagiarist is not himself pro tanto an "author"; but if by some magic a man who had never known it were to compose anew Keats's Ode on a Grecian Urn, he would be an "author," and, if he copyrighted it, others might not copy that poem, though they might of course copy Keats's.

Accordingly, a work of authorship may, at least theoretically, be original even though it is not novel – or even though it is similar to a work of authorship by another – so long as it was not copied.

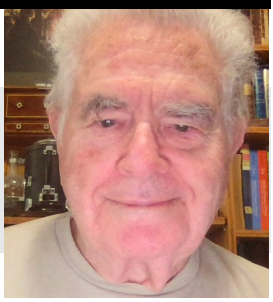
As for the creativity requirement, the minimum level of creativity is very low. It has been said that most works of authorship meet the creativity requirement easily, as they, in the words of courts, "possess some creative spark, 'no matter how crude, humble or obvious' it might be." A factual compilation may meet the originality requirement based on the selection and arrangement of the facts, for example, but an alphabetical listing of telephone numbers has been found to lack the requisite originality.

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

BY

HAROLD GOLDWHITE
California State University, Los Angeles
hgoldwh@calstatela.edu



A trifle belatedly let me wish my readers a happy new year – and let me use the occasion of the start of a new set of columns for 2022 to look back a century and examine what was new in the chemical world in 1922. I will do this by scanning the pages of the "Annual Reports of the Progress of Chemistry for 1922" issued by The Chemical Society (of London; now the Royal Society of Chemistry) in London in 1923. This is the 19th. Volume of this valuable series, and I have drawn on these volumes for earlier columns I have written.

In the chapter on general and physical chemistry there is a critical analysis of gas viscosities. From these measurements can be derived a "mean collision area" of a gas that can be linked to modern (1922) views of atomic structure "and to the part which, according to the Lewis-Langmuir theory, is played by the valency electrons in the combination of the elements to form compounds…" "According to the Lewis-Langmuir theory the hydrogen compounds of the elements chlorine, sulphur, phosphorus, and silicon have an outer ring structure which is essentially identical with the outer ring structure of the inert element argon." Viscosity data and collision area measurements generally support this similarity – and [editor's note] thus presumably support the Lewis-Langmuir octet theory of molecular structure.

Sir W. H. Bragg delivered a recent (1922) lecture on the use of X-ray crystallography in linking the symmetry of crystals to the symmetry of their constituent molecules. He deduces that since most organic crystals are monoclinic prismatic in shape, if the molecule making up the crystal is devoid of symmetry, there should be four such molecules in the unit cell.

Debye and Scherrer, from X-ray crystallographic data on lithium fluoride, infer that the valence electron of lithium has been transferred to the valence shell of fluorine, supporting directly the ionic combination of polar elements as postulated by – who else – Lewis and Langmuir. G. N. Lewis's book on Valency, that I discussed in an earlier column, was published the next year, in 1923.

A theory in the forefront of chemistry around 1922 was the radiation theory of chemical change. In its simplest form this theory asserts that "the frequency of the radiation that transforms the molecules of a substance into a reactive condition can be calculated from the temperature coefficient of the velocity of the reaction." This topic formed the basis of a general discussion of The Faraday Society, the U.K.'s primary outlet for physical chemistry. The theory came under sustained attack during that discussion and subsequently, since in many cases reacting molecules had no absorption bands in the relevant spectral areas. The reporter's conclusion is that the radiation theory has not received definitive support in the period under review – quite the reverse.

Disperse systems and colloidal solutions get their own section. I will not go into detail on the 1922 findings, but simply remark that this fascinating state lying between true solutions and particle suspensions seems to have been somewhat neglected of late. When I ask current chemistry students "What is a colloid?" they seem stumped for an answer!

I conclude this initial essay on the chemistry of 1922 with a start on the section on inorganic chemistry. There is, unsurprisingly, overlap with the section on general and physical chemistry. Atomic theory is the starting topic, and we hear again about the L-L theory, as I shall call it for short. The reporter draws on the work of some famous chemists (Sir J. J. Thomson, A. Lapworth, R. Robinson, N. Bohr, and W. L. Bragg among others) to conclude that L-L theory begins to show imperfections beginning with sodium, and increasingly with heavier elements. "…one cannot escape the conclusion that chemical properties are determined, not by the outer electrons alone, but by the atomic constitution as a whole."

More about 1922 in next issue.

CHAIR'S MESSAGE

Hello!

I would like to write to you this month about volunteer work in our Section. I remember receiving my SCALACS magazine each month back in the days before I was involved with the executive board of the San Gorgonio Local Section. When I would read about various volunteer opportunities, I would always think that there was probably a large group of regular volunteers that already existed, so my help was not really needed. Since getting involved with the Section, I have found that this is not the case at all. In reality, the Section is sustained by a small group of dedicated individuals, but we would like to see the number of volunteers for our Section grow over the next year.

You are exactly the volunteer we have been looking for. You have some gift, talent, background experience, etc. that you can share with others. There are people in this Section that can benefit from your participation in our events and activities throughout the year. We need your help to continue to plan worthwhile events and activities for the people in our Section. There are opportunities for short-term time commitments and long-term time commitments and anything in between, so we have an opportunity that fits every schedule.

Just let us know what works for you. If you are interested in helping out with one or more of our committees, please fill out the form at **https://forms.gle/swTa7XWpLYAb7GD96,** where you can include information about your preferred availability. Thank you to everyone who has already volunteered and helped on a committee so far this year.

See what the San Gorgonio Local Section has planned for you this March and April in the following page.

2022 U.S. National Chemistry Olympiad (USNCO) Local Exam: March 23-30

We are pleased to announce that the San Gorgonio Local Section will be participating in the **2022 U.S. National Chemistry Olympiad (USNCO)**. The primary goals of this program are to stimulate interest and achievement in chemistry among high school students throughout the United States and to provide recognition of outstanding students, teachers, and schools. Students in AP or IB chemistry are encouraged to participate.

We have the privilege of nominating ten students to represent the San Gorgonio Local Section in the National Chemistry Olympiad exam. The Local Section exam will be used to identify these students. The results of this exam will also be used to select students who will receive San Gorgonio Section scholarships of up to $1200 that can be used when they enter college.

As of now, it is planned to offer the Local Exam in a hybrid format which means it may be administered online as well as available in a paper format. The local exam will be given **March 23-30.**

The schedule and exam format may change based on COVID-19 conditions. Contact the Olympiad committee chairs for more information: **Dennis Pederson, Ph.D. (dennis.pederson@gmail.com)** and **Eileen DiMauro (edimauro@mtsac.edu).**

Women Chemists' Committee (WCC) Saturday, April 9 at 9 a.m.

Save the date for our first meeting of the **Women Chemists' Committee (WCC) – Saturday, April 9 at 9 am.** This virtual meeting will involve a roundtable discussion featuring several chemists in careers beyond academia or medicine. The event is open to everyone but is geared towards undergraduate and graduate students. Attendees will have the opportunity to network with the invited speakers in breakout rooms during the event. Stay tuned for more info on this exciting event through our website, social media, and email communications. Please spread the word to anyone who might be interested in attending this virtual WCC event.

More details to come at http://sgacs.org/.

You can always email me if you have any questions or suggestions for the Section. Have a great month!

Dr. Jenifer N. Nalbandian
Chair
jnalbandian@calbaptist.edu

SOUTHERN CALIFORNIA SECTION
AMERICAN CHEMICAL SOCIETY
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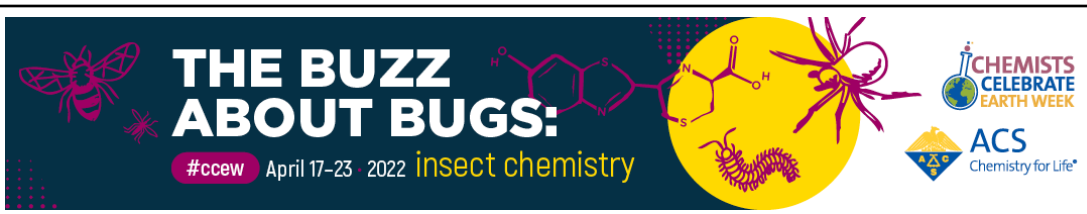
IMPORTANT
Do Not Delay!

Contains Dated Meeting Announcement

PERIODICALS



SCALACS will be celebrating Chemists Celebrate Earth Week on April 17–23 with the theme, "The Buzz About Bugs: Insect Chemistry." More info in April.

Bi-Section Chemists' Calendar

MARCH

7 SCALACS Virtual Seminar by Nobel Laureate Dr. Arieh Warshel — see page 3
16 & 17 SCALACS High School Chemistry Olympiad Exam — see page 2
17 SCALACS Virtual Seminar by Professor Jenny Y. Yang — see page 4
23-30 San Gorgonio High School Chemistry Olympiad Exam — see page 9

APRIL

2 City of STEM Kickoff Festival — see page 2
9 San Gorgonio Women Chemists' Committee Meeting — see page 9
17-23 Chemists Celebrate Earth Week

For more information or to find events,please see our websites:
www.scalacs.org • www.sgacs.org