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SCALACS

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American Chemical Society

Volume LXXX

APRIL 2025

Number 3

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CHAIR'S MESSAGE



Dear SCALACS Members,

I recently returned from the ACS Spring National Meeting in San Diego, where the ACS 2025-2029 Strategic Plan (<https://www.acs.org/about/strategicplan.html>) was presented. The plan outlines four strategic goals: elevating the reputation of science, enhancing community engagement, empowering scientists, and delivering innovative solutions. These goals align with SCALACS's ongoing activities, including our outreach programs, virtual seminars, and member gatherings.

A notable highlight was Dr. Frances Arnold's Priestly Medal address, a testament to her groundbreaking work. I was inspired by her emphasis on supporting future scientists and fostering collaborative research environments and community. Upon my return to campus, I bumped into some enthusiastic PCC Chemistry Club board members who were still talking about how much her words resonated with them!

At the ACS Kids Zone, I enjoyed demonstrating the concept of trapped gases in glaciers using POP Rocks, an activity featured in the latest Celebrating Chemistry issue (<https://www.acs.org/education/celebrating-chemistry-editions/2025-ccew/crackling-of-an-ice-core.html>). I also engaged in productive meetings with the Committee on Community Activities (CCA) and the Committee on Minority Affairs (CMA) and participated in both the District VI caucus and the ACS Council meeting. My sincere thanks to Brian Brady and Krishna Kallury for their collaboration on our SCALACS Sci-Mix poster, showcasing our local section's activities.

Looking ahead, Chemists Celebrate Earth Week (CCEW) will take place from April 20-26, 2025, with the theme "Glaciers: Hot Topic, Cool Chemistry." SCALACS will participate in the City of STEM event at Exposition Park on April 12, 2025, distributing Celebrating Chemistry periodicals and conducting related hands-on activities.

We will host a Virtual Seminar on April 22, 2025, titled "Biosensors in monitoring & treatment of ailments/diseases."

Preparations are underway for our SCALACS strategic planning workshop.

I encourage your participation in these upcoming events.

Sincerely,

Veronica I. Jaramillo, Ph. D.
PCC Dean of Natural Sciences
Fellow of the American Chemical Society
SCALACS 2025 Chair

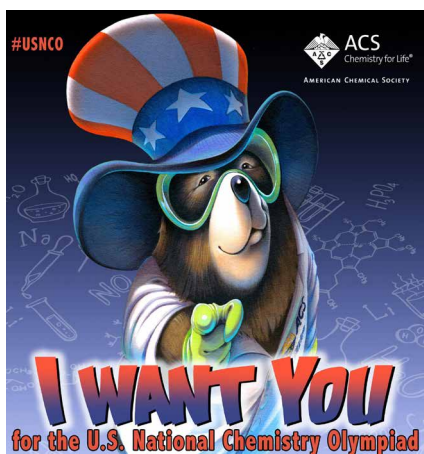


Announcing the 2024 Richard C. Tolman Award Recipient



The 2024 Tolman Award recipient is
Professor Kenneth J. Shea,
Distinguished Professor of Chemistry,
Emeritus, University of California, Irvine.
Congratulations, Professor Shea!

We will honor Professor Shea at the
Tolman Award Dinner. Look for more
information in our next issue.



2025 US NATIONAL CHEMISTRY OLYMPIAD

The local section exam has been administered and tests are being graded currently. 430 students from 35 schools participated on March 19 & 20. Twelve top students will be selected to move forward to the National Exam and SCALACS will send notifications to the teachers regarding this. The National Exam will be hosted at California State University, Dominguez Hills on Saturday, April 12.

KEY DATES FOR 2025 USNCO EXAM

*Schedule is subject to change. All changes will be posted on the USNCO website:
<https://www.acs.org/education/olympiad.html>*

April 12, 2025

June 1-14, 2025

July 5-14, 2025

National Exam at Cal State Dominguez Hills

Study Camp

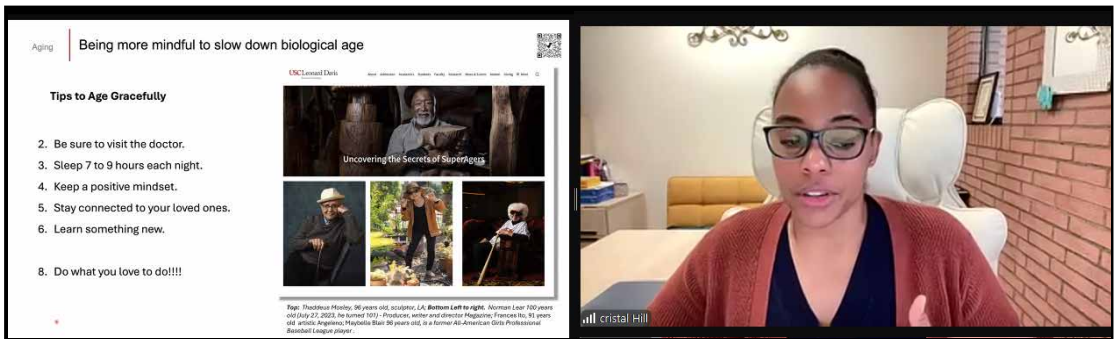
2025 International Chemistry Olympiad

Any questions, please contact our SCALACS administrator, e-mail office@scalacs.org or call 310-327-1216.

SUMMARY REPORT ON THE VIRTUAL SEMINAR PRESENTED BY DR. CRISTAL HILL OF USC

Summary report written by Krishna Kallury.

Date: March 17, 2025; Time: 4:00 to 5:00 pm
Title: Longevity on Your Plate – The Role of Diet in Aging and Healthspan
Presentation Mode: Virtual Live
Attendees: 82 registered from across the country;
45 Students/Teachers from 2 Schools & 1 University



At the outset, Dr. Krishna Kallury welcomed all the attendees on behalf of SCALACS and introduced fellow executive committee member Jessica Lu, Associate Professor, Biola University and requested her to introduce the speaker. Jessica introduced Dr. Cristal Hill, Assistant Professor, USC's Leonard Davis School of Gerontology, summarizing her academic details and research experience and the awards she won as a young researcher.

The way we eat throughout our lives impacts our physical shape and the way we age. Science has proven that a well-balanced and varied diet full of nutritious foods like fruits and veggies, whole grains, legumes, nuts, and lean proteins; and restricting the amounts of sugar, salt, saturated or solid fats, and alcoholic beverages is the recipe for good health. This means we all have the power to maximize and improve our health, add vitality to our years, reduce the risk of disease, and increase our healthspans - the number of years we live in good health. Research also shows that it's never too late to make improvements.

Dr. Hill began by introducing the terms chronological and biological aging. The former means the number of years you are alive, while the latter represents how old your cells and tissues are based on physiological (clinical) evidence. Biological aging could be accelerated or decelerated based on conditions such as psychosocial stresses, nurturing environments, lifestyle parameters, genetic risk or resilience and cellular damage. External factors consist of lifestyle (sedentary vs. active), nutrition (calorie vs. nutrient dense), genes (genetic risk and cellular stress), mental stress, smoking and living environment (walkability, food availability and microbes).

Comparison between Asia/Europe and Canada, Mexico and Costa Rica on one hand and USA on the other shows the lesser money we spend, the longer aging is. Traditional diets have their history from centuries ago to modern era. They are focused on the foundation of fruits and vegetables, culturally diverse recipes using whole grains, pulses, nuts/seeds, herbs and spices and other plant foods. Traditional diets are carbohydrate rich, suitable for active lifestyles. They are unsuitable for modern less active populations.

For improving the lifespan, Dr. Hill described four types of dietary interventions. They are (1) Calorie Restriction, (2) Fasting, (3) Ketogenic diet and (4) Reduced Protein Intake. Benefits of each of these are reduced obesity, lesser metabolic decline/diabetes/cardiovascular disease, reduced risk of cancer/dementia/PD (Parkinson's Disease)/AD (Alzheimer's Disease) and immunefunction/autography, respectively. Dr. Hill touched upon the review of Longo and Anderson (Cell 2022, 185, 1455) which summarizes research on all four types of dietary interventions up until 2022.

Longevity on Your Plate
"The Role of Diet in Aging and Healthspan"

SCALACS Virtual Seminar
Monday, March 17, 2025
4:00 PM PT

USC Leonard Davis School of Gerontology
Cristal M. Hill, PhD
Assistant Professor of Gerontology
Email: cristalhill@usc.edu

ACS SCALACS
The Southern California Section of the American Chemical Society



Calorie Restriction (CR)

Diet as a whole, encompassing food composition, calorie intake, and the length and frequency of fasting periods, affects the time span in which health and functional capacity are maintained.

The authors analyze aging and nutrition studies in simple organisms, rodents, monkeys and humans to link longevity to conserved growth and metabolic pathways, and outline their role in aging and age-related disease. They focused on feasible nutritional strategies shown to delay aging and/or prevent diseases through epidemiological, model organism, clinical, and centenarian studies, and underline the need to avoid malnourishment and frailty. These findings are integrated to define a longevity diet based on a multi-pillar approach adjusted for age and health status to optimize lifespan and healthspan in humans (see Figure 1 on next page).

While explaining the benefits of Calorie Reduced (CR) diet, Dr. Hill cited the highlights of the results in the following five references:

Julie Mattison et al, Nature Communications 2017 (January), 1-12: "Caloric restriction improves health and survival of rhesus monkeys"

Bartke et al, Nature 2001, 414, p. 412: "Extending the lifespan of long-lived mice"

Sofia Milman et al, Aging Cell 2014, August 13 (4), 769: "Low insulin-like growth factor-1 level predicts survival in humans with exceptional longevity"

Jason Fleischer et al, Experimental Gerontology 2022, 165, 111837: "Associations between the timing of eating and weight-loss in calorically restricted healthy adults: Findings from the CALERIE study"

Eric Ravussin et al, J. Gerontology: Medical Sciences, 2015, 70(9), 1097; A 2-Year Randomized Controlled Trial of Human Caloric Restriction: Feasibility and Effects on Predictors of Health Span and Longevity"

Calorie restriction (CR) and time-restricted eating (TRE) are distinctly different dietary management strategies with overlapping health outcomes. After two years of CR, healthy participants in the Comprehensive Assessment of Long-Term Effects of Reducing Intake of

Energy (CALERIE) study showed significant weight-loss relative to the ad libitum intake control group and achieved 12% CR on average. Preclinical rodent studies have shown that sustaining a consistent eating interval of 8–12 h between the first and last calories of each day—without reducing daily calorie intake—can impart health benefits that partly overlap with those imparted by CR.

Fasting

Studies on fasting have also demonstrated its potential to stimulate cellular repair processes like autophagy, which helps eliminate damaged cells and may protect against age-related diseases. Furthermore, fasting has been linked to the activation of certain genes and cellular pathways that promote longevity. Autophagy is the body's natural process of cellular "self-cleaning," where damaged or unnecessary components are broken down and recycled. This mechanism helps maintain cellular health by removing waste, repairing damage, and adapting to stress, especially during nutrient deprivation. It plays a key role in preventing diseases like cancer and neurodegeneration, boosting immune function, and promoting longevity. Stimulated by fasting and cellular stress, autophagy ensures efficient energy use and overall well-being, making it essential for maintaining a healthy, functional body.

Ketogenic Diet

The ketogenic diet is a very low-carbohydrate, high-fat diet that forces the body into a metabolic state called ketosis, where it primarily burns fat for fuel instead of glucose, resulting in the production of ketones.

Megan Roberts et al, Cell Metab. 2017 September 05; 26(3): 539–546; “A ketogenic diet extends longevity and healthspan in adult mice: C57BL/6 mice were assigned to a ketogenic, low-carbohydrate, or control diet at 12 months of age and were either allowed to live their natural lifespan or tested for physiological function after 1 or 14 months of dietary intervention. The ketogenic diet (KD) significantly increased median lifespan and survival compared to controls. In aged mice, only those consuming a KD displayed preservation of physiological function. The KD increased protein acetylation levels and regulated mTORC1 signaling in a tissue-dependent manner. This study demonstrated that a KD extends longevity.

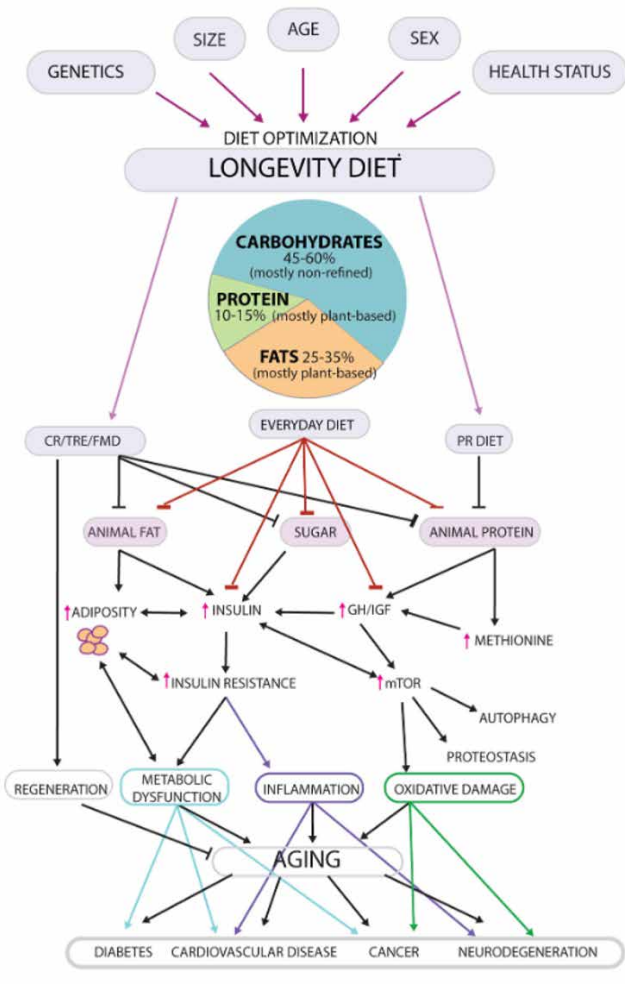


FIGURE 1

Dietary Protein Restriction

Solon-Biet et al (Cell Reports 2015, 11, 1529; “Dietary Protein to Carbohydrate Ratio and Caloric Restriction: Comparing Metabolic Outcomes in Mice”) Nutritional interventions improve metabolic health in mice. Solon-Biet et al find that short-term ad libitum low-protein, high-carbohydrate (LPHC) diets improve levels of insulin, glucose, lipids, and HOMA. LPHC diets under ad-libitum-fed conditions generate the metabolic benefits of caloric restriction without a 40% reduction in total caloric intake.

Levin et al (Cell Metabolism 2014, 19, 407; “Low Protein Intake Is Associated with a Major Reduction in IGF-1, Cancer, and Overall Mortality in the 65 and Younger but Not Older Population”): Mice and humans with growth hormone receptor/IGF-1 deficiencies display major reductions in age-related diseases. Because protein restriction reduces GHR-IGF-1 activity, we examined links between protein intake and mortality. Respondents aged 50–65 reporting high protein intake had a 75% increase in overall mortality and a 4-fold increase in cancer death risk during the following 18 years. These associations were either abolished or attenuated if the proteins were plant derived. Conversely, high protein intake was associated with reduced cancer and overall mortality in respondents over 65, but a 5-fold increase in diabetes mortality across all ages. Mouse studies confirmed the effect of high protein intake and GHR-IGF-1 signaling on the incidence and progression of breast and melanoma tumors, but also the detrimental effects of a low protein diet in the very old. These results suggest that low protein intake during middle age followed by moderate to high protein consumption in old adults may optimize healthspan and longevity.

Studies on Blue Zone Populations

Have you ever wondered why some people live to be 100 or older? Dan Buettner did. In the early 2000s, Buettner embarked on a mission to determine what specific aspects of lifestyle and environment might help humans live longer. He teamed up with National Geographic and the National Institute of Aging, assembling a team of anthropologists, epidemiologists and researchers who were able to identify five areas with the highest percentage of centenarians. Known as the Blue Zones, these areas also have low rates of chronic diseases including heart disease, diabetes and cancer.

“The Blue Zone way of eating and living has been linked to lower risks of developing heart disease, type 2 diabetes and some cancers,” explains Laura Lu, RD, CDN, a registered dietitian nutritionist and certified intuitive eating counselor in New York City. “It’s important for people to understand that Blue Zone isn’t a specific diet. It’s actually a concept that highlights various regions, cultures and access to local food. One of the most significant, underrated benefits from the Blue Zone is the emphasis on improved quality of life. This is characterized by cultivating strong social connections, staying active and reducing stress.”

What Are The Five Specific Locations Of The Blue Zones?

Sardinia, Italy: Sardinia is the second-largest island in the Mediterranean Sea and home to some of the world's longest-living males. The local shepherds walk at least five mountainous miles daily and follow a predominately plant-based diet. Meat is enjoyed on Sundays and special occasions only.

Okinawa, Japan: The world's longest-living women are from Okinawa, a chain of islands in Japan. Their longevity is suggested to be in part due to their close-knit social circles, as well as an old Confucian mantra said before meals that reminds them to avoid overeating and stop when they are 80% full.

Loma Linda, California: The residents of this city in San Bernardino have one of the highest rates of longevity in America. The community of Seven-Day Adventists in Loma Linda follows a primarily vegan diet and also recognizes their Sabbath day weekly.

Nicoya, Costa Rica: The Nicoya Peninsula is known for elders with a positive outlook on life. Their diet is abundant in tropical fruits packed with antioxidants, and their water is rich in calcium and magnesium that helps to prevent heart disease and builds strong bones.

Ikaria, Greece: This island in Greece is known for the long-living locals who embrace a Mediterranean diet abundant in olive oil, fruits, vegetables, whole grains, and beans. Ikarians also take time for a mid-afternoon break. They experience half the rate of heart disease and 20% less cancer than Americans do. Additionally, most Ikarians are Greek Orthodox Christians that follow several periods of fasting throughout the year where they essentially follow a vegan diet.

Loma Linda, California “A group of Americans living 10 years longer”

The Seventh-Day Adventist church in this sunny pocket of Southern California was founded in the 1840s. The church flourished through the 20th century – and so did its 430 Loma Linda members who view health as central to their faith.

Today, a community of about 9,000 Adventists in the Loma Linda area are the core of America’s Blue Zones region. They live as much as a decade longer than the rest of us, and much of their longevity can be attributed to vegetarianism and regular exercise. Plus, Adventists don’t smoke or drink alcohol.

Jeanne Calment (the oldest lady on earth)

Jeanne Louise Calment was a French supercentenarian and, with a documented lifespan of 122 years and 164 days, the oldest person ever whose age has been verified. Her longevity attracted media attention and medical studies of her health and lifestyle.

After a Q/A session, Krishna Kallury proposed a vote of thanks.

I found this presentation interesting and informative. Kudos to Dr. Cristal M. Hill for a great job!!

—Frank Romano, Senior Chemists Committee Chair, New York

I enjoyed the talk very much, and appreciated that it was via zoom. Dr. Hill covered a lot of the science and mechanisms of action, which was a super learning experience for me.

—Linda Frodyma Wobbe, former science librarian



Students at Bravo Medical Magnet School.

Students at Biola University.



News from the ACS Spring 2025 Meeting San Diego, California, March 23-27, 2025

The ACS Spring 2025 meeting was held in hybrid format with 15,332 registrations (14,2512 in-person and 1,081 online) as of March 26. The Council met on March 26, opening with resolutions in memory of deceased Past President Attila Pavlath (California Section) and all recently deceased councilors.

The ACS Council acted on several Governance issues recommended by the relevant ACS committees. (Several of the following actions will also require ACS Board approval.)

1. Selected two candidates from four nominees for President-Elect, 2026. Christina Bodurow (Indiana Section) and Dawn Mason (North Carolina Section) will appear on the fall ballot sent to ACS members along with any additional petition candidates.
2. Voted to continue the Committees on Chemical Technical Professionals, Budget and Finance, Education, International Activities, and Patents and Related Matters.
3. Voted to amend the duties of the Committee on Patents and Related Matters and change its name to the Committee on Intellectual Property.
4. Voted to increase the number of members on Nominations and Elections from 15 to 19 members (to support the increased workload from the addition of International Councilors approved at the last meeting of Council).
5. Voted to approve new International Chemical Sciences Chapters in Ghana, Ecuador, and Northeast China.
6. Voted to dissolve the inactive Penn/Ohio Border Local Section effective January 1, 2026; members are being contacted about joining neighboring sections.
7. Voted to approve the 2026 Schedule of Dues and Benefits.

Council also received committee reports; of particular interest:

8. The Committee on Committees announced that the ACS Committee preference form is now available online to all ACS members through July 3. Members interested in serving on an ACS Committee in 2026 should go to [CMTE.acs.org](https://cmte.acs.org) to complete their preferences.
9. The Committee on Economic and Professional Affairs is updating the ACS Professional Employment Guidelines which will be up for action at the fall Council meeting. Reach out to CEPA@ace.org for more information on the draft guidelines.
10. The Committee on Education is revising the ACS Guidelines and Recommendations for Teaching Middle and High School Chemistry; these will be available soon for the upcoming academic year.

For more information on Council actions, please visit Councilor Talking Points: Summary of Governance Issues and Actions at the SCALACS website.

SCALACS Booth At The ACS Spring 2025 National Meeting Sci-Mix Event

Venue: San Diego Convention Center

Time: 8:00 pm to 10:00 pm

SCALACS Volunteers: Veronica Jaramillo, Brian Brady and Krishna Kallury



(L-R): Krishna Kallury, Veronica Jaramillo, and Brian Brady at SCALACS booth,

The SCALACS Booth was located in the Local Sections area Isle #875 at the Exhibitions Hall. We displayed two posters at the Booth on our activities during 2024. A number of graduate and undergraduate students visited our Booth and Krishna Kallury briefed them on the symposia we have conducted in 2024 at both the high school and collegiate level in promotion of research in STEM subjects. All of them expressed interest in participating in these symposia and were enquiring about the schedules/dates in 2025. Krishna took their email addresses and promised to be in touch with them about these events.

Of particular interest is that our Booth was located adjacent to the Booths from San Jose, San Francisco, Berkeley and Seattle Local Section Booths. All of them visited our booth and we had a discussion about the ACS Western Regional Meeting slated for October 25-28, 2025, in San Jose. The event is co-sponsored by the Silicon Valley and California Local Sections. They cordially invited us to participate in the event and share the information with the faculty members and their students of academic/industrial institutions in our area. We assured them that we will spread the word around. This is a great opportunity for us to establish collaborations with these Local Sections in our California State. A couple of contacts are mentioned below:

Dr. Christopher J. Miller, Stanford (cjmil@stanford.edu)

Dr. Natalie L. McClure, Regulatory Affairs, DevRx Consulting (nmclure@devrxconsulting.com)

One of the visitors to our booth, James J. Shih, Senior Principal Biologist, Protein Biosciences, Eli Lilly, San Diego, CA, admired the work we are doing in promoting STEM research and invited us to visit his lab.

Report on the National Senior Chemists Committee Events at ACS San Diego

Date: March 24, 2025 , 8:00 am - 12:00 noon

Venue: Hilton San Diego Bayfront (for SCC Executive Committee meeting), San Diego Convention Center, Committee Row for Sci-Mix, (8 to 10 pm)

The SCC Executive Committee meeting was a hybrid event with 19 members in attendance and three joining virtually. Representatives from LSAC, YCC and WCC also participated. One of the main highlights was the appreciation shown by a number of SCC members on the spectacular work SCALACS is doing in promotion of collaboration with other ACS local sections, promotion of STEM education/research and encouragement of underrepresented communities. Reports from Outreach, In-reach and Partnerships Subcommittees were presented. The SCC News letter announced that articles from Local Section Senior Chemists will be welcome including topics of interest to the local audiences.

At the Sci-Mix event on March 24, 2025 (8 to 10 pm), six SCC members volunteered, three of them from 8 to 9 pm and the other three from 9 to 10 pm. The contributions of the SCC subcommittee of SCALACS were predominantly displayed in a poster. Around 120 people visited the SCC booth and a lot of them were enquiring and taking pictures of the SCALACS poster. Krishna Kallury of SCALACS was volunteering in the second group.

A full-day symposium honoring Ann Nalley (ACS President, 2006) was presented on March 25, 2025 with a number of speakers describing her contributions.



(L-R): Lee Hoffman, Professor of Chemistry at Drexel University, Krishna Kallury, and ACS SCC Chair Frank Romano.

SUMMARY REPORT ON SCALACS PARTICIPATION IN EGIS

Organizers: LA County Office of STEM Education

Date: March 29, 2025; 9:00 am - 12:30 pm

Venue: LA Zoo premises

SCALACS Booth Volunteers: Krishna Kallury (Executive Committee Member), Sunhwa Joung (Executive Committee Member & Science Teacher, Pacifica High School), Sophia Ahrablou & Charlie Lerner (Students at Pacifica High School) and Anu Kallury (Software Engineer)



“Engaging Girls in STEM Education” (EGIS) Fair is intended to encourage girls to pursue STEM courses in their schools and to educate them on the value of STEM education. Around 300 girls registered for the event and they were split into two groups. The High School Students visited the Exhibitors area from 9:00 to 10:30 am and the Middle Schoolers from 11:00 am to 12:30 pm. At SCALACS booth, we demonstrated four experiments: classification of acids & bases as weak or strong based on their pH using red cabbage extract as indicator; an invisible

ink decoding with phenolphthalein indicator/ammonia spray; the concept of density and salting out using metallic and polymer beads and floating candles; and oxidation/reduction. For the concept of salting out, we used an experiment with FD&C Blue and Yellow food dye solutions in water and isopropanol mixture and adding potassium carbonate to salting out the alcohol along with the blue dye into a separate top layer above the water/yellow dye layer. Oxidation/reduction was demonstrated with iodine and Vitamin C using starch indicator. The high school students loved the latter two concepts based experiments, while the middle school students liked the former two experiments very much. Overall, around 250 students visited our booth.

A Grade 7/8 Science Teacher from Rise Kohyang Middle School, Los Angeles, visited our booth along with her students. She invited us to do a demonstration session to her class this school year.



The two Pacifica High School students did a marvelous job in handling the experiments and explaining the chemistry concepts to the student visitors to our booth. Our thanks to both of them and their teacher Sunhwa Joung.

Regeneron Science Talent Search 2025 Awards



Ava Grace Cummings, Smithfield, North Carolina, Matteo Paz, Pasadena High School, California, and Owen Jianwen Zhang, Bellevue, Washington, top 3 winners of the 2025 Regeneron Science Talent Search

We are extremely proud of Matteo Paz, 18 of Pasadena High School, California for winning the top award of \$250,000 in the 2025 Regeneron Science Talent Search, the U.S.'s oldest and most prestigious science and math competition for high school seniors.

Now in its 84th year, the competition celebrates and rewards young innovators who are applying their Science, Technology, Engineering and Math (STEM) talent and leadership skills to push the boundaries of discovery and address today's pressing challenges.

40 finalists, including Matteo, were honored during an award ceremony at the National Building Museum in Washington, D.C, where they were awarded more than \$1.8 million in prizes for their groundbreaking research, exceptional problem-solving skills and potential to shape the future of STEM.

Matteo won the first place and \$250,000 for designing machine-learning algorithms to efficiently comb through 200 billion entries of raw NEOWISE infrared full-sky data. By analyzing tiny changes in infrared radiation, the AI sorted the objects into 10 classes. He found 1.5 million new potential objects.

Second place and \$175,000 went to Ava Grace Cummings, 18, of Smithfield, North Carolina, for creating a fruit fly model of STAC3 disorder, or Native American myopathy (a rare genetic muscle disease). She found that the common nettle herb, alone or combined with the experimental drug Tirasemtiv, improved movement in both adult flies and larvae.

Third place and \$150,000 went to Owen Jianwen Zhang, 18, of Bellevue, Washington, who solved a long-standing math problem about objects called 3-uniform hypergraphs. He proved a maximum value for how many 3-uniform hypergraphs can have similar structures but differing connections. Owen's results have applications in computer science.

Congratulations to all the winners!

BY

KEITH ORSO
Irell & Manella LLP
KOrso@irell.com



Recent installments of this column have explored the legal doctrine of obviousness-type double patenting, which is implicated when an inventor patents an invention (e.g., a novel cough syrup formulation) and then seeks or obtains a second patent on an obvious variation of the same invention (e.g., a flavored cough syrup having the same formulation). But what if the inventors of the two patents are different? Suppose two researchers at the same company independently develop similar inventions and one patents the invention before the other. Can the later patent be invalidated for obviousness-type double patenting even though the inventors are different?

This issue arose in a case many years ago involving patent application no. 543,520 claiming titanium-based Ziegler catalysts used to polymerize ethylene by contacting a titanium compound with an anhydrous magnesium dihalide support under certain conditions. The application was owned by a company that also owned an issued patent and two pending patent applications. The patent and other pending applications each likewise claimed the formation of a Ziegler-type catalyst by combining a titanium compound with an activated form of magnesium halide but each named entirely different groups of inventors.

The patent examiner rejected application no. 543,520 and the Board of Patent Appeals and Interferences affirmed the rejection on obviousness-type double patenting grounds.

On appeal to the Court of Appeals for the Federal Circuit, the applicants argued, among other things, that the doctrine of obviousness-type double patenting should not apply to commonly-owned applications with different inventive entities because it would be unduly restrictive and would discourage group research. The applicants further argued that each inventor in a research department should be entitled to separate patents for his or her own independent contribution to the basic objective of the overall research project.

The Federal Circuit rejected these arguments and affirmed obviousness-type double patenting. Addressing the argument that basing obviousness-type double patenting on commonly-owned applications with different inventive entities would put corporations in a “box,” the Federal Circuit emphasized that corporations could still obtain two patents if they filed terminal disclaimers to eliminate any additional patent term and ensure that the patents would remain commonly owned. (See the March edition of this column for more on terminal disclaimers).

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.

BY

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



In this column I conclude looking back at the new chemistry of 100 years ago as reflected in the pages of The Chemical Society's Annual report for 1925 (Volume XXII) published in London in 1926. In my two previous columns I looked at aspects of inorganic and organic chemistry. I start this column with a look at crystallography. One of the reporters on this topic was Sir William H. Bragg, Nobel Laureate and a pioneer, along with his son and co-Nobel Laureate, of X-ray crystallography. We all know Braggs' Law.

The chapter on crystallography begins with a tribute to the Russian crystallographer Professor F. von Fedorov who died of starvation as a consequence of the Russian Revolution. This great scientist proved the possibility of 230 types of crystal structure. His major opus was only published posthumously: The Crystal Kingdom (1050 pages plus an atlas) was published in Russia in 1920 but only became available in the West in 1925.

Further work on the structures of quartz have clarified the distinction between alpha and beta forms. Quartz plays a significant role in the history of crystallography. In 1669 Steno established in quartz the law of Constancy of Angles between faces. In 1811 Arago discovered in quartz the phenomenon of optical activity and Biot discovered the variation of optical activity with the wavelength of light. In 1822 John Herschel showed that dextrorotatory quartz crystals are mirror images of levorotatory crystals. Now X-ray analysis has shown that alpha quartz, the low temperature form that changes to beta quartz when heated above

575°C, is only a slightly distorted form of the beta type.

X-ray studies of cellulose have shed light on its structure. It may consist of two phases: an amorphous phase in which crystallites are embedded. The dimensions of the crystallites have been determined. Mercerized cellulose, cellulose treated with concentrated sodium hydroxide solution to generate a textile fiber, has crystallite dimensions greater than those in native cellulose.

Turning to molecular structures, solid carbon dioxide is cubic. The unit cell contains four molecules, and it is concluded that the three atoms are colinear. Solid ammonia is also cubic, and the unit cell contains four molecules. Three hydrogen atoms must be arranged trigonally about each nitrogen atom but probably do not lie in the same plane as the nitrogen atom.

X-ray analysis of metallic manganese has proved to be unusually difficult. It turns out that this is because it is a mixture of three allotropes. One form is obtained pure by electrolytic deposition and is face-centered tetragonal. The most stable form at room temperature is cubic with 56 atoms in the unit cell. A third form is also cubic. It has been established that carbon dissolves in manganese interstitially.

X-ray powder photography of solid ethane and solid diborane establishes that they must be structurally similar. "...boron in diborane, like carbon in ethane, functions as a quadrivalent element. ... The molecules in the crystals correspond to the ordinary chemical molecules."

Continued on page 13.



SAVE THE DATE - April 12, 2025
LA Maker Faire + City of STEM Festival
Exposition Park, Los Angeles, California
More info: <https://losangeles.makerfaire.com/>

Maker Faire is a gathering of fascinating, curious people who enjoy learning and who love-sharing what they can do. From engineers to artists to scientists to crafters, Maker Faire is a venue for these "makers" to show hobbies, experiments, projects. It is a family-friendly showcase of invention, creativity, and resourcefulness. Gather your friends and family and check out SCALACS booth at this event!

Continued from page 12.

Turning to a new subject for these “Annual Reports” there is under the more general heading of “Mineralogical Chemistry” a section on “Geochemistry”. It begins with a comment that Bischof’s seminal work on “Chemical Geology” dating from 1847 (!) seems to have been almost forgotten but there has been a recent revival of interest in the topic with the publication of English, French, and Russian works on the subject. A new paper from the U.S. Geological Survey calculates the average composition of the earth’s solid crust to a depth of 10 miles, including both the atmosphere and the hydrosphere, in percentages as: O, 49.5; Si, 25.8; Al, 7.5; Fe, 4.7; Ca, 3.4; Na, 2.6; K, 2.4; Mg, 1.9; H, 0.9; Ti, 0.6; Cl, 0.19; P, 0.12; C, 0.087.....etc. So, just over 99.5% of the crust is made up of thirteen elements and other than silicon of few rock-forming elements.

A consideration of the compositions of rocks and meteorites, together with the velocities of earthquake waves at various depths, gives a picture of the internal structure of the earth. It has a central core of nickel and iron about 3400 km in diameter. Above this is a lithospheric shell, made up of patches of silicates in a metal matrix, about 700 km thick; then comes an iron in rock shell about 700 km thick; a peridotite shell of about 1540 km thick; a basaltic layer of only 40 km thick; and finally, a surface granitic crust of 20 km thickness.

Examinations of the compositions of meteorites and the earth’s crust have disclosed the following principle – “there is a preponderance of elements of the helium atomic group, namely those with atomic weights divisible by 4 and up to atomic number 28 (Ni)”. A new meteorite recently discovered in West Africa is 100 meters in length and 40 meters in width. It is about 80% metal and 20% silicates.

New investigations on the compositions of tektites still leave unsettled the problem of their origins. Those found in Bohemia are of clear green glass and some researchers believe they are relics of ancient glass industries. Those found in Australia resemble obsidian, the volcanic glass, but there are no recent volcanoes in Australia. Many researchers now believe these tektites are meteoritic. Their composition is puzzling; they are very high in silica, up to 90%, unlike volcanic glasses or any other meteorites.

In the period 1922 – 1925, 211 new mineral names, not necessarily new minerals, have entered the literature.

This concludes my cursory look at the chemical highlights of a century ago. I hope to be able to continue this series in about a year’s time with a look back at 1926.



Chemists Celebrate Earth Week (CCEW) Glaciers: Hot Topic, Cool Chemistry April 20-26, 2025

To promote the positive role that chemistry plays in the world, ACS established the Chemists Celebrate Earth Week (CCEW) public awareness campaign.

CCEW's theme for 2025, Glaciers: Hot Topic, Cool Chemistry, celebrates the International Year of Glacier Preservation and glaciers' role in creating a more sustainable world.

Glaciers are sheets of ice formed by snow falling on them more than melting. Over many years, the snow gets packed into ice, to form the large structures we see when we visit places like Antarctica and Greenland.

Glaciers are important for many reasons. They store a lot of fresh water. Snow adds to this stored water, and in warmer weather, some of the ice melts into fresh water. Glaciers are heavy and slide slowly downhill, shaping the land as they move. Their snowy surfaces reflect sunlight, which helps keep the Earth from getting too hot.

Scientists usually expect glaciers to change slowly over a long time. But now, studies show that glaciers are changing faster than before. View the website for more information about glaciers and fun facts like these:

- Did you know that over two-thirds of world's fresh water is frozen in glaciers?
- Did you know glaciers keep the earth from becoming too warm? They reflect sunlight away and keep the earth comfortable enough for us to live in.

Read and enjoy this Hot Topic as you learn about the Cool Chemistry of glaciers and their impact on our everyday lives! Learn more here: <https://www.acs.org/education/ccew.html>

Stay tuned for SCALACS events held in celebration of Chemists Celebrate Earth Week (CCEW)!

YOU ARE INVITED TO
ATTEND THE

Caltech



SCOM 2025

Southern California
Organometallics
Meeting 2025

Sunday, May 18th
1PM

California Institute of Technology
Oral and Poster Presentations
Chen Breezeway

Attendee Registration:
<https://scom.chem.ucsb.edu>

SCALACS will be supporting this event by providing financial assistance.

UPCOMING 2025 EVENTS

April 12	City of STEM + LA Maker Faire, Exposition Park, LA
April 20-26	Chemists Celebrate Earth Week <i>Glaciers: Hot Topic, Cool Chemistry</i>
April 22	SCALACS 55th Anniversary of Earth Day Virtual Seminar on "Biosensors in monitoring & treatment of ailments/diseases"
May 10 - 16	2025 Regeneron International Science and Engineering Fair (ISEF), Ohio
May 18	SCOM 2025 Southern California Organometallics Meeting - Caltech Oral and Poster Presentations, 1:00 PM, Chen Breezeway
May (TBD)	SCALACS Virtual Seminar on "Wearable Biosensors"
July 5 - 14	International Chemistry Olympiad, United Arab Emirates
August 17 - 21	ACS Fall 2025, Washington, DC
September	SCALACS Science Fair at a local school promoting contributions of food constituents from various cultures towards chemistry/STEM
October (TBD)	SCALACS Hispanic Heritage Celebration Virtual Seminar on "Analytical components of biosensors"
October 19 - 25	National Chemistry Week (NCW) <i>Hidden Life of Spices</i>
October 23	Mole Day
October 25 - 28	ACS Western Regional Meeting: Building Bridges, San Jose, CA
November (TBD)	SCALACS High School Students Research Symposium
December (TBD)	SCALACS Undergraduate/Graduate Research Symposium

*Actual event dates and titles to be announced. Events are subject to change.
For most up-to-date information, visit www.scalacs.org.*

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For more information or to find events, visit www.scalacs.org



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